



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-1200

February 11, 2019

Mr. Mano Nazar
President and Chief Nuclear Officer
Nuclear Division
Florida Power & Light Co.
Mail Stop: EX/JB
700 Universe Blvd.
Juno Beach, FL 33408

SUBJECT: TURKEY POINT NUCLEAR GENERATING STATION – NUCLEAR
REGULATORY COMMISSION INTEGRATED INSPECTION REPORT
05000250/2018004 AND 05000251/2018004

Dear Mr. Nazar:

On December 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Turkey Point Nuclear Generating Station, Units 3 and 4. On January 24, 2019, the NRC inspectors discussed the results of this inspection with Mr. Bob Coffey, Regional Vice President – Southern Region, 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. The findings involved violations of NRC requirements. 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 the 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 II; the Director, Office of Enforcement; and the NRC resident inspector at the Turkey Point Nuclear Generating Station.

If you disagree with the cross-cutting aspects assigned to the findings 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 II; and the NRC resident inspector at the Turkey Point Nuclear Generating Station.

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 at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Randall A. Musser, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Docket Nos.: 50-250, 50-251
License Nos.: DPR-31, DPR-41

Enclosure:
IR 05000250/2018004 and 05000251/2018004
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-250, 50-251

License Nos: DPR-31, DPR-41

Report Nos: 05000250/2018004, 05000251/2018004

Enterprise Identifier: I-2018-004-0044

Licensee: Florida Power & Light Company (FPL)

Facility: Turkey Point Nuclear Generating Station, Units 3 and 4

Location: 9760 SW 344th Street
Homestead, FL 33035

Dates: October 01, 2018 through December 31, 2018

Inspectors: J. Orr, Senior Resident Inspector
J. Reyes, Resident Inspector
A. Butcavage, Reactor Inspector (Section 71111.08)
P. Capehart, Senior Operations Engineer (Section 71111.11)
P. Cooper, Reactor Inspector (Section 71152)
J. Rivera, Health Physicist (Sections 71124.01, 71151)

Approved by: Randall A. Musser, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee's performance by conducting a baseline inspection at Turkey Point Nuclear Generating Station Units 3 and 4 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 and self-revealed findings, violations, and additional items are summarized in the table below.

List of Findings and Violations

Missed Corrective Actions to Repair Concrete Delamination in High Head Safety Injection Trenches			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000250,251/2018004-01 Opened/Closed	[P.3] – Problem Identification and Resolution, Resolution	71152 – Problem Identification & Resolution
An NRC-identified Green NCV of 10 CFR 50, Appendix B, Criterion XVI, was identified when FPL failed to ensure that concrete delamination in the Unit 3 and Unit 4 high head safety injection (HHSI) trenches, safety-related structures that provide support to HHSI suction piping, was corrected.			

Failure to Implement Interim Compensatory Measures for a Nonconservative Nuclear Safety Capability Assessment			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000250,251/2018004-02 Opened/Closed	[P.3] – Problem Identification and Resolution, Resolution	<u>71152</u> Problem Identification & Resolution
A Green NRC-identified NCV of Renewed Facility Operating License Condition 3.D., Fire Protection, was identified for the failure to adequately implement and maintain in effect all provisions of the approved fire protection program. Specifically, FPL identified on September 20, 2016, that the alternate AC power supply cables to the Unit 3 and Unit 4 vital inverters were improperly modeled in the NFPA 805 Nuclear Safety Capability Assessment (NSCA) as always being available when they might actually be impacted by postulated fire scenarios. The modeling error resulted in a non-conservative analysis that was not promptly compensated for to ensure that adequate defense-in-depth and safety margins were maintained. Compensatory measures in the form of roving fire watches were not established by FPL until June 28, 2018.			

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
URI	05000250,251/2018003-01	Vital Inverter Alternate AC Supply Cables Were Not Included in the Nuclear Safety Capability Assessment	71152 Inspection Results	Closed

PLANT STATUS

On October 01, 2018, Unit 3 was shutdown to start refueling outage 3PTN30. The Unit was restarted for power operations on November 07, 2018, and returned to rated thermal power on November 13, 2018. The Unit remained at or near rated thermal power for the remainder of the inspection period.

Unit 4 operated at or near rated thermal power for the entire inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs 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 IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.04 - Equipment Alignment

Partial Walkdown (4 Samples)

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

- (1) 3A, 4A and 4B high head safety injection (HHSI) pumps while the 3B HHSI pump was out of service (OOS) on October 10 – 11, 2018
- (2) 3A, 4A and 4B safety-related 4160-volt switchgears while the 3A safety-related 4160-volt switchgear was OOS on October 11 – 12, 2018
- (3) Unit 3 and Unit 4 auxiliary feedwater (AFW) train 1 while AFW train 2 was OOS for maintenance on October 15, 2018
- (4) 3A and 3B residual heat removal (RHR) trains after system testing and restoration to support operational mode 4 on October 24, 2018

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (6 Samples)

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

- (1) Unit 3 and Unit 4 boric acid storage tanks and pumps room, fire zone (FZ) 41 on November 05, 2018
- (2) 3A and 3B emergency diesel generator (EDG) engine rooms and fuel oil day tank rooms, FZs 72, 73, 74 and 75 on November 06, 2018
- (3) Unit 3 electrical penetration south room and Unit 4 electrical penetration north and west rooms, FZ 20, 26 and 27 on November 07, 2018
- (4) Unit 3 and Unit 4 cable spreading room and reactor protection system motor generator set rooms, FZ 98 on November 26, 2018
- (5) Unit 4 spent fuel pool floor, FZ 29 on December 26, 2018
- (6) Unit 3 spent fuel pool floor, FZ 42 on December 27, 2018

71111.06 - Flood Protection Measures

Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the Unit 4 EDG and diesel fuel oil tank rooms on November 07 and 26, 2018.

71111.08 - Inservice Inspection Activities (1 Sample)

The inspectors evaluated refueling outage 3PTN30 pressurized water reactor non-destructive testing by observing or reviewing the following examinations:

- (1) Ultrasonic (UT)
 - a) ASME Class 1, Reactor Vessel, MRP-227, Ultrasonic Examination of Internal Baffle Plate to Former, Bolts (Observed and Reviewed)
 - b) ASME Class 2, Steam Generator "A", Feedwater Piping Replacement, Phased Array Ultrasonic Inspection Results, Weld 14-FWA-2301-1518 and 14-FWA-2301-1718 (Reviewed)
- (2) Visual
 - a) VT-2 of Class 1 Reactor Vessel, Bottom Mounted Instrumentation Penetration Nozzles, 8, 21, 33, 42 and 50, IAW ASME Code Case N-722 (Video Review, Current and Previous Examination Comparison for the Selected Samples)
 - b) VT-2 of Class 1 Reactor Upper Head Surface of CRDM Penetration Nozzles 32, 51, 63 and the Head Vent Nozzle, IAW Code Case N729-4, (Reviewed)
 - c) EVT-1, of ASME Class 1 Reactor Vessel, Internal Baffle Plate to Former, Bolts Examination identified by MRP-227 Examinations (Reviewed)
- (3) Eddy Current Testing (ECT)
 - a) Reactor Pressure Vessel Bottom Mounted Instrumentation, Class 1, In-core Instrumentation (ICI) Thimble Tubes, Examination Results. (Reviewed.)

The inspectors evaluated FPL's boric acid control program performance, and performed a walk-down inspection of the Unit 3 reactor containment building, including the moisture barrier and the upper reactor vessel closure head with the boric acid program owner.

The inspectors also held discussions with the responsible engineer and reviewed FPL's response to the Westinghouse 10 CFR Part 21 associated with Control Rod Drive Mechanism (CRDM) Thermal Sleeve Wear, and the associated EPRI Materials Reliability Program Needed Interim Guidance for PWR CRDM Thermal Sleeve Wear.

71111.11 - Licensed Operator Regualification Program and Licensed Operator Performance

Operator Regualification (1 Sample)

The inspectors observed and evaluated a simulator scenario administered to an operating crew on November 20, 2018.

Operator Performance (9 Samples)

The inspectors observed and evaluated the following licensed operator activities on Unit 3:

- (1) Operational mode 4 to mode 5 cooldown on October 01, 2018
- (2) Reactor coolant system (RCS) drain down to 11-13% pressurizer level cold calibration on October 03, 2018
- (3) RCS drain down from 12% pressurizer level cold calibration to below the reactor vessel head flange on October 04, 2018
- (4) Reactor head lift and subsequent RCS flooding of the lower refuel cavity on October 05, 2018
- (5) Testing of the 3B safety-related 4160-volt switchgear on October 13, 2018
- (6) Reactor refueling operations and response to a temporary loss of communications with the containment refueling crew on October 15, 2018
- (7) Unit 3 RCS drain down to 1.5 feet below the reactor vessel head flange on October 17, 2018
- (8) Low power physics testing on October 26, 2018
- (9) Main turbine (MT) roll to 1800 rpm, MT over speed testing, main generator synchronization to the electric power grid, reactor power ascension to 20%, and steam generator water level control transfer from the bypass feedwater regulating valves to the main feedwater regulating valves on November 09, 2018

Operator Exams (1 Sample)

The inspectors performed an in-office review of the overall pass/fail results of the individual operating examinations and the crew simulator operating examinations that were completed on December 21, 2018.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (2 Samples)

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

- (1) AR 2092653, (a)(1) action plan corrective action status for the Unit 3 startup transformer system exceeding reliability criteria
- (2) AR 2290140, Maintenance rule evaluation of 3-POV-2602, Unit 3 containment purge exhaust valve, stroke failure

71111.13 - Maintenance Risk Assessments and Emergent Work Control (4 Samples)

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

- (1) Unit 4 online risk monitor (OLRM) and Unit 3 yellow shut down risk (SDR) during reactor head lift with RCS water level 2.5 feet below the reactor vessel head flange on October 05, 2018
- (2) Unit 4 OLRM and Unit 3 SDR while the 3B safety-related 4160-volt switchgear, 3B emergency diesel generator, and the 3B high head safety injection pump were OOS on October 09 and 10, 2018
- (3) U4 OLRM and Unit 3 SDR, while Unit 3 was reducing RCS level to the reactor vessel head flange and during the heavy lift of the new Unit 3 low pressure LP1 rotor over the Unit 4 turbine deck on October 17, 2018
- (4) U4 OLRM and Unit 3 SDR, during the Unit 3 RCS heat up and shutdown of both RHR pumps, RHR system testing, and while transitioning to operational mode 4 on October 23, 2018

71111.15 - Operability Determinations and Functionality Assessments (4 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) AR 2283915, Mode 3 hold, POV-3-2602 failed inservice test (IST) stroke on October 22, 2018
- (2) AR 2283877, Potential foreign material in AFW steam supply piping from valve 3-10-119 disc guide pin on October 24, 2018
- (3) AR 2288227, Prompt operability determination, U3 AFW train 1 failed back-up nitrogen consumption surveillance on October 27 and 30, 2018
- (4) AR 02286186, 3B RHR pump interim disposition after failed IST comprehensive test and review of final disposition and retest data for 3B RHR comprehensive IST on October 16 and 31, 2018

71111.19 - Post Maintenance Testing (5 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Work order (WO) 40435298-01, 3A emergency sequencer failure after changing control cards on October 03 and 04, 2018
- (2) WO 40155994, 3B safety-related 4160-volt switchgear after maintenance and installation of new breaker on the 3AB01 cubical on October 12, 2018
- (3) WO 40542547, 3B RHR post maintenance surveillance test after motor replacement on October 16, 2018
- (4) WO 40545006-17, Unit 3 comprehensive RHR pump tests (re-test) on October 25, 2018

- (5) WO 40582440, 3B EDG fuel oil piping after modification and welding of new piping on November 07 and 08, 2018

71111.20 - Refueling and Other Outage Activities (1 Sample)

The inspectors evaluated the Unit 3 refueling outage, 3PTN30, activities from October 01, 2018, until Unit 3 was restarted on November 07, 2018.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (2 Samples)

- (1) 3-OSP-072.5, Main Steam Safety Valve Setpoint Verification Test on October 01, 2018
- (2) 3-OSP-203.1, Train A Engineered Safeguards Integrated Test on October 24, 25 and 29, 2018

Reactor Coolant System Leak Detection (1 Sample)

- (1) 4-OSP-041.1, Reactor Coolant System Leak Rate Calculation on November 13, 14 and 15, 2018

Containment Isolation Valve (2 Samples)

- (1) 3-OSP-051.5, Local Leak Rate Tests, observed penetration 29, and reviewed results of all 3PTN30 refuel outage LLRTs on October 10 and 31, and November 06 and 07, 2018
- (2) 3-OSP-051.5, Local Leak Rate Tests, observed penetration 36, on October 25, 2018

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (1 Sample)

The inspectors evaluated radiological hazards assessments and controls.

Instructions to Workers (1 Sample)

The inspectors evaluated worker instructions.

Contamination and Radioactive Material Control (1 Sample)

The inspectors evaluated contamination and radioactive material controls.

Radiological Hazards Control and Work Coverage (1 Sample)

The inspectors evaluated radiological hazards control and work coverage.

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

The inspectors evaluated risk-significant high radiation area and very high radiation area controls.

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

The inspectors evaluated radiation worker performance and radiation protection technician proficiency.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified FPL performance indicator submittals listed below for the period from October 01, 2017, through September 30, 2018. (10 Samples)

- (1) Unit 3 and Unit 4 Mitigating Systems Performance Index (MSPI), Emergency AC Power System
- (2) Unit 3 and Unit 4 MSPI, High Pressure Injection System
- (3) Unit 3 and Unit 4 MSPI, Heat Removal System
- (4) Unit 3 and Unit 4 MSPI, Residual Heat Removal System
- (5) Unit 3 and Unit 4 MSPI, Cooling Water Systems

The inspectors verified licensee performance indicators submittals listed below for the period from October 01, 2017 through June 30, 2018. (1 Sample)

- (1) OR01: Occupational Exposure Control Effectiveness

71152 - Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed FPL's corrective action program for trends that might be indicative of a more significant safety issue. The inspectors reviewed FPL's evaluation of a potential adverse trend in the area of transient combustibles as described in AR 2268081, Transient Combustibles Trend Investigation. The evaluation concluded there was no adverse trend.

Annual Follow-up of Selected Issues (3 Samples)

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

- (1) AR 02274176, Recovery – PTN Inadequate Design Engineering Governance Oversight Coating Program resulting in deficient conditions and impacts to safety related systems.

This issue was selected to verify that the issue was addressed to a level of detail commensurate with the structures' safety significance.

- (2) AR 2236811, Corroded Support Components Inside Unit 04 CCCW Trench
AR 2237081, Unit 03 HHSI Pump Room Trench - Walkdown
AR 2237082, Unit 04 HHSI Pump Room Trench - Walkdown
AR 2237089, Corroded Pipe/Tubing Supports inside the Unit 03 CCW Trench
AR 2056273, Degraded Supports for Safety Related Systems.

These ARs were selected to verify that FPL was appropriately addressing previously identified structural support deficiencies in the Unit 3 and Unit 4 HHSI trenches. The trenches are below grade and normally covered with steel plates. Visual inspections are infrequently performed in the HHSI trenches which is a structure that contains safety related carbon steel pipe supports and at times contains standing borated water from HHSI pump operations.

- (3) On June 25, 2018, the inspectors inquired about an open corrective action item documented in AR 2156812. AR 2156812 was originated by FPL on September 20, 2016, and documented that the Nuclear Safety Capability Assessment (NSCA) for the fire protection program improperly modeled the alternate AC power supply cables to the Unit 3 and Unit 4 vital inverters. This issue was described as Unresolved Item (URI) 05000250,251/2018003-01, Vital Inverter Alternate AC Supply Cables Were Not Included in the Nuclear Safety Capability Assessment, in NRC Inspection Report 05000250/2018003 and 05000251/2018003 (ADAMS ML18317A242). This URI is closed to a finding discussed in the Inspection Results of this inspection report.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

60855.1 - Operation of an Independent Spent Fuel Storage Installation

The inspectors evaluated FPL's independent spent fuel storage installation cask loadings on November 27, 2018.

INSPECTION RESULTS

Observation	71152, Problem Identification and Resolution, Annual Follow-up of Selected Issues
<p>No findings were identified. The inspectors reviewed an adverse trend related to problem identification and resolution of significant external corrosion on intake cooling water (ICW) and component cooling water (CCW) safety-related structures and components.</p> <p>The potential for loss of material from both the external and internal environment is considered to ensure that the effects of aging are being adequately managed so that the intended function(s) of structures, and components are being maintained consistent with the current licensing basis (CLB). For the ICW system piping, the pipe surface that is exposed to the outdoors is managed by the Systems and Structures Monitoring Program, whereas, the internal pipe surface exposed to raw water is managed by the ICW System Inspection Program. Both Aging Management Programs are categorized as condition monitoring programs that do not include preventive actions.</p> <p>During the most recent Design Basis Assurance Inspection (ADAMS Accession Number ML17277A837) the inspectors identified that the acceptance criteria associated with 0-ADM-564, Systems/Program Monitoring, for the identification of adverse conditions was not being implemented as described. Specifically, the procedure specified to identify any areas that exceeded "light surface rust." After the identification of several areas that exceeded the light surface rust during a NRC walkdown, the licensee initiated AR 2218437. As a result, the licensee identified areas with loss of material depths of 1/16", 3/32", and 1/8". The licensee determined, as specified in the acceptance criteria section of Spec-M-086, that for any wall loss greater than 1/4" an engineering evaluation is required. The locations with the loss of material less than 1/4" are thus deemed acceptable.</p> <p>Protective coatings are not currently credited as a preventative measure to minimize loss of material on the Intake Cooling Water System piping. FPL however has developed a Coatings Repair Project for the Unit 3 and Unit 4 CCW Heat Exchangers that is currently scheduled to be completed by April 17, 2021. In the interim, FPL has modified procedure 0-ADM-654 Systems/Program Monitoring as part of the corrective actions associated with AR2250515. This procedure now includes the requirement to predict a degradation rate to justify continued use when significant deficiencies are noted during license renewal walkdowns.</p> <p>The inspectors concluded that FPL was making adequate progress to address the degradation issues with the ICW and CCW System piping and that the system was operable in its current condition.</p>	

Missed Corrective Actions to Repair Concrete Delamination in HHSI Trenches			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000250,251/2018004-01 Opened/Closed	[P.3] – Problem Identification and Resolution, Resolution	71152 – Problem Identification and Resolution

An NRC-identified Green NCV of 10 CFR 50, Appendix B, Criterion XVI, was identified when FPL failed to ensure that concrete delamination in the Unit 3 and Unit 4 HHSI trenches, safety-related structures that provide support to HHSI suction piping, was corrected.

Description: On November 14, 2012, engineers performed an inspection in the normally covered Unit 4 HHSI trench. The engineers identified concrete spalling on the HHSI walls. The concrete spalling was described as moderate, did not include any concrete cracking and overall the Unit 4 HHSI trench appeared structurally sound. This deficient condition was entered into FPL's corrective action program (CAP) as AR 1822156.

In response to the deficient condition, FPL engineers completed a condition evaluation of the deficient concrete condition and determined spalling along the walls could degrade further if left untreated, and consequently compromise the steel reinforcement bars (rebar). The deficiency was further evaluated as requiring timely repair to prevent further degradation. Immediate repair was deemed not required at the time and that the identified deficiency did not affect the structural component's function, integrity, or ability to withstand design basis events and was not an operability concern.

AR 1822156 was closed to the condition evaluation and work request (WR) 94064268 was created on November 30, 2012 to complete the repair. The condition evaluation provided detailed repair instructions to ensure any exposed rebar was appropriately cleaned and preserved with approved coatings prior to the concrete repair. Concrete voids were to be filled with approved grout and corrosion inhibitor. Finally, the entire concrete surfaces were to be coated (brushed, rolled or sprayed) with a migrating corrosion inhibitor to prevent further damage in the area.

The detailed work instructions were incorporated in work order (WO) 40199508 on December 1, 2012, but the concrete repair was never completed in the Unit 4 HHSI trench and the work order was inappropriately canceled on March 1, 2018. FPL informed the inspectors that the work order cancellation was part of a group of work orders, work requests, and action requests that were inappropriately cancelled due to an administrative error in the work management system. FPL previously identified this issue in AR 2266152 on March 29, 2018, and initiated corrective actions to recover the cancelled WOs, WRs, and ARs, but missed WO 40199508 in its extent of condition review. FPL initiated AR 2296512 to address cancelled WO 40199508.

A similar condition in the Unit 3 HHSI trench was identified by FPL engineers on November 17, 2017. AR 2237081 documented the deficient concrete in the Unit 3 HHSI and noted that the condition was less severe than the Unit 4 concrete spalling and that the Unit 3 concrete spalling was bounded by the Unit 4 condition evaluation. WO 40583625-01 was created to correct the concrete spalling consistent with the detailed work order instructions provided in the condition evaluation attached to AR 1822156.

WO 40583625-01 included five items to correct:

- Remove 3" of accumulated borated water
- Remove the old submersible pump and install a new one
- Remove an abandoned tygon hose
- Remove dry boric acid from walls, pipe supports, and submersible pump limit switch
- Repair the minor plaster delamination of the Unit 3 HHSI concrete walls.

The inspectors reviewed the completed WO 40583625-01 on December 18, 2018 and noted that two items were not “circled/slashed” as completed yet the work order was signed off as completed in step 6.0 and was progressed to a “closed/work is complete” status on November 11, 2018. The inspectors questioned FPL about the final status of the work order and on December 27, 2018, FPL determined the work to repair the concrete delamination in the Unit 3 HHSI trench was not completed as directed by WO 40583625-01 and was closed in the work management system and CAP. FPL determined the work to remove the old submersible pump and install a new one was not warranted when the technicians executed WO 40583625-01, yet they inappropriately did not provide any comments in the work orders and signed the entire work order as complete in step 6.0. The maintenance work supervisor additionally did not identify that not all steps in WO 40583625-01 were “circle/slashed” as completed and step 6.0, Restoration/Completion was signed as complete by the technicians. On December 27, 2018, FPL initiated AR 2295754 to address the human performance issues with executing 40583625-01 as written.

Corrective Action(s): FPL entered these issues into its CAP as ARs 2295754 and 2296512 to address the human performance issues with not performing safety related work as directed and to ensure that concrete delamination issues are finally resolved in the Unit 3 and Unit 4 HHSI trenches.

Corrective Action Reference(s): ARs 2295754 and 2295612.

Performance Assessment:

Performance Deficiency: The failure to correct identified deficient concrete conditions in the Unit 3 and Unit 4 HHSI trenches and close the issues in the CAP and work management program without repair is a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern in that spalling along the HHSI trench walls could degrade further if left untreated, and consequently compromise the steel reinforcement. The inspectors also determined the performance deficiency adversely affected the Equipment Performance attribute of the Mitigating Systems Cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, The Significance Determination Process (SDP) for Findings At-Power and determined the finding was of very low safety significance (Green) because the finding did not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant in accordance with the licensee’s maintenance rule program for greater than 24 hours.

Cross-cutting Aspect: The inspectors reviewed this performance deficiency for cross-cutting aspects as required by IMC 0310, “Aspects Within the Cross-Cutting Areas,” dated December 4, 2014. FPL first identified the concrete delamination in the Unit 4 HHSI trench on November 14, 2012. For separate reasons, concrete delamination issues in the Unit 3 and Unit 4 HHSI trenches were not corrected in a timely manner. This finding was assigned a cross-cutting aspect in the Resolution component of the Problem Identification and Resolution cross-cutting area, in that it states: The organization takes effective corrective actions to address issues in a timely manner commensurate with their safety significance (P.3).

Enforcement:

Violation: 10 CFR 50, Appendix B, Criterion XVI., Corrective Action requires in part that conditions adverse to quality, such as deficiencies be promptly identified and corrected.

Contrary to the above, concrete delamination of the HHSI trench structures was identified by FPL engineers on November 12, 2012 for Unit 4 and on November 17, 2017 for Unit 3. These issues were closed in the corrective action and work management programs without correcting the deficient concrete structures. The issues were re-entered into the corrective action program as ARs 2295754 and 2296512.

This violation is being treated as a Non-Cited Violation consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Implement Interim Compensatory Measures for a Nonconservative Nuclear Safety Capability Assessment

Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000250,251/2018004-02 Closed	[P.3] – Problem Identification and Resolution, Resolution	71152 Problem Identification & Resolution

A Green NRC-identified NCV of Renewed Facility Operating License Condition 3.D., Fire Protection, was identified for the failure to adequately implement and maintain in effect all provisions of the approved fire protection program. Specifically, FPL identified on September 20, 2016, that the alternate AC power supply cables to the Unit 3 and Unit 4 vital inverters were improperly modeled in the NFPA 805 Nuclear Safety Capability Assessment (NSCA) as always being available when they might actually be impacted by postulated fire scenarios. The modeling error resulted in a non-conservative analysis that was not promptly compensated for to ensure that adequate defense-in-depth and safety margins were maintained. Compensatory measures in the form of roving fire watches were not established by FPL until June 28, 2018.

Description: On June 25, 2018, the inspectors inquired about an open corrective action item documented in AR 2156812. AR 2156812 was originated by FPL on September 20, 2016, and documented that the NSCA improperly modeled the alternate AC power supply cables to the Unit 3 and Unit 4 vital inverters. The vital inverters power vital plant instruments and controls and are normally powered by the vital DC batteries. The NSCA incorrectly modeled that the alternate AC power supply would be always available to power the vital inverters if the DC power supply was damaged by a fire. However, the alternate power supply cables may be unavailable by postulated fire damage. Not correctly including the fire damage potential for the inverter alternate power supply cables resulted in a non-conservative analysis when the NSCA was completed. Unit 3 and 4 transitioned to a risk-informed fire protection program in accordance with NFPA 805 on May 6, 2016. This issue was described as Unresolved Item (URI) 05000250,251/2018003-01, Vital Inverter Alternate AC Supply Cables Were Not Included in the Nuclear Safety Capability Assessment, in NRC Inspection Report 05000250/2018003 AND 05000251/2018003 (ADAMS ML18317A242).

In response to the inspectors' questions, FPL determined that the non-conservative condition still existed and that it was potentially more than a minimal risk impact. FPL initiated interim compensatory measures in the form of roving fire watches in all affected Unit 3 and Unit 4 fire

areas on June 28, 2018. FPL initiated AR 2270522 to document the associated interim compensatory measures.

An initial risk evaluation by FPL that considered the vital inverter ac power cables failed resulted in a more than minimal risk impact change to the fire protection program. Specifically, the Unit 3 core damage frequency (CDF) increase was calculated as $5.00\text{E-}07$ and the Unit 4 CDF increase was $7.40\text{E-}07$. The Unit 3 large early release frequency (LERF) increase was calculated as $4.70\text{E-}08$ and the Unit 4 LERF increase was $5.60\text{E-}08$. FPL determined additional modeling was necessary to accurately assess the risk impact. Corrective actions were added to AR 2270522 to track the necessary fire protection program change evaluations. The results of FPL's fire Probabilistic Risk Assessment (PRA) evaluations were completed on December 7, 2018.

On December 19, 2018, FPL presented the results of their revised fire PRA evaluations to the NRC inspectors. The revised fire PRA evaluations correctly modeled postulated fire damage to the vital inverters AC power supply cables. Additionally, the revised fire PRA evaluations incorporated risk modeling methodologies approved in the following three NRC guidance documents:

- EPRI/NRC-RES, Refining and Characterizing Heat Release Rates from Electrical Enclosures During Fire (RACHELLE_FIRE), NUREG-2178 EPRI 3002005578;
- EPRI/NRC-RES, Nuclear Power Plant Fire Ignition Frequency and Non-Suppression Probability Estimation Using the Updated Fire Events Database; United States Fire Experience Through 2009, NUREG-2169 EPRI 3002002936; and,
- USNRC, Close-Out of Fire Probabilistic Risk Assessment Frequently Asked Question 13-0005 on Cables Fires Special Cases: Self-Ignited and Caused by Welding and Cutting," FAQ 13-0005.

Because the revised PRA evaluations included these methodologies, the overall updated CDFs and LERFs for Units 3 and 4, were reduced. The inspectors determined that the fire protection program changes did not require NRC review because they were demonstrated to have no more than a minimal risk impact. Because the fire protection program changes were acceptable without NRC review, URI 05000250,251/2018003-01, Vital Inverter Alternate AC Supply Cables Were Not Included in the Nuclear Safety Capability Assessment is closed. However, FPL procedure, FP-AA-104-1000, Fire Protection Maintenance, Testing, Impairment and Compensatory Action, Rev. 0, required in part, at Step 4.3.1.2.A.(1), that compensatory actions (for impairment of all fire protection-related systems, equipment and features) shall be assigned with risk insight. From September 20, 2016 until June 28, 2018, FPL had not implemented compensatory actions for a non-conservative analysis issue associated with the Unit 3 and Unit 4 vital inverters, which are post-fire safe shutdown equipment.

Corrective Actions: Immediate corrective actions after the inspectors identified this issue on June 25, 2018, included establishing interim compensatory measures commencing on June 28, 2018, in the form of roving fire watches in all affected Unit 3 and Unit 4 fire areas. Long term corrective actions included an NFPA 805 change evaluation that completed on December 7, 2018 as documented in EC 292388.

Corrective Action References: FPL placed this issue in their CAP as AR 2270522.

Performance Assessment:

Performance Deficiency: The failure to establish appropriate compensatory measures consistent with FPL procedure, FP-AA-104-1000, Fire Protection Maintenance, Testing, Impairment and Compensatory Action, Rev. 0, for impairment of equipment, such as the inverter AC power cables being non-conservatively analyzed features, was a performance deficiency. FP-AA-104-1000 requires compensatory actions shall be designed with risk insights and to reduce the risk created by the lost functions.

Screening: The inspectors determined that the performance deficiency was more than minor per IMC 0612, Appendix B, "Issue Screening," because the non-conservative vital inverter power supply cable analysis adversely affected the Design Control attribute of the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The non-conservative vital inverters power supply cable analysis was not promptly compensated for to ensure that adequate defense-in-depth and safety margins were maintained. Compensatory measures in the form of roving fire watches were not established by FPL until June 28, 2018.

Significance: Using Inspection Manual Chapter 0609, Appendix F, Fire Protection Significance Determination Process, Figure F.1 – Phase 1 Flow Chart, the inspectors determined that the finding was of very low safety significance (Green) because a Senior Reactor Analyst reviewed and accepted FPL's Fire PRA results. Specifically, Question 1.5.1-B. does the licensee's risk-based evaluation for this fire finding indicate a delta CDF of less than $1\text{E-}6$, and was the evaluation result accepted by an SRA was answered Yes, and therefore issue screens to Green, with no further analysis required.

Cross-cutting Aspect: The inspectors reviewed this performance deficiency for cross-cutting aspects as required by IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. From September 20, 2016, to June 28, 2018, FPL had not established interim compensatory measures in the form of roving fire watches for a non-conservative NSCA modeling issue. This finding was assigned a cross-cutting aspect in the Resolution component of the Problem Identification and Resolution cross-cutting area, in that it states, the organization takes effective corrective actions to address issues in a timely manner commensurate with their safety significance. (P.3).

Enforcement:

Violation: Turkey Point Unit 3 and Unit 4 Renewed Facility Operating License Conditions 3.D., Fire Protection, require in part that FPL shall implement and maintain in effect all provisions of the approved fire protection program. FPL fire protection program procedure, FP-AA-104-1000, Fire Protection Maintenance, Testing, Impairment and Compensatory Action, Revision 0, Step 4.3.1.2.A.(1), required for impairment of equipment, such as the inverter AC power cables being non-conservatively analyzed, that compensatory actions shall be established and designed with risk insights.

Contrary to the above, from September 20, 2016 through June 28, 2018, interim compensatory measures in the form of roving fire watches were not established by FPL.

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

This finding closes unresolved item 05000250/2018003-01 AND 05000251/2018003-01.
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EXIT MEETINGS AND DEBRIEFS

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

The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

On October 12, 2018, the inspectors presented the inservice inspection results to Mr. Robert Coffey, Regional Vice President – Southern Region and other members of the licensee staff.

On October 19, 2018, the inspector presented the radiation protection inspection results to Mr. Robert Coffey, Regional Vice President – Southern Region, and other members of the licensee staff.

On January 24, 2019, the inspector presented the quarterly resident inspector inspection results to Mr. Robert Coffey, Regional Vice President – Southern Region, and other members of the licensee staff.

LIST OF DOCUMENTS REVIEWED

Section 71111.08 - Inservice Inspection Activities:

Procedures:

0-ADM-563, Turkey Point Plant, Administrative Procedure, Reactor Vessel Internals Aging Management Program, Rev. 4
03-9127242-003, (NDE 4.15, Component, Support & Inspection Visual Examination (VE) ASME Section XI Code Case N-722-1 and N-729-4". Rev.5
3-GMI-059.04, Flux Map Thimble Tube Eddy Current Test (ECT), Turkey Point Unit 3, Rev 1A
VP-17-006, Vendor Procedure, Ultrasonic Examination of Slotted Hex (Type C) and Round Head (Type D) Baffle Bolts, Rev. 2

Drawings:

10019246, Curtiss Wright, Examination Technique Specification Sheet, Zetec Thimble Tube Wear Scare Standard, Sheet 1, 9/22/04
117892E, Babcock and Wilcox Company, Instrumentation Nozzle Assembly, Rev. 2
117897E, Babcock and Wilcox Company, Instrumentation Nozzle Details, Rev. 2

Action Requests:

AR 02265723, Westinghouse 10CFR50 Part 21 on Reactor Vessel Head Thermal Sleeve Flange Wear, 6/19/18
AR 02272677, Nuclear Safety Advisory Letter for CRDM Thermal Sleeve Wear, NSAL-18-1, 7/18/18
AR 02284866, As-Found Condition of the Unit 3 Flux Thimble Tubes, 10/09/2018
AR 02285053, NRC Identified, Containment Moisture Barrier Damage, 10/11/18
AR 02285104, MRP-227 Baffle Bolt Examination Results PTN-3, RFO 30, 10/11/18
AR 02285473, NRC Identified, Procedure NDE 4.15, Add Detail Drawing for Bottom Mounted Instrumentation Examination Volume, 10/12/18

Miscellaneous Documents:

180-9290427-000, Turkey Point 3 - PTN3R30 Bare Metal Visual Examination Upper Head, 10/25/18
180-9290753-000, NDE Services Final Report, Turkey Point 3 PTN3-30 Baffle to Former Bolt MRP-227 Ultrasonic Examination and Visual Examination, 10/18/18
180-9290929-000, NDE Services Final Report Turkey Point Unit 3, PTN-3-30 Refueling Outage Remote Visual Examination of Reactor Vessel Bottom Mounted Instrumentation Nozzle Penetrations, 10/29/18
BMI-FTT-IP, Bottom Mounted Instrumentation (BMI) Flux Thimble Tubing (FTT) Inspection Program, Rev. 6
Turkey Point Nuclear Plant, Curtiss-Wright/Anatec, Eddy Current Inspection Report, Unit 3, Work Order 40542402-01, 10/8/18
ETSS-PTN-FTT-TP3-30-0, Examination Technique Specification Sheet, 10/2/18
FPE-NDE-18-028, NextEra Inter Office Correspondence, Eddy Current Certification and Qualification Documentation Review, 8/27/18
Personnel Eddy Current Certification and Visual Acuity Certification Records, E, Emery, G. Ingenthron, M. Lancaster
Personnel Ultrasonic Certifications and Visual Acuity Certification Records, R. Sheffield, N. Bauman, T. Baune, J. Timm, T. Blechinger, A. Feuchtmann

Personnel Visual Inspection Certifications and Visual Acuity Certification Records, D. Langenfeld, A. Clemmons
Turkey Point Unit #3, Phased Array Ultrasonic Examination Report, Steam Generator "A", Feedwater Piping Replacement, Pipe to Elbow Weld No. 14"-FWA-2301-1518, 10/22/18
Turkey Point Unit #3, Phased Array Ultrasonic Examination Report, Steam Generator "A" Feedwater Piping Replacement, Pipe to Elbow Weld No. 14"-FWA-2301-1718, 10/22/18
Turkey Point Boric Acid Evaluation, Component ID, 03/Recirculation RHR Suction, 10/3/18
Westinghouse Transmittal of Nuclear Safety Advisory Letter (NSAL-18-1), Thermal Sleeve Flange Wear Leads to Stuck Control Rod, 7/13/18

71124.01 - Radiological Hazard Assessment and Exposure Controls

Procedures, Guidance Documents, and Manuals

0-HPA-001, Radiation Work Permit Initiation and Termination, Rev. 4B
0-HPS-025.2, Posting and Survey Requirements for Fuel Movement, Rev. 9
PI-AA-104-1000, Condition Reporting, Rev. 19
RP-AA-100-1001, Area Radiological Surveys, Rev. 4
RP-AA-100-1002, Radiation Worker Instruction and Responsibilities, Rev. 7
RP-AA-103-1001, Posting Requirements for Radiological Hazards, Rev. 5
RP-AA-103-1002, High Radiation Area Controls, Rev. 9
RP-AA-103-1006, Conduct of Radiological Diving Operations, Rev. 5
RP-AA-107-1003, Unconditional and Conditional Release of Material, Rev. 4
RP-TP-101-1003, Personnel Contamination Monitoring and Decontamination, Rev. 3
RP-TP-102-1000, Alpha Monitoring, Rev. 3
RP-TP-102-1001, Radiological Air Sample Assay, Rev. 4A
RP-TP-107-1001, Storage of Highly Radioactive Material in the Reactor Cavity or Spent Fuel Pool, Rev. 1

Records and Data

Air Calculation Sheet, U-3 14' HX Letdown, 10/17/18
Air Calculation Sheet, U-3 RCB 14', Routine, 10/17/18
Air Calculation Sheet, U-3 RCB 58' North, Set Upper Internals, 10/16/18
Air Calculation Sheet, U-3 RCB 58' Cavity, Cavity Rough Wash, 10/17/18
NSTS Annual Inventory Reconciliation Report, 1/18/18
RWP 18-3008, Containment General Outage Maintenance (Bulk Work), Rev. 2
RWP 18-3021, Painting Activities, Rev. 0
RWP 18-3100, Refueling Activities, Rev. 0
Source Leak Test and Inventory Form, 10/15/17
Survey No. PTN-M-20171001-1, Unit 3 & 4 Demineralizer Galleries, 10/1/17
Survey No. PTN-M-20171028-10, Unit 3 & 4 Demineralizer Galleries, 10/28/17
Survey No. PTN-M-20171108-10, Unit 3 & 4 Demineralizer Galleries, 11/8/17
Survey No. PTN-M-20171129-2, U3PipeAndValveRoom, 11/29/17
Survey No. PTN-M-20171130-6, U3PipeAndValveRoom, 11/30/17
Survey No. PTN-M-20180929-15, Unit 3 & 4 Demineralizer Galleries, 9/29/18
Survey No. PTN-M-20181002-33, Unit 3 & 4 Demineralizer Galleries, 10/2/18
Survey No. PTN-M-20181005-12, U3Containment14footOutsideBiowall, 10/5/18
Survey No. PTN-M-20181005-13, U3Containment14footInsideBiowall, 10/5/18
Survey No. PTN-M-20181016-10, U3Containment14footInsideBiowall, 10/16/18
Survey No. PTN-M-20181015-7, U3Containment30_6Elevation, 10/15/18
Survey No. PTN-M-20181015-17, U3Containment58Elevation, 10/15/18
Survey No. PTN-M-20181016-8, U3Containment14footOutsideBiowall, 10/16/18

Survey No. PTN-M-20181016-10, U3Containment14footInsideBiowall, 10/16/18
Survey No. PTN-M-20181016-14, U3Containment30_6Elevation, 10/16/18
Survey No. PTN-M-20181016-20, U3Containment58Elevation, 10/16/18
Survey No. PTN-M-20181017-49, 1-3-RCB-58 Pre-Rough Wash Survey of Upper Cavity,
10/17/18

CAP Documents

02228808
02229743
02229755
02230344
02232647
02233480
02234979
02238449
02246284
02253797
02260175
02262676
02261819
PTN-18-002, Turkey Point Nuclear Assurance Report, Radiological Protection & Radwaste,
4/11/18

71151 - Performance Indicator Verification

Procedures, Guidance Documents, and Manuals

0-ADM-032, NRC Performance Indicators Turkey Point, Rev. 9

Records and Data

0-ADM-032, Attachment 17, Occupational Exposure Control Effectiveness, 4th Quarter 2017 –
2nd Quarter 2018

List of ED Dose and Dose Rate Alarms, October 2017 - June 2018

Section 71152 - Problem Identification and Resolution

Action Requests

AR02232526, Adverse Trend in ICW/CCW corrosion
AR02239743, AMP Effectiveness Review: ICW Inspection Program
AR02218430, 2017 DBAI Minor Rust on Header Piping
AR02218437, 2017 DBAI Minor Rust on Header Piping
AR02250515, Change of AR guidance on License Renewal Walkdowns

Procedures

0-ADM-504, Corrosion Monitoring and Action Program, Rev. 0
0-ADM-561, Structures Monitoring Program, Rev. 7
0-ADM-564, Systems/ Programs Monitoring, Rev. 5
SPEC-M-086, Intake Cooling Water System Piping Inspection, Rev. 1

Other Documents Reviewed

PCR22580515, Revision to 0-ADM-564 Systems/Programs Monitoring