January 14, 2005

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

SUBJECT: PILGRIM NUCLEAR POWER STATION - NRC INSPECTION REPORT 05000293/2004008

Dear Mr. Balduzzi:

On December 3, 2004, the U. S. Nuclear Regulatory Commission (NRC) completed an engineering team inspection at Pilgrim Nuclear Power Station. The enclosed report presents the results of that inspection, which were discussed at an exit meeting on December 3, 2004, with Messrs. P. Dietrich, R. Smith and other members of your staff.

This 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 inspection included plant walkdowns; examination of selected procedures, drawings, modifications, calculations, surveillance tests and maintenance records; and interviews with station personnel.

The report documents two NRC identified findings of very low safety significance (Green), both of which were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating these issues as Non-Cited Violations (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Pilgrim Station.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document

Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Lawrence T. Doerflein, Chief
Safety Systems Branch
Division of Reactor Safety

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

Enclosure: Inspection Report 05000293/2004008
w/Attachment: Supplemental Information

cc w/encl:
G. J. Taylor, Chief Executive Officer, Entergy Operations
M. Kansler, President, Entergy Nuclear Operations, Inc.
J. T. Herron, Senior Vice President and Chief Operating Officer
S. J. Bethay, Director, Nuclear Assessment
D. L. Pace, Vice President, Engineering
B. O'Grady, Vice President, Operations Support
J. F. McCann, Director, Nuclear Safety Assurance
C. D. Faison, Manager, Licensing
M. J. Colomb, Director of Oversight, Entergy Nuclear Operations, Inc.
D. Tarantino, Nuclear Information Manager
B. S. Ford, Manager, Licensing, Entergy Nuclear Operations, Inc.
J. M. Fulton, Assistant General Counsel, Entergy Nuclear Operations, Inc.
S. Lousteau, Treasury Department, Entergy Services, Inc.
R. Walker, Department of Public Health, Commonwealth of Massachusetts
The Honorable Therese Murray
The Honorable Vincent deMacedo
Chairman, Plymouth Board of Selectmen
Chairman, Duxbury Board of Selectmen
Chairman, Nuclear Matters Committee
Plymouth Civil Defense Director
D. O'Connor, Massachusetts Secretary of Energy Resources
J. Miller, Senior Issues Manager
Office of the Commissioner, Massachusetts Department of Environmental Protection
Office of the Attorney General, Commonwealth of Massachusetts
Electric Power Division, Commonwealth of Massachusetts
R. Shadis, New England Coalition Staff
D. Katz, Citizens Awareness Network
Chairman, Citizens Urging Responsible Energy
J. Sniezek, PWR SRC Consultant
R. Toole, PWR SRC Consultant
C. McCombs, Acting Director, MEMA and Commonwealth of Massachusettts, SLO Designee
Commonwealth of Massachusetts, Secretary of Public Safety

Distribution w/encl:
S. Collins, RA
J. Wiggins, DRA
C. Anderson, DRP
D. Florek, DRP
W. Lanning, DRS
L. Doerflein, DRS
F. Bower, DRS
J. Jolicoeur, OEDO
J. Clifford, NRR
A. Howe, NRR
D. Collins, NRR
R. Fretz, PM, NRR
G. Wunder, Backup PM, NRR
T. Scarbrough, NRR
W. Raymond, DRP, Senior Resident Inspector
C. Welch, DRP, Resident Inspector
A. Ford, DRP, Resident OA
Region I Docket Room (with concurrences)

SISP Review Complete: LTD

DOCUMENT NAME: E:\Filenet\ML050140113.wpd
After declaring this document "An Official Agency Record" it **will** be released to the Public.
To receive a copy of this document, indicate in the box: "**C**" = Copy without attachment/enclosure "**E**" = Copy with attachment/enclosure "**N**" = No copy

OFFICE	RI/DRS		RI/DRS		RI/DRP		RI/DRS	
NAME	FBower/*FLB*		WSchmidt/*WLS*		CAnderson/*CJA*		LDoerflein/*LTD*	
DATE	12/23/04		12/27/04		12/22/04		1/14/05	

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.	50-293
License No.	DPR-35
Report No.	05000293/2004008
Licensee:	Entergy Nuclear Operations, Inc.
Facility:	Pilgrim Nuclear Power Station (PNPS)
Location:	600 Rocky Hill Road Plymouth, MA 02360
Inspection Period:	November 15, 2004 - December 3, 2004
Inspectors:	F. Bower, Senior Reactor Inspector, DRS (Team Leader) L. Cheung, Senior Reactor Inspector L. Scholl, Senior Reactor Inspector J. Lilliendahl, Reactor Inspector (Trainee) A. Passarelli, Reactor Inspector J. Talieri, Reactor Inspector
Approved by:	Lawrence T. Doerflein, Chief Safety Systems Branch Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000293/2004008; 11/15/2004 - 12/03/2004; Entergy Nuclear Operations, Inc., Pilgrim Nuclear Power Station, Safety System Design and Performance Capability.

The inspection was conducted by six regional inspectors. The inspection identified two findings of very low safety significance (Green) that were also non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be "Green" or be assigned a severity level after NRC management review. 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

Cornerstone: Mitigating Systems

- Green. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," because the licensee failed to establish adequate measures to assure that the design basis minimum water level in each salt service water (SSW) system pump well of the intake structure was correctly translated into the Technical Specifications and SSW System Operating Procedures.

  This issue was greater than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance and affected the cornerstone objectives of ensuring the availability, reliability, and capability of systems and components that respond to initiating events. Specifically, the lower level specified for ensuring SSW system operability had the potential to affect the capability of the SSW system to perform its safety-related function under worst case design basis loss of coolant accident (DBA-LOCA) conditions. The issue screened as very low safety significance (Green) in Phase I of the SDP, because it was a design deficiency that was not found to result in a loss of function. The team did not identify any examples where the minimum water level in the pump wells of the Intake Structure was less than design basis minimum water level.

  The team also identified that a contributing cause of the finding was related to the problem identification and resolution cross-cutting area, in that, although inconsistencies between the Updated Final Safety Analysis Report (UFSAR) and the SSW design basis document (DBD) regarding the SSW pump minimum water levels relative to mean sea level (msl) were identified during the DBD development process and during previous SSW assessments, these issues were not appropriately resolved. (Section 1R21.2)

- Green. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," because the licensee's station battery test program lacked adequate provisions to assure that all testing prerequisites were met and to assure that the available test equipment was adequately used for three cycles of Technical Specification (TS) required surveillance testing of the 125V A & B station batteries and the 250V station battery.

The finding was greater than minor because it was associated with the Mitigating Systems Cornerstone attribute of Procedure Quality and affected the objective of ensuring availability, reliability, and capability of systems needed to respond to initiating events. Specifically, the lack of procedure quality and detail led to repetitive instances where battery testing was not completed without error. The issue screened as very low safety significance (Green) in Phase I of the SDP, because it was a procedure quality issue that did not result in a loss of function since the capacity margin in the design of the batteries has enabled the licensee to perform engineering evaluations for the incorrectly performed testing and demonstrate operability.

The team also identified that a contributing cause of the finding was related to the problem identification and resolution cross-cutting area, in that, the licensee reviewed each of these events narrowly, determined that each was an isolated case and failed to identify the adverse trend of procedure inadequacies that contributed to the repetitive events. (Section 1R21.3)

B. Licensee-Identified Violations

None

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Safety System Design and Performance Capability (IP 71111.21)

1. Inspection Sample Selection Process

In selecting systems and components for review, the team focused on risk significance and considered the risk information contained in the licensee's Probabilistic Risk Assessment (PRA) and the U.S. Nuclear Regulatory Commission's (NRC) Simplified Plant Analysis Risk (SPAR) models. Using the risk insights, the team selected the Salt Service Water (SSW) and Direct Current (DC) Power systems for review. In selecting the components for review, the team considered risk importance measures, such as risk achievement worth (RAW) values, from the PRA and SPAR models, as well as the maintenance and modification history, and operating experience.

The team reviewed design and licensing basis documents for the two systems to understand the system needs, safety functions and regulatory requirements. The documents reviewed included the applicable technical specifications (TS), updated final safety analysis report (UFSAR), design basis documents (DBD) and design calculations. A list of documents reviewed is included in the attachment to this report. The team's inspection activities were focused on verifying that design bases were being correctly implemented for the selected systems and components to ensure that the systems can be relied upon to meet their design basis functional requirements.

2. Salt Service Water System

a. Inspection Scope

The team reviewed the piping and instrumentation drawings, other supporting documents (e.g., system health reports) and conducted plant walkdowns of the service water intake structure and other accessible portions of the SSW system to verify the physical installation was consistent with the design basis. In addition, during these walkdowns, the team evaluated the material condition of the plant to determine if Entergy personnel were adequately identifying and correcting material equipment problems. The team also visited the main control room, performed control board checks and discussed SSW system design and operation with the licensed operators.

In addition, the team interviewed cognizant system engineers and design engineers regarding the system design, operation, and performance. The team reviewed control diagrams, setpoint calculations, calibration procedures and surveillance tests to verify the capability of the SSW instrumentation and controls to respond to design basis transient and accident conditions. The team reviewed a selected sample of system operating procedures, off-normal operating procedures, and valve line-up lists to determine that they adequately controlled the plant configuration and supported operator actions assumed in the design basis.

The risk significant components selected for detailed review by the team included the SSW pumps and their associated controls. The team reviewed a sample of SSW periodic surveillance test procedures to ensure the tests demonstrated the required component functions, and that the acceptance criteria were consistent with the design basis assumptions and the pump curves. To verify that acceptance criteria were met and that problems identified through testing were corrected, the team reviewed completed surveillance tests and engineering evaluations. The team also reviewed inservice testing (IST) results to verify that acceptance criteria were met and the tested components were appropriately categorized.

The team also reviewed a selected sample of procedures, test and maintenance records and the licensee's commitments relative to six SSW system motor operated butterfly valves. The review was done to assess the implementation of the licensee's program for periodic testing of motor-operated valves and for implementing NRC Generic Letter (GL) 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Power-Operated Valves."

Relative to potential system and component degradation, the team conducted interviews with PNPS inservice inspection (ISI), systems and design engineering personnel and reviewed design specifications and plant design change documents regarding the material selection processes used for the SSW pumps, piping materials and pipe coatings. The team verified the structural integrity of these components through the review of design calculations, problem reports and corrective actions, field revision notices, and test results. The inspector also reviewed the ISI program and the piping spool database used in the visual inspection of the SSW piping.

To verify the effectiveness of the licensee's corrective actions related to SSW system design issues, the team selected the 1999 closeout report for the service water operational performance inspection (SWOPI) for a follow up evaluation. The evaluation included a review of the adequacy of the licensee's implementation of corrective actions that included procedure, UFSAR, and diesel generator loading calculation changes.

b. Findings

Introduction. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," because the licensee failed to establish adequate measures to assure that the design basis minimum water level in each SSW pump well of the intake structure was correctly translated into the Technical Specifications and SSW System Operating Procedures. This finding was determined to be of very low safety significance since the team did not identify an actual loss of safety function of the SSW System as a result of low level in the SSW intake bay.

Description. UFSAR Section 10.7, Salt Service Water System, describes, in part, the relationship between the SSW system performance analysis and the sea water tide level used in accident analysis calculations as 7.1 feet below mean sea level (msl). The -7.1 foot level is also the yearly astronomical minimum low tide. The -7.1 foot value was chosen for the design basis analysis of the minimum SSW system performance required to perform the emergency containment cooling function. This lowest tide level was assumed to be a constant, thereby yielding a conservatively low SSW system flow rate during accident analyses that span a several day period. The SSW pumps are also assumed to be operating at their minimum performance (allowed by inservice testing) thereby providing only the required 4500 gpm to the reactor building closed cooling water (RBCCW) heat exchanger. The team concluded that this description was consistent with the supporting design calculation, but noted that the potential for reducing level in an SSW pump well of the intake structure due to failure of the non-safety-related screen wash system and debris impinging on the traveling screens was not considered.

In addition to the SSW system design basis, the UFSAR also describes the manufacturer's design rated performance of the SSW pumps. UFSAR Section 10.7 states that the Technical Specifications originally described the minimum required SSW pump performance as 2700 gpm at 55 ft total developed head (TDH). The team noted that this was before the re-analysis (design calculation M630) of the minimum SSW system performance required to perform the emergency containment cooling function. The actual manufacturer's rating of the SSW pump is 2700 gpm at 95 ft TDH and minimum required performance for in-service testing is defined as 2700 gpm at 87.5 ft TDH. These TDH values are across the pump bowl not including the 40 ft vertical pump column. At this minimum performance point (87.5 ft TDH), the minimum water level in the SSW pump wells of the intake structure must be greater than or equal to 7.1 feet below msl.

The 55 ft value represents the minimum required pressure, in feet, measured at the centerline of the pump discharge piping (EL 23.9 ft) for a pump bowl operating at 2700 GPM at 87.5 ft TDH. The minimum sea water level for maintaining SSW pump manufacturer's design performance is approximately 13'9" below msl. This represents the lowest sea water level at which an SSW pump bowl operating at its rated performance of 95 ft TDH at 2700 gpm will produce a discharge head of 55 ft at 2700 gpm as measured at EL 23.9 ft.

However, the team noted that based on the SSW system performance analysis described above, SSW pumps operating at the minimum required performance will not satisfy the system requirements unless the pump suction is submerged in an SSW pump well of the intake structure at a level equivalent to 7.1 ft below msl. The team confirmed this analysis through the review of the four applicable cases in design calculation M630, SSW System Hydraulic Analysis, that all assumed a minimum submergence of the SSW pumps' suctions at the level of 7.1 ft below msl. This information was confirmed in Section 5.2.2, Minimum Water Level of the system design basis document (SDBD)-29 for the SSW system.

The team found that this design control error regarding the minimum level in an SSW pump well of the intake structure was carried into several plant documents. Pilgrim

Technical Specification 4.5.B.4.1 specifies the surveillance requirement to verify the water level in the pump wells of the Intake Structure as greater than or equal to 13 feet, 9 inches below msl to ensure SSW system operability. This is reiterated in Section 5.3.2.6 of SDBD-29 for the SSW system. The error was also translated into the definition for operability of the ultimate heat sink in procedure PNPS 2.2.32, Salt Service Water System (SSW).

Analysis. The performance deficiency was the licensee's failure to establish adequate measures to assure that the design basis minimum water level in each SSW pump well of the intake structure was correctly translated into the Technical Specifications and SSW System Operating Procedures. Specifically, the minimum water level above the SSW pump suction (-7.1 feet relative to mean sea level (msl) of 0 feet, 0 inches), assumed in design basis calculation M-630 to assure that the residual heat removal (RHR), RBCCW and SSW systems are operated to maximize their containment heat removal capability under worst case Design Basis Loss of Coolant Accident (DBA-LOCA) was not correctly translated into Pilgrim Technical Specifications 3/4.5. Also, the -7.1 foot level was not correctly translated into SSW system operating procedure 2.2.32. Both of these documents specify the minimum water level (to assure system operability) in the pump wells of the Intake Structure as greater than or equal to 13 feet, 9 inches below msl.

This issue was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance and affected the cornerstone objectives of ensuring the availability, reliability, and capability of systems and components that respond to initiating events. Specifically, the lower level specified for ensuring SSW system operability had the potential to affect the capability of the SSW system to perform its safety-related function under worst case DBA-LOCA conditions. The issue screened as very low safety significance (Green) in Phase I of the SDP, because it was a design deficiency that was not found to result in a loss of function. During the inspection, the team did not identify any recent examples of where the minimum water level in the pump wells of the Intake Structure were less than -7.1 feet.

The team also identified that a contributing cause of the finding was related to the problem identification and resolution cross-cutting area, in that, although inconsistencies between the UFSAR and the SSW DBD regarding the SSW pump minimum water levels relative to msl were identified during the DBD development process (OI-SSW-2) and during previous SSW assessments (SW95.0020.01), these issues were not appropriately resolved (CR-PNP-2004-3707).

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires measures shall be established to assure that the design basis systems and components are correctly translated into specifications and procedures. Contrary to the above, Pilgrim incorrectly translated the design basis minimum water level (-7.1 feet below mean sea level as assumed in design bases calculations M630 and M500) in each SSW pump well of the intake structure to Technical Specifications 3/4.5 and the SSW system operating procedure 2.2.32 which specify the minimum water level as greater than or equal to 13 feet, 9 inches below msl. Because this finding is of very low safety significance and has been entered into the PNPS corrective action program (CR-PNP-2004-3832 and CR-PNP-2004-3707), it is being treated as a non-cited violation, consistent with Section VI.A of the NRC's Enforcement Policy. **(NCV 05000293/2004008-01; Failure To Adequately Translate Design Basis Minimum SSW Pump Well Level to Technical Specifications)**

3. 125 and 250 Volt Direct Current (Vdc) System

a. Inspection Scope

The team reviewed the one-line diagrams for the dc power system and distribution panels, and other supporting documents (e.g., system health reports). The team also reviewed the heat, ventilation and air-conditioning (HVAC) drawings to confirm that the battery rooms were adequately ventilated to prevent hydrogen accumulation. The team walked down all station batteries, battery chargers, and associated switchgear rooms to verify that the physical installation was consistent with the design basis and to confirm the operating status of the battery ventilation systems. The team also reviewed the physical condition of the batteries and battery chargers to help determine that Entergy personnel were adequately identifying and correcting material equipment problems.

The team reviewed the loading and voltage-drop calculations of the three safety-related batteries and the sizing of associated battery chargers to verify that all dc loads were accounted for and that adequate voltages could be provided for the safety equipment to operate up to eight hours following a postulated design basis accident. The fuses and circuit breakers of the dc system were reviewed to confirm that they were properly coordinated and adequately rated for the expected short circuit currents. The control logic diagrams of the automatic switching circuitry of the swing bus was reviewed to confirm the adequacy of the design. Also, included in the review were the dc ground detection system and the vendor manuals.

In addition, the team interviewed cognizant system engineers and design engineers regarding the system design, operation, and performance. The dc system operating procedures were reviewed to verify that they adequately controlled the plant configuration and supported operator actions assumed in the design basis. In addition, the team reviewed the test results of the battery weekly, quarterly, service, and performance tests, battery charger tests, and the test of the automatic switching of the swing bus, to ensure that operability status was demonstrated.

The risk significant components selected for detailed review by the team included the three station batteries. The team reviewed the service and performance tests procedures for the batteries to determine whether the calculated voltages and capacity of the batteries were appropriately translated into the test procedures.

To verify the effectiveness of the licensee's corrective actions related to station battery issues, the team selected the station battery testing program for a follow up evaluation based on inspector identified findings in NRC Inspection Report (IR) 05000293/2000012.

The follow-up evaluation was performed to determine if the licensee's corrective actions were appropriate and if testing was being performed in accordance with the battery design bases. The inspectors reviewed the station battery (125 & 250 Vdc) test procedures and revision histories, records of station battery testing completed subsequent to IR 05000293/2000012 and the design calculations for sizing of the batteries and determining plant minimum voltages. The inspectors also conducted interviews with knowledgeable battery testing personnel including the DC systems engineer and DC design engineer.

b. Findings

Introduction. The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B Criterion XI, "Test Control," because the licensee's station battery test program lacked adequate provisions to assure that all testing prerequisites were met and to assure that the available test equipment was adequately used for three cycles of TS required surveillance testing of the 125V A & B station batteries and the 250V station battery. The issue screened as very low safety significance (Green) because it was a procedure quality issue that did not result in a loss of battery function.

Description. The team reviewed the results of the 125V and 250V station battery TS surveillance testing conducted for the last three operating cycles (1999, 2001 and 2003). The team noted that the 1999 service test procedures for both 125V and the 250V station batteries lacked the necessary detail to properly control the testing with respect to recording and documenting test results. This finding (NCV 05000293/2000-012-03) was identified by the NRC in 2000, when the inspectors noted that the licensee could not demonstrate that the batteries were correctly discharged according to their service test duty cycle and that the test records were insufficient during the critical first hour of each of the tests. The licensee's root cause analysis (PR00.9494) concluded that the root cause was that the test equipment failed to function as expected during battery testing and the test equipment failure went unrecognized because the test procedures lacked necessary detail to properly control the test.

In 2001, the licensee identified that improper use of the battery test equipment led to early termination of the 250V battery test. This issue was documented in PR01.1893. This team observed that the test procedure lacked the necessary detail regarding the operation of the timer, resulting in the early test termination. In 2003, the 250V station battery test procedure lacked the necessary detail to prevent improperly connecting the test equipment to the 250V battery. Discussions with licensee personnel revealed that the connections were made based on hand written sketches developed during a training class for using the test equipment. The improper connection resulted in damaging test equipment (a load bank) and causing current oscillations in excess of 1200 amperes. The design test value was 900 amperes. The inspectors noted that the apparent cause (CR-PNP-2003-01876) for the event was a lack of critical guidance in the test procedure. The team verified that additional inspector identified discrepancies in the battery test procedures were entered into the PNPS corrective action program (CR-PNP-2004-3659 and CR-PNP-2004-3828).

Analysis. The performance deficiency was the licensee's failure to establish an adequate test program and adequate procedures for testing the station batteries. Specifically, the test program lacked adequate provisions to assure that all battery testing prerequisites were met and to assure that the available test equipment was adequately used. The finding was greater than minor because it was associated with the Mitigating Systems Cornerstone attribute of Procedure Quality and affected the objective of ensuring availability, reliability, and capability of systems needed to respond to initiating events. Specifically, the lack of procedure quality and detail led to repetitive instances where battery testing was not completed without error. The issue screened as very low safety significance (Green) in Phase I of the SDP, because it was a procedure quality issue and a qualification deficiency that did not result in a loss of safety function. The capacity margin in the design of the batteries has enabled the licensee to perform engineering evaluations for the incorrectly performed testing and demonstrate operability.

The team also identified that a contributing cause of the finding was related to the problem identification and resolution cross-cutting area, in that, the licensee reviewed each of these events narrowly and determined that each was an isolated case. The licensee failed to identify the adverse trend of human errors and the collective significance of events during the performance of battery testing caused by procedure inadequacies that contributed to the repetitive events. The training provided prior to the 2003 event was not an adequate barrier to overcome the lack of detail in the procedures and preclude the human error experienced during connection of the test equipment.

Enforcement. 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires that a test program be established to assure that all testing required to demonstrate that systems and components will perform satisfactorily in service is performed in accordance with written test procedures and the test procedures shall include provisions for assuring that all prerequisites for the given test have been met, and that adequate test instrumentation is available and used. Contrary to the above, the licensee's test program did not establish adequate procedures to assure that all prerequisites were met and to assure that the available test equipment was adequately used, for testing the station batteries. Specifically, test procedures for the batteries lacked adequate detail and the training on the battery test equipment was inadequate, as evidenced by the repetitive failures to correctly connect and use the equipment for testing the station batteries. Because this finding is of very low safety significance and the licensee entered this issue into its corrective action program (CR-PNP-2004-03820), it is considered a non-cited violation consistent with Section VI.A.1 of the NRC's Enforcement Policy. **(NCV 05000293/2004008-02; Inadequate Program for Station Battery Test Control)**

4. OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems (IP 71152)

4. Annual Sample Review

Not applicable.

5. Cross Reference to PI&R Findings Documented Elsewhere

Section 1R21.2 of this report describes a finding associated with licensee's inadequate design controls and failure to adequately translate design basis minimum SSW pump well level into the TS. Although the licensee had several opportunities to identify the design control problems related to this parameter, sufficient corrective actions were not developed or implemented.

Section 1R21.3 of this report describes a finding associated with the licensee's inadequate test control and failure to identify the adverse trend of human errors and the collective significance of events during the performance of battery testing caused by procedure inadequacies that contributed to the repetitive events. Although the licensee had several opportunities to identify the repetitive problems, sufficient corrective actions were not developed or implemented since each of these events were reviewed narrowly and determined to be an isolated case.

4OA6 Exit Meeting Summary

The team presented the inspection results to Messrs. P. Dietrich, R. Smith and other members of the Pilgrim staff at the conclusion of the inspection on December 3, 2004. The team verified that the inspection report does not contain proprietary information.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

P. Dietrich, General Manager - Plant Operations
R. Smith, Director - Engineering
S. Bethay, Director - Nuclear Safety Assurance
T. White, Manager - Design Engineering
B. Ford, Manager - Licensing
F. McGinnis, Licensing
R. Pace, Supervisor - Design Engineering
S. Wollman, Supervisor - Engineering
J. Gaedtke, SSW System Engineer
B. Ahearn, DC Systems Engineer
S. Das, Senior Lead Engineer - Design Engineering
B. Sullivan, Assistant Operations Manager - Shifts
R. Daverio, Supervisor - Electrical Design Engineering
N. Eisenmann, Supervisor - I&C Design Engineering
D. Landecite, Manager - CA&A

NRC

W. Raymond, Senior Resident Inspector - Pilgrim
A. Ziedonis, Reactor Engineer (Trainee)

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000293/2004008-01	NCV	Failure To Adequately Translate Design Basis Minimum SSW Pump Well Level to Technical Specifications (Section 1R21.2)
05000293/2004008-02	NCV	Inadequate Program for Station Battery Test Control (Section 1R21.3)

LIST OF DOCUMENTS REVIEWED

Design and Licensing Basis Documents

System Design Basis Document (SDBD)-00, Writer's Guide and Requirements for System
Design Basis Documents, Rev. E3
SDBD-29, Salt Service Water (SSW) System, Rev. E0
SDBD-46G DC Power System, Rev. E0
Topical Design Basis Document (TDBD)-107, Motor Operated Valves / GL89-10, Rev. E1

UFSAR

Section 2.4, Hydrology
Section 8.5, Standby AC Power Source
Section 8.6, 125 and 250 Volt DC Power Systems
Section 8.8, 120 Volt AC Power System
Section 10.5, Reactor Building Closed Cooling Water System
Section 10.6, Turbine Building Closed Cooling Water System
Section 10.7, Salt Service Water System

Technical Specifications

Section 3/4.5, Core and Containment Cooling Systems
Section B3/4.5, Core and Containment Cooling Systems [Bases]
Section 3/4.9, Auxiliary Electrical System

Probabilistic Safety Assessment

Pilgrim Nuclear Power Station, IPE Update, PNPS-PSA, Rev. 1, April 2003
Section 1, Executive Summary
Section 3.2, Systems Analysis
Section 6, Plant Improvements and Unique Safety Features
Appendix A, System Dependencies
Appendix F, Cutsets for Dominant Accident Sequences
Appendix H, Post-Accident Human Reliability Analysis
Appendix L, Success Criteria

Drawings

E-9, Single Line Meter & Relay Diagram 480V System - Load Centers & Motor Control Centers B10 & B20, Rev. E54
E-10, Single Line Diagram - 480V System Motor Control Centers B14, B15, B17, B18, B28, & B29, Rev. E41
E-13, Single Line Relay & Meter Diagram, 125V &250V DC Systems, Rev. E78
E-18, Schematic Diagram Diesel Generator Load Shedding, Rev. E 16
E-45-7-6, Schematic and Connection Diagram, 125V DC Panel D 16, Switchgear Room A, Rev. E8
E-45-8-6, Schematic and Connection Diagram, 125V DC Panel D 17, Switchgear Room B, Rev. E5
E-45B-11-5, Schematic Diagram Automatic Transfer Switch D32/D33, Rev. E1
E-157, Schematic Diagram Traveling Screens and Screen Wash Pumps, Rev. E7
E-170, Schematic Diagram Salt Water Service System, Rev. E10
E-171, Schematic Diagram Salt Water Service System, Rev. E4
E-172, Schematic Diagram Salt Water Service System, Rev. E4
E-186, Schematic Diagram Battery Rooms A and B Vent Exhaust Duct Monitor, Rev. E1
E-206, Schematic Diagram Miscellaneous 480 Volt Services, Rev. E2
E-212, P&ID, Sheet 1, Service Water System, Rev. E83
E-212, P&ID, Sheet 2, Screen Wash System, Rev. E71
E-212, P&ID, Sheet 3, Hypochlorination System, Rev. E65
E-534, Schematic/Connection Diagram 125V DC Auto Transfer Schemes, Rev. E4
E-843, Arrangement and Setting Diagram, Panel Boards D4, D5 and D6, Sheet 1, Rev. E15
I-29-1 Sheets 1&2, SW Pumps Discharge ISI Weld Map, Rev. E7
M-8-4, Service Water Pump Assembly P208A, B, C, D & E, Rev. E26
M-8-32, Service Water Pump Performance Curve, Bowl Assembly Q-304548-2, Rev. EO
M-8-33, Service Water Pump Performance Curve, Bowl Assembly Q-304548-4, Rev. EO
M-8-34, Service Water Pump Performance Curve, Bowl Assembly Q-304548-5, Rev. EO
M-8-35, Service Water Pump Performance Curve, Bowl Assembly Q-304548-1, Rev. EO
M-8-36, Service Water Pump Performance Curve, Bowl Assembly Q-304548-3, Rev. EO
M-280, HVAC, Temperature Control Diagrams for Turbine Building, Rev. 20
M-388, Turbine Building Air Flow Diagram, Rev. 14
MMOV1, Motor Operated Valves Information Table, Rev. E51
MMOV2, Motor Operated Valves Information Table, Rev. E29
MMOV3, Motor Operated Valves Information Table, Rev. E41
MMOV4, Motor Operated Valves Information Table, Rev. E27
MMOV5, Motor Operated Valves Information Table, Rev. E39
MMOV6, Motor Operated Valves Information Table, Rev. E25
S-E-155, Sheets 1 & 2, 4.16kV & 480V AC Systems, Rev. E39 & E56
S-M-415, Sheets 1 & 2, Functional Description, Service Water System, Rev. E13 & E7
S-M-419, Functional Description (Logic Diagram) DC Power System, Sheet 1, Rev. E7
S-M-419, Functional Description (Logic Diagram) DC Power System, Sheet 2, Rev. E3

Calculations

25-226-C076, Setpoint Calculation for TBCCW, RBCCW & SSW Pump Auto Sequencing Timers, Rev. 0
25-42-002, 250 Volt Battery System Voltages, Rev. 0
Bechtel Pipe Stress Calculation 638, Reactor & Turbine Building Service Water to/from E-209B & E-122B (IEB 79-14)
M500, Range of Salt Service Water System Header Pressures and Pump Flows, Rev. 3
M605, Maximum Flows and Differential Pressures for SSW and RBCCW Butterfly Valves, Rev. 0
M630, SSW System Hydraulic Analysis, Rev. 3, April 10, 2001
M664, Containment Heat Removal, Rev. 1, dated December 22, 1997
M685, Sizing of Closed Cooling Water Heat Exchanger Partition Plates and Associated Calculations, Rev. 1
M687, “B” RBCCW HX Channel Shell Minimum Wall, Critical Flaw and Differential Pressure Calculations, Rev. 0, dated September 25, 1996
M1100, MOV Periodic Verification Program, Rev. 0, November 7, 2001
I-N1-55, Setpoint Calculation for Service Water Pump Start PS-3828A, PS-3828B, PS-3829A, PS-3829B, Rev. 2
I-N1-68, Loop Accuracy Calculation for SSW System Header Pressure, PT-3828 and PT-3829, Rev. 0
I-N1-71, Setpoint Calculation for Salt Service Water Pump Well Level Switches LS3825 & LS3826 Low Level Alarm, Rev. 0
I-N1-213, Reactor Building Heat Exchanger Differential Pressure and Service Water Flow Indication Uncertainty Calculations, Rev. 0
N-142, MCC Enclosure Temperatures, Rev. 3
PS-31-5, DC System Overcurrent Protection Study, Rev.1
PS-79, Emergency Diesel Generator Loading, Rev. 5
PS-123, Electrical Performance & Stroke Timing Evaluation of Priority 1 DC MOVs, Rev. 6
PS 233A, DC System Analysis, Methodology and Scenario Development, Rev. 0
PS 233B, 125 Volt Battery A System Voltage Calculation, Rev. 0
CCS-PS233B-0-6 Calculation Comment Sheet to add 3% margin to 125V-A battery
PS 233C, 125 Volt Battery B System Voltage Calculation, Rev. 0
PS-233D 250 Volt Station Battery System Voltage Calculation
PS-234, AC Calculations - Scenarios & Load Categories, Rev. 0
Supplier Design Document Review Form (SUDDS/RF) # 87-615, Cygna Calculation SSW-1, Piping Min Wall Thickness
SUDDS/RF# 92-027, Cygna Calculation SSWA-1, Piping Min Wall Thickness
SUDDS/RF# 97-95, Salt Service Water Pump Performance Test Curves and Data Sheets, Rev. 1

Specifications

E-11A, Specification for Replacement of 125 V DC Battery Charger, Rev. 4, October 27, 1992.
M-88, SSW Pump Improvements
M591, SSW & RBCCW Safety-Related Piping & Heat Exchanger Inspection, Maintenance & Test Requirements in Response to GL 89-13, Rev. E6, dated January 14, 2002
6498-M-8, SW Pumps, Rev. 0
Vertical Pump Data Sheet No. M8DS1-1

Procedures

2.1.38, MOV Motor Operation and Guidelines, Rev. 6
2.2.8, Standby AC Power System (Diesel Generators), Rev. 81
2.2.13, 250V DC Battery System
2.2.32, Salt Service Water System, Rev. 67
2.2.32, Salt Service Water System, Rev. 68
3.M.3-21, 125 and 250 V DC Undervoltage Relays and Ground Detectors, +/-24 V DC Overvoltage/Undervoltage Relays Calibration/Functional Test/Annunciator Verification, Rev. 14
3.M.3-24.12, VOTES 100 Operating Procedure, Rev. 12
3.M.3-24.17, Motor Power Monitor Operations Procedure, Rev. 1
3.M.3-45, Attachment 4, Automatic Transfer Switch 83-1 (Y-10) SE Relay Testing, Rev. 5
5.3.3, Loss of All Service Water, Rev. 17
8.5.3.2.1, Salt Service Water Pump Quarterly and Biennial (Comprehensive) Operability and Valve Operability Tests, Rev. 12
8.5.3.9, Salt Service Water (SSW) Pump Alternate Shutdown Panel Test, Rev. 12,
8.5.3.10, RBCCW Motor Operated Valve Operability Test, Rev. 11
8.5.3.11, SSW Valve Operability Test, Rev. 11
8.5.3.14, SSW Flow Rate Operability Test, Rev. 17
8.9.8.1, "A" 125 V DC Battery Acceptance, Performance, or Service Test, Rev. 9
8.9.8.2, "B" 125 V DC Battery Acceptance, Performance, or Service Test, Rev. 13
8.9.8.3, 250V DC Battery Acceptance, Performance, or Service Test
8.I.1, Administration of Inservice Pump and Valve Testing, Rev. 12
8.I.1.1, Inservice Pump and Valve Testing Program, Rev. 17
8.I.1.2, Appendix B Pump and Valve Testing Program, Rev. 0
8.I.32, Determination of Limiting Stroke Time Acceptance Criteria for Inservice Testing and Appendix B Test Programs Power Operated Valves, Rev. 5
8.M.3-1, Special Test for Automatic ECCS Load Sequencing of Diesels and Shutdown, Transformer with Simulated Loss of Off-Site Power and Special Shutdown Transformer Load Test, Rev. 33
8.C.14, Weekly Pilot Cell, Overall Battery Check, and Battery Charger Test, Rev. 43
8.C.16.2, 125 V A Battery Quarterly Inspection/Surveillance, Rev. 8
8.C.16.3, 125 V B Battery Quarterly Inspection/Surveillance, Rev. 8
8.C.43, Monthly System Valve Lineup Surveillance, Rev. 8

8.Q.3-4, 125/250V DC Motor Control Center and Breaker Panel Testing and Maintenance, Rev. 35.
8.Q.4-1, MCC Enclosure Maintenance, Rev. 12
ENN-DC-151, PSA Maintenance and Update, Rev. 0, dated July 31, 2003
ENN-DC-152, Preparation, Rev., Review and Approval of Design Basis Documents, Rev. 2
ENN-DC-159, System Monitoring, Rev. 1, dated August 31, 2004
ENN-DC-311, MOV Periodic Verification, Rev. 0, dated July 30, 2004
NE7.05, MOV Periodic Verification Program, Rev. 1
NEDWI-453, MOV Plant Performance Monitoring, Rev. 0, dated March 23, 1995 (Suspended)
NOP02E1, Service Water Inspections, Maintenance, and Testing in Response to Generic Letter 89-13, Rev. 0
NOP92M1, Motor Operated Valve Program, Rev. 4
TP01-009 A 125 V DC Battery Performance and Load Test, Rev. 1
TP01-010 B 125 V DC Battery Performance and Load Test, Rev. 1

Completed Surveillance Test Records

3.M.3-47.2, “B” Train Functional Test of Individual Load Shed Components (Partial), Rev. 11, completed August 29, 2004
8.C.16.1, 250V Battery Quarterly Inspection/Surveillance, Rev. 5, completed March 4, 2004
8.C.16.1, 250V Battery Quarterly Inspection/Surveillance, Rev. 6, completed September 3, 2004
8.E.29.1, Salt Service Water (SSW) Instrumentation Calibration and Functional Test, Rev. 12, completed August 18, 2003
8.E.29.1, Salt Service Water (SSW) Instrumentation Calibration and Functional Test, Rev. 13, completed October 12, 2004
Quarterly and Biennial Comprehensive Inservice Pump Testing Data Sheet, P-208A, September 3-5, 2003

Vendor Technical Manuals

V-0358, Rochester Instrument Systems Vendor Manual, Model PR-2000 DC Potential Ground, Detector
V-1118, Alber Engineering Test System Instruction Manual, Rev. 4, September 30, 2004

Modifications

Field Rev. Notice (FRN) 99-01-58, Repair and/or Replacement of Degraded SSW System
FRN 01-02-14, Replacement 125V DC Starters for D712 &D714 and 250V DC Starters for D923 & D964, dated April 2, 2001
FRN 01-09-04, SSW Cured-In-Place Liner Stress Relieving Process
Plant Design Change (PDC) 98-26, 125 V and 250 V DC Panelboard Refurbishment, Rev. 0
PDC 01-09, SSW Discharge Piping Cured-In-Place-Pipe (CIPP) Lining
PDC 03-56, SSW Pump Lineshaft Nickel-Chrome-Boron Alloy Hardfacing

Operability Evalutions

EE-99-073, Operability Evaluation for 125V DC Post Seal Nut Crack, dated September 11, 1999
OE 03-029, Operability Evaluation of High Temperature in MCCs D8 and D9, dated September 30, 2003

Engineering Service Requests

ER 02119414, Plan for Replacing MO-3805
ER03117095, Prepare Position Paper on Available Ultimate Heat Sink Margin to Raise Temperature from 75F to 78F
ER 03118528, Engineering Evaluation on the Scope of RFO#15 SSW Valve Replacements
ER 04100787, Replace Undervoltage Relays in 250VDC MCC D9, Rev. 0
ER 04101499, Engineering Evaluation of Discrepancies with 29-CK-3880D
ER 04101696, Engineering Evaluation for P-208D Pump Bowl
ER 04102802, Request Engineering Evaluation of SSW Piping During Valve Repairs
ER 04106595, Address Wear on Mating Surfaces and from Bearing Rotation Damage

System Health Reports

System 29 - Salt Service Water System, 2nd and 3rd quarter 2004
System 46G - Station DC and Battery System, 2nd and 3rd quarter 2004

Maintenance Records

MR 03115396, Stator Winding Discharge Temperature Alarm
MR10000754, Perform Inspection and Repair If Necessary to B SSW Discharge
MR P9900385, MOV PM iaw 8.Q.3-8.1 on MO-3801, TBCCW Heat Exchanger “A” SSW Valve
MR P0000715, MOV PM iaw 8.Q.3-8.1 on MO-3805, TBCCW Heat Exchanger “B” SSW Valve

Logs

Reactor/Turbine Tour Log Sheets, Rev. 5, 11/16/2004 - 11/18/2004
Outside/Turbine Tour Log Sheets, Rev. 5, 11/16/2004 - 11/18/2004

Problem Reports

PR99.9495, Cracked Battery Post Seal Nut, dated September 3, 1999
PR00.3478, Design margin value change for all three station batteries
PR00.9477, 250V Battery test problem in 1999
PR00.9494, 125V-A Battery test problem in 1999
PR00.9503, 125V-B Battery test problem in 1999
PR01.1361, ‘A’ SSW Pump Failed Operability Test, dated April 3, 2001
PR01.9241.00, SSW Pump ‘A’ Failed on Total Discharge Head, dated April 4, 2001

Condition Reports

CR-2001-01361	CR-2003-01876	CR-2004-3699*
CR-2001-01893	CR-2003-01951	CR-2004-3703*
CR-2001-01904	CR-2003-03160	CR-2004-3707*
CR-2001-05080	CR-2003-03546	CR-2004-3777*
CR-2001-05206	CR-2004-03320	CR-2004-3797*
CR-2001-08131	CR-2004-00007	CR-2004-3798*
CR-2001-09219	CR-2004-03275	CR-2004-3799*
CR-2001-09397	CR-2004-3626*	CR-2004-3820*
CR-2001-09241	CR-2004-3639*	CR-2004-3822*
CR-2002-10609	CR-2004-3648*	CR-2004-3828*
CR-2002-10622	CR-2004-3653*	CR-2004-3832*
CR-2002-12180	CR-2004-3655*	CR-2004-3833*
CR-2003-03546	CR-2004-3657*	CR-2004-3835*
CR-2003-01023	CR-2004-3659*	CR-2004-3837*
CR-2003-01812	CR-2004-3698*	

Note: * indicates CR initiated during this inspection.

Miscellaneous

OE 92.0057.00, Operating Experience Review Form for NRC IN 92-48, dated August 27, 1992
QA-02-005, QA Audit 01-07 for DC Power System
Service Water Operational Performance Inspection (SWOPI) Closeout Report 12/99
SWOPI Item SW95.0020.01, Revise the SSW Pump model to incorporate a -10ft design low water level (reference SWOPI Report Section 6.4.2.5 [page 33]), dated January 9, 1996
DBD Open Item (OI)-SSW-02/DB-617, UFSAR requires correction of the design conditions for the minimum sea water level (msl) required for the Salt Service Water pumps, October 3, 2000
PNPS Design Basis Recovery Program Framework, dated October 26, 2001
PNPS Program Plan for the Design Basis Recovery Program, dated March 6, 1998
Maintenance Request / Activity Report for MO-3800, printed November 18, 2004
Maintenance Request / Activity Report for MO-3801, printed November 18, 2004
Maintenance Request / Activity Report for MO-3805, printed November 18, 2004
Maintenance Request / Activity Report for MO-3806, printed November 18, 2004
Maintenance Request / Activity Report for MO-3808, printed November 18, 2004
Maintenance Request / Activity Report for MO-3813, printed November 18, 2004
Maintenance Trending Report for MO-3800, printed November 18, 2004
Maintenance Trending Report for MO-3801, printed November 18, 2004
Maintenance Trending Report for MO-3805, printed November 18, 2004
Maintenance Trending Report for MO-3806, printed November 18, 2004
Maintenance Trending Report for MO-3808, printed November 18, 2004
Maintenance Trending Report for MO-3813, printed November 18, 2004
Problem Trending Report for MO-3800, printed November 18, 2004
Problem Trending Report for MO-3801, printed November 18, 2004

Problem Trending Report for MO-3805, printed November 18, 2004
Problem Trending Report for MO-3806, printed November 18, 2004
Problem Trending Report for MO-3808, printed November 18, 2004
Problem Trending Report for MO-3813, printed November 18, 2004
Repetitive Task, MOV Periodic Verification Program - Review Risk Categorization, dated 2004-11-30-9.54.00
Training Reference Text - Salt Service Water System
USAS B31.1.0, Power Piping, 1967 Edition

Correspondence

Entergy Memo MSED99-029, from M. Green, regarding MOV PM Frequencies
Entergy Memo NESG02, from S. Bethay, regarding Official Closeout for the Design Basis Information Program, dated January 22, 2002
MEMO-DD-Pilgrim Station-1, Cracked Post Seal Nuts, dated November 10, 2004
BECo Letter 2.97.128, L. Olivier to USNRC, Supplemental Response to NRC 50.54(f) Letter Regarding Adequacy and Availability of Design Bases Information, dated December 8, 1997
USNRC Letter to PNPS T. Sullivan, Safety Evaluation of Licensee Response to Generic Letter 96-05, Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves, Pilgrim Nuclear Power Station (TAC NO. M97086)
NRC Generic Letter (GL) 96-05, Periodic Verification of Design-Basis Capability of Safety-Related Power-Operated Valves
GL 89-13, "Service Water System Problems Affecting Safety-Related Equipment," dated April 4, 1990
NRC Inspection Report (IR) 50-293/95-01, Pilgrim Service Water Self-Assessment Inspection, dated August 3, 1995
NRC IR 50-293/97-13 and Notice of Violation, dated February 6, 1998
NRC IR 50-293/2000-012, dated January 17, 2001
NRC IR 50-293/2002-008, dated October 17, 2002

LIST OF ACRONYMS

CFR	Code of Federal Regulations
DBA-LOCA	Design Basis Loss of Coolant Accident
DBD	Design Basis Documents
DC	Direct Current
GPM	Gallons per Minute
HVAC	Heating, Ventilating and Air Conditioning
IR	Inspection Report
ISI	Inservice Inspection
IST	Inservice Testing
MSL	Mean Sea Level
NRC	U. S. Nuclear Regulatory Commission
PRA	Probabilistic Risk Assessment
RBCCW	Reactor Building Closed Cooling Water
RHR	Residual Heat Removal
RAW	Risk Achievement Worth
SDP	Significance Determination Process
SPAR	Simplified Plant Analysis Risk
SSW	Salt Service Water System
SWOPI	Service Water Operational Performance Inspection
TDH	Total Developed Head
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
V	Volts
Vdc	Volt Direct Current