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

July 6, 2016

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

SUBJECT: PILGRIM NUCLEAR POWER STATION – EVALUATION OF CHANGES, TESTS, OR EXPERIMENTS AND PERMANENT PLANT MODIFICATIONS TEAM INSPECTION REPORT 05000293/2016007

Dear Mr. Dent:

On May 19, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Pilgrim Nuclear Power Station (PNPS). The enclosed inspection report documents the inspection results, which were debriefed on May 19, 2016, with Acting Site Vice President, Mr. M. Romeo; General Manager Plant Operations, Mr. J. Macdonald; and other members of your staff. An exit meeting was held on June 29, 2016, with Acting Site Vice President, Mr. M. Romeo, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. In conducting the inspection, the team reviewed selected procedures, calculations and records, observed activities, and interviewed station personnel.

This report documents one NRC-identified finding of very low safety significance (Green) and one self-revealing finding of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. However, because of the very low safety significance and because the findings were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs), consistent with Section 2.3.2.a of the NRC's Enforcement Policy. If you contest the NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at PNPS. In addition, if you disagree with the cross-cutting aspect assigned to any finding, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at PNPS.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, “Public Inspections, Exemptions, Requests for Withholding,” of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Paul G. Krohn, Chief
Engineering Branch 2
Division of Reactor Safety

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

Enclosure:
Inspection Report 05000293/2016007
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.	50-293
License No.	DPR-35
Report No.	05000293/2016007
Licensee:	Entergy Nuclear Operations, Inc. (Entergy)
Facility:	Pilgrim Nuclear Power Station (PNPS)
Location:	Plymouth, MA 02360
Inspection Period:	May 2 through May 19, 2016
Inspectors:	M. Orr, Reactor Inspector, Division of Reactor Safety (DRS), Team Leader J. Schoppy, Senior Reactor Inspector, DRS J. Rady, Reactor Inspector, DRS
Approved By:	Paul G. Krohn, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

Inspection Report 05000293/2016007; 05/02/2016 – 05/19/2016; Pilgrim Nuclear Power Station (Pilgrim); Engineering Specialist Plant Modifications Inspection.

This report covers a 2-week on-site inspection of the evaluations of changes, tests, or experiments and permanent plant modifications. The inspection was conducted by three region based engineering inspectors. Two findings of very low safety significance (Green) were identified, both of which were considered to be non-cited violations (NCVs). 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 the Cross-Cutting Areas," dated December 4, 2014. All violations of U.S. Nuclear Regulatory Commission (NRC) requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

NRC-Identified and Self Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a violation of Title 10 of the *Code of Federal Regulations* (10 CFR) 50, Appendix B, Criterion XVI, "Corrective Action," because Entergy did not promptly identify and correct a condition adverse to quality. Specifically, Entergy did not identify degraded salt service water (SSW) pump discharge piping supports that called into question the operability of both SSW loops. Entergy's short-term corrective actions included replacing support bracket H29-1-9SG, repairing SSW support H29-1-11SG, refurbishing several corroded SSW supports, and implementing a permanent plant modification to restore the 'D' SSW pump to an operable condition.

  The finding is considered more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone's objective of ensuring the reliability, availability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The team evaluated the significance of this finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," Exhibit 2, "Mitigating Systems Screening Questions." The team determined the finding screened as very low safety significance (Green) because the finding did not result in the loss of system functionality.

  The finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because Entergy did not take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, Entergy did not effectively resolve and correct SSW support corrosion issues identified in October 2015, including causes and extent-of-condition, in a timely manner to preclude an adverse impact on system reliability in May 2016. [P.3] (Section 1R17.2.1.b.1)

- Green. The team documented a self-revealing violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," as Entergy failed to verify the adequacy of the design to assure that applicable regulatory requirements and the design basis were correctly translated into safety-related SSW pump discharge piping support installation instructions. Specifically,

Entergy did not assure that the SSW pump discharge piping supports were installed in accordance with design drawings which called into question the operability of both SSW loops. Entergy's short-term corrective actions included implementing a permanent plant modification for the 'D' SSW pump support and temporary modifications on the 'A', 'B', and 'E' SSW pump discharge piping supports.

The finding is considered more than minor because it is associated with the design control (initial design) attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone's objective of ensuring the reliability, availability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The team evaluated the significance of this finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," Exhibit 2, "Mitigating Systems Screening Questions." The team determined the finding screened as very low safety significance (Green) because the finding was a design deficiency which did not result in a loss of functionality of the SSW pump supports.

This finding did not have a cross-cutting aspect because the most significant contributor of the performance deficiency occurred during initial construction and, thus, was not reflective of current Entergy performance. (Section 1R17.2.1.b.2)

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R17 Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications (71111.17)

.1 Evaluations of Changes, Tests, or Experiments (20 samples)

a. Inspection Scope

No safety evaluations were completed at Pilgrim since the last inspection. As a result, the team did not review any safety evaluations to evaluate whether the changes to the facility or procedures, as described in the Updated Final Safety Analysis Report (UFSAR), had been reviewed and documented in accordance with 10 CFR Part 50.59 requirements.

The team reviewed twenty 10 CFR 50.59 screenings for which Entergy had concluded that a safety evaluation was not required to be performed. These reviews were performed to assess whether Entergy's threshold for performing safety evaluations was consistent with 10 CFR 50.59. The team interviewed plant staff and reviewed supporting information including calculations, analyses, design change documentation, procedures, the UFSAR, the technical specifications (TSs), and plant drawings to assess the adequacy of the screenings. The team compared the screenings and supporting documents to the guidance and methods provided in Nuclear Energy Institute (NEI) 96-07, “Guidelines for 10 CFR 50.59 Evaluations,” as endorsed by Regulatory Guide (RG) 1.187, “Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments,” to determine the adequacy of the screenings. The samples included design changes, calculations, and procedure changes. The screenings and applicability determinations were selected based on the safety significance, risk significance, and complexity of the change to the facility.

In addition, the team compared Entergy’s administrative procedures used to control the screening, preparation, review, and approval of safety evaluations to the guidance in NEI 96-07, Revision 1, to evaluate whether those procedures adequately implemented the requirements of 10 CFR 50.59. The reviewed screenings are listed in the Attachment.

b. Findings

No findings were identified.

.2 Permanent Plant Modifications (10 samples)

.2.1 Salt Service Water Pump Shaft Modification

a. Inspection Scope

The team reviewed engineering change (EC) 59896 that Entergy implemented to evaluate a one-time change to the pump shaft of SSW pump serial number Q304548-1, currently installed as the 'A' SSW pump (P-208A). During the pump rebuild in August 2015, the vendor identified that the inner diameter of the impeller bore was slightly out of tolerance (larger due to normal wear). Other than the dimensional discrepancy, the vendor determined that the impeller was suitable for re-use. The vendor determined that the pump shaft was not suitable for re-use and recommended replacement. However, manufacturing a new pump shaft to the dimensions specified in Pilgrim's SSW pump design drawing (M8-38) would result in the clearance between the new shaft and the existing impeller being out of tolerance. The EC evaluated and approved oversizing the pump shaft in the area of the impeller to allow re-use of the impeller while maintaining the proper impeller to shaft clearance.

The team reviewed the modification to verify that the design bases, licensing bases, and performance capability of the 'A' SSW pump had not been degraded by the modification. The team interviewed engineering staff and reviewed technical evaluations associated with the modification to determine if the A SSW pump would function in accordance with the design assumptions. The team performed several walkdowns of accessible portions of the SSW system in the intake area (including walkdowns with the 'A' SSW pump in service) to independently verify engineering assumptions where possible and assess Entergy's configuration control and the material condition of the associated structures, systems, and components (SSCs). The team reviewed SSW pump surveillances, operator logs, maintenance work orders (WOs), and operating procedures to verify that Entergy adequately maintained and controlled the SSW pumps as designed. The team also reviewed corrective action (CA) condition reports (CRs), inservice test trending data, system engineer walkdown reports, and the SSW system health report to determine if there were reliability or performance issues associated with the SSW system. The documents reviewed for each section of this report are listed in the Attachment.

b. Findings

.1 Degraded Salt Service Water Pump Discharge Piping Supports

Introduction. The team identified an NCV of very low safety significance (Green) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," because Entergy did not promptly identify and correct a condition adverse to quality. Specifically, Entergy did not identify degraded SSW pump discharge piping supports that called into question the operability of both SSW loops.

Description. During an initial SSW pump walkdown, the team identified and questioned apparent degraded conditions on the 'B' and 'D' SSW pump discharge piping supports (H29-1-1062 and H29-1-1065, respectively). In response to the team's concerns, engineering promptly performed several detailed SSW support walkdowns, agreed with the team's assessment, and initiated CA CRs for the degraded conditions. On May 4,

2016, engineering initiated CR 2016-3157 for the 'D' SSW support and CR 2016-3161 for the 'B' SSW support. In particular, engineering identified that the embedded plate in the SSW pump suction bay ceiling that supports the 'D' SSW hanger H29-1-1065 appeared to be corroded through and partially fractured. In addition, engineering identified that a gap existed beneath the embedded plate providing structural support for the south side of 'B' SSW hanger H29-1-1062. The plate and hanger provide support for the associated SSW pump discharge piping following a 90 degree bend after it passes through the concrete floor into the SSW vault below. These hangers were designed to provide both seismic and lateral support to hold the SSW discharge pipe in place when force is applied during pump operation causing thrust on the elbow piping.

Entergy promptly assessed the immediate operability of both SSW loops given the identified degraded conditions. Entergy determined that the 'D' SSW support (H29-1-1065) could not be assured to be structurally sound and thus was not able to fulfill its safety function. Accordingly, at 12:31 P.M. on May 4, operators declared the 'D' SSW pump inoperable and entered a TS 3.5.B.4 limiting condition for operation (LCO) statement for the 'D' SSW pump (LCO Track 1-16-0075). Engineering determined that the 'B' SSW loop remained operable with compensatory measures because (1) the 'E' SSW pump and common 'C' swing SSW pump remained operable and aligned to the 'B' SSW loop, and (2) operators placed the 'D' SSW pump in "pull-to-lock" and tagged its discharge valve closed to minimize transmitting stress to the plate in question. Entergy implemented a permanent plant modification via WO 445125 to restore the 'D' SSW pump to an operable condition. At 6:03 P.M. on May 10, operators declared the 'D' SSW pump operable and exited the TS LCO tracking statement.

In response to the degraded condition on 'B' SSW support H29-1-1062, operators determined that the 'B' SSW pump was operable but degraded/non-conforming based on engineering judgment as there was reasonable assurance of the hanger's structural integrity and its ability to perform its safety function. Based on detailed walkdowns, Entergy determined that the 'A' SSW loop remained operable because the 'A' SSW pump and 'B' SSW pump remained operable and aligned to the 'A' SSW loop. Entergy initiated actions to repair the 'B' SSW support.

In response to NRC questions, Entergy contracted an external vendor to perform a past operability assessment of the SSW system pumps' discharge piping, addressing the degraded conditions of the associated piping supports during the period prior to identification and repair of the issue of concern. The team reviewed Entergy's completed evaluation, noting that the assumed loads appropriately considered worst-case combinations of deadweight, thermal expansion, seismic, and unbalanced pump start-up and shut-down pressure forces. In addition, the team reviewed Entergy's evaluation regarding the remaining stiffness and capacity/reliability of the degraded pipe supports. The team noted that Entergy's evaluation adequately reduced the pipe support member size to account for the corrosion degradation and reduced the corresponding stiffness of the pipe support. Furthermore, the team (in consultation with NRC staff) noted that while RG 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," allows damping values for the piping system of 4%, Entergy's seismic piping analysis used more conservative damping values of 0.5% and 1.0%. The team verified that Entergy's past operability analysis demonstrated that stresses met the operability limits of ASME Boiler and Pressure Vessel Code, Section III, Paragraph NC-3655, referenced within Appendix F, Paragraph F-1430, which is the criteria identified in

Appendix C, Paragraph C.11 (piping and pipe support requirements) of NRC IMC 0326. Thus, the team determined that Entergy's conclusions regarding past operability were adequate and the piping system remained operable/but degraded for the as-found support conditions.

Based on a review of Entergy's corrective action program (CAP) and the SSW system health and walkdown reports, the team noted that Entergy had missed several recent opportunities to identify and correct the SSW support deficiencies prior to NRC identification. Specifically, on October 9, 2015, NRC inspectors had identified significant corrosion on SSW support bracket H29-1-9SG on the 'A' SSW common discharge piping in the lower level vault at the SSW intake structure. Entergy performed a walkdown of the bracket and observed the degraded portion of the bracket as described by the NRC inspectors (CR 2015-8476). During a more rigorous inspection of the bracket, engineering identified that the lower portion of the bracket was fractured. Entergy determined that support bracket H29-1-9SG was inoperable; however, based on additional calculations, the 'A' SSW loop remained operable but degraded/non-conforming. Entergy performed an extent-of-condition walkdown, an equipment apparent cause evaluation (EACE)(CR 2015-8476 CA-3), and installed a new support bracket (WO 427705) for this condition adverse to quality. During Entergy's extent-of-condition walkdowns, engineering identified additional SSW supports in the lower level SSW vault that exhibited some level of corrosion. For example, on October 20, 2015, engineering identified degraded SSW support (H29-1-11SG) and initiated CR 2015-8652 to evaluate and repair (WO 428288). On October 22, 2015, Entergy initiated CR 2015-8733 to generate WO 428515 to clean, inspect, and recoat various SSW pipe supports (H29-1-10SG, H29-1-12SG, H29-1-22, H29-1-23, H29-1-24, H29-1-25, H29-1-26, H29-1-27, H29-1-1062, and H29-1-1063) located in the lower level vault at the SSW intake structure. Engineering noted that the conditions on these ranged from minor surface rust to moderate corrosion involving some level of flaking. Engineering determined that, based on visual observations, none of the conditions appeared to challenge the functional capability of the supports. The team noted that Entergy had documented completion of WO 428288 on March 3, 2016, and WO 428515 (including the cleaning, inspecting, and recoating of 'B' SSW pipe support H29-1-1062) on April 1, 2016.

In addition, the team noted that the following also represented missed opportunities for Entergy to self-identify the degraded 'B' and 'D' SSW supports prior to May 2016: (1) EACE corrective actions included an action for system engineers to complete a detailed walk down of accessible safety-related pipe supports and document with pictures in system notebooks (CR 2015-8476 CA-7); (2) engineering closed 2015-8476 CA-7 on April 5, 2016, but did not identify any additional degraded SSW supports and did not place any pictures of the 'B' and 'D' SSW supports in the system notebook; (3) on April 14, 2016, the Departmental Performance Improvement Coordinator CA Closure Committee determined that engineering's response to 2015-8476 CA-7 was not adequate for closure and initiated CR 2016-2646; (4) CR 2016-2646 was closed to 2015-8476 CA-12, which engineering closed out on April 27, 2016, by disputing the Departmental Performance Improvement Coordinator CA Closure Committee's comments; (5) 2015-8476 CA-9 documented completion of WO 428515 and that no additional actions were required on April 11, 2016; (6) operations training documented the plant operators review of the CR 2015-8476 EACE and closed 2015-8476 CA-10 on February 26, 2016; (7) engineering's closure review for CR 2015-8476 documented adequate closure of all CAs on April 29, 2016, under 2015-8476 CA-13; and (8) the system engineer SSW walkdown report performed on April 26, 2016, documented no

SSW support issues and noted completion of WO 428515 to coat rusted hangers/supports in the SSW pump suction bay. The team noted that based on engineering's extent-of-condition review (documented in CR 2015-8733) that it is likely that significant degradation of 'D' SSW support H29-1-1065 did not exist in October 2015; however, the corrosive attack on 'D' SSW support H29-1-1065 was unlikely to have occurred over a one week time period (from the last documented system engineer walkdown on April 26 until identified on May 4).

Analysis. The performance deficiency associated with this finding was that Entergy did not identify degraded SSW pump discharge piping supports that called into question the operability of both SSW loops. The team determined that it was reasonable for Entergy to identify and correct degraded supports H29-1-1062 and H29-1-1065 prior to NRC identification of the issue in May 2016. The finding was considered more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone's objective of ensuring the reliability, availability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The team evaluated the significance of this finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," Exhibit 2, "Mitigating Systems Screening Questions." The team determined the finding screened as very low safety significance (Green) because the finding did not result in the loss of system functionality.

The finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because Entergy did not take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, Entergy did not effectively resolve and correct SSW support corrosion issues identified in October 2015, including causes and extent-of-condition, in a timely manner to preclude an adverse impact on system reliability in May 2016. [P.3]

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, 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 the above, from October 9, 2015, to May 4, 2016, Entergy did not identify and correct conditions adverse to quality regarding degraded SSW discharge piping supports (H29-1-1062 and H29-1-1065) that adversely impacted both SSW loops. Entergy's short-term corrective actions included replacing support bracket H29-1-9SG, repairing SSW support H29-1-11SG, refurbishing several corroded SSW supports, and implementing a permanent plant modification to restore the 'D' SSW pump to an operable condition. Because this violation is of very low safety significance (Green) and has been entered into Entergy's CAP (CRs 2015-8476, 2015-8652, 2015-8733, 2016-3157, and 2016-3161) this violation is being treated as an NCV consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000293/2016007-01, Failure to Identify and Correct Degraded SSW Pump Discharge Piping Supports that Called into Question the Operability of Both SSW Loops)**

.2 Salt Service Water Pump Discharge Piping Supports Design Control Issue

Introduction. The team documented a self-revealing violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," as Entergy failed to verify the adequacy of the design to assure that applicable regulatory requirements and the design basis were correctly

translated into safety-related SSW pump discharge piping support installation instructions. Specifically, Entergy did not assure that the SSW pump discharge piping supports were installed in accordance with design drawings which called into question the operability of both SSW loops.

Description. In May 2016, in response to degraded conditions on 'D' SSW hanger H29-1-1065, Entergy implemented a permanent plant modification via WO 445125 to restore the 'D' SSW pump to an operable condition (see the NRC-identified finding documented in Section 1R17.2.1.b.1 of this report). Following the repair, engineering noted a design control deficiency while examining the corroded embedded plate removed as part of the modification to 'D' SSW hanger H29-1-1065. Specifically, engineering observed that the embedded plate was not installed in accordance with design drawing C46, "Intake Structures Sections," and drawing C122 Sheet 1, "Typical Concrete Details." The design drawings show the embedded steel as a 6C13 structural shape with two 1 inch x ¼ inch bent bars extending more than 15 inches into the concrete ceiling at 18 inch intervals. Based on measurements of the corroded section removed, the embedded steel was actually a ½ inch flat plate with 3/8 inch diameter studs welded to the back. Based on the installed configuration, compared to the design drawings, engineering had a reasonable doubt of operability for three similarly configured SSW discharge piping supports (H29-1-1063 supporting 'A' SSW pump discharge piping; H29-1-1062 supporting 'B' SSW pump discharge piping; and H29-1-1064 supporting 'E' SSW pump discharge piping) and initiated CR 2016-3326 on May 11, 2016. Operators promptly declared the 'A', 'B', and 'E' SSW pumps inoperable and entered a 72 hour TS 3.5.B.4 LCO action statement (LCO ACT-1-16-0090) for the inoperable 'A' SSW loop at 9:00 P.M. on May 11. At 9:00 P.M. on May 11, operators also entered a TS 3.5.B.4 LCO tracking statement due to the inoperable 'E' SSW pump (LCO Track 1-16-0078). The 'B' SSW loop remained operable as the 'D' SSW pump and common 'C' swing SSW pump remained operable and aligned to the 'B' SSW loop.

Entergy developed and implemented temporary modifications to install temporary seismic and lateral supports on the discharge piping for the 'A', 'B', and 'E' SSW pumps to restore each of the affected pumps to an operable with compensatory measures condition. Entergy completed EC 64672 (WO 445641) on P-208A (the 'A' SSW pump) and EC 64675 (WO 445642) on P-208B (the 'B' SSW pump) on May 12. At 8:35 P.M. on May 12, operators declared the 'A' and 'B' SSW pumps operable with compensatory measures and exited the TS 3.5.B.4 LCO action statement for the 'A' SSW loop. Entergy completed EC 64674 (WO 445643) on P-208E (the 'E' SSW pump) on May 18. At 0:37 A.M. on May 18, operators declared the 'E' SSW operable with compensatory measures and exited the TS 3.5.B.4 LCO tracking statement. Entergy planned to implement permanent plant modifications on the 'A', 'B', and 'E' SSW pump discharge piping supports to restore each of the respective SSW pumps to a fully operable condition.

In response to NRC questions, Entergy contracted an external vendor to perform a past operability assessment of the SSW system pumps' discharge piping, addressing the degraded conditions of the associated piping supports during the period prior to identification and repair of the issue of concern. The team reviewed Entergy's completed evaluation, noting that the assumed loads appropriately considered worst-case combinations of deadweight, thermal expansion, seismic, and unbalanced pump start-up and shut-down pressure forces. In addition, the team reviewed Entergy's evaluation regarding the remaining stiffness and capacity/reliability of the degraded pipe

supports. The team noted that Entergy's evaluation adequately reduced the pipe support member size to account for the corrosion degradation and reduced the corresponding stiffness of the pipe support. Furthermore, the team (in consultation with NRC staff) noted that while RG 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," allows damping values for the piping system of 4%, Entergy's seismic piping analysis used more conservative damping values of 0.5% and 1.0%. The team verified that Entergy's past operability analysis demonstrated that stresses met the operability limits of ASME Boiler and Pressure Vessel Code, Section III, Paragraph NC-3655, referenced within Appendix F, Paragraph F-1430, which is the criteria identified in Appendix C, Paragraph C.11 (piping and pipe support requirements) of NRC IMC 0326. Thus, the team determined that Entergy's conclusions regarding past operability were adequate and the piping system remained operable/but degraded for the as-found support conditions.

The team noted that the best opportunity for the original licensee (Boston Edison) to identify this design control deficiency was during initial construction. The team noted that Entergy modified the south side of the 'D' SSW support H29-1-1065 in 2005 (ER 05106937) due to corrosion issues but did not remove the installed embedded plate in the ceiling (which would have revealed the design deficiency). On May 4, 2016, in response to the team's concerns, engineering initiated CR 2016-3161 for the 'B' SSW support. In particular, engineering identified that "a gap existed beneath the embedded channel providing structural support for the south side of 'B' SSW hanger H29-1-1062." The team noted that the observed gap between the previously embedded "plate" and the concrete ceiling called into question whether there was actually an embedded 'C' channel installed as shown in the associated SSW support drawings. Notwithstanding, the team noted that it was reasonable for Entergy to identify and correct this design control deficiency prior to May 2016 through preventive maintenance activities on these safety-related supports and managing aging effects during periodic engineering and plant operator walkdowns of the SSW supports in the intake structure. The team also noted that Entergy performed an extent-of-condition review (CR 2016-3326, CA-4). Specifically, Entergy performed a search of drawings, field sketches, field changes, specifications, problem reports, procurement documents, receipt inspections, and PNPS Engineering Drawings Reference Handbook and concluded that this was the only safety-related location with this configuration.

Analysis. The performance deficiency associated with this finding was that Entergy did not verify the adequacy of the design to assure that the safety-related SSW pump discharge piping supports were installed in accordance with design drawings which called into question the operability of both SSW loops. The team determined that it was reasonable for Entergy to identify and correct this performance deficiency prior to discovery in May 2016. The finding was considered more than minor because it was associated with the design control (initial design) attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone's objective of ensuring the reliability, availability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The team evaluated the significance of this finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," Exhibit 2, "Mitigating Systems Screening Questions." The team determined the finding screened as very low safety significance (Green) because the finding was a design deficiency which did not result in a loss of functionality of the SSW pump supports.

This finding did not have a cross-cutting aspect because the most significant contributor of the performance deficiency occurred during initial construction and, thus, was not reflective of current Entergy performance.

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, prior to May 12, 2016, Entergy failed to verify the adequacy of the design to assure that applicable regulatory requirements and the design basis were correctly translated into safety-related SSW pump discharge piping support installation instructions. Specifically, Entergy did not assure that the SSW pump discharge piping supports (H29-1-1062, H29-1-1063, H29-1-1064, H29-1-1065) were installed in accordance with design drawings (H29-1-1062, Pipe Support SSWS, Revision E1; H29-1-1063, Pipe Support SSWS, Revision E2; H29-1-1064, Pipe Support SSWS, Revision E0; and H29-1-1065, Pipe Support SSWS, Revision E2, respectively). Entergy's short-term corrective actions included implementing a permanent plant modification for the 'D' SSW pump support and temporary modifications on the 'A', 'B', and 'E' SSW pump discharge piping supports. Because this violation is of very low safety significance (Green) and has been entered into Entergy's CAP (CR 2016-3326), this violation is being treated as an NCV consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000293/2016007-02, Failure to Adequately Translate SSW Support Design Drawings into the Installation Work Orders to Ensure SSW Discharge Piping was Adequately Supported)**

.2.2 Fuel Oil Transfer System Design Bases Reconstitution

a. Inspection Scope

The team reviewed EC 42768 that Entergy implemented to assure that applicable regulatory requirements and the design basis were correctly translated into specifications, drawings, procedures, and instructions associated with TS Amendment 184. In August 2012, NRC inspectors had identified that Entergy did not have a documented design basis for crediting the station blackout (SBO) fuel oil transfer system to meet the seven day underground fuel oil storage tank requirement to support the emergency diesel generator (EDG) onsite power safety function (see NRC Integrated Inspection Report 05000293/2012005 Section 1R18). In the apparent cause analysis for that issue, Entergy determined that the SBO fuel oil transfer system had not been subjected to a design change or modification process and, as a result, the necessary design inputs, evaluations, and reviews were not performed in 1999 to adequately support TS Amendment 184. Entergy implemented this EC to assure that adequate design control measures were applied to the equipment and processes used to execute the EDG fuel transfer process approved by the NRC in TS Amendment 184.

The team reviewed the EC to verify that the design bases, licensing bases, and performance capability of the EDG system had not been degraded by any of the associated equipment, process, and/or procedure changes. The team interviewed design engineers, and reviewed evaluations, calculations, surveillance results, and associated maintenance WOs to verify that Entergy appropriately implemented the EC in accordance with design assumptions. The team also performed several walkdowns of

the accessible portions of the SBO and EDG fuel oil systems, including alternate fuel oil transfer equipment, to independently assess Entergy's configuration control and the material condition of the associated fuel oil SSCs. The team also reviewed CA CRs, preventive maintenance WOs, and the EDG system health report to determine if there were reliability or performance issues that may have resulted from the modification. Additionally, the team reviewed the 10 CFR 50.59 screen and engineering evaluation associated with this modification.

b. Findings

No findings were identified.

.2.3 Condenser Bay Internal Flooding Mitigation Modification

a. Inspection Scope

The team reviewed EC 59063 that Entergy implemented to evaluate and control the activities associated with the analysis, transportation, rigging, and installation of watertight doors and flood barriers to mitigate condenser bay internal flooding events. During the 2011 NRC Component Design Bases Inspection, the inspectors identified a design control violation because Entergy had not verified the adequacy of the design with respect to ensuring that safety-related equipment would be adequately protected from a postulated flood originating in the condenser bay. Specifically, Entergy had not correctly evaluated a failure of seawater system piping or equipment that could challenge the doors separating the condenser bay from the reactor building auxiliary bay, which would require timely operator identification and action to secure the seawater pumps to prevent the common mode failure of redundant safety-related components (see NRC Component Design Bases Inspection Report 05000293/2011007). Entergy originally issued EC 49706 to address all the design modifications needed to mitigate flooding issues related to condenser bay internal flooding. Entergy initially implemented portions of EC 49706 during the May 2015 refueling outage (RFO 20). However, based on Entergy's inability to finish the entire scope of EC 49706 in RFO 20 and to facilitate more effective EC package tracking and work management, Entergy decided to break down EC 49706 into several specific modification packages. Accordingly, Entergy created EC 59063 to cover the installation of the three watertight doors (DR-11, DR-12, and DR-25A) and flood gate GT-1 installed at door DR-22.

The team reviewed the modification to verify that safety-related equipment would be adequately protected from a postulated flood originating in the condenser bay, safe shutdown would not be challenged by condenser bay internal flooding, and that important-to-safety SSCs in the vicinity of the modified doors and barriers had not been adversely impacted by the modification. The team reviewed associated calculations to verify that engineering used conservative assumptions in comparing sloshing, inertia, seismic, and flood loads to the maximum flood height protection provided by each barrier. The team reviewed the associated WO instructions and documentation to verify that maintenance implemented the modification as designed. The team performed several walkdowns of the installed watertight doors and the new flood gate to independently assess Entergy's configuration control and workmanship, the operating environment, and the material condition of the associated SSCs. The team also reviewed CA CRs and completed WOs to determine if there were reliability or performance issues associated with the modification or new barriers. In addition, the

team reviewed the 10 CFR 50.59 screen and engineering evaluation associated with this modification.

b. Findings

No findings were identified.

.2.4 Removal of Flame Detectors and Floor Level Suppression System in 'A' and 'B' Emergency Diesel Generator Rooms

a. Inspection Scope

The team reviewed modification EC 40493 that removed the ultra-violet flame detectors that were connected to the pre-action fire suppression systems in the 'A' and 'B' EDG rooms. The pilot style nozzles that provided floor level water suppression for 'A' and 'B' EDG were plugged. The remaining detectors and fusible links within the 'A' and 'B' EDG rooms' fire detection and suppression systems remained functional. Entergy performed the modification because the existing ultra-violet flame detectors were obsolete and attempts to repair these faulty detectors were not successful. The floor level water suppression was installed as an enhancement to the overall pre-action suppression system and there was not a regulatory requirement to maintain this system. The review was performed to verify that the design bases and licensing bases of the 'A' and 'B' EDG rooms had not been degraded by the modification. Additionally, the equivalent 10 CFR 50.59 screen associated with this modification was reviewed as described in Section 1R17.1 of this report.

The team evaluated whether the modification was consistent with requirements in the design and licensing bases. Design assumptions were reviewed to evaluate whether they were technically appropriate and consistent with the UFSAR. The team also verified whether selected drawings were properly updated based on removal of the flame detectors and floor level suppression system. The team performed a walkdown of the 'A' and 'B' EDG rooms to identify any abnormal conditions related to removing the floor level suppression system from service. Finally, the team conducted interviews with engineering staff to determine if the remaining fire detection and pre-action suppression system would function in accordance with the design assumptions.

b. Findings

No findings were identified.

.2.5 Undervoltage Relay and Setpoint Change for Transfer Switch Y11

a. Inspection Scope

The team reviewed modification EC 46821 that Entergy implemented to replace a fixed setpoint undervoltage relay, ASCO Model 214B69, with an adjustable setpoint undervoltage relay, ABB Model CM-ESS.2S, within automatic transfer switch Y11. The existing undervoltage relay had a fixed dropout voltage setpoint of 204V. The new adjustable undervoltage relay was set to 196V. The modification was performed because the existing relay would occasionally sense momentary undervoltage conditions during large motor starts and initiate dead bus transfers from the normal power source of

transfer switch Y11 to the emergency power source in order to provide power to downstream loads. The review was performed to verify that the design bases, licensing bases, and performance capability of the replacement undervoltage relay and setpoint change had not been degraded by the modification. Additionally, the equivalent 10 CFR 50.59 screen associated with this modification was reviewed as described in Section 1R17.1 of this report.

The team evaluated whether the modification was consistent with requirements in the design and licensing bases. The team reviewed technical evaluations to assess whether the modification was consistent with design assumptions. Power requirements and setpoint calculations were reviewed to verify that the undervoltage relay met the manufacturer's specifications. Design assumptions were reviewed to evaluate whether they were technically appropriate and consistent with the UFSAR. The team also verified that selected drawings and preventive maintenance procedures were properly updated based on the installation of the replacement relay. The team reviewed the post-modification testing to verify proper operation of the equipment. The team performed a walkdown of the Y11 automatic transfer switch to identify any abnormal conditions and to verify proper operation of the equipment while in-service. Finally, the team conducted interviews with engineering staff to determine if the affected SSC would function in accordance with the design assumptions.

b. Findings

No findings were identified.

.2.6 Replace Line 355 Universal Power Line Carrier to Resolve Reflective Power Alarm

a. Inspection Scope

The team reviewed modification EC 49162 that replaced the existing Ametek Universal Power Line Carrier (UPLC), firmware V3.02a, with a new Ametek UPLC, firmware V3.08, within relay protection panel C650. The modification was performed because the existing UPLC that provided a directional comparison block function had a design flaw and caused an erroneous common alarm in the main control room during daily automatic check-back testing due to high reflective power being falsely detected. The review was performed to verify that the design bases, licensing bases, and performance capability of the replacement UPLC had not been degraded by the modification. A 10 CFR 50.59 screen associated with this modification was not required because this modification was an equivalent change.

The team evaluated whether the modification was consistent with requirements in the design and licensing bases. The team reviewed configuration data and technical evaluations to assess whether the modification was consistent with design assumptions. Design assumptions were reviewed to evaluate whether they were technically appropriate and consistent with the UFSAR. The team also verified that selected drawings and software quality assurance records were properly updated based on the installation of the replacement UPLC. The team reviewed the post-modification testing to verify proper operation of the equipment and performed a walkdown of the relay protection panel 650 to verify proper operation of the equipment while in-service. Finally, the team conducted interviews with engineering staff to determine if the affected SSCs would function in accordance with the design assumptions.

b. Findings

No findings were identified.

.2.7 Component Grade Dedication of Electrolytic Capacitors Used in Intermediate Range Monitors (IRMs)

a. Inspection Scope

The team reviewed CGD 137304 that performed a component grade dedication of Vishay 330 microFarad, 25Vdc, aluminum electrolytic capacitors. These capacitors were installed in the voltage regulators of intermediate range monitors (IRMs) A-H because the existing General Electric electrolytic capacitors were approaching their end-of-service life. The IRMs provide rod block signals to the reactor manual control system and trip signals to the reactor protection system during reactor startup. The review was performed to verify that the design bases, licensing bases, and performance capability of the replacement capacitors had not been degraded by the modification. A 10 CFR 50.59 screen associated with this modification was not required because this modification was a component grade dedication.

The team evaluated whether the modification was consistent with requirements in the design and licensing bases. The team reviewed the test acceptance plan and procurement requirements to assess whether the modification was consistent with design assumptions. Electrical specifications were reviewed to verify that the capacitors met the manufacturer's specifications. The team also verified that selected preventive maintenance procedures were properly updated based on the installation of the replacement capacitors. The team reviewed the post-modification testing to verify proper operation of the equipment. Finally, the team conducted interviews with engineering staff to determine if the affected SSCs would function in accordance with the design assumptions.

b. Findings

No findings were identified.

.2.8 Repair Wall of East Salt Service Water Pump Bay Near P-208E

a. Inspection Scope

The team reviewed EC 48932 that Entergy implemented to prevent further progression of degrading concrete on the south wall of the East SSW pump bay to preclude potential foreign material ingestion into the suction of safety-related SSW pumps. Specifically, in July 2013, divers identified an area of the submerged wall bulging and delaminating near the suction of SSW pump P-208E. Loose areas of concrete spalling were broken apart and removed by the divers, resulting in a 2-ft wide by 3-ft high depression with a depth of approximately 2 inches into the concrete wall just above the floor level in the pump suction bay. The EC evaluated and approved a plan and materials for non-structural, underwater concrete repair activities, detailing the cleaning and preparation of the affected area, installation of new rebar dowels, and application of an underwater repair mortar.

The team reviewed the modification package to verify that the design and licensing bases had not been degraded by the modification, and that the structural integrity of the SSW pump bay and the intake structure was not affected. The team reviewed the vendor product information and supporting materials list to determine if the change met design requirements. The team interviewed engineers responsible for the design configuration and repairs to evaluate whether the modification could result in an adverse effect to safety components. The team reviewed multiple underwater diver video recordings of the initial inspection, preparation and repair work, final foreign material exclusion closeout inspection, and follow-up inspections of the pump bay and repaired wall area. Finally, a review of CRs was performed to evaluate whether there were any reliability or performance issues associated with the post-modification configuration.

b. Findings

No findings were identified.

.2.9 Alternate Coating System for Structures and Systems Located within the Intake Structure

a. Inspection Scope

The team reviewed equivalent EC 48704 that Entergy implemented to replace the specified coating system for piping and structures located within the screen house/intake structure. The coating system is used to both protect carbon steel components from external corrosion and protect concrete structures from wear and degradation/spalling resulting from the moist and salty atmospheric environment. The coating system products specified in Pilgrim Unit 1 Specification C93ERNQ were no longer procurable and therefore required an equivalent replacement for the approved system.

The team reviewed the adequacy of the evaluation in determining that the coating material was suitable for protection in that environment. The team reviewed the chemical compatibility analysis to evaluate the suitability of the various selected Corotech products applied as primers, mid-layer coatings, and finish-layers or top coats to steel and ferrous metal piping and structures as well as concrete walls and floors. This included the review of the vendor's product data sheets and Material Safety Data Sheets, along with the surface preparation and application requirements, to ensure the engineering evaluation was consistent with the material product specifications. Additionally, the team reviewed Entergy's assessment to the impact/applicability of NRC Information Notice 2007-026, "Combustibility of Epoxy Floor Coatings at Commercial Nuclear Power Plants," noting that the fire water system within the screen house/intake structure was not applicable to EC 48704. The team interviewed engineers to discuss the associated evaluation and verify that the design and licensing bases would not be degraded by the repair method. Finally, the team performed several walkdowns of the screen house/intake structure and SSW pump bay to evaluate the material condition of the areas.

b. Findings

No findings were identified.

.2.10 Modifications to MO-1400-25A Core Spray Valve

a. Inspection Scope

The team reviewed EC 50195 that Entergy implemented to install a smaller size Limitorque actuator on the safety-related MO-1400-25A core spray inboard injection isolation valve. The modification was necessary because the thrust margin (the measured thrust at the point of torque switch trip above the required thrust) had degraded and no further adjustment of the torque switch was possible to increase thrust margin. Specifically, the range of the MO-1400-25A's SB-3 Limitorque actuator spring pack was limited such that adequate torque switch adjustment could no longer be set high enough to have any margin above the required thrust while maintaining margin on the valve's weak link limit. Entergy had determined that the existing size SB-3 Limitorque actuator was oversized for the required design conditions. The modification replaced the existing SB-3 actuator with an SB-1 actuator and changed the motor size from 80 ft-lb to 60 ft-lb, along with a spring pack that will permit the needed torque switch adjustments over time. The ratings of the SB-1 actuator with the 60 ft-lb motor were determined to be consistent with the design condition requirements. An adapter plate was manufactured and installed on the valve yoke flange to permit the transition to the smaller SB-1 bolt circle diameter.

The team reviewed the modification to verify that the design bases, licensing bases, and performance capability of the core spray system had not been degraded by the modification. The team verified that the design specifications of the new actuator were equivalent or an improvement. The team interviewed design engineers and reviewed calculations, evaluations, drawings, vendor verification, and post-modification testing results to verify that the valve replacement modifications were appropriately implemented and that revisions to applicable documentation had been completed. In addition, the team reviewed CA documents to determine if there were reliability or performance issues that may have resulted from the modification. The 10 CFR 50.59 screening determination associated with this modification was reviewed as described in Section 1R17.1 of this report.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (71152)

a. Inspection Scope

The team reviewed a sample of problems that Entergy had previously identified and entered into the CAP. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of CAs. In addition, the team reviewed CA CRs written on issues identified during the inspection to verify adequate problem identification and incorporation of the problem into the CAP.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On May 19, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Pilgrim Nuclear Power Station (PNPS). The enclosed inspection report documents the inspection results, which were debriefed on May 19, 2016, with Acting Site Vice President, Mr. M. Romeo; General Manager Plant Operations, Mr. J. Macdonald; and other members of your staff.

The team presented the inspection results to Mr. M. Romeo, (Acting) Site Vice President and other members of Entergy's staff at an exit meeting on June 29, 2016. The team returned the proprietary information reviewed during the inspection to the licensee and verified that this report does not contain proprietary information.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Entergy Personnel
S. Das, Senior Engineer
J. Gerety, Manager, Systems Engineering
D. Grimes, Senior Engineer, Mechanical/Civil Design
M. Lynch, EFIN Supervisor
M. McClellan, Senior Engineer, Mechanical/Civil Design
F. McGinnis, Regulatory Assurance
R. Metthe, EFIN Civil Engineer
R. Morris, EDG System Engineer
E. Perkins, Manager, Regulatory Assurance
B. Rancourt, Senior Engineer
J. Sabina, IST Coordinator
C. Sorensen, Maintenance Supervisor
J. Steele, Project Manager, Dryden Diving (Contractor)
J. Tucker, Supervisor, Mechanical/Civil Design
T. White, Manager, Design & Program Engineering

NRC Personnel
E. Carfang, Senior Resident Inspector - Pilgrim
K. Hsu, Senior Mechanical Engineer, Mechanical and Civil Engineering Branch, Division of Engineering, NRR
P. Kaufman, Senior Reactor Inspector, Engineering Branch 1, DRS, Region 1
M. Modes, Senior Reactor Inspector, Engineering Branch 1, DRS, Region 1

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened/Closed

05000293/2016007-01	NCV	Failure to identify and correct degraded SSW pump discharge piping supports that called into question the operability of both SSW loops (Section 1R17.2.1.b.1)
05000293/2016007-02	NCV	Failure to adequately translate SSW support design drawings into the installation work orders to ensure SSW discharge piping was adequately supported (Section 1R17.2.1.b.2)

LIST OF DOCUMENTS REVIEWED

10 CFR 50.59 Screened-out Evaluations

2.2.22.5, RCIC Injection and Pressure Control, Revision 17, Process Applicability Determination, dated 7/29/15
2.2.32, Salt Service Water System (SSW), Revision 92, Process Applicability Determination, dated 1/11/16
2.2.8, Standby AC Power System (Diesel Generators), Revision 107, Process Applicability Determination, dated 6/20/14
3.M.3-1, Installation and Removal of Interlock for Relay Testing of Buses A5 and A6, dated 11/12/13
3.M.4-37, Hydraulic and Mechanical Snubber Functional Test, Revision 43, Process Applicability Determination, dated 4/14/15
3.M.4-53, Check Valve Disassembly and Inspection, Revision 8, Process Applicability Determination, dated 5/28/14
8.5.1.3, Core Spray Motor Operated Valve Quarterly Operability, Revision 36, Process Applicability Determination, dated 2/18/14
8.5.2.3, LPCI and Containment Cooling Motor Operated Valve Operability Test, Revision 52, Process Applicability Determination, dated 5/21/14
8.5.3.11, SSW Valve Operability Test, Revision 18, Process Applicability Determination, dated 2/14/14
8.6.5.1, Jet Pump Operability Check, Revision 34, Process Applicability Determination, dated 11/3/15
8.B.14, Changes to Fire Protection Technical Requirements, dated 3/13/14
8.C.35, Diesel Powered Air Compressor Operability Test, Revision 30, Process Applicability Determination, dated 2/12/15
8.M.2-7.1.9, Testing of Drywell to Pressure Suppression Chamber Vacuum Breakers, Revision 4, Process Applicability Determination, dated 7/9/14
8.M.3-20.2, Performance of Signal Adequacy Testing of Line 355 Protective Relays, dated 9/25/14
EC 26026, Procedure 2.2.1 Upgrade Line 342 to Match National Grid Auburn Station Changes, dated 3/16/13
EC 31167, Missile Protection for EDG Underground Storage Tanks Process Applicability Determination, dated 7/16/13
EC 32791, Installation of New Free Standing Annunciator Panel C661 in Relay House, dated 3/16/13
EC 48619, Upgrade of Line 355 Protection Scheme to Match Line 342 Improvements, dated 7/7/14
EC 49036, Upgrade EDG ‘B’ Governor Control System, dated 1/17/14
EC 54258, HPCI B Lube Oil Filter Vent Valve Equivalent Change Evaluation, Revision 0

Calculations & Analysis

C15.0.2283, Qualification of Doors #4, 11, 15, 22, & 25 for PBOC Flood Load, Revision 1
C15.0.3441, Modification of SSW Pipe Support H29-1-1065, Revision 0
C15.0.3655, Condenser Bay Flood - Barrier Doors, Revision 0
D3DQA-12352-01 & D3DQA-12352-02, Structural Design Analysis of Flood Barrier (Door 11 & Door 12) for Entergy Nuclear Operations Inc. Plymouth MA, Revision C
D3DQA-12352-03, Structural Design Analysis of Flood Barrier (Door 25A) for Entergy Nuclear Operations Inc. Plymouth MA, Revision D
M563, AC Motor Operated Valve Design Basis Review, Revision 9

M600, MOV Pressure Locking and Thermal Binding Evaluation, Revision 4
M636, MOV Weak Link Summary, Revision 8
M792, Weak Link Analysis for MO-1400-25A and MO-1400-25B, Revision 0
M1146, Thrust and Torque Calculation for MO-1400-25A, Revision 3
M1363, Emergency Diesel Generator (EDG) Underground Storage Tank (UST) Vent Missile Analysis, Revision 0
M1373, Internal Flooding Calculation with Safe Shutdown Evaluation for PNPS Reactor Building, Revision 0
M1373, Internal Flooding Calculation with Safe Shutdown Evaluation for PNPS Turbine, RX Aux, Radwaste, Intake, Offgas & Main Stack Buildings, Revision 0
M1393, Emergency Diesel Fuel Oil Skid Flow Calculation, Revision 0
M1402, Analysis of Actuator Weight Change for MO-1400-25A and MO-1400-25B, Revision 0
M1403, Yoke Adapter Plate Analysis for MO-1400-25A, Revision 0
PDC 94-18H, Modification to MO-1400-25A for GL 89-10, Revision 0
PS1, 120V Vital AC Buses Y1 and Y2, Revision 3
PS79, Emergency Diesel Generator Loading, Revision 6
PS129, AC MCC Bus Voltage During Start of MOVs, Revision 0
PS133, Electrical Performance and Stroke Timing Evaluation of Priority 3 AC MOVs, Revision 2
PS141, Thermal Overload Heater Sizing for Priority 2, 3, 4, 5 and 6 MOVs, Revision 1
S&SA055, EDG Low Sulfur Fuel Consumption and Ultra Low Sulfur Density Limits Over Seven Days in Response to a LOCA with LOOP, Revision 7

Corrective Action Condition Reports (CR-PNP-)

2007-03930	2010-01179	2011-04503	2012-03428
2012-04692	2013-04298	2013-05277	2013-07470
2013-07692	2013-07918	2014-00899	2014-01711
2014-02247	2015-00289	2015-01198	2015-01462
2015-02697	2015-03323	2015-05614	2015-06255
2015-06987	2015-07587	2015-08476	2015-08652
2015-08733	2015-08875	2015-08897	2015-08932
2015-09217	2015-09242	2015-09254	2015-09315
2015-09376	2015-09377	2016-00527	2016-00657
2016-00875	2016-01365	2016-01475	2016-01484
2016-01695	2016-02050	2016-02207	2016-02452
2016-02512	2016-02646	2016-02894	2016-02896
2016-02898	2016-02899	2016-03086	2016-03126*
2016-03127*	2016-03157*	2016-03161*	2016-03162*
2016-03163*	2016-03189	2016-03190	2016-03195*
2016-03214	2016-03237	2016-03240	2016-03288
2016-03289	2016-03326*	2016-03337*	2016-03338*
2016-03339*	2016-03369*	2016-03374*	2016-03420
2016-03433*	2016-03445*	2016-03453	2016-03459*
2016-03462*	2016-03463*	2016-03472*	2016-03474*
2016-03477*	2016-03485	2016-03492*	2016-03498*
2016-03499*	2016-03500*	2016-03536	2016-03568*

* CR written as a result of this inspection

Design & Licensing Bases

Final Safety Analysis Report for Pilgrim Nuclear Power Station, Revision 30
NRC Regulatory Guide 1.137, Fuel Oil Systems for Emergency Power Supplies, Revision 2
Office of Nuclear Reactor Regulation Letter to Entergy Nuclear Generation Company, "Pilgrim Nuclear Power Station – Issuance of Amendment RE: Emergency Diesel Fuel (TAC No. MA5392)," dated 3/17/00
Pilgrim Nuclear Power Station Licensee Event Report 1998-021, Inadequate Fuel Supply for Emergency Diesel Generators, dated 10/2/98
SDBD-14, System Design Basis Document for the Core Spray System, Revision 2
SDBD-61, System Design Basis Document for the Emergency Diesel Generator and Auxiliary Systems, Revision 2
TDBD-109, Topical Design Basis Document for Internal and External Flooding, Revision 0
Technical Specifications and Bases for Pilgrim Nuclear Power Station, Revision 298

Drawings

2300-21-13, HPCI Turbine Oil Piping Diagram, Revision E2,
29053, Sht. 1, 345kV Schematic Diagram Current and Potential Transformers STA650 – Switchyard, Revision 31
29054, Sht. 2, 345kV Schematic Diagram Current and Potential Transformers STA650 - Switchyard, Revision 21
A44SH4A, Watertight Door 11 Assembly Drawing, Revision 0
A44SH4B, Watertight Door 11 Design Details 01, 03, 04, & 18, Revision 0
A44SH5A, Watertight Door 12 Assembly Drawing, Revision 0
A44SH6A, Watertight Door 25A Assembly Drawing, Revision 0
A44SH7, Flood Barrier – Gate 1, Revision 0
C122 Sht. 1, Typical Concrete Details, Revision E1
C-226, Turbine Building Foundations Interior Walls Sections & Details, Revision E2
C46, Intake Structures Sections, Revision 7
E16, Sht. 1, Schematic Meter and Relay Diagram Generator and Auxiliary Transformers, Revision 27
E16B1-3, Automatic Transfer Switch, Revision 2
H29-1-1062, Pipe Support SSWS, Revision E1
H29-1-1063, Pipe Support SSWS, Revision E2
H29-1-1064, Pipe Support SSWS, Revision E0
H29-1-1065, Pipe Support SSWS, Revision E2
M8-35, Service Water System Service Water Pump Performance Curve – Bowl Assembly (Q304548-1), Revision E0
M8-38, Salt Service Water Pump Lineshafts, Revision 9
M15, Equipment Location Reactor Building Plan Basement, Revision 23
M105-11-5, Valve Assembly Core Spray System 10" Motor Operated Gate Valves MO1400-25A&B, Revision 10
M105-53, Yoke Adapter Plate for MO-1400-25A, Revision 0
M110C76, Emergency Diesel Fuel Oil Transfer Skid – SBO D/G T160A & B to EDG T-126A & B, Revision 4
M223, Diesel Oil Storage and Transfer System P & ID, Revision 33
M242, PID Core Spray System, Revision 53
M244 Sht. 2, HPCI System Turbine Lube and Control Oil Subsystem, Revision 10
M8636, Service Water Pumps P-208A, B, C, D, & E Discharge, Revision E3
MMOV3, Motor Operated Valve Information Table, Revision 47

MMOV4, Motor Operated Valve Information Table, Revision 33
SE155, Sht. 1, Station Electrical Single Line Composite Design 4.16kV and 480V AC Systems, Revision 42

Evaluations
CR-PNP-2011-04503 CA-2, Condenser Bay Flooding Design and Licensing Basis Apparent Cause Evaluation, dated 11/3/11
CR-PNP-2015-08476 CA-3, SSW Pipe Support H29-1-9SG is Degraded Equipment Apparent Cause Evaluation, dated 11/10/15
EC 16177, SSW Pump Lineshaft Hardfacing Materials and Processes Modifications, Revision 0
EC 62543, Create Equipment Ids for SSW System Pipe Supports, Revision 0
LPI Letter Report No. A16212-LR-001, Past Operability Evaluation of Salt Service Water System Pump Discharge Piping – Pilgrim Nuclear Power Station, Revision 0
NED 86-97, Transmittal of Screenhouse Root Cause Analysis, dated 1/24/86
Operability Evaluation No. CR-PNP-2016-03157/Version 1 Process Applicability Determination, dated 5/6/16
Operability Evaluation No. CR-PNP-2016-03326/Version 1 Process Applicability Determination, dated 5/12/16
Procurement Engineering Evaluation 00154422, Flexible Hose Assembly, dated 12/8/15
SEP-PNPS-IST-008 Attachment 3, Determining OM Code – Valve Acceptance Criteria (MO-3806, MO-3808), dated 1/30/14

Functional Test, Surveillances, and Modifications Acceptance Tests
2.1.26, Inventory of Alternate Shutdown and EOP Support Tools and Material, performed 1/29/16 and 3/31/16
3.M.2-21, Electrolytic Capacitor Leakage Current Test, performed 10/10/13
3.M.2-35, Intermediate Range Monitor Functional Check, performed 4/1/14
3.M.2-5.2, Intermediate Range Monitor Calibration, performed 4/2/14
3.M.3-24.16, MO-1400-25A Quiklook Operations Procedure, performed 5/1/15
8.1.11.11, Reactor Coolant Pressure Boundary Isolation Valve Cold Shutdown Operability, performed 5/1/15 and 8/23/15
8.5.1.5, Core Spray Motor Operated Valve Operability from Alternate Shutdown Panel, performed 5/1/15
8.5.1.6, Hydro Leak Test (1400-MO-25A), performed 5/1/15
8.5.3.2.1, Salt Service Water Pump Quarterly and Biennial (Comprehensive) Operability and Valve Operability Tests, performed 11/19/15, 12/30/15, & 3/2/16
8.9.1 Attachment 3, Emergency Diesel Generators On-Site Fuel Oil Quantity, performed 3/16/16, 3/28/16, & 4/16/16
8.9.1, Emergency Diesel Generator and Associated Emergency Bus Surveillance (A EDG), performed 3/28/16
8.9.1, Emergency Diesel Generator and Associated Emergency Bus Surveillance (B EDG), performed 3/16/16 & 4/16/16
8.9.1.1, Diesel Oil Transfer System Skid-Mounted Valve Operability and Supplemental Testing, performed 4/25/13 & 4/27/15
8.9.19, Diesel Fuel Oil Emergency Transfer Skid Aging Management Surveillance, performed 7/31/15
8.B.6.2, EDG B Pre-Action Sprinkler System Functional Test, performed 3/16/16
8.C.42, Subcompartment Barrier Control Surveillance, performed 5/18/15
8.Q.3-8.2, LIMITORQUE Type HBC, SB/SMB-0 Through SB/SMB-3 Valve Operator Maintenance - Critical Maintenance, performed 4/6/95 and 5/1/15

9.17, Core Flow Evaluation, performed 5/25/15
52627888-01, Air Compressor K-118B Functional Test and Inspection, performed 11/3/15
52627894-01, Air Compressor K-118A Functional Test and Inspection, performed 11/3/15
ECT 42768, Fuel Transfer Equipment Test using Guidance from PNPS 2.2.8 Attachment 9, performed 5/5/14

Miscellaneous
3.M.3-4, Insulation Test (P-208A), performed 11/18/15
3.M.3-51, Electrical Termination Procedure, performed 11/19/15
3.M.4-14.2, Salt Service Water Pumps: Routine Maintenance, performed 11/19/15
100193313, Sulzer Pumps (US) Inc. As Found Report & Repair Plan for Entergy Pilgrim Nuclear Power Station, Revision 2
B-4P6T4-M1 Bill of Materials (Valve Plug), dated 1/28/15
CAT ID 0032117009, QC Inspection - Summary Data, dated 5/12/14
CAT ID 0032117015, QC Inspection - Summary Data, dated 1/7/14
Diesel Fuel Oil Sample Results (EDG A FOST, EDG B FOST, SBO DG FOST A, SBO DG FOST B), performed 3/7/16
Diesel Fuel Oil Storage Tank Level (A & B), dated 2/27/16 – 4/26/16
Dryden Diving Underwater Video, SSW East Bay East Wall Post-Prep/Pre-Patching, dated 8/28/14
Dryden Diving Underwater Video, SSW East Bay Final FME Inspection, dated 7/11/13
Dryden Diving Underwater Video, SSW East Bay Inspection and Cleaning, dated 7/11/13
Dryden Diving Underwater Video, SSW East Bay Spall Repair on East Wall, dated 2/29/16
EN-DC-117 Attachment 9.4, EC 59063 Condenser Bay Internal Flooding Post Modification Test Plan, Revision 0
EN-MA-118 Attachment 9.3, Foreign Material Exclusion Tool Accountability Log, dated 11/18/15
EN-MA-127, Conduct of Diving Operations, performed 11/19/15
ENN-MS-S-009-PNP, Safety Classification Site Specific Guidance and Safety Function Sheets, Revision 2
Euclid Chemical Company, Speed Crete Blue Line, Rapid Setting, Cement Based Repair Mortar for Underwater, Master Format No. 35 01 00.00, Revision 03.13
MCS99-18, EDG Emergency Diesel Fuel Oil Transfer Office Memorandum, dated 3/23/99
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MSDS - Corotech 100% Epoxy Pre Primer Clear V155-00, Revision dated 1/11/13
MSDS - Corotech 100% Solids Epoxy Floor Coating Catalyst V43090, Revision dated 3/25/13
MSDS - Corotech 100% Solids Epoxy Floor Coating V430-Series, Revision dated 5/24/13
MSDS - Corotech Aliphatic Acrylic Urethane Gloss Catalyst V500-90, Revision dated 1/16/13
MSDS - Corotech Aliphatic Acrylic Urethane Gloss V500-Series, Revision dated 1/3/14
MSDS - Corotech Elastite 160 10 Mil 100% Acrylic Elastomeric Waterproof Coating 160-Series, Revision dated 4/5/11
MSDS - Corotech Moisture Tolerant Quick Set Epoxy Sealer Catalyst V15690, Revision dated 2/12/13
MSDS - Corotech Moisture Tolerant Quick Set Epoxy Sealer Clear V15600, Revision dated 2/7/13
MSDS - Corotech Polyamide Epoxy Gloss Coating High Build Catalyst V40092, Revision dated 12/26/12
MSDS - Corotech Polyamide Epoxy Gloss Coating Semi Gloss V400-Series, Revision dated 12/18/12
Nuclear Power Plant Bright-Line Survey, dated 6/14/2010

PNPS Control Room Log, dated 5/3/16 – 5/16/16
SCR-2010-0186, Software Quality Assurance Data Sheet, Revision 1

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VT-2-RR-15054, SSW Pump P-208A VT-2 Examination, performed 11/19/15

Operating Experience
GE SIL No. 330, Jet Pump Beam Cracks, dated 6/9/80
NRC Regulatory Information Summary 01-009, Control of Hazard Barriers, dated 4/2/01
OE34122, Incorrectly Installed Valve Handle Blocking Device Allowed Valve Movement Resulting in an Oil Leak, dated 7/2/11
OE179830, Inadequate Fuel Supply for Emergency Diesel Generators, dated 5/5/99
OE-NOE-2007-00077 CA14, NRC Information Notice 2007-05: Vertical Deep Draft Pump Shaft and Coupling Failures, dated 6/4/07

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1.3.135, Control of Doors, Revision 8
1.5.10, Control of Fuses, Revision 3
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2.1.26, Inventory of Alternate Shutdown and EOP Support Tools and Material, Revision 49
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2.2.8 Attachment 10, EDG Fuel Management Strategy, Revision 113
2.2.32, Salt Service Water System (SSW), Revision 92
3.M.2-5.2, Intermediate Range Monitor Calibration, Revision 39
3.M.2-21, Electrolytic Capacitor Leakage Current Test, Revision 12
3.M.2-35, Intermediate Range Monitor Functional Check, Revision 9
3.M.3-1, A5/A6 Buses 4kV Protection Relay Calibration/Functional Test and Annunciator Verification, Revision 145
3.M.3-17.1, RAYCHEM or Taping of 1000 Volt and Under Cables and/or Wires, Revision 26
3.M.3-24.16, Quiklook Operations Procedure, Revision 17
3.M.3-33, 345kV Startup Transformer Calibration and Functional Relay Testing, Revision 34
3.M.4-14.2, Salt Service Water Pumps: Routine Maintenance, Revision 67
3.M.4-108, Mechanical Inspection and Preventive Maintenance for Facility Doors, Revision 25
8.5.3.11, SSW Valve Operability Test, Revision 18
8.6.5.1, Jet Pump Operability Check, Revision 34
8.9.1, Emergency Diesel Generator and Associated Emergency Bus Surveillance, Revision 131
8.9.19, Diesel Fuel Oil Emergency Transfer Skid Aging Management Surveillance, Revision 2
8.B.14, Fire Protection Technical Requirements, Revision 53
8.B.6.1, EDG A Pre-Action Sprinkler System Functional Test, Revision 13
8.B.6.2, EDG B Pre-Action Sprinkler System Functional Test, Revision 13
8.C.22, Startup Transformer and 345kV Switchyard Surveillance, Revision 42
8.C.42, Subcompartment Barrier Control Surveillance, Revision 26
8.M.2-7.1.9, Testing of Drywell to Pressure Suppression Chamber Vacuum Breakers, Revision 4
9.17, Core Flow Evaluation, Revision 36
C109-ER-Q, Procurement, Design, Installation and Inspection of Hilti Sleeve Anchors for use in Masonry Block Walls and Hardened Concrete, Revision E10
EN-DC-115, Engineering Change Process, Revision 18
EN-DC-153, Preventive Maintenance Component Classification, Revision 13

EN-DC-306, Acceptance of Commercial Grade Items/Services in Safety Related Applications, Revision 5
EN-LI-100, Process Applicability Determination, Revision 18
EN-LI-101, 10CFR50.59 Evaluations, Revision 12
SEP-PNPS-IST-008, Administrative Controls for Limiting Stroke Time Criteria of Inservice Test and Appendix B Test Program Power-Operated Valves, Revision 0

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Salt Service Water Monthly Walkdown Report, dated 3/30/16 & 4/26/16
Salt Service Water Pump P-208A IST Trend Data, 1/11/12 – 3/1/16
Salt Service Water System Health Report, Q1-2016

Vendor Manuals and Specifications
A13-ER-Q, Pilgrim Unit 1 Specification Report for Procurement, Design, Installation and Inspection of Hollow Steel Doors, Pressed Steel Frames and Hardware, Revision 24
Benjamin Moore & Co., Corotech Product Data Sheets for V156, V430, V155, V400, V160, and V500
C-93-ER-NQ, Furnishing, Delivery, Storage, and Application of Field Painting Outside the Primary Containment, Revision 25
C-93-ER-NQ-EO, Furnishing, Delivery, Storage, and Application of Field Painting Outside the Primary Containment, Revision 0
V-0257, HPCI Turbine (EC 54258 Update), Revision 40
V-0305, Goulds Pumps, Revision 41
V-0364, Service Manual for Automatic Transfer Switches, Revision 12
V-0390, Limitorque Valve Controls, Revision 35
V-0441, Walworth Gate, Globe, Swing Check Valves, Revision 34
V-2159, New Governor Control Manual for the Emergency Diesel Generators, Revision 0
V-2186, Sandpiper Air Powered Pumps, Revision 0
V-2239, Presray Flood Protection Products – Installation and Operation for a D3DQA with a Bolt in Place Installation, Revision 0

Work Orders

00229640	00334804	00339850	00354018
00362959	00368266	00380325	00383551
00424359	00428515	52459853	52504901
52510818	52516112	52624081	52627894

LIST OF ACRONYMS

10 CFR	Title 10 of the *Code of Federal Regulations*
CA	corrective action
CAP	corrective action program
CR	condition report
DRS	Division of Reactor Safety
EACE	equipment apparent cause evaluation
EC	engineering change
EDG	emergency diesel generator
IMC	inspection manual chapter
IRM	intermediate range monitor
LCO	limiting condition for operation
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission, U.S.
PNPS	Pilgrim Nuclear Power Station
RFO	refueling outage
SBO	station blackout
SSC	structure, system, and component
SSW	salt service water
TS	technical specification
UFSAR	Updated Final Safety Analysis Report
UPLC	universal power line carrier
WO	work order