UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

February 14, 2017

Mr. John Dent
Site Vice President
Entergy Nuclear Operations, Inc.
600 Rocky Hill Road
Plymouth, MA 02360-5508

SUBJECT: PILGRIM NUCLEAR POWER STATION – INTEGRATED INSPECTION REPORT 05000293/2016004 AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION REPORT 07201044/2016001

Dear Mr. Dent:

On December 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Pilgrim Nuclear Power Station (PNPS). On January 26, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented five findings of very low safety significance (Green) in this report. Four of these findings involved violations of NRC requirements. Further, inspectors documented one licensee-identified violation which was determined to be of very low safety significance (Green). The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at PNPS. In addition, if you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC, 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at PNPS.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Arthur L. Burritt, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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

Enclosure:
Inspection Report 05000293/2016004
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REGION I

Docket No.	50-293
License No.	DPR-35
Report No.	05000293/2016004
Licensee:	Entergy Nuclear Operations, Inc (Entergy)
Facility:	Pilgrim Nuclear Power Station (PNPS)
Location:	600 Rocky Hill Road Plymouth, MA 02360
Dates:	October 1, 2016 through December 31, 2016
Inspectors:	E. Carfang, Senior Resident Inspector B. Pinson, Resident Inspector J. Vasquez, Acting Resident Inspector P. Ott, Operations Engineer B. Dionne, Health Physicist J. DeBoer, Emergency Preparedness Inspector P. Cataldo, Senior Resident Inspector J. Nicholson, Senior Health Physicist B. DeBoer, Health Physicist N. Embert, Project Engineer
Approved By:	Arthur L. Burritt, Chief Reactor Projects Branch 5 Division of Reactor Projects

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SUMMARY

IR 05000293/2016004; 10/01/2016 – 12/31/2016; PNPS; Operability Determinations and Functionality Assessments, Problem Identification and Resolution, and Follow-Up of Events and Notices of Enforcement Discretion.

This report covered a three-month period of inspection by resident inspectors and announced baseline inspections performed by regional inspectors. The inspectors identified four non-cited violations (NCVs) and one finding, all of which were of very low safety significance (Green). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Initiating Events

- Green. A self-revealing Green finding was identified for the inadequate implementation of a work order on the 'A' feedwater regulating valve (FRV) encoder as required by EN-WM-102. Specifically, Entergy did not install a wire assembly on the 'A' FRV encoder as required by the work instructions located in the vendor manual. The wire loosened, resulting in the 'A' FRV failing open and the operators inserting a manual scram. In response to the loose connection, Entergy added a sealant to the connector to ensure all wires remain in place on both FRVs. Entergy entered the issue into the corrective action program (CAP) under condition report (CR) 2016-6635.

  The inspectors determined that the finding is more than minor because it is associated with the equipment performance attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during a shutdown as well as power operations. Specifically, the performance deficiency affected the reliability and capability of the 'A' FRV which led to a plant scram, tripping of the reactor feed pumps, and closure of the main steam isolation valves (MSIVs). The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," issued October 7, 2016, and IMC 0609, Appendix A, Exhibit 1, "Initiating Events Screening Questions," issued June 19, 2012, and determined a detailed risk evaluation was required because the 'A' FRV failure caused a reactor trip and partial loss of feedwater (power conversion system). A Region I senior reactor analyst (SRA) used the Standardized Plant Analysis Risk (SPAR) model for Pilgrim, Version 8.24, and SAPHIRE, Version 8.1.4, to complete the detailed risk evaluation. The estimated increase in core damage frequency (CDF) was calculated to be 4E-7/year, or very low safety significance (Green). For issues resulting in an increase in CDF > 1E-7, IMC 0609 requires an evaluation of large early release frequency (LERF) using the guidance of NUREG-1765, "Basis Document for LERF Significance Determination Process," and IMC 0609, Appendix H, "Containment Integrity Significance Determination Process," issued May 6, 2004. The performance deficiency associated with the failure of the 'A' FRV and resultant reactor trip would be considered a Type A finding and, as such, the calculated increase in CDF value is used in conjunction with an appropriate LERF factor (multiplier) to determine the estimated increase in LERF associated with the issue. In the absence of early core damage

sequences for this event, LERF is not a significance risk contributor and the safety significance of this performance deficiency is defined by the estimated increase in CDF (4E-7/year) or Green. This finding has a cross-cutting aspect of Human Performance, Work Management, in that Entergy did not adequately implement the process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. Specifically, maintenance staff were provided a work order that did not meet station requirements to ensure the work could be adequately performed. Specific steps of the vendor manual were not used to direct work by staff and led to an installation error. The work planning process also did not implement the engineering recommendation to perform a practice installation on the equipment prior to installing equipment in the field. [H.5] (Section 4OA3.4)

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because Entergy did not perform a prompt operability determination and adequately evaluate the operability of a recirculation flow converter in a timely manner in accordance with procedure EN-OP-104, "Operability Determination Process." As a result, Entergy allowed this flow converter to remain in service, without reasonable assurance of its capability to perform its required safety function, from the time the adverse condition was discovered on October 3, 2016, until the component was declared inoperable and replaced on October 21, 2016. Entergy entered the initial equipment failure into the CAP as CR 2016-07622 and CR 2017-0854. Entergy took corrective actions to replace the inoperable flow converter.

  The inspectors determined that this performance deficiency was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The issue is also similar to the more than minor example in IMC 0612, Appendix E, "Examples of Minor Issues," issued August 11, 2009, Example 3j because the flow converter's capability to perform its required safety function could not be reasonably assured. The inspectors screened this finding in accordance with IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," and determined that this finding was of very low safety significance (Green) because the finding affected a single reactor protection system (RPS) trip signal to initiate a reactor scram, but did not affect the function of other redundant trips or diverse methods of reactor shutdown, did not involve control manipulations that unintentionally added positive reactivity, and did not result in a mismanagement of reactivity by operator. The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance, Conservative Bias, because Entergy did not use decision making-practices that emphasize prudent choices over those that are simply allowable. Specifically, Entergy did not take a conservative approach in making the decision to keep the 'A' recirculation flow converter in service when available information regarding its operability was incomplete. Operators continued to act based on the assumption that the flow converter would remain operable, without reasonable assurance. Management did not adequately prioritize the completion of the operability evaluation for this safety-related component. Instead, the completion of the evaluation was delayed due to a

heavy workload on the available staff who were qualified to provide the necessary input. [H.14] (Section 1R15)

- Green. A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified in that Entergy did not identify and correct a condition adverse to quality related to high pressure coolant injection (HPCI) pump degraded performance, as required by EN-LI-102, "Corrective Action Program." EN-LI-102, requires, in part, that "individuals closing corrective actions verify that the required action has been taken ensuring that the response is adequate, answers all aspects of the assigned action, and the intent of the action is met." Specifically, vibrations on the HPCI main pump to speed reducer coupling were not addressed during HPCI system maintenance, despite a degrading trend starting May 21, 2015. This led to the HPCI system being declared inoperable on November 7, 2016, after vibration levels exceeded the in-service testing (IST) action range threshold. Entergy's corrective actions included modeling vibrations of the HPCI system during operation and installing a stiffening plate on the HPCI pump support pedestal in order to dampen vibrations associated with the system. Entergy has entered this into their CAP as CR 2016-8657.

  The inspectors determined that this performance deficiency was more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage.) Specifically, Entergy did not address the increase in HPCI pump vibrations from May 21, 2015, to November 7, 2016, when the vibrations increased into the IST Action range and resulted in pump inoperability. In accordance with IMC 0609.04, "Initial Characterization of Findings," issued October 7, 2016, and IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, the inspectors determined that the finding was of very low safety significance (Green) because the finding did not affect the design or qualification of a mitigating structure, system, or component (SSC), represent a loss of system and/or function, involve an actual loss of a function of at least a single train or two separate safety systems for a greater time than allowed by technical specifications (TS), or represent an actual loss of function of one or more non-TS trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program. The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance, Design Margins, in that the organization operates and maintains equipment within design margins, and margins are carefully guarded and changed only through a systematic and rigorous process. Specifically, Entergy did not demonstrate that the work process supports nuclear safety and maintenance of design margins by minimizing long-standing equipment issues, preventive maintenance (PM) deferrals, and maintenance and engineering backlogs. Entergy's failure to effectively manage design margins regarding HPCI system vibrations led to a continuing degradation of the system, and the eventual need to declare the HPCI system inoperable on November 7, 2016. [H.6] (Section 4OA2.1)

- Green. The inspectors identified a Green NCV of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," for Entergy's failure to properly assess and manage the increase in risk due to performing protective relay calibration and functional testing associated with the shutdown transformer (SDT) on seven occasions from December 9, 2005, through August 27, 2014. Specifically, Entergy did not identify that the performance of calibration and functional testing of

protective relays associated with the SDT would prevent the 4160V safety buses from being automatically powered by other required sources, and consequently, did not properly assess and manage the increase in risk. Entergy's corrective action requires the unit to be in an outage to perform the tests. Entergy entered the issue into the CAP under CR 2017-0856.

The inspectors determined that this performance deficiency was more than minor because it is associated with the configuration control attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, the finding was similar to Example 7e of NRC IMC 0612, Appendix E, "Examples of Minor Issues," in that the overall elevated plant risk would have put the plant into a higher licensee-established risk category and would have required additional risk mitigating actions (RMAs). The inspectors evaluated the finding using the Significance Determination Process, Attachment 0609.04, "Initial Characterization of Findings," issued October 7, 2016. Because the finding involved a maintenance rule risk assessment, it was screened through IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," issued May 19, 2005. The finding screened as very low safety significance (Green) using Flowchart 1 of Appendix K because the incremental core damage probability deficit (ICDPD) was determined to be greater than 1E-6 and less than 1E-5, and three or more RMAs were taken. The inspectors concluded this finding had a cross-cutting aspect in the area of Human Performance, Avoid Complacency, in that individuals did not recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, the unavailability of the startup transformer (SUT) and emergency diesel generators (EDGs) during portions of testing was a latent issue that Entergy did not identify, and the associated increase in risk was not assessed and managed. [H.12] (Section 4OA3.1)

Cornerstone: Barrier Integrity

- Green. A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified in that Entergy did not promptly correct a condition adverse to quality associated with the operability of a MSIV. Specifically, Entergy did not take timely corrective actions to inspect and remove debris from air tubing that supplied air to a valve actuator after the associated MSIV failed a surveillance test on March 29, 2016. This uncorrected condition subsequently led to a repeat failure of the valve on August 16, 2016. Entergy entered these issues into their CAP as CR 2016-2250 and CR 2016-5987 and developed corrective actions to revise associated procedures as needed, replaced the affected MSIV air pack manifold, cleared loose debris from the affected air tubing, and scheduled the replacement of affected air tubing during the next refueling outage.

  The inspectors determined that this performance deficiency was more than minor because it was associated with the barrier performance attribute of the Barrier Integrity cornerstone and it adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, when MSIV-1C failed to meet its surveillance requirements on March 29, 2016, Entergy did not take corrective actions necessary to adequately identify and resolve the underlying issue of system debris being present in air tubing, which

affected the valve actuator and caused a slow closing time for the valve. This inaction led to continued valve inoperability, for a duration greater than that allowed by TS, which presented itself during a subsequent operability test on August 16, 2016. The inspectors screened this finding in accordance with IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power;" using Exhibit 3, "Barrier Integrity Screening Questions." The inspectors determined that this finding was of very low safety significance (Green) because the finding did not involve an actual open pathway in the physical integrity of reactor containment or involve an actual reduction in function of hydrogen igniters in the reactor containment. The inspectors determined that this issue had a cross-cutting aspect in the area of Human Performance, Conservative Bias, because Entergy did not use decision-making practices that emphasize prudent choices over those that were simply allowable. Specifically, when the MSIV initially failed its surveillance in March 2016, Entergy did not take a conservative approach in their operability determination and immediate response to the issue. This was demonstrated by the fact that, following the March 2016 valve failure, when a cause evaluation identified the likelihood of debris in air tubing affecting valve operability, individuals rationalized that the degraded condition had been resolved on its own and would not recur. Entergy acted on this assumption, rather than making the conservative determination that the effect of present debris could impact continued operability in an unpredictable manner, as it did during the subsequent failed surveillance test in August 2016. [H.14] (Section 4OA3.3)

Other Findings

A violation of very low safety significance (Green) was identified by Entergy and reviewed by the inspectors. Corrective actions taken or planned by Entergy have been entered into Entergy's CAP. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

The unit began the inspection period at 100 percent power. On October 18, 2016, the unit was downpowered to 50 percent power to perform a thermal backwash of the main condenser. The thermal backwash was secured due to high condenser air in-leakage and the unit returned to 100 percent power on October 20, 2016. On December 14, 2016, operators reduced power to approximately 8 percent to facilitate closing the #2 main turbine stop valve following the discovery of a mechanical hydraulic control system pilot valve malfunction. On December 15, 2016, operators identified packing leakage on the 2C MSIV and a body to bonnet leak on the 2D MSIV. On December 16, 2016, the unit commenced a shutdown to repair the 2C and 2D MSIVs. Following repairs, operators returned the unit to 100 percent on December 23, 2016. The unit remained at or near 100 percent power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors reviewed Entergy's readiness for the onset of seasonal low temperatures. The December 14, 2016, review focused on Entergy's cold weather preparations. Walkdowns of the EDGs and the station blackout diesel generator (SBODG) were included as part of the inspection. The inspectors reviewed the Final Safety Analysis Report (FSAR), TSs, control room logs, and the CAP to determine what temperatures or other seasonal weather could challenge these systems, and to ensure Entergy personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including Entergy's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during cold weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial System Walkdowns (71111.04 – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Residual heat removal (RHR) system restoration following planned maintenance on October 12, 2016
- Reactor core isolation cooling system with HPCI pump inoperable on November 8, 2016
- 'A' and 'B' EDGs with the SUT out-of-service (OOS) on November 21, 2016
- SBODG following corrective maintenance on December 9, 2016

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the FSAR, TSs, work orders, CRs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Entergy staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q – 5 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Entergy controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for OOS, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Salt service water (SSW) pump vault on September 27, 2016
- 'A' and 'B' battery rooms on October 7, 2016
- SBODG room on December 12, 2016

- MSIV steam tunnel on December 19, 2016
- Reactor building closed cooling water (RBCCW) 'A' and 'B' rooms on December 27, 2016

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the FSAR, the site flooding analysis, and plant procedures to identify internal flooding susceptibilities for the site. The inspectors' review focused on the HPCI system room and the 'B' RHR quadrant room. It verified the adequacy of equipment seals located below the flood line, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers. It also reviewed the CAP to determine if Entergy was identifying and correcting problems associated with both flood mitigation features and site procedures for responding to flooding.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11Q – 2 samples; 71111.11A – 1 sample)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator training during the conduct of a 10 CFR 55.59 required requalification examination on October 4, 2016, which included evaluations of two annual simulator scenarios. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the TS action statements entered by the shift manager. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

On October 18, 2016, inspectors observed downpower activities from 88 percent power to 50 percent power, observed reactivity manipulations, and reviewed core flow and control rod insertions. Inspectors also observed reactor engineering interface and compliance with reactivity maneuver-specific sheets; 'C' feedwater pump shutdown; procedure compliance and 3-way communication, and unexpected main steam line radiation monitoring alarm response; response to degrading main condenser vacuum; and command and control during recovery. The inspectors observed pre-shift briefings and reactivity control briefings to verify that the briefings met the criteria specified in Entergy procedure EN-OP-115, "Conduct of Operations," Revision 16. Additionally, the inspectors observed operator performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

.3 Licensed Operator Requalification Program

a. Inspection Scope

On November 8, 2016, inspectors conducted an in-office review of results of the licensee-administered comprehensive written examinations and annual operating tests for 2016 for PNPS operators. The inspection assessed whether Pass/Fail rates were consistent with the guidance of IMC 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The review verified that the failure rate (individual or crew) did not exceed 20 percent.

- None of the 49 operators failed any section of the Annual Exam. The overall individual failure rate was 0.0 percent.
- None of the 7 crews failed the simulator test. The crew failure rate was 0.0 percent.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 1 sample)

a. Inspection Scope

The inspectors reviewed the sample listed below to assess the effectiveness of maintenance activities on SSC performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance work orders, and maintenance rule basis documents to ensure that Entergy was identifying and properly evaluating performance problems within the scope of the maintenance rule. For the sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria

established by Entergy staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). Additionally, the inspectors ensured that Entergy staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- Quality Control sample on commercial grade dedicated lubricants for safety-related equipment on November 18, 2016

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 4 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Entergy performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that Entergy personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When Entergy performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- 'B' EDG planned load shed testing on October 12, 2016
- Emergent line outage on 345kV line 342 with K-117 diesel driven air compressor OOS on November 1–2, 2016
- Risk mitigating actions during 'B' EDG instrumented run on November 17, 2016
- Emergent maintenance on SBODG with fire protection valve 1-D-1 OOS on December 9, 2016

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 4 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- Recirculation flow converter failure on October 3, 2016
- RBCCW piping degradation on December 1, 2016
- Reinstallation of core spray system relay leads without torqueing on December 12, 2016
- Turbine stop valve testing mechanism failure on October 18, 2016, and valve testing on December 15, 2016

The inspectors evaluated the technical adequacy of the operability determinations to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and FSAR to Entergy's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Entergy.

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because Entergy did not complete a prompt operability determination in a timely manner in accordance with procedure EN-OP-104, "Operability Determination Process." As a result, Entergy allowed this flow converter to remain in service, without reasonable assurance of its capability to perform its required safety function, from the time the adverse condition was discovered on October 3, 2016, until the component was declared inoperable and replaced on October 21, 2016.

Description. Pilgrim utilizes six average power range monitors (APRMs), which provide an indication of reactor power based on local power range monitors. The safety function of the APRMs is to provide input into the RPS and ensure that the reactor scrams following a malfunction in order to prevent fuel damage. Two recirculation flow converters sum the flow values from each of the reactor recirculation loops and provide a value for total reactor flow. The RPS then compares flow to reactor power for the APRM flow biased scram.

On October 3, 2016, during quarterly surveillance testing, Entergy declared the 'A' recirculation flow converter inoperable when a post-calibration 9 percent mismatch was discovered between it and the 'B' flow converter. The 'A' flow converter was recalibrated and returned to service on October 4, 2016, with an as-left mismatch reading of 3.5 percent – 4 percent. The as-left mismatch was lower than the 6 percent administratively allowed set point, but higher than that observed after prior calibrations. At this point, the flow converter was declared operable based on the completion of a successful recalibration, and the issue was captured in Pilgrim's CAP as CR 2016-07622.

On two occasions, October 5, 2016, and October 13, 2016, Entergy did not follow the requirements of EN-OP-104, "Operability Determination Process," Revision 11. On October 5, 2016, engineering provided written input to operations that recommended a compensatory measure for operators to check the mismatch reading on an increased frequency (6-hour, as opposed to a usual 12-hour interval) and to alert the engineering

department immediately if the mismatch were to exceed 4 percent. EN-OP-104, Section 5.11[25](a) states that "engineering input shall be in the form of documentation that has been developed and/or approved through an Engineering process." However, contrary to the above, the input provided on October 5, 2016, was not in the form of an operability evaluation as prescribed in EN-OP-104, Attachment 9.6. As a result, the input did not receive required approval by Engineering management, the operability determination did not incorporate criteria for the eventual discontinuation of the established compensatory measures, and no corrective actions were developed to provide additional input in order to assure a reasonable expectation of continued operability. As a result, operators were performing an unapproved compensatory measure to maintain the operability of the 'A' flow converter.

EN-OP-104, Revision 11, Section 5.11[3](a) states, "a prompt [operability] determination is warranted when additional information, such as supporting analysis, is needed to confirm the immediate determination. A prompt determination, when needed, should be done without delay. Plant staff should make continuous progress toward completing the determination." Contrary to the above, on October 13, 2016, a prompt operability determination was delayed. On October 11, 2016, a senior reactor operator questioned why a compensatory measure was performed without supporting operability documentation for the 'A' flow converter. The initial operability evaluation for the flow converter was then revised to request a formal operability evaluation to provide a further basis for operability with the compensatory measures in place. The initial due date of the operability evaluation was October 13, 2016, but was extended to October 21, 2016. The due date extension was approved based on operations management approval, and the initial short due date of the assignment to gather the data. Continuous progress was not made on the operability evaluation by engineering, and other tasks were assigned to the engineer. On October 21, 2016, prior to completion of the operability evaluation, inspectors questioned operations management about the timeliness of the operability evaluation. Operations management did not have a sense of urgency to complete the formal operability evaluation based on their expectation of favorable results.

The operability evaluation was completed on October 21, 2016, at which point the flow converter was declared inoperable based on a review of historical data collection that indicated a slowly degrading trend in the flow converter's signal behavior since the time the unit was installed in April 2016. Engineers concluded that the pattern of drift, magnitude of drift, or sudden failure of the flow converter could not be predicted going forward. The inoperable unit was replaced by the previously installed unit, which still had time remaining within its PM replacement period, and the flow converter was restored to operability. On November 4, 2016, the flow converter was replaced with a new unit.

Entergy performed an adverse condition analysis, evaluating the apparent cause of the issue, which determined that the inoperable unit experienced an internal failure, most likely associated with a DC amplifier. Inspectors reviewed flow indication inputs into the flow converter, recorded by the plant computer, and compared these inputs to the logged flow converter output readings from the time the unit was installed in April 2016 through the calibration on October 3, 2016, and generally the flow converter signal provided an appropriate signal. However, inspectors determined that Entergy allowed unreliable equipment to remain in service that potentially impacted TS required equipment, without completing a proper evaluation on two occasions, October 5 and 13,

2016. The function of the 'A' flow converter was reasonably in doubt during that time period. Entergy entered these issues into their CAP as CR 2017-0854.

Analysis. The inspectors determined that not completing the operability evaluation of the 'A' recirculation flow converter in a timely manner in accordance with EN-OP-104 was a performance deficiency within Entergy's ability to foresee and correct. The inspectors determined that this performance deficiency was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, in not completing the operability evaluation in a timely manner, Entergy allowed the flow converter to remain in service for several weeks, during which there was not sufficiently reasonable assurance that it would have continued to maintain the capability to perform its required safety function of providing input to produce accurate reactor flow biased scram signals to prevent damage to the fuel cladding during an overpower event. The issue is also similar to the more than minor example in IMC 0612, Appendix E, "Examples of Minor Issues," issued August 11, 2009, Example 3j because the flow converter's capability to perform its required safety function could not be reasonably assured.

The inspectors screened this finding in accordance with IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," and determined that this finding was of very low safety significance (Green) because the finding affected a single RPS trip signal to initiate a reactor scram, but did not affect the function of other redundant trips or diverse methods of reactor shutdown, did not involve control manipulations that unintentionally added positive reactivity, and did not result in a mismanagement of reactivity by operator.

The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance, Conservative Bias, because Entergy did not use decision making-practices that emphasize prudent choices over those that are simply allowable. Entergy did not ensure timely actions were taken to address degraded conditions commensurate with their safety significance. Operations management agreed with an extension to the due date for the operability evaluation, because they assumed favorable results and no additional actions would be required. Other engineering tasks were prioritized over the operability evaluation. The lack of conservative bias resulted in unreliable equipment remaining in service for a period of time that potentially impacted a function of an APRM flow biased scram input. [H.14]

Enforcement. 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states in part activities affecting quality shall be accomplished in accordance documented procedures. Entergy procedure EN-OP-104, Revision 11, states, "engineering input shall be in the form of documentation that has been developed and/or approved through an engineering process" and "a prompt [operability] determination, when needed, should be done without delay. Plant staff should make continuous progress toward completing the determination." Contrary to the above, between October 5 and October 13, 2016, Entergy did not properly document or approve engineering input for an operability evaluation, associated with degraded conditions identified on the 'A' recirculation flow converter, in accordance with EN-OP-104. Furthermore, contrary to the guidance in EN-OP-104, Entergy delayed the completion of

a prompt operability evaluation associated with this degraded condition. This condition had the potential to impact the safety-related function of initiating a reactor scram in response to high-flux conditions. Specifically the recirculation flow converter remained in service from October 3, 2016, until October 21, 2016, while its capability to provide valid input signals to the APRMs could not be reasonably assured. Entergy took corrective actions to replace the inoperable flow converter. Because this violation was of very low safety significance (Green), and Entergy has entered this into their CAP as CR 2016-07622 and CR 2017-0854, the NRC is treating this as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000293/2016004-01, Failure to Promptly Perform an Operability Evaluation for a Recirculation Flow Converter)**

1R18 Plant Modifications (71111.18 – 1 sample)

Temporary Modifications

a. Inspection Scope

The inspectors reviewed the temporary modifications listed below to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

- Security electrical bus uninterrupted power supply installation on October 19 and October 26, 2016

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, confirmed work site cleanliness was maintained, and witnessed the test or reviewed test data to verify quality control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- Replacement of safety relief valve ‘B’ on October 6, 2016
- 'B' EDG varistor replacement and breaker maintenance on October 12, 2016
- Recirculation flow converter and power source replacement on November 4, 2016

- Plate installation on HPCI pump pedestal to correct high vibrations on November 22, 2016
- 2D outboard MSIV body to bonnet leak repair on December 19, 2016
- 2C outboard MSIV partial packing replacement on December 21, 2016

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)

a. Inspection Scope

The inspectors reviewed the outage schedule and shutdown risk assessments for a forced outage performed from December 16 through December 22, 2016. The outage was performed in response to 2C MSIV packing leak and 2D MSIV body to bonnet valve leak repair. During this outage, the inspectors observed plant shutdown and startup, as well as the outage activities listed below:

- Reactor shutdown and startup activities
- Cold and hot shutdown temperature control
- Shutdown risk assessment and risk management
- Implementation of TSs
- Outage control center activities
- Licensee identification and resolution of problems

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied TSs, the FSAR, and Entergy procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- 8.M.2-2.M.8.5, Diesel generator ‘A’ initiation by loss of offsite power logic on October 5, 2016
- 8.7.4.4, MSIV surveillance testing on October 18, 2016 (in-service testing)
- 8.7.2.7, Control room high efficiency air filtration system surveillance test on October 29, 2016

- 8.5.3.2.1, 'E' SSW pump operability run following elevated vibrations on November 8, 2016

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 – 1 sample)

a. Inspection Scope

Entergy implemented various changes to the Pilgrim Emergency Action Levels (EALs), Emergency Plan, and Implementing Procedures. Entergy had determined that, in accordance with 10 CFR 50.54(q)(3), any change made to the EALs, Emergency Plan, and its lower-tier implementing procedures, had not resulted in any reduction in effectiveness of the Plan, and that the revised Plan continued to meet the standards in 50.47(b) and the requirements of 10 CFR Part 50, Appendix E.

The inspectors performed an in-office review of all EAL and Emergency Plan changes submitted by Entergy as required by 10 CFR 50.54(q)(5), including the changes to lower-tier emergency plan implementing procedures, to evaluate for any potential reductions in effectiveness of the Emergency Plan. This review by the inspectors was not documented in an NRC Safety Evaluation Report and does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety. The requirements in 10 CFR 50.54(q) were used as reference criteria.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 3 samples)

a. Inspection Scope

The inspectors reviewed Entergy's performance in assessing and controlling radiological hazards in the workplace. The inspectors used the requirements contained in 10 CFR Part 20, TSs, Regulatory Guide 8.38, and the procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the performance indicators (PIs) for the occupational exposure cornerstone, radiation protection program audits, and reports of operational occurrences in occupational radiation safety since the last inspection.

Radiological Hazard Assessment (1 sample)

The inspectors conducted independent radiation measurements during walkdowns of the facility and reviewed the radiological survey program and recent plant radiation surveys for radiological work activities.

Contamination and Radioactive Material Control (1 sample)

The inspectors selected several sealed sources from inventory records and assessed whether the sources were accounted for and were tested for loose surface contamination.

Radiation Worker Performance and Radiation Protection Technician Proficiency (1 sample)

The inspectors evaluated radiation worker performance with respect to radiation protection work requirements. The inspectors evaluated radiation protection technicians in performance of radiation surveys and in providing radiological job coverage.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation (71124.05)

a. Inspection Scope

The inspectors reviewed Entergy's performance in assuring the accuracy and operability of radiation monitoring instruments used to protect occupational workers during plant operations and from postulated accidents. The inspectors used the requirements in 10 CFR Part 20; regulatory guides; ANSI 323A, N323D, and N42.14; and procedures required by TSs as criteria for determining compliance.

Calibration and Testing Program

The inspectors reviewed the calibration standards used for portable instrument calibrations and response checks to verify that instruments were calibrated by a facility that used National Institute of Science and Technology traceable sources.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index (2 samples)

a. Inspection Scope

The inspectors reviewed Entergy's submittal of the Mitigating Systems Performance Index for the following systems for the period of October 1, 2015, through September 30, 2016:

- Emergency alternating current power system (MS06)
- Cooling water system (MS10)

To determine the accuracy of the PI data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed Entergy's operator narrative logs, CRs, mitigating systems performance index derivation reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Occupational Exposure Control Effectiveness (1 sample)

a. Inspection Scope

The inspectors reviewed Entergy submittals for the occupational radiological occurrences PI for the period of October 1, 2015, through September 30, 2016. The inspectors used PI definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment of Performance Indicator Guidelines," Revision 7, to determine the accuracy of the PI data reported. The inspectors reviewed electronic personal dosimetry accumulated dose alarms, dose reports, and dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized PI occurrences. The inspectors conducted walkdowns of various locked high and very high radiation area entrances to determine the adequacy of the controls in place for these areas.

b. Findings

No findings were identified.

.3 Radiological Effluent TS/Offsite Dose Calculation Manual Radiological Effluent Occurrence (1 sample)

a. Inspection Scope

The inspectors reviewed Entergy submittals for the radiological effluent TS/Offsite Dose Calculation Manual radiological effluent occurrences PI for the period of October 1, 2015, through September 30, 2016. The inspectors used PI definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment of Performance Indicator Guidelines," Revision 7, to determine if the PI data was reported properly. The inspectors reviewed the public dose assessments for the PI for public radiation safety to determine if related data was accurately calculated and reported.

The inspectors reviewed the CAP database to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous and liquid effluent summary data and the results of associated offsite dose calculations to determine if indicator results were accurately reported.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify Entergy entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended CR screening meetings. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, Entergy performed an evaluation in accordance with 10 CFR Part 21.

b. Findings

Introduction. A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified in that Entergy did not identify and correct a condition adverse to quality related to HPCI pump degraded performance, as required by EN-LI-102, "Corrective Action Program." Specifically, vibrations on the HPCI main pump to speed reducer coupling were not addressed during HPCI system maintenance, despite a degrading trend starting May 21, 2015. This led to the HPCI system being declared inoperable on November 7, 2016, after vibration levels exceeded the IST Action range threshold.

Description. The HPCI system provides an injection source of high pressure water into the reactor vessel to restore and maintain coolant inventory after accidents and transients. The system's main components include a main pump, a booster pump, a speed reducer between the two pumps, and a dedicated steam turbine.

Vibration levels at various points along the HPCI system are taken during quarterly surveillance tests in order to monitor and trend per American Society of Mechanical Engineering IST code requirements. When IST trended values reach the Alert range, various actions are required, but systems are allowed to operate in that range. When the IST Action range threshold is reached, the component/system is required to be declared inoperable until corrected. Due to resonance vibrations caused by interactions between the HPCI booster pump and main HPCI pump, Entergy was granted a relief request (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14198A157) that allows vibrations with the following ranges: 0.700 to 0.829 inches/second is the Alert range and vibrations above that require immediate action to correct. Prior to the refueling outage in May 2015, HPCI pump vibrations were stable in the range of 0.534 to 0.663 inches/second. After the 2015 outage, a ten year overhaul and coupling clean and inspect maintenance PMs were performed and the vibrations increased to 0.7397 inches/second and remained in the Alert range throughout the cycle, starting with the first surveillance test after the 2015 refueling outage on May 21, 2015.

Increased vibrations during system operation on the P4H vibration point, located on the speed reducer coupling, were identified following a HPCI outage completed during Refueling Outage 20 in May 2015. Entergy's assessment of elevated vibration levels at vibration point P4H was that they were due to a structural resonance condition that amplifies the vibration amplitude due to motion of the pump support pedestal. After identification of increased vibrations, Entergy tracked and trended the results following subsequent normally scheduled quarterly surveillance runs.

Between May 2015 and August 2016, there were 7 vibration data points taken on point P4H, with the lowest reading being 0.723 inches per second and the highest reading being 0.819 inches per second, with a generally increasing trend. On September 20, 2016, the HPCI system was removed from service to disassemble and inspect the speed reducer coupling in an effort to identify the source of the increased vibrations. The coupling was disassembled, cleaned, lubricated, and reassembled. No cause for the increased vibration was identified and the coupling was reinstalled. Following the maintenance, the system was post-maintenance tested with lower vibration results, however, the post-maintenance testing did not identify that the maintenance did not successfully address the vibrations, and the corrective action assignment was closed out. EN-LI-102, requires, in part, that "individuals closing corrective actions verify that the required action has been taken ensuring that the response is adequate, answers all aspects of the assigned action, and the intent of the action is met." During the next regularly scheduled surveillance test, on November 7, 2016, the P4H vibration reading exceeded the IST Action range for the HPCI system and the system was required to be declared inoperable.

Entergy's corrective actions included modeling vibrations of the HPCI system during operation and installing a welded steel stiffening plate between the HPCI pump support pedestals on November 11, 2016. Following installation of the stiffening plate, the HPCI system was post-maintenance tested satisfactorily with vibration levels on the P4H vibration returning to the Acceptable range at 0.6173. While the HPCI system was

declared inoperable due to exceedance of IST vibration limits, it remained available and would have provided water injection into the reactor vessel if required for accident mitigation.

Analysis. The inspectors determined that Entergy did not identify and correct the cause of increased vibrations on the HPCI main pump to booster pump speed reducer coupling as required by EN-LI-102, which led to declaring the HPCI system inoperable on November 7, 2016. The inspectors determined that this was a performance deficiency within Entergy's ability to foresee and correct and should have been prevented. The inspectors determined that this performance deficiency was more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage.) Specifically, Entergy did not address the increase in HPCI pump vibrations from May 21, 2015, to November 7, 2016, when the vibrations increased into the IST Action range and resulted in pump inoperability. In accordance with IMC 0609.04, "Initial Characterization of Findings," issued October 7, 2016, and IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, the inspectors determined that the finding was of very low safety significance (Green) because the finding did not affect the design or qualification of a mitigating SSC, represent a loss of system and/or function, involve an actual loss of a function of at least a single train or two separate safety systems for a greater time than allowed by TS, or represent an actual loss of function of one or more non-TS trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program.

The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance, Design Margins, in that the organization operates and maintains equipment within design margins, and margins are carefully guarded and changed only through a systematic and rigorous process. Specifically, Entergy did not demonstrate that the work process supports nuclear safety and maintenance of design margins by minimizing long-standing equipment issues, PM deferrals, and maintenance and engineering backlogs. Entergy's failure to effectively manage design margins regarding HPCI system vibrations led to a continuing degradation of the system, and the eventual need to declare the HPCI system inoperable on November 7, 2016. [H.6]

Enforcement. 10 CFR Part 50, Appendix B, Criterion XVI states that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected. Contrary to this, from May 21, 2015, to November 7, 2016, Entergy did not identify and correct the cause of increased vibrations on the HPCI pump, leading to the HPCI system being declared inoperable on November 7, 2016, after vibration levels surpassed the IST Action range threshold. Entergy's corrective actions included modeling vibrations of the HPCI system during operation and installing a stiffening plate on the HPCI pump support pedestal which restored vibration values to within acceptable levels. Because this violation was of very low safety significance (Green), and Entergy has entered this into their CAP as CR 2016-8657, the NRC is treating this as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000293/2016004-02, Ineffective Corrective Actions to Correct High Pressure Coolant Injection System Vibrations)**

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues to identify trends that might indicate the existence of more significant safety concerns. As part of this review, the inspectors included repetitive or closely-related issues documented by Entergy in trend reports, site PIs, major equipment problem lists, system health reports, maintenance rule assessments, and maintenance or CAP backlogs. The inspectors also reviewed Entergy's CAP database for the third and fourth quarters of 2016 to assess CRs written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRCs daily CR review (Section 4OA2.1). The inspectors reviewed the Entergy station trend report covering the months of June, July, August, September, and October of 2016, conducted under EN-LI-FAP-006, "Trending and Performance Review Process," to verify that Entergy personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Findings and Observations

No findings were identified.

The inspectors evaluated a sample of CRs generated over the course of the past two quarters by departments that provide input into the trend report. Entergy appropriately identified four new adverse trends in the areas of procedure use and adherence, radiation worker practices, industrial safety recovery actions, and pre-drill meeting attendance during a 12 month review. As part of the review, inspectors identified that Entergy continues to exhibit challenges in identifying significant conditions adverse to quality. This was identified in Inspection Report 2015004 (ADAMS Accession No. ML16042A327). Entergy entered this issue into the CAP as CR 2016-8470.

Inspectors also identified a low level trend in the protection of equipment. Inspectors identified four instances where equipment was not protected as required by EN-OP-119, "Protected Equipment Postings." In all four instances, inspectors screened each of the observations in accordance with IMC 0612, Appendix B, "Issue Screening," issued September 7, 2012, and IMC 0612, Appendix E, "Examples of Minor Issues," issued August 11, 2009, and determined that these issues were minor because the safety function of the equipment was maintained. The inspectors also reviewed corrective maintenance backlogs, control room deficiencies, and operator work arounds. Inspectors concluded these were adequately addressed with the scope of the CAP.

.3 Review of Refueling Outage 21 Scope

a. Inspection Scope

The inspectors performed an in-depth review of Entergy's corrective actions associated with PM being considered for removal from the scope of Refueling Outage 21 (RFO21). Inspectors chose a sample of the work being considered for removal from RFO21 based on information contained in LO-PNPLO-2016-00004 and CR-2014-4052. Specific samples chosen included (a) RHR pump 'B' motor replacement, (b) RBCCW heat exchanger retubing, and (c) 250VDC battery charger replacements. Additionally,

inspectors reviewed recent PM deferrals and frequency changes as they relate to safety-related equipment to ensure they were performed in accordance with Entergy procedures. Inspectors reviewed PNPS procedure 1.3.142, "PNPS Risk Review and Disposition," Revision 5, to ensure appropriate risk assessments were done for the chosen work activities. Inspectors ensured that work packages were developed or planned based on recommendations contained in the risk assessments.

RHR Pump 'B' Motor Replacement

The inspectors reviewed the 1.3.142 Risk Assessment for Entergy's consideration of cancelling the RHR pump 'B' motor replacement in RFO21. Entergy's risk assessment indicated that the motor replacement was being considered for cancellation as a result of the plant closure announcement. The options considered included (a) replacing the RHR pump 'B' motor as currently scheduled in accordance with the time based refurbishment PM and (b) deferring the refurbishment of the RHR pump 'B' motor.

RBCCW Heat Exchanger Retubing

The inspectors reviewed the 1.3.142 Risk Assessment for Entergy's decision regarding the need to retube the RBCCW heat exchangers. Three options were presented and evaluated, to include (a) continuing with a tube leak mitigation strategy and retubing the heat exchangers prior to 2025, (b) continuing with a tube leak mitigation strategy and retubing the heat exchangers after 2025, and (c) do nothing.

250VDC Battery Charger Replacements

The inspectors reviewed the 1.3.142 Risk Assessment for Entergy's decision regarding the replacement of the D13 250VDC battery charger. Three options were presented and evaluated, to include (a) replacing the D13 normal battery charger, (b) doing nothing, and (c) replacing both the normal and backup battery chargers with updated solid state drive chargers.

b. Findings and Observations

No findings were identified.

RHR Pump 'B' Motor Replacement

Entergy's risk assessment, completed in October 2016, indicated that the motor replacement was being considered for cancellation as a result of the plant closure announcement. The recommendation was to not replace the RHR pump 'B' motor and to keep the presently available motor as a spare instead of using it to replace the 'B' motor. The recommendation was approved by Entergy management. Inspectors determined that the risk assessment was performed in accordance with Entergy procedures. Inspectors performed a detailed review of the basis for deferring the replacement of the motor, including recent PM results and CAP commitments. The inspectors reviewed the results of PM tests, including vibration data and motor insulation resistance data, and did not identify any adverse trends in motor parameters. Additionally, the inspectors verified that RHR pump 'B' remained classified as "High Critical" in accordance with procedure EN-DC-153, "Preventive Maintenance Component Classification," and associated PMs were appropriately scheduled.

Inspectors did note that a similar motor, the RHR pump 'A' motor, failed unexpectedly in 2012 as a result of a motor winding failure, and was replaced with a new motor. Entergy's evaluation of that failure determined that a combination of the high run time and motor age caused the failure. It was identified that, in the 10 years prior to the failure, the RHR 'A' pump was started and operated significantly more than the remaining three pumps. The circumstances surrounding that failure and corrective actions that were developed as a result of that failure were reviewed as they related to the RHR pump 'B' motor. As a result of the RHR pump 'A' motor failure and the turbine auxiliary oil pump failure in 2013, a time based refurbishment PM was developed for non-continuous large motors that are part of the Large Motor Program. As a result, it was determined that the remaining three RHR pump motors would be replaced in upcoming outages, with one each being performed in 2017 ('B' motor), 2019 ('C' motor) and 2021 ('D' motor). The inspectors did not identify any significant issues of concern.

RBCCW Heat Exchanger Retubing

Entergy's risk assessment, completed in August 2015, associated with the RBCCW heat exchangers identified three options, which included (a) continuing with a tube leak mitigation strategy and retubing the heat exchangers prior to 2025, (b) continuing with a tube leak mitigation strategy and retubing the heat exchangers after 2025, and (c) do nothing. Option (b) was recommended and approved by Entergy management based on operating history and PM results on the RBCCW heat exchangers. Inspectors performed a review of recent CRs associated with the RBCCW system and verified tube plugging margins presented in the risk assessment. Inspectors reviewed the tube mitigation strategy currently in place and the appropriateness of the strategy as it relates to the RBCCW heat exchangers going forward. No significant issues of concern were identified. The inspectors determined that the decision to not retube the RBCCW heat exchanger was within Entergy's risk assessment and work management process.

250VDC Battery Charger Replacements

Entergy's risk assessment, completed in October 2016, associated with the 250VDC battery chargers identified three options, which included (a) replacing the D13 normal battery charger, (b) doing nothing, and (c) replacing both the normal and backup battery chargers with updated solid state chargers. Option (a) was recommended based on operating history of the battery chargers, and available components to maintain the backup battery charger operable. The risk assessment recommended replacement of the D13 250VDC normal battery charger during the 2017 online battery charger replacement window. Additionally, the assessment recommended not replacing the D15 250VDC backup battery charger with an updated solid state charger, but to utilize the existing PM activities to maintain charger operability. Inspectors reviewed the CAP for recent CRs associated with the operability of the battery chargers and whether those CRs were evaluated as part of the risk assessment. Additionally, inspectors reviewed work planning documents associated with the battery chargers to ensure the work was planned or scheduled. No significant issues were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 4 samples)

.1 (Closed) Licensee Event Report (LER) 05000293/2016-002-00 and 2016-002-01: Online Maintenance Test Configuration Prohibited By Technical Specifications

On April 19, 2016, it was discovered that a maintenance activity performed on August 26, 2014, and August 27, 2014, had rendered the SUT and the standby EDGs unable to automatically supply power to the 4160V safety buses A5 and A6. This was due to a breaker interlock that prevented breakers associated with the SUT and EDGs from closing when breakers associated with the SDT are in the test position and closed. In response to this discovery, Entergy performed a root cause evaluation (RCE) (CR 2016-2735). Inspectors reviewed the RCE, the corrective actions, and the LER. Through this review, a licensee-identified NCV (documented in Section 4OA7) and one NRC-identified NCV were identified. This LER is closed.

Introduction. The inspectors identified a Green NCV of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," for Entergy's failure to properly assess and manage the increase in risk due to performing protective relay calibration and functional testing associated with the SDT on seven occasions from December 9, 2005, through August 27, 2014. Specifically, Entergy did not identify that the performance of calibration and functional testing of protective relays associated with the SDT would prevent the 4160V safety buses from being automatically powered by other required sources, and consequently, did not properly assess and manage the increase in risk.

Description. On seven occasions between December 9, 2005, and August 27, 2014, with the plant at 100 percent power and the SDT and SBODG OOS for planned maintenance, Entergy personnel performed relay calibration and functional testing in accordance with procedure 3.M.3-1, "A5/A6 Buses 4kV Protective Relay Calibration/Functional Test and Annunciator Verification – Critical Maintenance," and 3.M.3-29, "Shutdown Transformer and 23kV Relay Calibration and Functional Test." At the time of testing, Entergy had performed a risk assessment for the work week, in accordance with EN-WM-104, "On Line Risk Assessment," and procedure 1.5.22, "Risk Assessment Process," and categorized risk as "Yellow." EN-WM-104 provides risk categories based on proposed maintenance activities, and are listed as "Green," "Yellow," "Orange," and "Red," in increasing significance. EN-WM-104 provides the following guidance for a Yellow risk categorization:

> "**Yellow** is considered an acceptable risk. The risk important SSCs should be maintained available/operable. Measures should be taken to ensure that subsequent maintenance activities do not increase risk. The length of time spent in a yellow condition should be minimized."

Additionally, Attachment 9.3 of EN-WM-104 provides guidance on appropriate RMAs for activities that result in an elevated (above Green) risk category.

At the time of performance of procedures 3.M.3-1 and 3.M.3-29, Entergy tagged both the SDT and SBODG OOS, but did not recognize that incoming power to the 4160V safety buses A5 and A6 was not available from either the SUT or the station's EDGs for the periods of time when breakers 152-501 and 152-601 were in the test position and closed. Due to the SDT lockout relay scheme, when breakers 152-501 and 152-601 are in the "test" position and closed, neither the SUT or EDGs would automatically provide

power to the station's 4160V safety buses in the event of a turbine trip. During the test, a turbine trip would have resulted in a station blackout with the breakers in the "test" position. However, the 4160V buses could be loaded once the breakers were taken out of test, which is a simple breaker manipulation that can be completed from the control room.

In addition to the procedural guidance mentioned above, Entergy utilizes an Equipment Out of Service Monitor (EOOS) quantitative risk assessment tool, which utilizes a probabilistic risk assessment model to quantify the CDF. At the time of testing in March 2008 through August 2014, risk was evaluated as Yellow in EOOS with the SDT and SBODG were identified as being unavailable. The inspectors input the actual equipment OOS (SBODG, SUT, SDT, and both EDGs) into the EOOS program to calculate risk, and identified that the EOOS risk number calculated CDF as 3.02E-2/year, correlating to a risk category of Red, which is higher than Yellow. EN-WM-104 indicates that Red risk is "considered an unacceptably high risk," and requires "immediate steps […] to restore any related risk significant equipment" and that the "plant should be placed in a safer condition/mode as soon as possible."

The risk assessment performed for the testing did not identify the SUT or EDGs as unavailable, and consequently, Entergy did not properly assess and manage the risk. Inspectors verified that at the time of testing, RMAs included increasing risk awareness and control, reducing the duration of the maintenance activity, and minimizing the magnitude of the risk increase. During the 2012 and 2014 tests, a control room operator was briefed to trip the breakers during the test, if needed, as an additional RMA in a response to a September 1, 2010, CR (CR 2010-3056) describing the test configuration as being unacceptably high risk and recommended having operator actions to trip the breakers. At this point, Entergy failed to recognize that the EDGs would also not load the 4160V safety buses.

Procedure 3.M.3-1 was performed on a 2 year frequency, and procedure 3.M.3-29 was performed on a 4 year frequency. Procedure 3.M.3-29 was last performed on February 22, 2014. Procedure 3.M.3-1 has been performed three times with the reactor at 100 percent power since 2005, on March 5, 2008, August 26, 2012, and on August 26–27, 2014. In 2012 and 2014, procedure 3.M.3-1 was performed with the exposure time of 33 minutes and 44 minutes, respectively. Entergy was unable to determine the precise time period in 2008 when breakers 151-501 and 152-601 were in the test position and closed, but determined the condition existed for between 3 and 11 hours, because the test procedures were conducted in series in 2008.

Entergy developed corrective actions in CR 2016-2735 to require performance of the procedures while the reactor is in an outage, due to not being able to comply with TS 3.9.B.2 while above 25 percent power. CR 2016-2735 did not address the risk associated with the condition identified, and CR 2017-0856 was written as a result of NRC inspection. Entergy entered the issue into the CAP as CR 2017-0856.

Analysis. The inspectors determined that Entergy failed to properly assess and manage the increase in risk when performing protective relay calibration and functional testing associated with the SDT on seven occasions between December 9, 2005, and August 26–27, 2014. The inspectors determined that this was a performance deficiency within Entergy's ability to foresee and correct, and should have been prevented. The inspectors determined that this performance deficiency was more than minor because it

is associated with the configuration control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, the finding was similar to Example 7e of NRC IMC 0612, Appendix E, "Examples of Minor Issues," issued August 11, 2009, in that the overall elevated plant risk would have put the plant into a higher licensee-established risk category and would have required additional RMAs.

The inspectors evaluated the finding using IMC 0609.04, "Initial Characterization of Findings," issued October 7, 2016. Because the finding involved a maintenance rule risk assessment, it was screened through IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," issued May 19, 2005. The finding screened as very low safety significance (Green) using Flowchart 1 of Appendix K because the ICDPD was determined to be greater than 1E-6 and less than 1E-5, and three or more RMAs were taken. Specifically, the ICDPD, based on actual risk conditions at the time of the testing and the flawed risk assessment performed by Entergy, was calculated to be 3.32E-5 assuming a conservative exposure time of 11.15 hours. A 90 percent human factor success probability was included in the ICDPD resulting in a final value of 3.32E-6. The inspectors verified the breaker logic for operator recovery from the test position, to ensure dual closure of the breaker would not occur. Additionally, Entergy had three or more RMAs, including (1) increasing risk awareness and control, (2) reducing the duration of the maintenance activity, and (3) minimizing the magnitude of the risk increase.

The inspectors concluded this finding had a cross-cutting aspect in the area of Human Performance, Avoid Complacency, in that individuals did not recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, the unavailability of the SUT and EDGs during portions of testing was a latent issue that Entergy did not identify, and the associated increase in risk was not assessed and managed. [H.12]

Enforcement. 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," paragraph (a)(4), requires, in part, that "… the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities." Contrary to the above, on seven occasions from December 9, 2005, to August 27, 2014, Entergy did not assess and manage the increase in risk that resulted from performing protective relay calibration and functional testing associated with the SDT. In addition, Entergy did not upgrade plant risk from "Yellow" to "Red" risk and did not specify additional RMAs for the increased risk condition. Entergy's corrective action requires the unit to be in an outage to perform the tests. Because this violation was of very low safety significance (Green) and was entered into the CAP as CR 2017-0856, this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000293/2016004-03, Failure to Properly Assess and Manage Risk Associated with Shutdown Transformer Protective Relay Testing)**

.2 (Closed) LER 05000293/2016-005-00: Ultimate Heat Sink and Salt Service Water System Declared Inoperable

The inspectors reviewed Entergy's actions and reportability criteria associated with LER 05000293/2016-005-00, which is addressed in CR 2016-5951. On August 15, 2016,

during a period of hot summer weather conditions, PNPS declared the ultimate heat sink and SSW system inoperable due to exceeding the high sea water inlet temperature limit of 75°F. This was due to a combination of increased sea water surface temperature in Cape Cod Bay and the contribution of recirculation water from the plants outfall due to wind and tidal conditions. Operators reduced power to restore sea water inlet temperature to the allowed levels. The inspectors reviewed the sequence of events and the operator and plant equipment response to the event. No performance deficiencies or violations were identified. Entergy's planned corrective actions include performing an engineering evaluation in order to increase the margin between the SSW design basis inlet temperature and expected environmental operating conditions, and implementing procedural enhancements. This LER is closed.

.3 (Closed) LER 05000293/2016-006-00: 'C' Inboard Main Steam Isolation Valve Inoperable

On August 16, 2016, during performance of MSIV surveillance testing, with the plant operating at approximately 60 percent power, the 'C' MSIV failed to meet its required stroke time, closing in 7.2 seconds compared to the maximum allowable closing time of 5.0 seconds. Entergy declared the MSIV inoperable, and the plant was shut down to inspect and repair the valve. Subsequent analysis determined that the valve had become inoperable due to debris (dust/wear and corrosion products) that had been introduced into the air tubing supplying the valve actuator following an August 2015 air supply connection rupture. The air tubing was cleared of debris, the affected component of the valve actuator was replaced, and the MSIV tested with an acceptable stroke time.

While reviewing the past operability of the valve, Entergy determined that the operability of the MSIV could not be reasonably assured from between the time of its last successful surveillance test on May 24, 2016, and the subsequent failure on August 16, 2016. The inspectors reviewed the LER, the RCE (CR 2016-5987), and associated corrective actions. The inspectors also reviewed CRs, RCEs, and corrective actions associated with a previous MSIV failure that had taken place on March 29, 2016. Through these reviews, the inspectors identified a performance deficiency that was characterized as more than minor and is documented below. This LER is closed.

Introduction. A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified when Entergy did not promptly correct a condition adverse to quality associated with the operability of a MSIV. Specifically, Entergy did not take timely corrective actions to inspect and remove debris from air tubing that supplied air to a valve actuator after the associated MSIV failed a surveillance test on March 29, 2016. This uncorrected condition subsequently led to a repeat failure of the valve on August 16, 2016.

Description. Pilgrim utilizes four pairs of MSIVs, each pair consisting of an inboard and an outboard MSIV that are in line and redundant to one another. The MSIVs are designed to isolate steam flow from the reactor vessel in such a manner as to prevent fuel damage by limiting the loss of reactor coolant in case of a major leak from the steam piping outside of primary containment. The valves are also designed to limit the release of radioactive material in case of a loss of coolant accident by closing the primary containment barrier.

On March 29, 2016, during a quarterly stroke test of Pilgrim's MSIVs, the 'C' inboard MSIV (MSIV-1C) failed to meet its required closing time of 5 seconds, instead closing in 5.3 seconds. Operators were performing this surveillance test in accordance with Pilgrim station procedure 8.7.4.4, "Main Steam Isolation Valve Operability, 60% Power," Revision 26. This procedure contained the requirement that "[i]f any closing time criterion is not met, the [shift manager] will declare the valve(s) inoperable and take actions specified in TS Section 3.7.A.2.b." However, due to a misunderstanding of the applicability of IST procedures to the surveillance test, the valve was not declared inoperable. Instead, Entergy personnel responded to the failed test results by re-stroking the valve an additional time, which yielded an acceptable valve closure time of 3.8 seconds. Then, after what Entergy determined to be a sufficient wait period of greater than four hours, in accordance with their IST procedures, the valve was re-stroked two more times, yielding acceptable stroke times of 3.8 and 3.6 seconds respectively. Based on these results, Entergy declared the valve operable, but required a compensatory measure that the surveillance frequency of the test be increased.

The MSIV stroke time test is performed to meet two separate requirements. The FSAR requires that the valve close within 3.0-5.0 seconds in order to ensure the valves will close to limit a radiation release and not cause an unacceptable pressure transient. The stroke time is also trended for IST monitoring, to determine if the valve performance is trending in an expected and acceptable manner. NRC inspectors challenged not entering the TS limiting condition for operation because the valve failed to meet the FSAR surveillance requirements and that IST allowances for re-stroking a valve did not apply in this instance. Entergy subsequently acknowledged that the valve should have been declared inoperable. Entergy's entered this issue into their CAP as CR 2016-2250, and an associated Human Performance Evaluation concluded that had operators followed the testing procedure, the MSIV-1C would have been declared inoperable before taking other actions. Entergy took corrective actions to revise procedure 8.7.4.4 to clarify the requirement that a valve be declared inoperable after a failed test and proceeded with the plan to keep the valve in service based on the acceptable results of the subsequent March 29 re-strokes.

Following the failed surveillance test on March 29, 2016, Entergy performed an equipment apparent cause evaluation (CR 2016-02163), which determined that the valve had likely failed to meet its required closure time due to the presence of debris that caused a solenoid valve plunger in the valve actuator to get stuck and delay the initiation of the valve movement. This evaluation concluded that this was likely to be an isolated incident, and that the debris would have been sufficiently removed following the initial failed test, allowing the valve to subsequently operate adequately, as demonstrated by the subsequent successful tests.

EN-LI-102, "Corrective Action Program," Revision 26, Section 5.5[3](d)(3), states that management must ensure formulation of a corrective action plan to correct adverse conditions and address identified causes. Furthermore, EN-LI-118, "Cause Evaluation Process," Revision 22, Section 5.12[9][e] states that developed corrective actions should be timely, "commensurate with the significance of the problem being fixed." Contrary to these requirements, based on the assumption that the potential debris issue had been resolved without additional action being required, Entergy did not plan to perform further inspection or repair/replacement of affected components until the next available opportunity, during either a planned or forced outage.

Entergy tested MSIV-1C again on April 29 and May 24, 2016, and the closure times were again found to be acceptable. As a result, Entergy determined that the increased test frequency of the valve could be stopped, and the valve was tested again on August 16, 2016, according to the normal frequency of three months. During this test, the valve closed in 7.4 seconds, failing for a second time to meet the 5-second closure time requirement. Entergy declared the valve inoperable and shut down the plant to inspect and repair the valve on August 22, 2016. Entergy performed an RCE (CR 2016-5987), which concluded that the debris affecting valve operation had been introduced into the air tubing supplying the valve actuator following an August 2015 air supply nipple connection rupture, which agitated debris (dust/wear and corrosion products) present in the air tubing. This loosened debris entered the actuator during subsequent valve tests and eventually inhibited movement of the solenoid valve plunger. Following the failed test, the air supply line was cleared of loose debris, the MSIV air pack manifold was replaced, and the MSIV was successfully retested and placed back into service. Entergy developed corrective actions to replace the additional air tubing during the next refueling outage in 2017.

Entergy performed a past operability determination which concluded that the operability of MSIV-1C could not be reasonably assured between the last successful surveillance test on May 24, 2016 and the failure on August 16, 2016. This constituted a non-compliance with TS 3.7.A.2.b, which requires that, in the event an automatic primary containment isolation valve is inoperable (e.g. MSIV-1C), at least one valve in the line shall be closed and deactivated in the closed position. While the in-line outboard MSIV remained operable during the period MSIV-1C was inoperable, it remained open while the plant was operating. As a result of this non-compliance, in accordance with 10 CFR 50.73(a)(2)(i)(C), Entergy submitted LER 2016-006-00 to the NRC on October 13, 2016.

Analysis. The inspectors determined that not taking actions to correct adverse conditions and address identified causes in a timely manner in accordance with Procedure EN-LI-102 was a performance deficiency within Entergy's ability to foresee and correct. The inspectors determined that this performance deficiency was more than minor because it was associated with the barrier performance attribute of the Barrier Integrity cornerstone, and it adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, MSIV-1C failed to meet its surveillance requirements on March 29, 2016, Entergy did not take corrective actions necessary to adequately identify and resolve the underlying issue of system debris being present in air tubing, which affected the valve actuator and caused a slow closing time for the valve. This inaction led to continued valve inoperability, for a duration greater than that allowed by TS, which presented itself during a subsequent operability test on August 16, 2016. The inspectors screened this finding in accordance with IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, using Exhibit 3, "Barrier Integrity Screening Questions." The inspectors determined that this finding was of very low safety significance (Green) because the finding did not involve an actual open pathway in the physical integrity of reactor containment, or involve an actual reduction in function of hydrogen igniters in the reactor containment. Inspectors drew these conclusions based on the fact that the in-line outboard MSIV maintained operability throughout the course of events.

The inspectors determined that this issue had a cross-cutting aspect in the area of Human Performance, Conservative Bias, because Entergy did not use decision-making practices that emphasize prudent choices over those that were simply allowable. Specifically, when the MSIV initially failed its surveillance in March 2016, Entergy did not take a conservative approach in their operability determination and immediate response to the issue. This was demonstrated by the fact that, following the March 2016 valve failure, when a cause evaluation identified the likelihood of debris in air tubing affecting valve operability, individuals rationalized that the degraded condition had been resolved on its own and would not recur. Entergy acted on this assumption, rather than making the conservative determination that the debris could impact continued operability in an unpredictable manner, as it did during the subsequent failed surveillance test in August 2016. [H.14]

Enforcement. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states in part that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, on March 29, 2016, Entergy did not take corrective actions to assure that conditions adverse to quality were promptly identified and corrected. Specifically, the closing time for the inboard MSIV-1C did not meet its specified requirements, and Entergy did not plan corrective actions until a forced outage or refueling outage. As a result of the underlying cause of this equipment failure not being resolved, from May 24, 2016, to August 16, 2016, MSIV-1C remained in an inoperable state for a period of time longer than that allowed by TSs, as demonstrated by its failure during a subsequent test on August 16, 2016. Entergy entered these issues into their CAP as CR 2016-2250 and CR 2016-5987 and developed corrective actions to revise associated procedures as needed, replaced the affected MSIV air pack manifold, cleared loose debris from the affected air tubing, and scheduled the replacement of affected air tubing during the next refueling outage. This violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000293/2016004-04, Failure to Correct a Condition Adverse to Quality Associated with a Main Steam Isolation Valve)**

.4 (Closed) LER 05000293/2016-007-00: Manual Reactor Scram Due to Feedwater Regulating Valve Malfunction

On September 6, 2016, a manual scram was inserted from 91 percent power due to a malfunction of the 'A' FRV. The remote operation capability malfunction of the 'A' FRV was caused due a loose wire that impacted the ability of the FRV to modulate based on feedback. The local-manual operation of the valve was prevented by corrosion of the local mechanical locking device, due to a packing leak on the 'A' FRV. In response to the 'A' FRV malfunction, the stem and packing were replaced and the encoder was reassembled with confirmation that all wires were installed correctly and sealed in place. The inspectors reviewed the sequence of events and the operator and plant equipment response to the event. Inspectors reviewed the LER, the RCE (CR 2016-6635), and corrective actions. Through this review, inspectors identified a performance deficiency that was characterized as more than minor and is documented below. This LER is closed.

Introduction. A self-revealing Green finding was identified for the inadequate implementation of a work order on the 'A' FRV encoder as required by EN-WM-102. Specifically, Entergy did not install a wire assembly on the 'A' FRV encoder as required

by the work instructions located in the vendor manual. The wire loosened, resulting in the 'A' FRV failing open and the operators inserting a manual scram.

Description. On May 10, 2015, Entergy implemented a new design of cable connectors on the stepping motor encoder on the 'A' FRV. The FRVs receive a signal from the feedwater level control system and adjust flow from the signals received from the encoder. The digital valve controller directs the movement of the stepping motor, which controls the spool valve. The spool valve movement adjusts the force on the piston, causing FRV movement. The connectors on the stepping motor were of a new design and require a specific orientation to ensure a secure fit. This work was completed in Work Order 382229, which referred maintenance personnel to the vendor manual V-2036, "Feedwater Regulating Valves," for installation instructions. The vendor manual states to install the contact with the contact spring facing the housing cavity rib and to insert and straighten until the contact reaches the bottom. The next step required was to pull back to ensure the contact locking lance retains the contact in the housing.

On September 6, 2016, the control room received an alarm generated by feedwater flow oscillations. The unit was down powered the previous day due to high sea water inlet temperatures. The operators placed the 'A' FRV in manual and flow oscillations continued. Operators attempted to use the local mechanical locking device on the 'A' FRV, however, the 'A' FRV packing leak corroded the locking device, so feedwater flow could not be stabilized locally. The reactor was manually scrammed at +42 inches reactor water level, when a pre-established band was exceeded.

During troubleshooting of the system, a wire was found loosely connected to the cable connector when removing the stepping motor cover. Entergy performed a mockup of the connections, and was able to reproduce similar interruptions in the feedback circuit when the connector was installed improperly. Wires installed with the correct orientation were not easily dislodged from the cable connector because the locking tab is effective. The loose wire connection identified was the common neutral lead for the encoder feedback circuits and the encoder. With this wire loose, the digital control system loses the feedback circuit, which results in the loss of valve control in both automatic and remote-manual modes of operation. EN-WM-102, "Work Implementation and Closeout," Revision 9, step 5.3, states, in part, that the work activity is performed in accordance with the work package, site procedures, and company policies and guidelines. Work Order 382229 required installation of the encoder locking clip contacts per the vendor manual instructions. One wire clip was not installed with the correct orientation into the connector, as required by V-2036. All other wires were checked for a secure fit, and none were identified as loose.

Work Order 382229 did not implement the work order planning requirements of fleet procedure EN-FAP-WM-011, section 3.7.2, which requires, in part, that the applicable vendor manual be scanned and attached to the work order or specify starting and ending steps. While vendor manual V-2036 Appendix C does contain the required steps for installation, clear instructions in the work order were not available for the technicians. The work order references Appendix C of the V-2036 that has numerous instructions that did not apply to the work maintenance personnel performed. Of particular importance in the vendor manual is the orientation of the locking clip, and the instruction to pull lightly to verify the locking clip is working.

In response to the loose connection, Entergy added a sealant to the connector to ensure all wires remain in place on both FRVs. The packing and stem were replaced on the 'A' FRV as well. A RCE was performed in CR 2016-6635. The cause evaluation identified that recommended training of technicians was not performed prior to the installation of equipment, which may have identified issues with the work order, prior to installation of the connector.

Analysis. The inspectors determined that Entergy did not implement work order requirements on the 'A' FRV encoder as required by EN-WM-102, which was a performance deficiency that was within Entergy's ability to foresee and correct. The finding is more than minor because it is associated with the equipment performance attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during a shutdown as well as power operations. Specifically, the performance deficiency affected the reliability and capability of the 'A' FRV which led to a plant scram, tripping of the reactor feed pumps, and closure of the MSIVs.

The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," issued October 7, 2016, and IMC 0609, Appendix A, Exhibit 1, "Initiating Events Screening Questions," issued June 19, 2012, and determined a detailed risk evaluation was required because the 'A' FRV failure caused a reactor trip and partial loss of feedwater (power conversion system). A Region I SRA used the SPAR model for Pilgrim, Version 8.24, and SAPHIRE, Version 8.1.4, to complete the detailed risk evaluation. The SRA made the following assumptions and changes to the SPAR model to best represent the safety significance of this event:

- The direct result of the 'A' FRV failure (and associated performance deficiency) was a manual reactor trip
- The recovery probability associated with the unit auxiliary transformer supply breakers to Buses A5 and A6 (ACP-XHE-XM-NORECBKR) was changed from 0.12 to 0.01, based upon a reevaluation of the available time (nominal versus barely adequate) to restore AC power to the safety buses while the HPCI and reactor core isolation cooling system operate to maintain core cooling and reactor coolant system make-up
- Truncation was 1E-11

Based upon the above model changes, the estimated increase in CDF was calculated to be 4E-7/year, or very low safety significance (Green). The dominant core damage sequences involve reactor trips with the common cause failure of both unit auxiliary transformer supply breakers and failure to recover those breakers, and reactor trips involving the common cause failure of the battery chargers D11, D12, and D14. For issues resulting in an increase in CDF > 1E-7, IMC 0609 requires an evaluation of LERF using the guidance of NUREG-1765, "Basis Document for LERF Significance Determination Process," and IMC 0609, Appendix H, "Containment Integrity SDP." The performance deficiency associated with the failure of the 'A' FRV and resultant reactor trip would be considered a Type A finding and, as such, the calculated increase in CDF value is used in conjunction with an appropriate LERF factor (multiplier) to determine the estimated increase in LERF associated with the issue. Per Appendix H, Table 5.2, LERF factors of 1.0 or 0.6 are used for high pressure core damage accident sequences with the drywell dry or flooded, respectively. These Appendix H LERF factors are considered conservative bounding values. More recent insights from an NRC Office of

Research sponsored study by Energy Research, Inc. (ERI/NRC-03-04, November 2003) and the State of the Art Reactor Consequence Analysis Project at Peach Bottom Nuclear Power Station (NUREG/CR-7110) have identified that improved modeling and analysis of anticipated types and sizes of reactor coolant system ruptures, projected containment heating and fuel-coolant interactions, and operator actions taken in accordance with emergency operating procedures significantly reduce the potential for containment breach and the likelihood of a large early release. Furthermore, the dominant sequences discussed above would result in considerable time before postulated core damage and potential containment breach. In the absence of early core damage sequences for this event, LERF is not a significance risk contributor and the safety significance of this performance deficiency is defined by the estimated increase in CDF (4E-7/year) or Green.

This finding has a cross-cutting aspect of Human Performance, Work Management, in that Entergy did not adequately implement the process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. Specifically, maintenance staff were provided a work order that did not meet station requirements to ensure the work could be adequately performed. Specific steps of the vendor manual were not used to direct work by staff and led to an installation error. The work planning process also did not implement the engineering recommendation to perform a practice installation on the equipment prior to installing equipment in the field. [H.5]

Enforcement. This finding does not involve enforcement action because no violation of a regulatory requirement was identified. The issue is being characterized as a finding. **(FIN 05000293/2016004-05, Feedwater Regulating Valve Failure Results in Reactor Scram)**

4OA5 Other Activities

.1 Repetitive Degraded Cornerstone (Column 4) Follow-Up Activities

As described in the Mid-cycle Assessment letter, dated September 1, 2016 (ADAMS Accession No. ML15243A259), PNPS remains in the Repetitive Degraded Cornerstone Column (Column 4).

Completed Activities

Regional management conducted multiple site visits to Pilgrim to meet with senior Pilgrim management, as well as provided oversight for various inspections conducted during the fourth quarter.

On September 2, 2016, Entergy declared readiness for the 95003 Phase ‘C’ inspection. On October 13, 2016, the NRC notified Entergy of the inspection dates – November 28, 2016, through December 9, 2016, and January 9, 2017, through January 13, 2017 (ADAMS Accession No. ML16286A592).

The objectives of Inspection Procedure 95003 are to: 1) provide the NRC with timely additional information to be used in deciding whether the continued operation of the facility is acceptable and whether additional regulatory actions are necessary to arrest declining licensee/plant performance; 2) provide an independent assessment of the extent of risk-significant issues to aid in the determination of whether an unacceptable

margin of safety or security exists; 3) independently assess the adequacy of the programs and processes used by the licensee to identify, evaluate, and correct performance issues; 4) independently evaluate the adequacy of programs and processes in the affected strategic performance areas; 5) provide insight into the overall root and contributing causes of identified performance deficiencies; and 6) evaluate the licensee's third-party safety culture assessment and conduct a graded assessment of the licensee's safety culture based on the results of the evaluation.

The first two weeks of inspection were conducted on site from November 28, 2016, through December 9, 2016. The team is scheduled to complete the final week of inspection on January 9, 2017 through January 13, 2017.

.2 Initial Loading of the ISFSI Inspection Procedure (60855, 60855.1)

a. Inspection Scope

The inspectors observed and evaluated Entergy's loading of the first of five multipurpose canisters (MPC) associated with their Independent Spent Fuel Storage Installation (ISFSI) dry cask campaign from September 26 through October 1, 2016. The inspectors reviewed Entergy's activities related to operation and monitoring of the ISFSI. The inspectors verified compliance with the Certificate of Compliance, TSs, regulations, and station procedures.

The inspectors observed the lowering of the HI-TRAC and MPC into the spent fuel pool and the loading of spent fuel assemblies into the MPC. The inspectors observed the heavy load movement of the HI-TRAC and loaded MPC from the spent fuel pool to the cask decontamination and processing area. The inspectors performed an independent verification of Entergy's time-to-boil calculation for the loaded MPC to ensure that Entergy adequately calculated and tracked the time-to-boil and properly planned for contingent alternate cooling. The inspectors also observed MPC processing operations including: decontamination and surveying, welding, non-destructive weld examinations, MPC blow down of water with helium, and vacuum drying. The inspectors observed the MPC lid fit-up for the second MPC of the campaign, including measurements for the drain tube. During performance of these activities, the inspectors verified that procedure use, communication, and coordination of ISFSI activities was performed in accordance with Entergy's procedures.

The inspectors attended Entergy briefings to assess their ability to identify critical steps of the evolution, potential failure scenarios, and human performance tools to prevent errors, as well as reviewing pertinent examples of operating experience. The inspectors reviewed training records of personnel assigned to ISFSI activities and verified all required training was completed prior to performing ISFSI operations. The inspectors also reviewed the documentation of receipt inspections of the HI-STORM, MPC, and fuel spacers that were used for the first cask of the campaign.

The inspectors reviewed Entergy's program associated with fuel characterization and selection for storage. The inspectors reviewed the first cask fuel selection package to verify that Entergy was loading fuel in accordance with the Certificate of Compliance, TS, and procedures. The inspectors confirmed that Entergy did not plan to load any damaged fuel assemblies during this campaign. The inspectors reviewed recordings

made of the fuel assemblies loaded into the first MPC, to ensure the loading was in accordance with the loading plan.

The inspectors reviewed radiation protection procedures and radiation work permits associated with the ISFSI loading campaign. The inspectors also reviewed the as-low-as-reasonably-achievable (ALARA) goal for the cask loading to determine the adequacy of Entergy's radiological controls and to ensure that radiation worker doses were ALARA, and that project dose goals could be achieved. The inspectors reviewed radiological survey records from the current loading campaign to confirm that contact dose rates on the HI-TRAC surface were as expected. The inspectors assessed whether workers were aware of the radiological conditions in their work area and the radiation work permit controls/limits.

The inspectors performed a walk-down of the heavy haul path to verify that no hazardous condition exists that could impact the HI-STORM. The inspectors also reviewed the transient combustibles evaluation for the fuel in the equipment to be used for the dry cask loading campaign staged on the ISFSI pad. The inspectors reviewed the log entries for operator rounds for the TS requirement of ensuring the HI-STORM air vents are clear. The inspectors reviewed the system for tracking the inspection and calibration of the rigging used for the dry cask loading campaign.

The inspectors reviewed corrective action reports and the associated follow-up actions that were generated since Entergy started planning for their initial ISFSI campaign to ensure that issues were entered into the CAP, prioritized, and evaluated commensurate with their safety significance.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On January 26, 2017, the inspectors presented the inspection results to Mr. John Dent, Site Vice President, and other members of the PNPS staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

The following licensee-identified violation of NRC requirements was determined to be of very low safety significance (Green) and meets the NRC Enforcement Policy criteria for being dispositioned as a NCV.

- TS 3.9.B.2 requires that when "incoming power is not available from both startup and shutdown transformers, continued operation is permissible, provided both diesel generators and associated emergency buses remain operable, all core and containment cooling systems are operable, and reactor power level is reduced to 25% of design." Contrary to the above, on seven occasions between 2005 and August 27, 2014, for an average of 3.6 hours, Entergy conducted test Procedures 3.M.3-1, "A5/A6 Buses 4kV Protective Relay Calibration/Functional Test and Annunciator Verification – Critical Maintenance," and 3.M.3-29, "Shutdown Transformer and 23kV Relay Calibration and Functional Test," that placed the plant

in a condition not allowed by TS 3.9.B.2. Specifically, the testing would have prevented emergency buses A5 and A6 from automatically transferring to their backup power supplies. Entergy entered this condition into their CAP as CR 2016-2735. A Region I SRA conducted a detailed risk evaluation for this issue using IMC 0609, Appendix A, "Significance Determination Process for Findings At-Power," issued June 19, 2012. Using the average time from above, along with operator recovery actions, the SRA calculated the change in core damage probability to be <1E-7, which was considered to be of very low safety significance (Green).

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

J. Dent, Site Vice President
J. MacDonald, General Plant Manager
R. Avery, Projects and Maintenance Services
S. Asplin, Service Water System Engineer
M. Andrews, Quality Control
C. Baker, Receipt Inspection Specialist
G. Brough, Contract Coordinator
B. Barrus, Main Steam Systems Engineer
D. Berkland, Fire Protection Engineer
G. Blankenbiller, Chemistry Manager
R. Byrne, Regulatory Assurance Engineer
D. Calabrese, Emergency Preparedness Manager
M. Catino, Procurement Supervisor
R. Clifford, Receipt Inspection Specialist
J. Cox, Nuclear Oversight
W. Corbo, Nuclear Oversight
M. Dagnello, FIN Team Superintendent
J. Falconieri, Electrical Systems and Components Engineer
G. Flynn, Operations Manager
R. Gage, Tools Management
J. Gerety, System Engineering Manager
K. Goodall, Shift Manager
M. Green, Systems and Components Engineer
M. Jacobs, Nuclear Oversight Manager
M. Janus, Electrical Maintenance Superintendent
G. James, Manager, Reactor Engineering
L. Johnson, Dry Cask Super
K. Kampschneider, Electrical Systems Engineer
J. Kelly, Radiation Protection
P. Kristian, Project Manager, Dry Fuel Storage
D. King, VT Level III Examiner
S. King, Fire Watch
D. Labon, Instrument and Controls System Engineer
M. Landry, Fire Protection Engineer
M. McDonnell, Shift Manager
C. McMorrow, Fire Marshall
R. Metthe, Structures Engineer
P. Mone, Electrical Systems and Components Engineer
C. McMorrow, Fire Marshall
J. Moylan, Manager, Project & Maintenance Services
R. Morris, EDG System Engineer
A. Niederberger, Systems and Components Engineer
D. Noyes, Recovery Director

J. O'Donnell, HPCI System Engineer
J. Ohrenberger, Maintenance Manager
A. Papadakis, Tool Management
E.P. Perkins, Regulatory Assurance
E. Perkins, Regulatory Assurance Manager
L. Pepple, Radiation Protection Supervisor
D. Proksell, Nuclear Oversight
N. Reece, RBCCW Systems Engineer
E. Sanchez, Reactor Engineering
F. Sayers, Quality Control
K. Sejkora, Sr. Chemist
R. Sheridan, Operations, Control Room Supervisor
G. Sterling, Security Supervisor
P. Stover, Radiation Protection Supervisor
J. Taylor, Superintendent Operations Training
S. Velez, Senior Lead Reactor Engineer
J. Whalley, Shift Manager
M. Williams, Nuclear Safety Licensing Specialist
K. Woods, BOP Systems & Components Supervisor
A. Zelie, Radiation Protection Manager

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

05000293/2016004-01	NCV	Failure to Promptly Perform an Operability Evaluation for a Recirculation Flow Converter (Section 1R15)
05000293/2016004-02	NCV	Ineffective Corrective Actions to Correct High Pressure Coolant Injection System Vibrations (Section 4OA2.1)
05000293/2016004-03	NCV	Failure to Properly Assess and Manage Risk Associated with Shutdown Transformer Protective Relay Testing (Section 4OA3.1)
05000293/2016004-04	NCV	Failure to Correct a Condition Adverse to Quality Associated with Main Steam Isolation Valve (Section 4OA3.3)
05000293/2016004-05	FIN	Feedwater Regulating Valve Failure Results in Reactor Scram (Section 4OA3.4)

Closed

05000293/2016-002-00 and 2016-002-01	LER	Online Maintenance Test Configuration Prohibited By Technical Specifications (Section 4OA3.1)

05000293/2016-005-00	LER	Ultimate Heat Sink and Salt Service Water System Declared Inoperable (Section 4OA3.2)
05000293/2016-006-00	LER	'C' Inboard Main Steam Isolation Valve Inoperable (Section 4OA3.3)
05000293/2016-007-00	LER	Manual Reactor Scram Due to Feedwater Regulating Valve Malfunction (Section 4OA3.4)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
2.2.108, Diesel Generator Cooling and Ventilation System, Revision 47
2.2.146, Station Blackout Diesel Generator, Revision 44
8.C.40, Seasonal Weather Surveillance, Revision 37
8.C.40, Seasonal Weather Surveillance, Revision 38

Maintenance Orders/Work Orders
52663772

Section 1R04: Equipment Alignment

Procedures
2.2.8, Standby AC Power System (Diesel Generators), Revision 115
2.2.19, Residual Heat Removal, Revision 13
2.2.22, Reactor Core Isolation Cooling (RCIC), Revision 80
2.2.146, Station Blackout Diesel Generator, Revision 44
EN-MA-133, Control of Scaffolding, Revision 7

Condition Reports
2016-2044 2016-8084 2016-8655

Maintenance Orders/Work Orders
00344013 00413488 00430190

Miscellaneous
EC 12192
Tagout 61-133-X-166

Section 1R05: Fire Protection

Procedures
5.5.2, Special Fire Procedure, Revision 56
8.B.14, Fire Protection Technical Requirements, Revision 55
89XM-1-ER-Q, Updated Fire Hazards Analysis, Revision 16
EN-DC-127, Control of Hot Work and ignition Sources, Revision 16

EN-DC-161, Control of Combustibles, Revision 15
EN-OP-139, Fire Watch Program, Revision 0

Condition Reports
2016-7404

Maintenance Orders/Work Orders
52656466 52658361 52705746

Miscellaneous
Fire Hazards Analysis – Fire Area 1.9, Fire Zone 1.32, Main Steam and Feedwater Tunnel
Fire Watch 16-106
Fire Watch 16-124

Section 1R06: Flood Protection Measures

Procedures
2.5.2.71, Radwaste Collection System, Revision 38

Condition Reports
2015-0906

Miscellaneous
PNPS-NE-07-00006, Pilgrim Probabilistic Safety Assessment, Appendix C – Internal Flooding Analysis, Revision 1
SDBD-23, Design Basis Document for High Pressure Coolant Injection System, Revision 2
TDBD-109, Topical Design Basis Document for Internal and External Flooding, Revision 0
TDBD-111, Pipe Break Analysis, Revision 1
FSAR Appendix O
E-536, Environmental Parameters for use in the environmental qualification of electrical equipment (per 10CFR50.49), Revision 11
S&SA 60, Flooding due to ECCS leakage outside containment, Revision 0
M1373, Internal Flooding Calculation with Safe Shutdown evaluation for PNPS reactor building, Revision 0

Drawings
M232, P&ID Radwaste Collection System, Revision 38
E11, Single Line Diagram 480V System Motor Control Centers B13 & B22 & B23 & B25 & B26, Revision 51
M121-3-1, XOMOX Corp Mark 326 Plug Valve, Revision 3

Section 1R11: Licensed Operator Requalification Program

Procedures
SES-2001-01 Revision 2
SES-2010-11 Revision 4

Condition Reports
2016-07664

Miscellaneous
PNPS 2.1.14, Station Power Changes, Revision 114
RMP-PNP-21-21, Reactivity Maneuver Plan for October 2016 Thermal Backwash, dated October 2016

Section 1R12: Maintenance Effectiveness

Procedures
EN-DC-313, Procurement Engineering Process, Revision 12
89EN-DC-306, Acceptance of Commercial-Grade Items/Services in Safety-Related Applications, Revision 5

Maintenance Orders/Work Orders
52597666

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
1.5.22, Risk Assessment Process, Revision 26
3.M.3-47, Load Shed Relay Operational/Functional Test – Critical Maintenance, Revision 88
EN-DC-106, Temporary Installation of Measurement and Test Equipment, Revision 0
EN-DC-136, Temporary Modifications, Revision 13
EN-OP-119, Protected Equipment Postings, Revision 8
EN-WM-104, Online Risk Assessment, Revision 13

Condition Reports
2016-1561 2016-9083 2016-9235 2016-9817

Miscellaneous
EOOS Risk Evaluation for Work Week 1641
EOOS Risk Evaluation for Work Week 1646

Section 1R15: Operability Determinations and Functionality Assessments

Procedures
2.1.5, Controlled Shutdown from Power, Revision 130
2.2.99, Main Turbine Generator, Revision 57
3.M.3-6, 208V/408V Load Center Breaker Preventative Maintenance, Revision 38
3.M.3-30, HFA Relays Preinstallation Testing and Adjustment Removal/Installation and Testing Coil Replacement Preventive Maintenance, Revision 31
8.M.2-3.6.5, Neutron Monitor Flow Converter Functional and Calibration Test – Critical Maintenance, Revision 45
Closure Test Circuit Not Functioning Properly, Revision 0
EN-OP-104, Operability Determination Process, Revision 11
TP16-018, Turbine Stop Valve Closure Functional Test with Turbine Stop Valve SV-2 Slow

Condition Reports
2016-7622 2016-8016 2016-8307 2016-8442 2016-8443 2016-8446
2016-8903 2016-8903 2016-8906 2016-9050 2016-9057 2016-9061
2016-9480 2016-9798 2016-9810 2016-9916

Maintenance Orders/Work Orders
00462899 52363576 52714760

Miscellaneous
Adverse Condition Analysis, CR-PNP-2016-07622, Recirculation Flow Converter Comparator Trip, Revision 0
Engineering Change 68816
EPRI Technical Report, Evaluation and Testing of ABB Circuit Breakers with Mobilgrease 28, dated October 2001
Preventative Maintenance Data, PMID 50076625 and 50076626
RG 1.118, Periodic Testing of Electrical Power and Protection Systems, Revision 3
V-1106, Relays – Auxiliary HEA, HFA, HGA, HNA and HAS, dated November 2014

Drawings
E50, Schematic Diagram – Generator Turbine Valve Test, Revision 3
M2T72, Turbine Control Diagram, Revision 1

Section 1R18: Plant Modifications

Procedures
8.Q.3-3, 480V AC Motor Control Center Testing and Maintenance, Revision 67

Condition Reports
2016-07015 2016-07098 2016-07701 2016-07799 2016-08063 2016-08073
2016-08151 2016-08168 2016-08290 2016-08560

Maintenance Orders/Work Orders
00458577

Miscellaneous
Adverse Cause Analysis, Temporary UPS 480V Cable Connection Voltage Discrepancies, CR-PNP-2016-08063
Engineering Chang 67392
Temporary Modification Change Notice 67412

Section 1R19: Post-Maintenance Testing

Procedures
2.2.21, High Pressure Coolant Injection (HPCI), Revision 85
3.M.3-60, Infrared Thermography, Revision 12
8.5.4.1, High Pressure Coolant Injection (HPCI) System Pump and Valve Quarterly and Biennial, Revision 120
8.9.1, Emergency Diesel Generator and Associated Bus Surveillance, Revision 133
EN-WM-107, Post Maintenance Testing, Revision 5

Condition Reports
2016-10039 2016-10040 2016-8594 2016-8657

Maintenance Orders/Work Orders
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00463518 004553801 004553802 004553810 52657689 52717838

Miscellaneous
DRP-20255, GE/ALCO 251 Engine Radiator Fan Drive, dated May 23, 2000
EN-Weld Material Requisition for WO 463518
Engineering Change 68754, 68762
Multiple Weld Datasheet for WO 459865
Record of Corrective action for WO 463454
Valve Packing Data Sheet: AO-203-2C, Rev. 0
Valve Packing Data Sheet: AO-203-ALT, Rev. 1

Section 1R20: Refueling and Other Outage Activities

Procedures
2.1.1, Start-up From Shutdown, Revision 195
2.1.4, Approach to Critical and Plant Heatup, Revision 40
2.1.5, Controlled Shutdown from Power, Revision 13
2.1.6, Reactor Scram, Revision 70

Condition Reports
2016-10039 2016-10040 2016-10096

Section 1R22: Surveillance Testing

Procedures
1.17.1, Potential Seismic Hazards, Revision 12
1.17.1, Potential Seismic Hazards, Revision 13
8.7.4.4, Main Steam Isolation Valve Operability, 60% Power, Revision 27
8.M.2-2.10.8.5, Diesel Generator "A" Initiation by Loss of Offsite Power Logic, Revision 57
8.5.3.2.1, Salt Service Water Pump Quarterly And Biennial (Comprehensive) Operability And Valve Operability Tests, Revision, 32
8.7.2.7, Measure Flow and Pressure Drop Across Control Room High Efficiency Air Filtration System (CRHEAFS), Revision 38
EN-MA-119, Material Handling program, Revision 28

Condition Reports
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Maintenance Orders/Work Orders
00458939 00460585 52568814 52577815

Miscellaneous
Calculation No. M1415, Review of Control Room Envelope (CRE) DP Test Data

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Procedures
EN-EP-310, Emergency Response Organization Notification System, Revision 5
EP-AD-270, Equipment Important to Emergency Response, (EITER), Revision 2

Miscellaneous
Pilgrim Nuclear Power Station Emergency Plan, Revision 45
Pilgrim Nuclear Power Station Emergency Plan, Revision 46

Section 2RS1: Radiological Hazard Assessment and Exposure Controls

Procedures
EN-RP-101, Access Controls for Radiologically Controlled Areas, Revision 11
EN-RP-104, Personnel Contamination Events, Revision 9
EN-RP-106, Radiological Survey Documentation, Revision 7
EN-RP-106-01, Radiological Survey Guidelines, Revision 2
EN-RP-108, Radiation Protection Posting, Revision 15
EN-RP-109, Hot Spot Program, Revision 4
EN-RP-113, Response to Contaminated Spills /Leaks, Revision 9
EN-RP-121, Radioactive Material Control, Revision 13
EN-RP-121-01, Receipt of Radioactive Material, Revision 2
EN-RP-122, Alpha Monitoring, Revision 9
EN-RP-131, Air Sampling, Revision 15
EN-RP-141-01, Job Coverage Using Remote Monitoring Technology, Revision 5
EN-RP-143, Radioactive Source Control, Revision 12
EN-RP-210, Area Monitoring Program, Revision 1
EN-RP-402, DOP Challenge Testing of HEPA Vacuums and Portable Ventilation Units, Revision 4
EN-RP-404, Operation and Maintenance of HEPA Vacuum Cleaners and HEPA Ventilation Units, Revision 6

Condition Reports

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2016-6476	2016-6551	2016-6835	2016-8191		

Self-assessments and Audit Reports
EN-FAP-OM-011 Attachment 7, Entergy Nuclear- Trimester Functional Area Report for Radiation Protection, April 2016

Miscellaneous
Pilgrim Nuclear Power Station, Sealed Source Inventory, September 21, 2016
EN-RP-143, Attachment 9.4 - Sealed Source Leak Test Worksheet, September 28, 2016
PNPS Radiation Work Permit 2016065, Operations and RP Surveillances, Tours and Minor Repairs, March 31, 2016
PNPS Radiation Work Permit 2016061, Low Impact Work in RAs, HRAs LHRA and Areas > 100 K dpm/100 cm2, May 16, 2016
EN-RP-121 Attachment 9.6 - Unconditional Release Survey Log, November 30, 2016
PNPS Rad Survey 1611-0087, RW -13' El King Kong & Spent Resin Rooms, November 15, 2016
PNPS Rad Survey1608-0160, CRD Quad El -17' CRD Pumps A and B, August 22, 2016
PNPS Rad Survey 1610-0220, 120' El Radwaste North and South Sample Sinks, October 21, 2016
PNPS Air Sample Log, December 1, 2016

Section 2RS5: Radiation Monitoring Instrumentation

Procedures
EN-RP-301, Radiation Protection Instrument Control, Revision 9
EN-RP-206, Dosimeter of Legal Record Quality Assurance, Revision 6
PNPS Procedure 7.4.63, Process Radiation Monitor Setpoints, Revision 13

PNPS Procedure 7.4.42, Calibration of the NUMAC Gaseous PRMs, Revision 27
PNPS Procedure, 7.4.48, Calibration of the Turbine Building Gaseous Effluent Monitors (GEMS), Revision 9

Condition Reports
2016-3221 2016-4619

Miscellaneous
EN-RP-303 Attachment 9.1 Source Checking of Radiation Protection Instrumentation, May 1, 2016
Dose Rates vs Shield Configuration for N-273 Bench Calibrator. January 31, 2016
Dose Rate vs Shields Sheppard 78 Box Calibrator, January 7, 2016
PNPS Apparent Cause Evaluation GEMS Availability Evaluation, August 10, 2016
Maintenance Rule Panel a(1) Evaluation for Process Rad Monitors, September 26, 2016
PNPS System Health Report 45E/66 Process Rad Monitors, for Q3 2016

Section 4OA1: Performance Indicator Verification

Procedures
Entergy Procedure, EN-LI-114, Performance Indicator Process, Revision 7
Entergy Procedure, EN-FAP-RP-002, Radiation Protection Performance Indicator Program, Revision 3
PNPS Procedure 7.3.25, Particulate and Iodine Monitoring at the Main Stack and the Reactor Building Vent, Revision 42
PNPS Procedure 7.3.31, Tritium Sampling, Revision 25
PNPS Procedure 7.3.37, Noble Gas Effluent Sampling, Revision 39
PNPS Procedure 7.3.48, Airborne Effluent Monitoring of the Turbine Deck and Reactor Feed Pump Bay, Revision 26
PNPS Procedure 7.3.12, Liquid Effluent Releases with RETDAS, Revision 10
PNPS Procedure 7.3.15, Dose Assessment, Revision 1

Miscellaneous
Pilgrim Monthly Dose Summary Report for 4th Quarter 2015
Pilgrim Monthly Dose Summary Report for 1st Quarter 2016
Pilgrim Monthly Dose Summary Report for 2nd Quarter 2016
Pilgrim Monthly Dose Summary Report for 3rd Quarter 2016
PNPS Annual Radioactive Effluent Release Report, January 1 through December 31, 2015
PNPS-RPT-05-006, PNPS Mitigating Systems Performance Index Basis Document, Revision 5
EN-LI-114 Attachment 9.2 NRC Performance Indicator Technique Datasheet, January 2016
EN-LI-114 Attachment 9.2 NRC Performance Indicator Technique Datasheet, April 2016
EN-LI-114 Attachment 9.2 NRC Performance Indicator Technique Datasheet, July 2016
EN-LI-114 Attachment 9.2 NRC Performance Indicator Technique Datasheet, October 6, 2016

Gas and Liquid Effluent Waste Permits
PNPS 7.9.12, Liquid Release Report Permit Number 2016001, June 16, 2016
PNPS 7.9.12, Liquid Release Report Permit Number 2016002, August 19, 2016

Section 4OA2: Problem Identification and Resolution

Procedures
1.3.142, “PNPS Risk Review and Disposition,” Revision 5

3.M.1-15, “Vibration Monitoring For Preventive Maintenance And Balancing,” Revision 53
EN-DC-324, “Preventive Maintenance Program,” Revision 17
EN-DC-344, “Large Motor Program,” Revision 4
EN-DC-335, “PM Basis Template,” Revision 6
EN-DC-153, “Preventive Maintenance Component Classification,” Revision 14
EN-LI-102, Corrective Action Program, Revision 26
EN-LI-118, Cause Evaluation Process, Revision 23
EN-OP-119, Protected Equipment Postings, Revision 8

Condition Reports

2013-0378	2014-4052	2015-3287	2015-5182	2015-5827	2015-7102
2015-8133	2016-0955	2016-3311	2016-5856	2016-5884	2016-7308
2016-7443	2016-8657	2016-8657	2016-9177		

Maintenance Orders/Work Orders

00302393	00374591	00427046	52339009	52468002	52468003
52468004	52468005	52596347	52642412	00440270	

Miscellaneous
APRM trend report dated November 2016
Engineering Change (EC) 14633
EC 35136
LO-PNPLO-2014-122
LO-PNPLO-2016-004
OL-OLP-2015-00025

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedures
EN-LI-102, Corrective Action Program, Revision 26
EN-WM-102, Work Implementation and Closeout, Revision 9
EN-FAP-WM-011, Work Planning Standard, Revision 4
3.M.3-1, A5/A6 Buses 4kV Protective Relay Calibration/Functional Test and Annunciator Verification – Critical Maintenance”, Revision 123
3.M.3-29, Shutdown Transformer and 23kV Relay Calibration and Functional Test, Revision 22

Condition Reports

2016-5987	2016-6635	2016-2250	2017-0854	2017-0856	2016-4223
2016-2735	2010-3056				

Miscellaneous
V-2036, Feedwater Regulating Valves, Revision 11

Section 4OA5: Other Activities

Procedures
EN-FAP-QV-207, Nuclear Independent Oversight Observations, Rev. 0
EN-DC-215, Fuel Selection for Holtec Dry Cask Storage, Rev. 7
EN-MP-120, Material Receipt, Rev. 10
EN-RE-210, BWR Reactor Core and MPC Cask Fuel Verification, Rev. 3
PNPS Procedure No. 2.2.75 Fuel Handling and Servicing Equipment, Rev. 73

PNPS Procedure No. 4.3 Fuel Handling, Rev. 132
PNPS Procedure No. 12.1 Multi-Purpose Canister Preparation for Loading, Rev. 1
PNPS Procedure No. 12.2 Multi-Purpose Canister Loading, Rev. 2
PNPS Procedure No. 12.3 Multi-Purpose Canister Backfill and Sealing, Rev.1
PNPS Procedure No. 12.4 Multi-Purpose Canister Stack Up and Transfer, Rev. 2

Condition Reports

2015-0328	2015-0437	2015-2129	2015-7005	2016-3006	2016-5133
2016-5394	2016-6024	2016-6071	2016-6228	2016-6417	2016-7361
2016-7365	2016-7388	2016-7400	2016-7412	2016-7787	

Maintenance Orders/Work Orders

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Miscellaneous
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Evaluation of Neutron Measurement Capabilities During the Dry Fuel Storage Process, dated 12/02/2011
QA-20-2016-PNP-1, Quality Assurance Audit Report
Work Order Package 52699900 01, Perform Quarterly Reactor Building Crane Preventative Maintenance
EN-DC-215, Fuel Selection for Holtec Dry Cask Storage, MPC #579 performed 09/26/16
RWP #2015 096, Rev. 1, Independent Spent Fuel Storage Installation, dated 02/17/2015

Section 4OA7: Licensee Identified Violations

Condition Reports
2016-2735

LIST OF ACRONYMS

10 CFR	Title 10 of the *Code of Federal Regulations*
ADAMS	Agencywide Documents Access and Management System
ALARA	as low as reasonably achievable
APRM	average power range monitor
CAP	corrective action program
CDF	core damage frequency
CR	condition report
EAL	emergency action level
EDG	emergency diesel generator
EOOS	equipment out of service monitor
FRV	feedwater regulating valve
FSAR	Final Safety Analysis Report
HPCI	high pressure coolant injection
ICDPD	incremental core damage probability deficit
IMC	Inspection Manual Chapter
ISFSI	independent spent fuel storage installation
IST	in-service testing
LER	licensee event report
LERF	large early release frequency
MPC	multi-purpose canister
MSIV	main steam isolation valve
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission, U.S.
OOS	out-of-service
PI	performance indicator
PM	preventive maintenance
PNPS	Pilgrim Nuclear Power Station
RBCCW	reactor building closed cooling water
RCE	root cause evaluation
RMA	risk mitigating actions
RPS	reactor protection system
RHR	residual heat removal
SBODG	station blackout diesel generator
SDT	shutdown transformer
SPAR	standardized plant analysis risk
SRA	senior reactor analyst
SSC	structure, system, and component
SSW	salt service water
SUT	startup transformer
TS	technical specification