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

August 14, 2018

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

SUBJECT: PILGRIM NUCLEAR POWER STATION – INTEGRATED INSPECTION REPORT 05000293/2018002

Dear Mr. Sullivan:

On June 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Pilgrim Nuclear Power Station (Pilgrim). On July 24, 2018, the NRC inspectors discussed the results of this inspection with Mr. Bruce Chenard, Acting General Manager of Plant Operations, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented two findings of very low safety significance (Green) in this report. One finding involved a violation of NRC requirements. Additionally, NRC inspectors documented one Severity Level IV violation with no associated finding. Further, inspectors documented two licensee-identified violations, one of which was determined to be of very low safety significance, and one of which was determined to be Severity Level IV, in this report. 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at Pilgrim. 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 Pilgrim.

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 Title 10 of the *Code of Federal Regulations* (10 CFR), Part 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Anthony Dimitriadis, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket Number: 50-293
License Number: DPR-35

Enclosure:
Inspection Report 05000293/2018002

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	50-293
License Number:	DPR-35
Report Number:	05000293/2018002
Enterprise Identifier:	I-2018-002-0059
Licensee:	Entergy Nuclear Operations, Inc. (Entergy)
Facility:	Pilgrim Nuclear Power Station
Location:	Plymouth, Massachusetts
Inspection Dates:	April 1, 2018 to June 30, 2018
Inspectors:	E. Carfang, Senior Resident Inspector B. Pinson, Resident Inspector P. Boguszewski, Acting Resident Inspector J. Ambrosini, Acting Senior Resident Inspector S. Wilson, Health Physicist D. Kern, Senior Reactor Inspector M. Rossi, Resident Inspector M. McLaughlin, Senior Enforcement Specialist
Approved By:	Anthony Dimitriadis, Chief Reactor Projects Branch 5 Division of Reactor Projects

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Entergy's performance at Pilgrim by conducting the baseline inspections described in this report in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. NRC-identified and self-revealing findings, violations, and additional items are summarized in the table below. Licensee-identified non-cited violations (NCVs) are documented in report Section 71153.

List of Findings and Violations

Failure to Properly Implement the Fatigue Management Program – Work Hour Controls for Covered Workers			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000293/2018002-01 Opened/Closed	P.3 – Resolution	71152 Annual Follow-up of Selected Issues
The inspectors identified a Green NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) 26.205(d). During the period December 2017 to April 2018, Entergy did not properly control the work hours of several workers who performed work covered under 10 CFR 26.4(a). Specifically, on eleven occasions, workers exceeded one of the following work hour limits: (1) 16 work hours in any 24-hour period; (2) 72 hours in any 7-day period; or (3) 54 hours per week average over a 6-week rolling time period.			

Loss of Secondary Containment Integrity due to Simultaneously Opened Airlock Doors			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green FIN 05000293/2018002-02 Opened/Closed	H.9 - Training	71153 Follow-up of Events and Notices of Enforcement Discretion
A self-revealed Green finding was identified when personnel did not implement a procedure requiring the closure and verification of doors credited with specific design functions. Procedure 1.3.135, "Control of Doors," requires station personnel to ensure closing and latching of doors. Failure to meet this requirement caused the loss of secondary containment integrity and unplanned entry into Technical Specification (TS) condition 3.7.C.1.			

480V Bus B6 Auto Transfer Function Degraded Due to Time Delay Relay Failure			
Cornerstone	Severity	Cross-Cutting Aspect	Inspection Results Section
Not Applicable	Severity Level IV NCV 05000293/2018002-03 Opened/Closed	Not Applicable	71153 Follow-up of Events and Notices of Enforcement Discretion
The inspectors identified a Severity Level IV NCV of TS 3.5.A.2 because a component of the low pressure coolant injection system was inoperable between May 12, 2015, and May 3, 2017, during which time, on occasions, core spray systems were also not operable. Specifically, a relay, used to transfer the power feed for the low pressure coolant injection valves to the backup source in the event of a degraded voltage condition, failed during testing. As a result, under certain conditions, the transfer would not have automatically occurred. This condition existed through the operating cycle, during which time the core spray pumps were also inoperable when removed from service for scheduled maintenance.			

Additional Tracking Items

Type	Issue number	Title	Inspection Results Section	Status
LER	05000293/2015-004-01	480V Bus B6 Auto Transfer Function Degraded, on March 8, 2016	71153	Closed
LER	05000293/2016-008-00	Emergency Diesel Generator 'A' Past Inoperability	71153	Closed
LER	05000293/2017-008-00	480V Bus B6 Auto Transfer Function Degraded, on March 8, 2016	71153	Closed
LER	05000293/2017-008-01	Supplement 480V Bus B6 Auto Transfer Function Degraded, on March 8, 2016	71153	Closed
LER	05000293/2017-011-00	Simultaneously Opened Reactor Building Airlock Doors Caused Loss of Secondary Containment	71153	Closed
LER	05000293/2017-013-00	Reportable Conditions Involving Standby Gas Treatment System and Secondary Containment Inoperability Not Reported in the Previous Three Years	71153	Closed
LER	05000293/2017-013-01	Supplement to Reportable Conditions Involving Standby Gas Treatment System and Secondary Containment Inoperability Not Reported in the Previous Three Years	71153	Closed

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PLANT STATUS

The unit began the inspection period in cold shutdown. On April 17, 2018, operations personnel commenced a reactor startup and returned the unit to rated thermal power. On April 27, 2018, operators commenced a shutdown to correct an issue with the feedwater regulating valves. On May 2, 2018, operators commenced a startup and returned the unit to rated thermal power. On May 15, 2018 and May 17, 2018, operators lowered power to approximately 60 percent power to perform backwashes of the main condenser then returned the unit to rater thermal power. On June 27, 2018, operators performed a down power to approximately 35 percent power to perform thermal and mechanical backwashes of the main condenser. In addition, Entergy cleaned and inspected a main condenser water box. The unit was returned to rated thermal power on June 30, 2018.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures in effect at the beginning of the inspection unless otherwise noted. Currently approved inspection procedures with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the inspection procedure requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in Inspection Manual Chapter 2515, Appendix D, "Plant Status," and conducted routine reviews using Inspection Procedure 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess Entergy's performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Summer Readiness (1 Sample)

The inspectors evaluated summer readiness of offsite and alternate alternating current power systems the week of May 28, 2018.

Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness for seasonal extreme weather conditions prior to the seasonal warm temperatures and heavy rains on May 29, 2018.

71111.04 - Equipment Alignment

Partial Walkdown (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) 'B' train of shutdown cooling after swapping from 'A' train shutdown cooling on April 5, 2018

(2) Reactor core isolation cooling system during high pressure coolant injection system isolation testing on May 9, 2018
(3) 'B' emergency diesel generator following maintenance on June 21, 2018

71111.05A/Q - Fire Protection Annual/Quarterly

Quarterly Inspection (5 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

(1) Salt service water bay on April 11, 2018
(2) Cable spreading room on May 9, 2018
(3) Upper 4160 volt switchgear room on May 9, 2018
(4) 'A' and 'B' emergency diesel generator rooms on May 10, 2018
(5) 'A' residual heat removal valve room on June 30, 2018

71111.06 - Flood Protection Measures

Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the intake structure on May 25, 2018.

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated licensed operator requalification training, in accordance with 10 CFR 55.59, on May 8, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated activities associated with the following licensed operator performance in the control room:

(1) Shutdown cooling train swap from 'A' to 'B' on April 11, 2018
(2) Reactor startup on April 17, 2018
(3) 'A' feedwater regulating valve failure on April 26, 2018

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (1 Sample)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Area and process radiation monitors the week of April 23, 2018

Quality Control (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the following equipment performance issues:

(1) 'B' emergency diesel generator damper modifications the week of May 7, 2018

71111.13 - Maintenance Risk Assessments and Emergent Work Control (5 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) Elevated outage risk for 'B' emergency diesel generator out of service due to a fuel oil transfer pump planned surveillance on April 2, 2018
(2) Elevated risk while shutdown cooling was secured for planned alternate trip system testing on April 16, 2018
(3) Elevated risk for planned maintenance on the shutdown transformer and station blackout diesel generator on May 21, 2018
(4) Elevated risk following emergent outage of shutdown transformer and station blackout diesel generator on May 24, 2018
(5) Elevated risk during planned two year overhaul of 'B' emergency diesel generator on June 11, 2018

71111.15 - Operability Determinations and Functionality Assessments (6 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Missing/out of place piping supports in the control rod drive rod insertion and withdrawal system on April 3, 2018
(2) 'A' emergency diesel generator sparking on April 3, 2018
(3) Reactor building component cooling water motor operated inlet valve for 'A' residual heat removal heat exchanger (MO-4060A) failure on April 16, 2018
(4) Startup transformer nitrogen blanket leak during the week of April 23, 2018
(5) 'B' residual heat removal pump lower than expected differential pressure on May 18, 2018
(6) Shutdown transformer lockout of 4160 volt bus A8 on May 23, 2018

71111.18 - Plant Modifications (3 Samples)

The inspectors evaluated the following temporary or permanent modifications:

(1) 'B' emergency diesel generator room damper position modification on April 4, 2018
(2) Startup transformer cooling system on April 12, 2018
(3) Startup transformer replacement on April 13, 2018

71111.19 - Post Maintenance Testing (9 Samples)

The inspectors evaluated post maintenance testing for the following maintenance/repair activities:

(1) Standby gas treatment fan relay (OC-37-1416A1, A2, A3 and TD-62-1416A) replacements on March 29, 2018
(2) Post work test on technical support center diesel run after sparking was observed on the technical support center transformer on April 2, 2018
(3) Control rod drive piping supports the week of April 2, 2018
(4) Startup transformer replacement on April 13, 2018
(5) Post work test on high pressure coolant injection steam line inboard isolation valve after packing adjustment on April 18, 2018
(6) Repair to junction box J2523 for temperature element repair on safety valve RV-203-4B on April 20, 2018
(7) Post work test on combined intermediate valve (CIV-3) on May 2, 2018
(8) Feedwater three element level control system repairs on May 2, 2018
(9) 'B' feedwater regulating valve repairs on May 2, 2018

71111.20 - Refueling and Other Outage Activities (2 Samples)

The inspectors evaluated forced outage activities for the following:

(1) Feedwater heater repairs and startup transformer replacement from March 6 to April 17, 2018
(2) 'A' and 'B' feedwater regulating valve repairs from April 26 to May 2, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (4 Samples)

(1) 8.M.2-2.10.1, Degraded Voltage Relay testing on April 20, 2018
(2) 2.1.31, Rod Worth Minimizer Operability on April 30, 2018
(3) 8.5.4.1, High Pressure Coolant Injection System Pump and Valve Quarterly and Biennial Comprehensive Operability on May 10, 2018
(4) 3.M.3-61.5, Overspeed Surveillance Testing of 'B' Emergency Diesel Generator on June 15, 2018

In-service (1 Sample)

(1) 8.I.11.21, Main Steam Isolation Valve Cold Shutdown Operability on April 29, 2018 and May 1, 2018

71114.06 - Drill Evaluation

Emergency Planning Drill (1 Sample)

The inspectors evaluated the conduct of a routine Entergy emergency planning drill on June 20, 2018.

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (1 Sample)

The inspectors conducted independent radiation measurements during walkdowns of the facility and reviewed:

- the radiological survey program;
- any changes to plant operations since the last inspection;
- recent plant radiation surveys for radiological work activities;
- air sampling and analysis; and
- continuous air monitor use.

Instructions to Workers (1 Sample)

The inspectors reviewed high radiation area work permit controls and use, reviewed electronic alarming dosimeter alarms and set points, observed worker briefings on radiological conditions, and observed containers of radioactive materials and assessed whether the containers were labeled and controlled in accordance with requirements.

Contamination and Radioactive Material Control (1 Sample)

The inspectors observed the monitoring of potentially contaminated material leaving the radiological controlled area and inspected the methods and radiation monitoring instrumentation used for control, survey, and release of that material. The inspectors selected several sealed sources from inventory records and assessed whether the sources were accounted for and were tested for loose surface contamination. The inspectors evaluated whether any recent transactions involving nationally tracked sources were reported in accordance with requirements.

Radiological Hazards Control and Work Coverage (1 Sample)

The inspectors evaluated in-plant radiological conditions and performed independent radiation measurements during facility walkdowns and observation of radiological work activities. The inspectors assessed whether posted surveys; radiation work permits; worker radiological briefings and radiation protection job coverage of the Thermex System filters filter replacement; the use of continuous air monitoring, air sampling and engineering controls; and dosimetry monitoring were consistent with the present conditions. The inspectors examined the control of highly activated or contaminated materials stored within the spent fuel pool and the posting and physical controls for selected high radiation areas, locked high radiation areas, and very high radiation areas.

High Radiation Area and Very High Radiation Area Controls (1 Sample)

The inspectors reviewed the procedures and controls for high radiation areas, very high radiation areas, and radiological transient areas in the plant.

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

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

71124.02 - Occupational As Low As Reasonably Achievable Planning and Controls

Radiological Work Planning (1 Sample)

The inspectors evaluated radiological work planning by reviewing significant work activities to verify that as low as reasonably achievable planning was integrated into work procedures and radiation work permit documents.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified Entergy's performance indicators submittals listed below for the period from April 1, 2017 through March 31, 2018. (3 Samples)

(1) Unplanned scrams per 7000 critical hours
(2) Unplanned power changes per 7000 critical hours
(3) Unplanned scrams with complications

71152 - Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed Entergy's corrective action program for trends that might be indicative of a more significant safety issue.

Annual Follow-up of Selected Issues (2 Samples)

The inspectors reviewed Entergy's implementation of its corrective action program related to the following issues:

(1) Condition Report 2017-6029, Voiding in core spray 'A' pump discharge line identified through ultrasonic testing exam
(2) Condition Reports 2016-8289, 2017-1082, and 2017-7946, Deficient implementation of EN-OM-123, "Fatigue Management Program," to meet the requirements of 10 CFR Part 26, Subpart I, "Managing Fatigue"

71153 - Follow-up of Events and Notices of Enforcement Discretion

Licensee Event Reports (7 Samples)

The inspectors evaluated the following licensee event reports:

(1) Licensee Event Report 05000293/2015-004-01, 480V Bus B6 Auto Transfer Function Degraded (ADAMS Accession No. ML16075A255). The circumstances surrounding this licensee event report are documented in report section Inspection Results.

(2) Licensee Event Report 05000293/2016-008-00, Emergency Diesel Generator 'A' Past Inoperability (ADAMS Accession No. ML17010A035). The circumstances surrounding this licensee event report are documented in Inspection Reports 05000293/2016011, Section 6.7.4.1 and 05000293/2017008, Enclosure 2.

(3) Licensee Event Report 05000293/2017-008-00, 480V Bus B6 Auto Transfer Function Degraded Due to Time Delay Relay Failure (ADAMS Accession No. ML17212A615). The circumstances surrounding this licensee event report are documented in report section Inspection Results.

(4) Licensee Event Report 05000293/2017-008-01, Supplement to 480V Bus B6 Auto Transfer Function Degraded Due to Time Delay Relay Failure (ADAMS Accession No. ML17312A277). The circumstances surrounding this licensee event report are documented in report section Inspection Results.

(5) Licensee Event Report 05000293/2017-011-00, Simultaneously Opened Reactor Building Airlock Doors Caused Loss of Secondary Containment (ADAMS Accession No. ML17234A318). The circumstances surrounding this licensee event report are documented in report section Inspection Results.

(6) Licensee Event Report 05000293/2017-013-00, Reportable Conditions Involving Standby Gas Treatment System and Secondary Containment Inoperability Not Reported in the Previous Three Years (ADAMS Accession No. ML18033A326). The circumstances surrounding this licensee event report are documented in report section Inspection Results.

(7) Licensee Event Report 05000293/2017-013-01, Supplement to Reportable Conditions Involving Standby Gas Treatment System and Secondary Containment Inoperability Not Reported in the Previous Three Years (ADAMS Accession No. ML18128A189). The circumstances surrounding this licensee event report are documented in report section Inspection Results.

Personnel Performance (1 Sample)

The inspectors evaluated response during the following non-routine evolutions or transients:

(1) 'A' feedwater regulating valve failure while at rated thermal power on April 26, 2018

INSPECTION RESULTS

Observations	71152 Semi-Annual Trend Review
The inspectors evaluated a sample of condition reports generated over the course of the past two quarters by departments that provide input into the trimester trend reports. The inspectors also evaluated maintenance backlogs, operator workarounds, operator burdens, control room deficiencies, and site staffing in response to the planned decommissioning of the unit in 2019. The inspectors determined that while Entergy, in general, identified issues at a low threshold and entered them into the corrective action program, there continued to be self-revealing and inspector identified procedure use and adherence (PU&A) issues that indicate a continuing trend in the area of configuration control when operators inadvertently lowered reactor water level by 10 inches (CR-PNP-2018-3531), and maintenance technicians inadvertently raised hotwell level while working on an incorrect component (CR-PNP-2018-4593). Additionally, inspectors identified low level PU&A related issues in the Radiation Protection department and Maintenance departments over the previous two quarters. Individually, Entergy identified PU&A as a contributor to these issues and developed corrective actions to address the human performance aspects, including additional oversight by department supervision, and continued focus on the appropriate use of human performance tools (self-check, peer check, job site review). While PU&A errors did occur, as described above, the previously identified negative trend has shown some improvement. Specifically, errors in the past 6 months were less significant in nature. Entergy has a human performance improvement plan developed under CR-PNP-2017-5782 and identified the recent trend in CR-PNP-2018-5167. Equipment reliability continued to challenge full power operation over the previous two quarters, including a feedwater heater condenser tube failure on March 6, 2018 (CR-PNP-2018-1943), the failure of the 'A' feedwater regulating valve on April 26, 2018 (CR-PNP-2018-3773), and the ongoing main condenser issues (CR-PNP-2018-4364, 4927, 5036, and 5255). These issues required timely response by control room operators, and inspectors noted improved operator performance relative to past events. The issues identified above were determined to be minor because the transients were not significant in nature per Inspection Manual Chapter 0612 and did not constitute a transient (scram) per Inspection Manual Chapter 0609. The examples were non-compliances with site procedures, but were not violations of a regulatory requirement.	

Observations	71152 Annual Follow-up of Selected Issues
<u>Condition Report 2017-6029, Voiding in core spray 'A' pump discharge line identified through ultrasonic testing exam</u> The inspectors reviewed the apparent cause analysis and the corrective actions taken. The inspectors concluded that the cause analysis was thorough, the extent of condition was reasonable, and the corrective actions were timely. The original issue was identified in Integrated Inspection Report 05000293/2017003 as NCV 05000293/2017003-07, Core Spray Voiding Due to Inadequate Instructions (ADAMS Accession No. ML17319A158).	

Observations	71152 Annual Follow-up of Selected Issues

Condition Reports 2016-8289, 2017-1082 and 2017-7946, Deficient implementation of EN-OM-123, "Fatigue Management Program," to meet the requirements of 10 CFR Part 26, Subpart I, "Managing Fatigue"

The inspectors determined several aspects of Fatigue Management Program implementation has improved, including the following:

- The number of Work Hour Waivers was reduced [2015 (16), 2016 (31), 2017 (11)], despite a continued large emergent maintenance workload and preventive maintenance workload.
- Maintenance supervisors demonstrated greater awareness of their responsibility to verify worker availability through the Personnel Qualification and Scheduling tracking system prior to assigning overtime work.
- The 10 CFR 26.205(e) annual program self-assessment was thorough, with meaningful findings and appropriate use of the corrective action program to address identified deficiencies.

Notwithstanding, the inspectors identified several continued performance deficiencies which are documented below as NCV 05000293/2018002-01.

Failure to Properly Implement the Fatigue Management Program – Work Hour Controls for Covered Workers			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000293/2018002-01 Open/Closed	P.3 – Resolution	71152 Annual Follow-up of Selected Issues

The inspectors identified a Green NCV of 10 CFR 26.205(d). During the period December 2017 to April 2018, Entergy did not properly control the work hours of several workers who performed work covered under 10 CFR 26.4(a). Specifically, on eleven occasions, workers exceeded one of the following work hour limits: (1) 16 work hours in any 24-hour period; (2) 72 hours in any 7-day period; or (3) 54 hours per week average over a 6-week rolling time period.

Description: Entergy previously implemented corrective actions to address deficient implementation of EN-OM-123, "Fatigue Management Program," Revision 13, to meet the requirements of 10 CFR Part 26, Subpart I, "Managing Fatigue." Annual self-assessments (2015-2018) noted improvement, but also identified continued inconsistent verification of worker hours in the Personnel Qualification and Scheduling tracking system prior to assigning emergent work schedule changes. Corrective actions included training additional supervisors on how to enter work-hours into the Personnel Qualification and Scheduling tracking system and on methods of verifying work hour limits to ensure that limits are not exceeded prior to assigning overtime. These corrective actions were completed on November 30, 2017.

The inspectors reviewed selected worker time records and the Personnel Qualification and Scheduling database for the period December 24, 2017, to April 14, 2018, and identified three instances where workers exceeded work hour limits without processing a work hour waiver request or performing a fatigue assessment as required by EN-OM-123. Additionally, the inspectors identified the following deficiencies and discussed them with licensee staff:

(1) Workers inconsistently charged time to shift turnovers (0, 0.5, 1.0, or 2.0 hours), which is excluded from work hour calculations. The inspectors reviewed NRC responses to Fitness For Duty frequently asked questions and noted 0.5 hours is typically sufficient for shift turnover. In many cases, workers charged excessive time to shift turnover which should have been charged to covered work and counted against the work hour limits. This practice artificially undercounted work hours and masked workers who exceeded work hour limits.

(2) The Personnel Qualification and Scheduling tracking system database was not updated with the most up-to-date hours worked thereby preventing the proper verification of proposed assignment of overtime, resulting in workers to exceed work hour limits.
- Sometimes, when assigning work, supervisors and watchbill coordinators did not use the Personnel Qualification and Scheduling tracking system
- Some used it after work began vice prior to issuing watch bill change.
- The Personnel Qualification and Scheduling tracking system database had a high error rate (29 of 330 entries were incorrect). In three instances, entire work days had not been entered into the Personnel Qualification and Scheduling tracking system.

Corrective Actions: In response to the inspectors' concerns, Entergy performed an additional review of work hours and identified eight additional instances where workers exceeded work hour limits. Interim corrective actions included: Entergy requiring certain supervisors to verify workers' hours daily in the Personnel Qualification and Scheduling tracking system, supervisors briefed on acceptable practices for charging time to shift turnover, and lessons-learned communicated with the affected departments.

Corrective Action References: CR-PNP-2018-03632, CR-PNP-2018-03647, CR-PNP-2018-03746, CR-PNP-2018-03755, and CR-PNP-2018-04145

Performance Assessment

Performance Deficiency: The inspectors determined the failure to control work hours as required by EN-OM-123, "Fatigue Management Program," and 10 CFR Part 26, Subpart I, "Managing Fatigue," was a performance deficiency. This performance deficiency was reasonably within the Entergy's ability to foresee and correct and should have been prevented.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the human performance attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the resulting increased likelihood of human error and associated potential to adversely impact equipment maintenance, availability, and reliability increased the likelihood of an initiating event.

Significance: The inspectors assessed the significance of the finding using the Significance Determination Process, Attachment 0609.04, "Initial Characterization of Findings." Because the finding impacted the Initiating Events cornerstone, the inspectors screened the finding through Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process for Findings At-Power," using Exhibit 1, "Initiating Event Screening Questions." Although the increased likelihood of human error increased the likelihood of an initiating event or adverse impact on mitigation equipment, the violation was determined to be of very low significance because no significant event, reactor trip, or loss of mitigation equipment occurred as a result of personnel fatigue linked to the hours worked.

Cross-Cutting Aspect: The cause of this finding, in accordance with Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014, has a cross-cutting aspect in the area of Problem Identification and Resolution - Resolution because corrective actions to ensure supervisors entered work hours into the Personnel Qualification and Scheduling tracking system prior to assigning overtime were neither timely nor effective. (P.3)

Enforcement

Violation: 10 CFR 26.205(d) states in part: "Licensees shall control the work hours of individuals who are subject to this section. (i) Except as permitted in 26.207, licensees shall ensure any individual's work hours do not exceed the following limits: (ii) 16 work hours in any 24-hour period; (iii) 72 work hours in any 7-day period"; and "26.205 (d)(7)(i) Individuals may not work more than a weekly average of 54 hours, calculated using an averaging period of up to 6 weeks." Procedure EN-OM-123 establishes the Entergy Fatigue Management Program controls which implement the requirements of 10 CFR Part 26.

Contrary to the above, from December 24, 2017, until April 14, 2018, on eleven instances Entergy did not control work hours to ensure individual's work hours did not exceed the work hour limits specified in 10 CFR 26.205(d) and EN-OM-123.

Enforcement Action: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Loss of Secondary Containment Integrity due to Simultaneously Opened Airlock Doors			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Reactor Safety - Barrier Integrity	Green FIN 05000293/2018002-02 Closed	H.9 –Training	71153(5) Follow-up of Events and Notices of Enforcement Discretion

A self-revealed Green finding was identified when Entergy did not ensure implementation of Procedure 1.3.135, "Control of Doors," which requires station personnel to ensure closing and latching of doors. This resulted in the loss of secondary containment integrity and unplanned entry into TS 3.7.C.1, "Secondary Containment."

Description: On June 20, 2017, Door 58, credited as one of two doors required to maintain secondary containment integrity, failed to automatically latch closed and remained partially open for at least one minute. After the door latch failed, Door 85, the other credited door for

maintaining containment integrity, was opened upon egress of a security officer. The security officer reported that both doors were open at the same time. One minute prior, station personnel exited both Door 85 and Door 58 without identifying this condition and did not ensure Door 58 latched closed as required. This resulted in a loss of secondary containment integrity and an unplanned entry into TS 3.7.C.1, "Secondary Containment."

The inspectors reviewed Entergy Procedure 1.3.135, Section 5.0.3, which states, "Station personnel shall ensure doors are closed and properly latched after each entrance/egress. This is accomplished by physically challenging the door to check that it is properly closed and latched."

As part of the corrective action process, Entergy identified a training gap existed regarding Procedure 1.3.135, "Control of Doors," in that the requirement to verify that doors are properly closed and latched was not understood by all site personnel. There was also a longstanding work order to repair the latch on Door 58; however, the monthly check of the doors in the plant was completed on June 15, 2018, and did not identify any discrepancies with Door 58 performance at that time. The inspectors reviewed the causal evaluation and agreed with the cause determination.

Corrective Actions: The latch for Door 58 was repaired and associated training documents were updated to include the requirements for confirming that doors are closed per Procedure 1.3.135.

Corrective Action Reference: CR-PNP-2017-6380

Performance Assessment:

Performance Deficiency: Pilgrim Procedure 1.3.135, Section 5.0.3 states, in part, "Station personnel shall ensure doors are closed and properly latched after each entrance/egress." However, station personnel exited Doors 58 and 85 without ensuring the doors were properly latched, which resulted in the loss of secondary containment integrity. The inspectors determined that Entergy's failure to implement and execute Procedure 1.3.135 for securing doors was a performance deficiency. This performance deficiency was reasonably within the licensee's ability to foresee and correct and should have been prevented.

Screening: This finding was more than minor in accordance with Inspection Manual Chapter 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated January 1, 2018, because the performance deficiency is associated with the configuration control attribute of the Barrier Integrity cornerstone and adversely affects the cornerstone objective to provide reasonable assurance that the physical design barrier, containment, could protect the public from radionuclide releases caused by accidents or events. Specifically, the loss of secondary containment existed for at least one minute due to both doors being open. This is also similar to Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," Example 2.e. Specifically, Procedure 1.3.135 was not implemented, and it was later determined that secondary containment Door 58 had not met its design function.

Significance: The inspectors assessed significance of this condition using Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and Inspection Manual Chapter 0609, Appendix A, Exhibit 3, "Barrier Integrity Screening Questions," Part C. Inspectors determined the finding to be Green because the finding only represents a degradation of the radiological barrier function provided for the auxiliary building.

Cross-Cutting Aspect: This finding, in accordance with Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014, has a cross-cutting aspect in the area of Human Performance - Training, in that Entergy failed to provide adequate training to staff to ensure knowledge of site-wide expectations, policies, and procedures. Specifically, Entergy determined that staff were unaware of the requirement to ensure closure and latching of doors as specified in Procedure 1.3.135. (H.9)

Enforcement:

Inspectors did not identify a violation of regulatory requirements associated with this finding.

The disposition of this finding closes Licensee Event Report 2017-011-00.

480V Bus B6 Auto Transfer Function Degraded Due to Time Delay Relay Failure			
Cornerstone	Severity	Cross-Cutting Aspect	Report Section
Not Applicable	Severity Level IV NCV 05000293/2018002-03 Closed	Not Applicable	71153(3) Follow-up of Events and Notices of Enforcement Discretion

The inspectors identified a Severity Level IV NCV of TS 3.5.A.2 because a component of the low pressure coolant injection system was inoperable between May 12, 2015, and May 3, 2017, during which time, on numerous occasions, core spray systems were also not operable. Specifically, a relay used to transfer the power feed for the low pressure coolant injection valves to the backup source in the event of a degraded voltage condition failed during testing. As a result, under certain conditions, the transfer would not have automatically occurred. This condition existed through the operating cycle, during which time the core spray pumps were also inoperable when removed from service for scheduled maintenance.

Description: Power to the low pressure coolant injection valves is supplied by the 480V Bus B6, which is, in turn, normally powered by Bus B1. The 27A-B1X/TDDO relay is used as part of the transfer of Bus B6 to the backup power source (Bus B2) in the event of loss of power or degraded voltage on Bus B1. Specifically, the relay (an Agastat Model E7022/PB004) energizes on detection of a degraded voltage condition and introduces a delay in the transfer to the backup bus in case the degraded condition clears before the transfer occurs. The relay uses a pneumatic time delay mechanism that has an adjustable range of 0.5 to 5 seconds, and was set for a 1.25 second delay.

On May 3, 2017, during Pilgrim Refueling Outage 21, Entergy performed Pilgrim Procedure, "480V Bus B6 Automatic Transfer Test, IV, Degraded Voltage and Timing Relays Calibration and Annunciator Verification." Entergy identified that the 27A-B1X/TDDO relay energized upon the degraded signal, but de-energized again after 0.03 seconds rather than after the 1.25 second time delay. With the relay dropping out almost instantaneously, if a degraded voltage condition occurred and recovered, the Bus transfer could have not been completed, resulting in the inoperability of low pressure coolant injection.

Entergy concluded that this condition existed during the operating cycle that began after the relay was installed in May 2015, until the discovery on May 3, 2017. This issue constituted a violation of TS Limiting Condition for Operation 3.5.A.2, Core Spray and Low Pressure

Coolant Injection Systems, because core spray systems were, at times, inoperable for preventive maintenance but all components of the low pressure coolant injection system were not operable. This issue was reported to the NRC in Licensee Event Report 05000293/2017-008-00, dated June 30, 2017, and supplemented by Licensee Event Report 05000293/2017-008-01, dated November 2, 2017.

Entergy sent the relay to a vendor laboratory (Altran Technologies) for failure analysis that included examinations, testing, and disassembly. The vendor observed the same time-delay failure in the relay, and concluded that it was due to an unspecified defect that caused the spring in the time delay mechanism to latch in an intermediate position between normal and energized. This prevented the pneumatic plunger from fully engaging, reducing the amount of air retained in the delay chamber. The reduced amount of air would quickly bleed out, resulting in the shortened time delay. The vendor did not identify a specific defect or its cause. The vendor did not identify evidence of damage to the relay from handling or over-heating, or any signs of degradation or foreign material. Therefore, the cause was inconclusive.

The relay had been installed in May 2015 after the previously-installed component failed. The relay that failed in 2015 had been installed for 14 years, and the cause of that failure was not determined because Entergy did not retain the part for analysis. The NRC identified Entergy's failure to perform a causal analysis for the failed relay in 2015 to be a violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions." The Green finding and NCV was documented in NRC Inspection Report 05000293/2015004, dated February 11, 2016.

For this 2017 failure, the inspectors reviewed the maintenance work order documentation from installation of the relay in 2015. The inspectors noted that the relay was bench tested and calibrated with a noted time delay of 1.25 seconds prior to installation. The relay was also tested using the 3.M.3-27 procedure after it was installed, and was noted to have "tested sat." The inspectors also noted that, when purchasing the relay in 2000, the licensee required that the vendor subject it to a 5000 cycle "burn in." The inspectors also considered that the relay had been in storage for 15 years, and had been installed in a mild environment, in a normally de-energized state. Apart from the 2015 failure (which involved the relay failing to energize at all), the inspectors did not identify previous similar failures at Pilgrim. Also, a review of industry and vendor operating experience did not reveal any similar failures of the pneumatic timing mechanism for this model relay.

Corrective Actions: Immediate corrective action was taken to replace the relay and verify its calibration through functional testing. As a result of its root cause analysis, Entergy developed a long-term corrective action to replace this relay with one that is not subject to failures of the pneumatic timing mechanism. Entergy's extent-of-condition review identified 26 additional relays of similar design installed in the plant. Entergy developed a long-term corrective action to similarly replace a subset of these relays (the failure of which could result in a loss of safety function) with the new style.

Corrective Action Reference: CR-PNP-2017-4768

Performance Assessment:

The inspectors determined that the failure of the 27A-B1X/TDDO relay was not within Entergy's ability to foresee and prevent. As a result, no performance deficiency was identified. Therefore, this violation will not be considered in the assessment process or the NRC's Action Matrix.

Enforcement:

Violation: TS 3.5.A.2, "Core Spray and Low Pressure Coolant Injection Systems," requires that during runs, startup, and hot shutdown modes, with one of the core spray systems inoperable, restoration of the inoperable core spray system to operable status within 7 days and maintain all active components of the low pressure coolant injection system and the diesel generators operable. Otherwise, be in at least cold shutdown within 24 hours.

Contrary to the above, on occasions between May 12, 2015, and May 3, 2017, one core spray system was inoperable while an active component of the low pressure coolant injection system was not maintained operable and Entergy did not place Pilgrim in at least cold shutdown within 24 hours. Specifically, an unspecified defect existed in the relay used to transfer power feed for the low pressure coolant injection valves to the backup source in the event of a degraded voltage condition. As a result, under certain conditions, the transfer would not have automatically occurred. This condition existed through the operating cycle, during which time the core spray systems were also individually declared inoperable when removed from service for scheduled maintenance.

Severity/Significance: This issue is considered within the traditional enforcement process because there was no performance deficiency associated with the violation of NRC requirements and the Reactor Oversight Program's significant determination process does not specifically consider violations without performance deficiencies in its assessment of licensee performance. Therefore, it is necessary to address this violation using traditional enforcement to adequately deter non-compliance. The NRC Enforcement Policy, Section 2.2.1 states, in part, that, whenever possible, the NRC uses risk information in assessing the safety significance of violations. The inspectors evaluated the issue using Inspection Manual Chapter 0609.04, "Initial Characterization of Finding," and Inspection Manual Chapter 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that the issue required a detailed risk evaluation because the defect in the 27A-B1X/TDDO relay resulted in a potential loss of the residual heat removal low pressure injection function. A Region I senior reactor analyst completed the detailed risk evaluation and estimated the increase in core damage frequency associated with this issue to be 2.27 E-9 per year. The dominant core damage sequence was a large break loss of coolant accident with a failure of residual heat removal low pressure injection valves to open and failure of core spray. This corresponds to very low risk significance (Green). To perform the detailed risk evaluation, an NRC senior reactor analyst used the Systems Analysis Programs for Hands-On Evaluation, Revision 8.1.6, Standardized Plant Analysis Risk Model, Version 8.50 for Pilgrim. Based on the safety significance insights, the inspectors determined that the issue is of very low safety significance and concluded that the violation would be best characterized as Severity Level IV.

Disposition: The violation is being treated as a NCV consistent with Section 2.3.2 of the Enforcement Policy.

The disposition of this violation closes Licensee Event Reports 05000293/2017-008-00 and 2017-008-01.

Minor Violation	71153
This violation of minor significance was identified by the licensee and has been entered into the licensee's corrective action program and is being treated as a minor violation, consistent with the NRC Enforcement Policy.	
Minor Violation: On June 22, 2015, Entergy submitted a licensee event report in accordance with 10 CFR 50.73 that contained information that was not complete or accurate in all material respects, contrary to the requirements in 10 CFR 50.9. Specifically, the licensee submitted Licensee Event Report 2015-004-00 to communicate the failure during testing of time delay Agastat relay 27A-B1X/TDDO intended to provide under-voltage protection for 480V emergency bus B6 by transferring power from bus B1 to bus B2. In the licensee event report, Entergy incorrectly documented that due to the failure, bus B6 would have continued to receive power from bus B1 with degraded voltage. Upon identifying the issue, on March 8, 2016, Entergy submitted a revised licensee event report with the correct information. Screening: Violations involving the submittal of inaccurate or incomplete information are evaluated under Traditional Enforcement because they impact the NRC's regulatory process. Accordingly, the inspectors evaluated this issue against the example violations in Section 6.9 of the NRC Enforcement Policy. The inspectors concluded that the violation is of minor safety significance because the inaccurate information did not change the NRC's review of the licensee event report and would not have altered the significance of the resulting violation. Enforcement: 10 CFR 50.9 requires that information provided to the Commission by a licensee shall be complete and accurate in all material respects. Contrary to the above, on June 22, 2015, Entergy provided information to the Commission that was not complete and accurate in all material respects. In the licensee event report, the licensee documented that due to the failure, bus B6 would have continued to receive power from bus B1 with degraded voltage. However, bus B6 would actually have tripped from bus B1 and lost power completely. This information was material to the NRC because the NRC requires timely and accurate reporting of information related to events in order to evaluate the potential safety significance and required NRC response. Entergy identified the inaccuracy and entered the issue into its corrective action program [CR-PNP-2015-9762]. On March 8, 2016, Entergy submitted a revision to the licensee event report (2015-004-01) that corrected the report. This failure to comply with 10 CFR 50.9 constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's Enforcement Policy. The disposition of this violation closes Licensee Event Report 05000293/2015-004-01.	

Licensee Identified Non-Cited Violation	71153
This violation of very low safety significance was identified by the licensee and has been entered into the licensee's corrective action program and is being treated as a NCV, consistent with Section 2.3.2 of the Enforcement Policy.	
Violation: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions appropriate to the circumstances and shall be accomplished in accordance with the instructions.	

Contrary to the above, from January 1994 to June 2017, Entergy modified site surveillance procedure 8.M.3-18, "Standby Gas Treatment System Exhaust Fan Logic Test and Instrument Calibration," without prescribing adequate documented instructions for the condition caused by the testing. Specifically, Entergy failed to identify that the procedurally prescribed lineup of the standby gas treatment system resulted in secondary containment being inoperable due to the large opening introduced into the system.

Significance/Severity: The inspectors evaluated this finding using Inspection Manual Chapter 0609.04, "Initial Characterization of Findings," and Inspection Manual Chapter 0609, Appendix A, Exhibit 3, "Barrier Integrity Screening Questions." The inspectors determined that the finding was of very low safety significance.

Corrective Action Reference: CR-PNP-2017-11714

The disposition of this violation closes Licensee Event Reports 05000293/2017-013-00 and 05000293/2017-013-01.

Licensee Identified Non-Cited Violation	71153
This violation of very low safety significance was identified by the licensee and has been entered into the licensee's corrective action program and is being treated as a NCV, consistent with Section 2.3.2 of the Enforcement Policy.	
Violation: 10 CFR 50.72(b)(3)(v)(C) requires licensees to a notify the NRC within 8 hours any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of structures or systems that are needed to control the release of radioactive material. Contrary to the above, Entergy did not make a required notification pursuant to 10 CFR 50.72(b)(3)(v)(C). Specifically, on June 20, 2017, secondary containment was declared inoperable due to simultaneous opening of both airlock doors, and Entergy did not make the required notification until June 22, 2017. Significance/Severity: This violation is being treated under the NRC's traditional enforcement process, for impeding the regulatory process, specifically Entergy did not make a required notification, as outlined in Inspection Manual Chapter 0612, Appendix B. The Reactor Oversight Process's significance determination process does not specifically consider the regulatory process impact in its assessment of licensee performance. Therefore, it is necessary to address this violation which impedes the NRC's ability to regulate using traditional enforcement to adequately deter non-compliance. The severity of this violation was determined to be Severity Level IV, as outlined in Example 9 from Section 6.9.d. of the NRC Enforcement Policy. Corrective Action References: CR-PNP-2017-06380 and CR-PNP-2017-07015 The disposition of this finding closes Licensee Event Report 2017-011-00.	

EXIT MEETINGS AND DEBRIEFS

Inspectors verified no proprietary information was retained or documented in this report.

- On July 24, 2018, the inspectors presented the quarterly resident inspector inspection results to Mr. Bruce Chenard, Acting General Manager of Plant Operations, and other members of the Entergy staff.

DOCUMENTS REVIEWED

71111.11

Procedures
EN-OP-115, Conduct of Operations

71111.12

Procedures
EN-DC-205, Maintenance Rule Monitoring, Revision 5

71111.13

Procedures
EN-WM-104, On-line Risk Assessment, Revision 16

71111.15

Procedures
EN-OP-104, Operability Determination Process, Revision 16

71111.18

Procedures
EN- DC-115, Engineering Change Process, Revision 25
EN- DC-136, Temporary Modifications, Revision 17

71124.01

Procedures
EN-RP-101, Access Control for Radiologically Controlled Areas, Revision 14
EN-RP-204, Special Monitoring Requirements, Revision 11

Condition Reports (*initiated in response to inspection)
2017-09417 2018-01292 2018-03680 2018-03681 2018-03727 2018-03752 2018-03969

Radiation Work Permits
2018060 2018064 2018082

71152

Procedures
EN-OM-123, Fatigue Management Program, Revision 13

Condition Reports (*initiated in response to inspection)
2016-08289 2017-01082 2017-07946 2018-03313 2018-03632* 2018-03647* 2018-03746* 2018-03755* 2018-04145*

Miscellaneous

LO-PNPLO-2017-003, Fatigue Management Program Self-Assessment dated 1/30/17
LO-PNPLO-2018-008, Fatigue Management Program Self-Assessment dated 1/30/18
NEI 06-11, Managing Personnel Fatigue at Nuclear Power Reactor Sites, Revision 1
NRC Regulatory Guide 5.73, Fatigue Management For Nuclear Power Plant Personnel dated March 2
Worker Time Records and PQ&S Records for Selected Maintenance Staff for the Period 12/24/17 to 4/14/18