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

February 14, 2017

Mr. Brian Sullivan
Site Vice President
Entergy Nuclear Northeast
James A. FitzPatrick Nuclear Power Plant
P.O. Box 136
Lycoming, NY 13093

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT - INTEGRATED INSPECTION REPORT 05000333/2016004

Dear Mr. Sullivan:

On December 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the James A. FitzPatrick Nuclear Power Plant (FitzPatrick). On January 19, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at FitzPatrick. 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 FitzPatrick.

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

Sincerely,

/RA/

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

Docket No. 50-333
License No. DPR-59

Enclosure:
Inspection Report 05000333/2016004
w/Attachment: Supplementary Information

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REGION I

Docket No.	50-333
License No.	DPR-59
Report No.	05000333/2016004
Licensee:	Entergy Nuclear Northeast (Entergy)
Facility:	James A. FitzPatrick Nuclear Power Plant
Location:	Scriba, NY
Dates:	October 1, 2016, through December 31, 2016
Inspectors:	E. Miller, Senior Resident Inspector B. Sienel, Resident Inspector J. DeBoer, Emergency Preparedness Inspector P. Finney, Senior Resident Inspector S. Horvitz, Project Engineer D. Kern, Senior Reactor Inspector S. Pindale, Senior Reactor Inspector
Approved by:	Arthur L. Burritt, Chief Reactor Projects Branch 5 Division of Reactor Projects

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SUMMARY

IR 05000333/2016004; 10/01/2016 - 12/31/2016; James A. FitzPatrick Nuclear Power Plant (FitzPatrick); Problem Identification and Resolution.

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

Cornerstone: Barrier Integrity

- Green. The inspectors identified a Green NCV of Technical Specification (TS) 5.4, "Procedures," because Entergy staff did not implement procedure AP-12.06, "Equipment Status Control," as required. Specifically, Entergy personnel did not recognize the impact of a change associated with the tagout of a 'C' residual heat removal (RHR) system primary containment isolation valve (PCIV). This resulted in motor operated valve 10MOV-13C being electrically isolated in the open position without being recognized as a PCIV and without proper entry into TS 3.6.1.3. Entergy restored the valve to operable status, entered this issue into their corrective action program (CAP) as condition report (CR)-JAF-2016-4419, and conducted meetings with each operating crew to discuss the event and reinforce standards for equipment status control and maintaining a questioning attitude. Training was also provided to operators to review the scenario and discuss requirements associated with PCIVs.

  This finding is more than minor because it was associated with the configuration control attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (containment) protect the public from radionuclide releases caused by accidents or events. Specifically, Entergy staff did not recognize the impact of a change associated with the tagout of a containment isolation valve. The change in the tagout resulted in a failure to isolate the containment isolation valve and enter TS 3.6.3.1 prior to maintenance. The finding was similar to Example 3.j in Appendix E of IMC 0612, "Examples of Minor Issues," issued August 11, 2009. Since the PCIV was in an open position with power removed, a reasonable doubt of operability existed due to the valve's inability to close to perform its containment isolation function. The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," issued October 7, 2016; Exhibit 3 of IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012; and Appendix H of IMC 0609, "Containment Integrity Significance Determination Process," issued May 6, 2004. Using Exhibit 3 of IMC 0609, Appendix A, Section B, "Reactor Containment," the finding directed the use of IMC 0609, Appendix H because it represented an actual open pathway in the physical integrity of reactor containment (i.e. valve). Using IMC 0609, Appendix H, the finding was classified as a Type B finding because it was related to a degraded condition that had potentially important implications for the integrity of containment, without affecting the likelihood of core damage (i.e. containment isolation was precluded by the isolation valve being failed in the open position, however the low pressure coolant injection function remained

available). Using Table 6.1, “Phase 1 Screening-Type B Findings at Full Power,” for a boiling water reactor, Mark 1 Containment, the inspectors were directed to perform a Phase 2 Assessment because the structure, system, and component (SSC) affected by the finding was a containment isolation valve. Using Table 6.2, “Phase 2 Risk Significance-Type B Findings at Full Power,” the inspectors determined that the failure of the containment isolation valve critical to suppression pool integrity/scrubbing was less than 3 days, and therefore was of very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance, Challenge the Unknown, because Entergy failed to maintain a questioning attitude to identify an improper configuration associated with a PCIV tagout during maintenance planning and execution. Specifically, a tagout writer modified the configuration for a containment isolation valve, which was not challenged or questioned during subsequent reviews. This resulted in the PCIV being tagged out in the open position, a condition that rendered the valve inoperable. [H.11] (Section 4OA2.2)

REPORT DETAILS

Summary of Plant Status

FitzPatrick began the inspection period at 80 percent power, the maximum power achievable due to fuel depletion as FitzPatrick was at the end of this operating cycle. At the end of the inspection period, FitzPatrick was operating at approximately 57 percent power. The maximum power will continue to decrease (coast down) until the refueling outage, which is planned for the first quarter of 2017.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (7111.01 – 2 samples)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors reviewed Entergy's readiness for the onset of seasonal low temperatures. The review focused on the emergency diesel generator (EDG) and the high pressure coolant injection (HPCI) systems. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), TSs, control room logs, and CAP to determine what temperatures or other seasonal weather could challenge these systems, and to ensure Entergy personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including Entergy's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during cold weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

.2 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed Entergy's preparations for the onset of flash flooding as posted by a National Weather Service "Flash Flood Watch" for the area on October 21, 2016. The inspectors reviewed the implementation of adverse weather preparation procedures before the onset of and during this adverse weather condition. The inspectors walked down the EDGs, emergency service water (ESW), and residual heat removal service water (RHRSW) to ensure system availability. The inspectors verified that operator actions defined in Entergy's adverse weather procedure maintained the readiness of essential systems. The inspectors discussed readiness for adverse weather response with operations and work control personnel.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial System Walkdown (71111.04 – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- 'B' RHRSW during planned 'A' RHR maintenance on November 1, 2016
- 'B' RHR during planned 'A' RHR maintenance on November 2, 2016
- 'B' core spray during planned 'A' core spray maintenance on November 8, 2016
- 'B' standby gas treatment during planned 'A' standby gas treatment maintenance on November 29, 2016

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

b. Findings

No findings were identified.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q – 4 samples)

a. Inspection Scope

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

- Standby gas filter room elevation 272' fire area/zone XX/SG-1 on October 26, 2016
- Reactor building elevation 369' fire area/zone IX/RB-1A on November 15, 2016
- Crescent area – east elevation 227' and 242' fire area/zone XVII/RB-1E on December 9, 2016
- Crescent area – west elevation 227' and 242' fire area/zone XVIII/RB-1W on December 9, 2016

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to assess susceptibilities involving internal flooding. The inspectors also reviewed the CAP to determine if Entergy staff identified and corrected flooding problems and whether operator actions for coping with flooding were adequate. The inspectors focused on the west electric bay to verify the adequacy of floor and water penetration seals, common drain lines, and flood barriers.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A – 2 samples)

a. Inspection Scope

The inspectors reviewed the reactor building closed loop cooling (RBCLC) heat exchanger system for readiness and availability to perform its safety functions on November 1, 2016. The inspectors also reviewed 66UC-22H, an east crescent area unit cooler on November 15, 2016. The inspectors reviewed the design bases for the components and verified Entergy's commitments to NRC Generic Letter 89-13, "Service Water System Requirements Affecting Safety-Related Equipment." The inspectors reviewed the results of previous inspections of the RBCLC heat exchangers and the east crescent area unit cooler. The inspectors discussed the results of the most recent inspection with engineering staff. The inspectors verified that Entergy initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

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

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

On November 7, 2016, the inspectors observed licensed operator simulator training, which included a simulator scenario that involved a recirculating pump seal failure, failure of 'A' reactor protection system to generate a scram signal, automatic alternate rod insertion failure, a safety relief valve (SRV) leak and tailpiece break, and emergency depressurization. The inspectors evaluated operator performance during the simulated event and verified completion of risk-significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors observed operators during control rod operability testing for fully withdrawn control rods on November 6, 2016. The inspectors observed the pre-job briefing, reactivity control briefings, and reviewed EN-OP-104, "Conduct of Operations," Revision 17 to verify that operators met all requirements associated with staffing and conduct of reactivity manipulations. Additionally, the inspectors observed test performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on SSC performance and reliability. The inspectors reviewed system health reports, CAP documents, and maintenance rule basis documents to ensure that Entergy staff was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.65 and verified that the (a)(2) performance criteria established by Entergy staff was reasonable. For SSCs classified as (a)(1), the

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

- Decay heat removal system isolation valves 32DHR-18 and 32DHR-19 on October 20, 2016
- Commercial grade dedication of 'A' RHR power supply capacitors on November 3, 2016

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 3 samples)

a. Inspection Scope

The inspectors reviewed maintenance activities to verify that the appropriate risk assessments were performed prior to removing equipment for work. The inspectors reviewed whether risk assessments were performed as required by 10 CFR 50.65(a)(4), and were accurate and complete. When emergent work was performed, the inspectors reviewed whether plant risk was promptly reassessed and managed. The inspectors also walked down selected areas of the plant, which became more risk significant because of the maintenance activities, to ensure they were appropriately controlled to maintain the expected risk condition. The reviews focused on the following activities:

- Unplanned drywell continuous air monitor high particulate count the week of October 3, 2016
- Planned maintenance on the 'A' RHR and RHRSW systems the week of November 1, 2016
- Planned maintenance on the 'B' core spray system the week of November 8, 2016

b. Findings

No findings were identified.

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

a. Inspection Scope

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

- CR-JAF-2016-3831 concerning the outboard main steam isolation valve (MSIV) 29AOV-86D indicating dual position on October 4, 2016
- CR-JAF-2016-4678 concerning operability of the 'A' low pressure coolant injection battery with foreign material in the electrolyte on November 16, 2016
- Review of the FitzPatrick operator workaround (OWA) program on December 12, 2016

- CR-JAF-2016-5133 concerning the operability of equipment in the east electric bay due to a tube leak associated with the 67UC-16B east electric bay unit cooler on December 19, 2016

The inspectors selected these issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the operability determinations to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and UFSAR to Entergy staff's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Entergy staff. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, such as in the case of OWAs, the inspectors determined whether the measures in place would function as intended and were properly controlled by Entergy. The inspectors verified that Entergy identified OWAs at an appropriate threshold and addressed them in a manner that effectively managed OWA-related adverse effects on operators and SSCs.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)

Temporary Modification

a. Inspection Scope

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

- Engineering Change 64595 – Lift lead for 70TCV-121B [control room ventilation AHU-3B chilled water outlet temperature control valve] to ensure valve remains in fail-safe position (open)

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 7 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- Work order (WO) 00456472 to correct control room emergency ventilation air system damper 70MOD-108A failure to fully open on October 5, 2016
- WO 00457847 to replace the reactor building track bay outer door, 24EOD-1B, interlock solenoid on October 12, 2016
- WO 454994 for planned maintenance associated with RBCLC pump 15P-1C on October 20, 2016
- WO 459686 to adjust reactor building exhaust isolation valve 66AOV-101B stroke time on October 26, 2016
- WO 52542781 to perform breaker preventive maintenance (PM) for the 'A' RHR min flow valve, 10MOV-16A, on November 3, 2016
- WO 52629017 to perform PM on 'A' core spray pump discharge check valve, 14CSP-10A, on November 9, 2016
- WO 52553778 to perform PM and replace 'A' RHRSW pump breaker loss of power alarm relay on November 11, 2016

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed FitzPatrick's work schedule and outage risk plan for refuel outage 22, which was scheduled to commence in the first quarter of 2017. The inspectors reviewed FitzPatrick's development of outage plans and schedules to verify that risk, industry experience, previous site specific problems, and defense-in-depth were considered. The inspectors also performed scaffold walkdowns to ensure no impact to safety-related equipment.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples)

a. Inspection Scope

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

- ISP-100D-RPS, Reactor Protection System (RPS) Instrument Functional Test/Calibration (ATTS) on October 28, 2016
- ST-22C, Automatic Depressurization System Logic System Functional Test on November 3, 2016
- ST-20C, Control Rod Operability for Fully Withdrawn Control Rods, on November 6, 2016
- ISP-200A, RPS-PCIS (A1 Channel) Pressure Transmitter Calibration (ATTS), on December 1, 2016

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

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

a. Inspection Scope

Entergy implemented various changes to the FitzPatrick emergency action levels (EALs), emergency plan, and implementing procedures. Entergy had determined that, in accordance with 10 CFR 50.54(q)(3), any change made to the EALs, emergency plan, and its lower-tier implementing procedures, had not resulted in any reduction in effectiveness of the plan, and that the revised plan continued to meet the standards in 10 CFR 50.47(b) and the requirements of 10 CFR 50, Appendix E.

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

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151 – 5 samples)

Mitigating Systems Performance Index (MSPI)

a. Inspection Scope

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

- Emergency Alternating Current Power System
- High Pressure Injection System
- Heat Removal System
- Residual Heat Removal System
- Cooling Water Systems

To determine the accuracy of the performance indicator (PI) data reported during this period, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and discussed specific questions with the responsible system engineer and risk analyst. The inspectors also reviewed FitzPatrick operator narrative logs, CRs, NRC integrated inspection reports, and the FitzPatrick MSPI basis document to validate the accuracy of the submittals.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 5 samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that Entergy staff entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended CR screening meetings.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues, as required by Inspection Procedure 71152, "Problem Identification and Resolution," to identify trends that might indicate the existence of more significant safety issues. In this review, the inspectors included repetitive or closely-related issues that may have been documented by Entergy outside of the CAP, such as trend reports, PIs, system health reports, and CAP backlogs. The inspectors also reviewed Entergy's CAP database for the third and fourth quarters of 2016 to assess CRs written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRC's daily CR review (Section 4OA2.1) to verify that Entergy personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Observations

The inspectors observed a declining trend with FitzPatrick operations department human performance events during the third and fourth quarter of 2016. Following a scram in January 2016, a common cause analysis (CCA), CR-JAF-2016-0910, was performed to evaluate operations performance due to a number of events that occurred during the forced outage. This common cause was expanded in April 2016 to provide a broader evaluation based on a continued trend with human performance events. In total, the common cause evaluation analyzed 25 CRs between October 2015 and April 2016. A weakness in operator fundamentals, particularly due to not working effectively as a team, was identified as the common cause. Corrective actions from the common cause involved operator crew reviews of industry guidance on working effectively as a team and development and implementation of training exercises to enhance crew teamwork.

Between April 2016 and November 2016, human performance events continued to occur. During this time, 16 additional events occurred. Events included failures to enter TS action statements, failures to follow procedures, and overfilling the spent fuel pool.

Following the inspectors' identification of the configuration control event associated with motor operated valve 10MOV-13C, as documented in CR-JAF-2016-4419, Nuclear Oversight issued a quality assurance finding (QAF) with regard to consequential and non-consequential events that occurred in operations during surveillance testing and during system reconfigurations to support clearance and tagging, revealing weaknesses in operator fundamentals and use of error prevention tools. The QAF was documented in CR-JAF-2016-4464, and required a written response from the Site Vice President with regard to how this growing trend would be addressed. The corporate functional area manager in operations also identified that the corrective actions associated with the common cause evaluation in CR-JAF-2016-0910 were ineffective to address issues with operator teamwork. CR-JAF-2016-4391 was written to address the ineffective corrective actions.

In response to the continued trend with human performance issues in operations and the QAF, CR-JAF-2016-4464 was written and an apparent cause evaluation (ACE) was performed. Also, a common cause evaluation was performed to evaluate the additional events that occurred since the previous common cause was performed in April 2016. Assessment of events through the ACE determined the apparent cause to be that the

operations shift and department management failed to effectively monitor operator performance. Specifically, individual operator weaknesses had the potential to be identified during on-shift or training observations, however they were not being identified and captured in processes used to track and improve individual performance. It was also identified that inadequate staffing led to numerous shift vacancies needing to be covered by substitute operators. The shortfalls led to non-plant operators (NPOs) being placed on a four-section rotation, causing changes to overall operator crew composition. The staffing challenge led to shortfalls in enhancing teamwork. A second contributing cause that was identified was inadequate questioning attitude or verification practice.

As part of the ACE, it was also identified that the previous corrective actions associated with the common cause focused on crew performance in the simulator, which typically involves senior reactor operators (SROs) and reactor operators (ROs), and lacked significant involvement with crew NPOs. There were few scenarios for teambuilding that provided NPOs the opportunity to work on crew dynamics when faced with unexpected situations.

Corrective actions developed to address the causes identified in the ACE included a stand down of all shift SROs with senior operations management and the general manager of plant operations to discuss the operations department shortfalls. An operations excellence improvement plan was developed to reinforce operations standards, provide additional oversight from industry peers, conduct paired observations, track and document items coached, and to provide a roll-up to operations management. The excellence plan also created actions to focus on improvement in pre-job briefs, enhancement of accountability in turnovers, improvement in adherence and accountability of procedure use through shift manager reviews of procedures performed, ensuring coaching is tracked and briefed to operations management, as well as shift manager certification of adherence to procedures following reviews of completed procedures performed during their respective shifts. The plan has an action to evaluate and remove administrative burdens on the field supervisor in operations to allow more in-field observations. Monthly meetings are to be held to evaluate current performance and assess effectiveness of actions to date. The operations excellence improvement plan is being tracked under WT-WTJAF-2016-0294.

In addition to the operations excellence improvement plan, corrective actions included performing focused crew assessment for all operating crews in the fourth quarter of 2016, hiring a sufficient number of NPO candidates to staff a licensing class in November 2016, hiring a sufficient number of RO and SRO candidates to staff a licensing class, and performing focused crew assessment for all operating crews following the refuel outage to identify any additional focus areas.

The inspectors' review of the events, trending, and cause evaluations identified a performance deficiency of more than minor significance that is documented below. Overall, the corrective actions associated with the most recent ACE and CCA appear reasonable to address the shortfalls of the past corrective actions and address the recently identified deficiencies associated with operator fundamentals. The inspectors will continue to assess operations performance through inspections during surveillance tests, control room walkdowns, and daily CAP reviews.

c. Findings

Introduction. The inspectors identified a Green NCV of TS 5.4, "Procedures," because Entergy staff did not implement procedure AP-12.06, "Equipment Status Control," as required. Specifically, Entergy personnel did not recognize the impact of a change associated with the tagout of a C' RHR system PCIV. This resulted in motor operated valve 10MOV-13C being electrically isolated in the open position without being recognized as a PCIV and without proper entry into TS 3.6.1.3.

Description. On November 2, 2016, at 1:30 AM, 10MOV-13C, the 'C' RHR suction isolation valve from the torus, was tagged out of service as part of planned maintenance for a conduit repair to an adjacent valve. The planned tagout placed the containment isolation valve in the open position with the valve electrically de-energized. During a walkdown by inspectors, it was identified that the containment isolation valve was not in the isolated position (closed) with the power removed while tagged out of service. Operators reviewed the condition against design requirements and determined that the valve was a PCIV, as listed in accordance with Technical Requirements Manual, Appendix A, "Primary Containment Isolation Valves" and UFSAR Table 7.3-1, "Primary Containment Isolation Valves." Following review, it was determined that operators failed to recognize the valve as a PCIV and enter applicable TS 3.6.1.3, "Primary Containment Isolation Valves," due to the valve not being able to perform its safety function to isolate should an accident occur during maintenance. Power to the valve was immediately restored at 9:25 AM, restoring operator ability to isolate the valve remotely from the control room, as described in the UFSAR, and exit the applicable TS.

The FitzPatrick staff submitted CR-JAF-2016-4419 and performed an ACE to understand why the PCIV tagout directed the valve to be in the open position with the power removed. The ACE determined that an error was made while the tagout was being written. On September 17, 2016, the tagout writer modified a previous tagout and changed the specified position of the containment isolation valve without understanding the implications. In October 2016, tagout reviews were completed as part of the work management process, and failed to identify the error. The ACE also determined that the SRO designated as the Field Supervisor failed to perform an adequate review of the components being positioned as part of the planned maintenance, thus also missing an opportunity to identify the error. FitzPatrick procedure AP-12.06, "Equipment Status Control," Section 8.17, "PCIV and SCIV [secondary containment isolation valve] Administrative Controls," provides requirements to ensure that, "a PCIV is under administrative control and to ensure the line remains isolated while the PCIV is declared inoperable." Entergy staff should have closed the containment isolation valve prior to commencing maintenance, to ensure proper administrative controls under AP-12.06.

Corrective actions included restoring the valve to operable status, and holding meetings with each operating crew to discuss the event and reinforce standards for equipment status control and maintaining a questioning attitude. Training was also provided to operators to review the scenario and discuss requirements associated with PCIVs.

Analysis. The inspectors determined that Entergy staff's failure to properly implement AP-12.06, "Equipment Status Control," to ensure a containment isolation valve was isolated and enter TS 3.6.3.1 prior to maintenance, was a performance deficiency that was reasonably within Entergy's ability to foresee and correct and should have been prevented. This finding is more than minor because it was associated with the

configuration control attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (containment) protect the public from radionuclide releases caused by accidents or events. Specifically, Entergy staff did not recognize the impact of a change associated with the tagout of a containment isolation valve. The change in the tagout resulted in a failure to isolate the containment isolation valve and enter TS 3.6.3.1 prior to maintenance. The finding was similar to Example 3.j in Appendix E of IMC 0612, "Examples of Minor Issues," issued August 11, 2009. Since the PCIV was in an open position with power removed, a reasonable doubt of operability existed due to the valve's inability to close to perform its containment isolation function.

The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," issued October 7, 2016; Exhibit 3 of IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012; and Appendix H of IMC 0609, "Containment Integrity Significance Determination Process," issued May 6, 2004. Using Exhibit 3 of IMC 0609, Appendix A, Section B, "Reactor Containment", the finding directed the use of IMC 0609, Appendix H because it represented an actual open pathway in the physical integrity of reactor containment (i.e. valve). Using IMC 0609, Appendix H, the finding was classified as a Type B finding because it was related to a degraded condition that had potentially important implications for the integrity of containment, without affecting the likelihood of core damage (i.e. containment isolation was precluded by the isolation valve being failed in the open position, however the low pressure coolant injection function remained available). Using Table 6.1, "Phase 1 Screening-Type B Findings at Full Power," for a boiling water reactor, Mark 1 Containment, the inspectors were directed to perform a Phase 2 Assessment because the SSC affected by the finding was a containment isolation valve. Using Table 6.2, "Phase 2 Risk Significance-Type B Findings at Full Power," the inspectors determined that the failure of the containment isolation valve critical to suppression pool integrity/scrubbing was less than 3 days, and therefore was of very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance, Challenge the Unknown, because Entergy failed to maintain a questioning attitude to identify an improper configuration associated with a PCIV tagout during maintenance planning and execution. Specifically, a tagout writer modified the configuration for a containment isolation valve, which was then not challenged or questioned during subsequent reviews. This resulted in the containment isolation valve being tagged out in the open position, a condition that rendered the valve inoperable. [H.11]

Enforcement. TS 5.4.1 requires, in part, that the applicable procedures recommended in Regulatory Guide 1.33, Appendix A, November 1972, be established, implemented, and maintained. Regulatory Guide 1.33, Section A, "Administrative Procedures," specifies, in part, that there be administrative procedures for equipment control (e.g. locking and tagging). FitzPatrick procedure AP-12.06, "Equipment Status Control," Section 8.17, "PCIV and SCIV Administrative Controls," provides requirements to ensure that "a PCIV is under administrative control and to ensure the line remains isolated while the PCIV is declared inoperable." Contrary to the above, on November 2, 2016, the inspectors identified that Entergy staff failed to properly implement AP-12.06, "Equipment Status Control," to ensure a containment isolation valve was isolated and declared inoperable prior to maintenance. Specifically, Entergy staff tagged 10MOV-13C, a 'C' RHR containment isolation valve, out of service by removing power and leaving the valve in the open position, which rendered it inoperable. Operators did not recognize the inoperabilty or take appropriate actions to comply with TS 3.6.3.1 prior to maintenance. Entergy

subsequently restored the valve to operable status and conducted meetings with each operating crew to discuss the event and reinforce standards for equipment status control and maintaining a questioning attitude. Training was also provided to operators to review the scenario and discuss requirements associated with PCIVs. Because this violation was of very low safety significance (Green) and was entered into the CAP as CR-JAF-2016-4419, this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000333/2016004-01, Failure to Ensure Proper Configuration Control of a PCIV during Planned Maintenance**)

.3 Annual Sample: Equipment Reliability (ER) in Relation to PM Deferrals

a. Inspection Scope

In October 2015, Entergy documented continuing gaps in ER despite a maintenance backlog reduction and other ER efforts (CR-JAF-2015-4667). Since January 2016, FitzPatrick has experienced several equipment failures including the failure of directional control valves causing an unplanned downpower, a failure to fast transfer electrical loads following a reactor scram, a failure of a transformer that resulted in a reactor scram, and the loss of a condensate booster pump due to a check valve failure. In August 2016, Entergy performed a CCA under CR-JAF-2016-3051 based a degrading trend in equipment performance issues.

Considering Entergy's March 2016 decision to permanently shut down and their subsequent preparations to begin the decommissioning of FitzPatrick in January 2017 followed by the August 2016 announcement of the potential for continued at-power operation, the inspectors performed an in-depth review of Entergy's CCA and corrective actions to determine whether actions already taken in preparation for decommissioning were appropriately being addressed to support ER and continued operation after January 2017. The inspectors also reviewed Entergy's ER excellence plan and PM excellence plan. The inspectors interviewed site staff, performed plant area walkdowns, and reviewed station procedures and deferred or deleted PMs.

b. Findings and Observations

No findings were identified.

Entergy's CCA determined the common cause was "declining support for the equipment reliability process" with specific drivers being less than ideal incorporation of operating experience, PM template use, and PM program feedback. Of note, Entergy's CCA identified that the station's responses to those CRs that prompted development of the PM excellence plan (WT-WTJAF-2016-0011 and WT-WTJAF-2015-0049) were ineffective. CCA corrective actions include the establishment of an ER excellence plan (WT-WTJAF-2016-0263) that will, in part, provide oversight of the PM excellence plan. Other corrective actions included ER site communications and the completion of additional semi-annual CCAs until there is an improved trend in equipment performance. Entergy's CCA also provided insights into other areas contributing to the ER issue, namely maintenance work practices, predominantly rework. Although rework was found to be statistically significant in the CCA, Entergy determined there was a lack of causality between rework events and those that were associated with the degrading trend in equipment performance.

The inspectors reviewed the ER excellence plan and considered the following actions noteworthy:

- A reduction in deferred critical PMs to two or less and a reduction in PMs in the second half of their grace period to 20 or less by June 2017
- Filling the vacant ER coordinator position, a position that the CCA acknowledged had been turned over three times in the past 3 years
- Re-enrollment in the Boiling Water Reactor Owners Group

The inspectors observed that a majority of the ER excellence plan actions concerned specific nuclear steam supply systems, mostly critical safety systems, while the CCA had determined that the majority of events that impacted the degrading trend in equipment performance were critical generation systems. The ER excellence plan actions that covered these latter systems were generic (e.g. single point vulnerabilities and scram vulnerability assessments) rather than specific systems.

The inspectors also reviewed the PM excellence plan and noted that the majority of the actions had been completed. Exceptions included the PM long range plan, system PM-benchmarking, and those actions designated as ongoing. Inspector observations included:

- In Section 2, PM adequacy, Entergy designated a number of systems to be PM-benchmarked under the 2015 PM Program Excellence Plan. Many “deep dives” had been cancelled in November 2015 based on future decommissioning including the neutron monitoring system. Notably, the 2016 CCA had cited ‘monitoring’ systems such as this as having been a high contributor to the equipment performance decline in September 2016. Appropriately, the PM benchmark actions previously cancelled were revitalized under the latest version of the 2016 PM Program Excellence Plan.

- In Section 5, PM feedback, all but two ongoing actions were complete. The performance criterion for the section was 100 percent PM feedback by December 31, 2015. The inspectors observed that, given that August 2016 CCA determined PM feedback was a specific driver of the common cause, reassessment of this plan section is warranted.

Finally, the inspectors reviewed a sampling of PM change requests from 2015 and 2016 to determine whether PMs that had been deferred or deleted based on the anticipated decommissioning had been identified for further analysis given the potential change in plant operations. That is, whether to accept the previously approved deferment/deletion or to reactivate/adjust the PM. Entergy’s PM excellence plan included action items to review previously approved PM change requests. As recently as August 17, 2016, Entergy had identified refueling outage PMs that had been deferred and/or deleted that also required a review in anticipation of a January 2017 refueling outage. However, the inspectors identified five PMs that had been coded for decommissioning that were not being re-analyzed by Entergy. Entergy reviewed the five approved PM change requests and agreed they were defueling-based justifications that required re-evaluation. Entergy entered CR-JAF-2016-4132 in its CAP and generated WT-WTJAF-2016-0011, CA-20 through CA-23, to document the condition, drive the re-evaluation, and include a third review of the 65 original PM change requests.

Overall, the inspectors concluded that Entergy's actions were reasonable and appropriate. The station had identified a negative trend in ER, acknowledged the need for timely improvement of the same, and developed plans to improve ER. In general, Entergy had identified those deleted or deferred PMs that warranted additional review given the potential to continue at-power operations past January 2017.

.4 Annual Sample: 'A' EDG Fuel Supply and Return Lines Swapped; Operability Evaluation

a. Inspection Scope

The inspectors performed an in-depth review of Entergy's causal analysis, operability evaluation, EDG performance reviews, and corrective actions associated with Entergy's discovery that the fuel injector supply and return lines for cylinder 19 of the 'A' EDG were swapped. The 'A' EDG is a 20-cylinder Electric Motors Division diesel generator. Mechanics identified this as-found condition on November 5, 2015, during an online EDG PM outage. This configuration error was not visible during normal plant operation because cover plates are normally installed over the fuel supply and return lines for individual cylinders. The 'A' EDG was inoperable for planned maintenance at the time of discovery. Entergy entered the issue into the CAP as CR-JAF-2015-04938 to correct the cylinder 19 fuel line configuration error, evaluate impact on 'A' EDG past operability, and assess reportability to the NRC. Mechanics performed WO 52529215 to complete the planned PM and restore cylinder 19 fuel lines to their correct configuration. Operators then performed WO 52654325 as post-maintenance testing to verify fuel line connections were tight and to assess EDG operating performance prior to declaring the 'A' EDG operable.

The inspectors independently reviewed CR-JAF-2015-04938, associated EDG vendor manuals, system drawings, design basis documents, periodic maintenance and surveillance test records, and system operating procedures. Additionally, the inspectors interviewed station personnel to determine whether EDG maintenance procedures, maintenance practices, and performance monitoring were adequate to maintain appropriate fuel supply and EDG configuration control to support the EDG's design function. The inspectors performed an in-plant walkdown of the 'A' EDG fuel system to verify components were configured as specified in system drawings and the vendor manual. The inspectors assessed Entergy's problem identification threshold, documentation of the issue, causal analysis, extent-of-condition review, and the prioritization and timeliness of corrective actions to evaluate whether Entergy was appropriately identifying, characterizing, and correcting problems associated with this issue. The inspectors compared the actions taken to the requirements of Entergy's CAP and 10 CFR Part 50, Appendix B.

b. Findings and Observations

No findings were identified.

Entergy determined the 'A' EDG fuel line configuration error was a condition adverse to quality. This condition was promptly corrected following identification. Engineers determined that due to the EDG fuel supply line and return line design (e.g., location of check valves), adequate fuel injection pressure was maintained to cylinder 19 for the 'A' EDG to perform its design function, despite the fuel supply and return lines being swapped. EDG surveillance test results, including the fully loaded 8-hour endurance test,

supported this conclusion. Therefore, Entergy determined EDG operability was not impacted by the configuration error and the issue was not reportable.

The inspectors concluded Entergy adequately identified and corrected the EDG fuel line configuration error in a timely manner as required by 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action." Entergy also correctly determined the issue was not reportable to the NRC. Notwithstanding, the inspectors noted CR-JAF-2015-04938 did not include actions to identify when and how the fuel lines had been swapped or establish corrective actions to preclude recurrence. The inspectors discussed this observation with engineers who subsequently interviewed mechanics and determined the fuel lines were inadvertently swapped on September 13, 2013, during replacement of the cylinder 19 fuel injector. The work instruction directed mechanics to reconnect all fuel lines from the manifold to the injector, but did not differentiate between the fuel supply line connection and the fuel return line connection. Based on these discussions, engineers initiated a procedure change to MP-093.05, "EDG Power Assembly Maintenance," Revision 8, to verify proper orientation of the fuel supply and fuel return lines and thereby reduce likelihood of recurrence. The inspectors determined the original general wording of the work instruction and resulting incorrect connection of the 'A' EDG cylinder 19 fuel lines represented a performance deficiency. However, because the incorrect fuel line connection did not adversely affect 'A' EDG availability, reliability, or capability, the inspectors concluded the issue was of minor safety significance in accordance with NRC IMC 0612.

.5 Annual Sample: Adequacy of Corrective Actions for Four October 2014 Reactor Water Recirculation (RWR) Trips as They Relate to an August 2016 'A' RWR Pump Trip

a. Inspection Scope

The inspectors performed an in-depth review of Entergy's root cause analysis and corrective actions associated with CR-JAF-2016-3180, which documented the trip of the 'A' RWR pump on August 21, 2016. Specifically, with reactor power at approximately 91 percent, a resistor in the 'A' RWR pump motor generator voltage regulator failed, which caused the field breaker, and consequently the RWR pump, to trip. Operators maintained power at 44 percent immediately following the transient. (Inspection of this event was documented in Section 4OA3 of Inspection Report 05000333/2016003.)

In October 2014, four RWR pump trips occurred within a week, as documented in CR-JAF-2014-6258. An in-depth review of these RWR pump trips was documented in Section 4OA3 of Inspection Report 05000333/2015001. The purpose of the current inspection was to determine whether the trip of the 'A' RWR pump on August 21, 2016, could have reasonably been prevented by corrective actions identified following the 2014 trips.

The inspectors assessed Entergy's problem identification threshold, documentation of the issue, causal analysis, extent-of-condition review, and the prioritization and timeliness of corrective actions to evaluate whether Entergy was appropriately identifying, characterizing, and correcting problems associated with this issue. The inspectors compared the actions taken to the requirements of Entergy's CAP and 10 CFR Part 50, Appendix B.

b. Findings and Observations

No findings were identified.

Entergy determined the cause of the 2016 'A' RWR pump trip was a failed resistor in the voltage regulator. Although there was a PM in place to rebuild the voltage regulator, every component of the regulator was not changed out during the PM, including the resistors. No operating experience was identified which would have suggested this was required and the voltage regulator vendor manual did not have a recommendation to do so. As part of Entergy's corrective actions, the voltage regulator for the 'A' RWR pump was replaced and a corrective action was initiated to create a PM to prevent a similar failure in the future. As the replacement voltage regulator was not new, the inspectors questioned the age of the resistors on it and whether it would also be susceptible to the same failure mechanism. The inspectors subsequently confirmed that a WO is planned to replace the voltage regulator with a fully refurbished one in refueling outage 22.

As documented in a previous NRC inspection report, the causes for the 2014 RWR pump trips were an inadequate PM strategy related to the slip ring tolerances and motor generator cleaning and an inadequate test procedure. The inspectors verified that the 2016 RWR pump trip was not due to untimely corrective action related to the 2014 issues. The inspectors concluded Entergy adequately identified and corrected the 2016 RWR voltage regulator maintenance issue in a timely manner as required by 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action."

.6 Annual Sample: SRV Issues

a. Inspection Scope

The inspectors performed an in-depth review of Entergy's evaluation and corrective actions associated with site-specific and industry generic issues that had occurred with SRVs. Specifically, based on industry operating experience with 3-stage Target Rock SRVs (Model 0867F), Entergy evaluated the potential for reduced reliability of the installed 3-stage SRVs at FitzPatrick. In addition, the inspectors reviewed Entergy's actions associated with SRV setpoint drift issues associated with the installed 2- stage Target Rock SRVs.

The inspectors assessed Entergy's problem identification threshold, problem analysis, extent of condition reviews, compensatory actions, and the prioritization and timeliness of their corrective actions to determine whether they were appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of Entergy's CAP and 10 CFR Part 50, Appendix B. The inspectors reviewed associated documents and interviewed engineering personnel to assess the reasonableness of Entergy's evaluations and of the planned and completed corrective actions.

b. Findings and Observations

No findings were identified.

FitzPatrick has 11 SRVs, manufactured by Target Rock, located on the steam lines inside the primary containment. They are dual function valves that operate in a safety mode or a relief mode. The SRVs are part of the pressure relief system that is designed to prevent over-pressurization of the reactor coolant system. Seven of the 11 SRVs comprise the automatic depressurization system, which is part of the emergency core cooling system

that functions to depressurize the reactor and provide core coolant injection following certain postulated accidents. Until 2010, FitzPatrick had historically used only the 2-stage Target Rock SRVs (three 3-stage SRVs were installed in 2010, replacing 2-stage SRVs).

The 2-stage SRVs have experienced challenges over several years during testing where they failed to lift within their lift pressure setpoint tolerance (within three percent of lift setpoint, usually lifting higher than setpoint tolerance). This has been previously identified and has typically been caused by corrosion bonding, which is a crevice corrosion phenomenon that occurs on highly polished metals in a wetted solution in close proximity to each other. There is extensive industry experience with corrosion bonding in Target Rock 2-stage SRVs. In order to address the corrosion bonding induced SRV test failures, FitzPatrick had begun a phased conversion to a modified Target Rock 3-stage SRV design, whose design produces a greater mechanical force between the valve disc and seat, resulting in reducing the likelihood of corrosion bonding. In 2010, Entergy installed three 3-stage SRVs (‘C’, ‘E’, and ‘F’) to address SRV seat leakage and setpoint drift issues. Of these three SRVs, the ‘C’ and ‘E’ are also automatic depressurization system valves.

During each refueling outage, all 11 SRV pilot assemblies and about one-third of the main SRV body assemblies are removed for testing and refurbishment. The results for the assemblies removed during the most recent refueling outage (2014) identified 7 of the 11 SRV pilot assemblies exhibited setpoint drift (high), in excess of the three percent tolerance permitted by plant TSs (see Licensee Event Report (LER) 2015-002, and NRC Inspection Report 05000333/2015004). None of the 3-stage SRV pilot assemblies failed this setpoint test.

In 2015, new operating experience was identified with the Target Rock 3-stage SRVs. Specifically, in January 2015, following a loss of offsite power event at the Pilgrim Nuclear Power Station, one of the four installed 3-stage SRVs did not fully open. Although as-found steam testing of the affected SRV did not duplicate that failure, the valve did not re-close as expected. Internal inspections showed: (a) the main piston was free to "wobble" on the stem, (b) deep fretting damage to the main guide inside diameter, (c) the locking tab was deformed, (d) a shortened free height of the main spring, and (e) significant deformation of the mating surfaces of both the stem and the piston. Curtiss Wright Flow Control Co. (Valve Group - Target Rock) submitted an interim 10 CFR Part 21 report on March 17, 2015, and an updated written notification on May 1, 2015. Target Rock believed the most likely root cause was excessive impact loads during limited flow testing that relieved the torque applied to the piston/stem interface (de-torqueing) that may subsequently lead to creation of a significant clearance between the piston and the main disc (de-shouldering). If the excessive impact load also damages the locking tab, vibration-induced loads can allow the piston to rotate, creating/increasing the clearance between the piston and the stem. If the clearance becomes significant, the piston tilts in its guide bore, which can adversely affect SRV performance. Subsequently, additional similar operating experience, and similar internal degradation, was identified in the nuclear industry.

Accordingly, since FitzPatrick had three 3-stage SRVs installed, they completed an operability evaluation on May 20, 2016, to address their potential for reduced SRV reliability associated with 3-stage SRVs. That evaluation compared operating history (e.g., SRV leakage, evidence of main spring shortening, and lower main steam line vibration due to lower steam flow), and concluded that the ‘C’, ‘E’, and ‘F’ SRVs were

operable, degraded/non-conforming. The inspectors previously reviewed this operability evaluation and concluded that there was sufficient basis to consider these three SRVs operable, degraded/non-conforming.

Following a June 24, 2016, manual shutdown in response to an unexpected transient, Entergy conservatively elected to bring the unit to a cold shutdown condition and removed the installed 'E' and 'F' 3-stage SRVs for internal inspection to evaluate the actual condition of these SRVs. They replaced the 'E' and 'F' SRVs with refurbished 2-stage Target Rock SRVs. While one of the two removed SRVs had no notable degradation, the other SRV internal inspection results did reveal some degradation. In particular, the following was documented in the associated report:

- stem-to-piston thread damage between the lock nut and stem shoulder
- visible wear of piston shoulder
- fretting of the piston rings and corresponding cylinder walls at the cylinder bottom
- main spring shortening

Entergy and engineering consultants attended the remote site inspection of the SRV internals. Their consensus of opinion was that the degradation of these SRVs was not as severe as those seen at the other nuclear facilities; and they concluded that, based on the damage that was seen and analyzed for the 'E' and 'F' 3-stage SRVs at FitzPatrick, SRV operability would not have been challenged.

Entergy completed another operability evaluation on September 1, 2016, to incorporate the results of the internal inspections of the 'E' and 'F' SRVs and to evaluate the operability of the remaining installed 3-stage SRV ('C'). In their evaluation, Entergy referenced that they had engaged independent engineering consultants regarding the FitzPatrick SRVs. Both consultants were aware of the internal inspection results at other nuclear facilities, and used that information to compare to the FitzPatrick internal inspection results. Entergy's operability evaluation again concluded that the remaining 3-stage SRV was operable, degraded/non-conforming. They plan to remove, disassemble, and inspect it during the upcoming refueling outage (January 2017); and replace it with a 2-stage SRV.

Entergy plans to continue to monitor and assess the progress that the vendor makes with addressing the performance issues with the 3-stage SRVs. In particular, Target Rock is planning to resolve the excessive impact loads during limited flow testing that apparently lead to the creation of de-shouldering between the piston and the main disc. Pending resolution of this issue, Entergy plans to continue to use 2-stage SRVs. After the 3-stage testing/design changes are implemented, which are expected to resolve 3-stage degradation issues, Entergy plans to continue their phased approach to replacing the 2-stage SRVs.

The inspectors reviewed the various CRs that describe both the FitzPatrick and industry operating experience. The inspectors found that Entergy staff were knowledgeable and engaged with the technical details and internal inspection results for the various 3-stage SRV issues in the industry. Both operability evaluations for the installed 3-stage SRVs at FitzPatrick provided sufficient bases to conclude that the condition of the installed 3-stage SRVs was sufficient to demonstrate reasonable assurance of operability. The inspectors

determined that FitzPatrick staff's overall evaluation of and corrective actions in response to three stage SRV issues were appropriate, timely and commensurate with their safety significance.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 - 2 samples)

.1 (Closed) LER 05000333/2016-001-00: System Actuations during Manual Scram in Response to Frazil Ice Blockage and Residual Transfer (1 sample)

On January 23, 2016, operators initiated a manual scram in response to lowering screenwell water level due to frazil ice formation. The scram was complicated by a residual transfer of station electrical loads that resulted in non-vital equipment trips. The event also resulted in the manual actuation of RPS, HPCI, reactor core isolation cooling, and MSIV closures and the automatic actuation of the EDGs, ESW, and containment isolations in multiple systems.

Entergy entered the screenwell water level issue and subsequent scram into the CAP as CR-JAF-2016-0243 and performed a root cause evaluation. The root cause was determined to be a design vulnerability of the intake structure which allowed frazil ice formation. Contributing causes included station leaders accepted mitigating actions versus elimination of the potential for frazil ice buildup, and procedures for mitigating the impact of frazil ice formation were not effective for rapidly developing events. Corrective actions taken include creation of a new screenwell water level rate of change computer alarm and revisions to normal and abnormal operating procedures. Entergy also documented the failure to fast transfer electrical loads in CR-JAF-2016-0244 and performed an ACE. The cause of the residual transfer (or, failure of the fast transfer) was the slow opening of 345KV breaker 71PCB-10042, which appropriately prevented the fast transfer from occurring. The breaker opened slowly due to sticking control valves within the breaker caused by the combined effects of reduced breaker operation (plant operation allowed the 345 KV line to remain in service, thereby not requiring breaker operation), grease that is susceptible to cold weather, and breaker rebuild PM frequency. Corrective actions include the replacement or rebuild of the affected control valves, changing the grease specified for use in the valves, and reducing the PM frequency. The inspectors reviewed the LER and the associated cause evaluations for accuracy, the adequacy of proposed and completed corrective actions, and the appropriateness of the extent-of-condition review. This event and two associated findings were documented in Section 4OA3 of Inspection Report 05000333/2016001. No additional findings or violations of NRC requirements were identified. This LER is closed.

.2 (Closed) LER 05000333/2016-002-00: Sticking DC Pilot in Solenoid Valve Cluster Assembly Results in Slow MSIV Closures (1 sample)

On January 23, 2016, the station initiated a manual scram in response to lowering screenwell water level due to frazil ice blockage, and subsequently closed the MSIVs. A post-scram review identified that MSIV 29AOV-86B closed slowly. On January 27, 2016, testing per ST-1B identified that MSIV 29AOV-86C also closed slowly. Both MSIVs exceeded the closing time of TS Surveillance Requirement 3.6.1.3.6. This condition caused two independent channels of a system used to control the release of radioactive material to become inoperable. In both cases, the inboard MSIVs performed satisfactorily. Therefore, all main steam lines were able to perform their intended safety functions to isolate. Troubleshooting identified that the problem originated in the solenoid valve cluster

assemblies and on February 25, 2016, an Exelon PowerLabs failure analysis concluded that DC pilot valves 2950V-86B3 and 2950V-86C3 exhibited slow vent times. The solenoid valve cluster assemblies were replaced and tested successfully. Additional corrective actions included changing the PM frequency from 8 years to 6 years.

The inspectors reviewed the LER, ACE, and the evaluation of the solenoid valve failure mechanism in order to assess the condition and associated corrective actions. The inspectors determined that there was not a loss of safety function since the inboard MSIVs were not affected by this condition. No findings or violations of NRC requirements were identified. This LER is closed.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On January 19, 2017, the inspectors presented the inspection results to Mr. Brian Sullivan, Site Vice President, and other members of FitzPatrick staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

B. Sullivan, Site Vice President
T. Peter, General Manager, Plant Operations
C. Adner, Director, Manager Operations and Regulatory and Performance Improvement
D. Bittinger, Manager, Design and Programs Engineering
W. Drews, Manager, Regulatory Assurance
K. Habayeb, Supervisor Engineering
R. Heath, Manager, Radiation Protection
J. Jones, Manager, Emergency Planning
D. Poulin, Director, Engineering
T. Redfearn, Manager, Security
M. Reno, Manager, Training

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Open/Closed

05000333/2016004-01	NCV	Failure to Ensure Proper Configuration Control of a PCIV During Planned Maintenance (Section 4OA2.2)

Closed

05000333/2016-001-00	LER	System Actuations during Manual Scram in Response to Frazil Ice Blockage and Residual Transfer (Section 4OA3.1)
05000333/2016-002-00	LER	Sticking DC Pilot in Solenoid Valve Cluster Assembly Results in Slow MSIV Closures (Section 4OA3.2)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
AOP-13, Severe Weather, Revision 25
AP-12.04, Seasonal Weather Preparations, Revision 24

Condition Reports
CR-JAF-2015-4241 CR-JAF-2015-4387

Work Order
52675794

Section 1R04: Equipment Alignment

Procedures
ODSO-4, Shift Turnover and Log Keeping, Revision 12
OP-13, Residual Heat Removal System, Revision 97
OP-14, Core Spray System, Revision 37
OP-20, Standby Gas Treatment System, Revision 38

Section 1R05: Fire Protection

Procedures
PFP-PWR14, Crescent Area East Elevation 227' and 242' Fire Area/Fire Zone XVII/RB-1E
PFP-PWR15, Crescent Area West Elevation 227' and 242' Fire Area/Fire Zone XVIII/RB-1W
PFP-PWR22, Standby Gas Filter Room Elevation 272' Fire Area Zone XX/SG-1, Revision 6
PFP-PWR28, Reactor Building Elevation 369' Fire Area/Fire Zone IX/RB-1A, Revision 8

Condition Report
CR-JAF-2016-4930

Drawing
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ST-39S, Secondary Containment Isolation Valve Testing, Revision 2
ST-39V, Secondary Containment Verification Test, Revision 3

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LIST OF ACRONYMS

10 CFR	Title 10 of the *Code of Federal Regulations*
ACE	apparent cause evaluation
CAP	corrective action program
CCA	common cause analysis
CR	condition report
EAL	emergency action level
EDG	emergency diesel generator
ER	equipment reliability
ESW	emergency service water
HPCI	high pressure coolant injection
IMC	Inspection Manual Chapter
LER	licensee event report
MSIV	main steam isolation valve
MSPI	mitigating systems performance index
NCV	non-cited violation
NPO	non-plant operator
NRC	Nuclear Regulatory Commission
PCIV	primary containment isolation valve
PI	performance indicator
PM	preventive maintenance
QAF	quality assurance finding
RBCLC	reactor building closed loop cooling
RHR	residual heat removal
RHRSW	residual heat removal service water
RO	reactor operator
RWR	reactor water recirculation
RPS	reactor protection system
SRO	senior reactor operator
SRV	safety relief valve
SSC	structure, system, and component
TS	technical specification
UFSAR	Updated Final Safety Analysis Report
WO	work order