



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

November 7, 2018

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  
05000250/2018003 AND 05000251/2018003**

Dear Mr. Nazar:

On September 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Turkey Point Nuclear Generating Station, Units 3 and 4. On October 18, 2018, 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.

The NRC inspectors documented one finding of very low safety significance (Green) in this report. The 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 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.

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 05000250/2018003 and 05000251/2018003

cc: Distribution via ListServ

SUBJECT: TURKEY POINT NUCLEAR GENERATING STATION – NUCLEAR  
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 05000250/2018003 AND 05000251/2018003

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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: 05000250/2018003, 05000251/2018003

Enterprise Identifier: I-2018-003-0043

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: July 1, 2018 through September 30, 2018

Inspectors: D. Orr, Senior Resident Inspector  
R. Reyes, Resident Inspector  
P. Cataldo, Senior Resident Inspector, Seabrook Station (Section  
71111.04)  
M. Endress, Senior Resident Inspector, Vogtle Electric Generating Plant  
(Sections 71111.04, 71111.05AQ, and 71111.11)

Approved by: R. 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.

### List of Findings and Violations

Inoperable Auxiliary Feedwater Steam Supply Flow Path			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000251/2018003-02 Closed	None	71153
A self-revealing Green NCV of 10 CFR 50, Appendix B, Criterion V, Procedures, was identified when FPL failed to ensure that the torque arm of the 4A steam generator (SG) auxiliary feedwater (AFW) steam supply valve, MOV-4-1403, remained engaged with its valve stem key. A disengaged torque arm subsequently caused the geared limit switch settings for the 4-1403 motor operator to become out of sync with the valve travel and rendered the AFW 4A SG supply flow path inoperable.			

### Additional Tracking Items

Type	Issue number	Title	Report Section	Status
Unresolved Item (URI)	URI 05000250,251/2018003-01	Vital Inverter Alternate AC Supply Cables Were Not Included in the Nuclear Safety Capability Assessment	71152	Open
Licensee Event Report (LER)	LER 05000251/2018-001-00	Inoperable Auxiliary Feedwater Steam Supply Flowpath	71153	Closed

## PLANT STATUS

Unit 3 began the inspection period at rated thermal power. On September 29, 2018, the unit was down powered to 42 percent to perform surveillances prior to starting the refueling outage and on September 30, 2018, the unit was shut down.

Unit 4 began the inspection period at rated thermal power. On August 08, 2018, the unit was down powered to 49 percent to repair elevated vibrations on the 4B steam generator feed pump. The unit was returned to rated thermal power on August 15, 2018. On August 29, 2018, the unit was down powered to 71 percent to repair position control issues associated with the main turbine number 4 control valve. The unit was returned to rated thermal power on August 30, 2018, and remained at or near rated thermal power for the remainder of the 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

### 71111.01 - Adverse Weather Protection

#### External Flooding (1 Sample)

The inspectors evaluated readiness to cope with external flooding on July 5 - 6 & 16 - 17, September 4 - 5, 7, and 10, 2018.

### 71111.04 - Equipment Alignment

#### Partial Walkdown (3 Samples)

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

- (1) Unit 3 train 2 auxiliary feedwater (AFW) following C AFW pump inservice test on July 5, 2018
- (2) 3B intake cooling water (ICW) header while the 3A ICW header was out of service (OOS) for maintenance on July 26, 2018
- (3) 4A emergency diesel generator (EDG) while the 4B EDG was OOS on September 11, 2018

#### Complete Walkdown (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of the Unit 3 EDGs on September 10 – 14, 2018.

#### 71111.05AQ - Fire Protection Annual/Quarterly

##### Quarterly Inspection (6 Samples)

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

- (1) AFW pump fire zone (FZ) 84 on July 3, 2018
- (2) Unit 3 and Unit 4 steam generator feedwater pump areas, FZs 66 and 69 on July 3, 2018
- (3) Unit 3 and 4 charging pump rooms, FZs 055 and 045, on July 27, 2018
- (4) Unit 3 and 4 pipe and valve rooms, FZs 040 and 030, on July 27, 2018
- (5) Unit 3 and Unit 4 main steam platforms, FZs 115 and 114, on August 14, 2018
- (6) Unit 3 and Unit 4 feedwater platforms, FZs 116 and 113, on August 15, 2018

#### 71111.06 - Flood Protection Measures

##### Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the Unit 3 pipe and valve room and residual heat removal pump rooms on August 28 through September 04, 2018.

#### 71111.07 - Heat Sink Performance

##### Heat Sink (1 Sample)

The inspectors evaluated the 3A, 3B, and 3C component cooling water (CCW) heat exchangers (HXs) performance on August 22 and 27, 2018.

#### 71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

##### Operator Requalification (1 Sample)

The inspectors observed and evaluated a simulator scenario administered to an operating crew on July 12, 2018.

##### Operator Performance (1 Sample)

The inspectors observed and evaluated the Unit 3 train 2 AFW monthly operability test on July 2, 2018.

### 71111.12 - Maintenance Effectiveness

#### Routine Maintenance Effectiveness (1 Sample)

The inspectors evaluated the effectiveness of routine maintenance activities and/or safety significant function associated with action request (AR) 2236913, 3C reactor coolant pump seal failure plant level event, on August 27 and 28, 2018.

#### Quality Control (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the commercial dedication of the 3B EDG fuel oil transfer pump motor on August 23, 29, and 30, 2018.

### 71111.13 - Maintenance Risk Assessments and Emergent Work Control (6 Samples)

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

- (1) 3B CCW HX, 3CD instrument air compressor, 3A EDG, and 4A CCW HX OOSs on July 18, 2018
- (2) 3AB19 4kV breaker, S74B computer room chiller, 4B CCW HX, and Unit 4 2B 480V load center/4kV rooms chiller OOSs on August 09, 2018
- (3) 3A ICW header OOS for mechanical cleaning of the header basket strainer on August 20 and 21, 2018
- (4) 4B EDG OOS due to a failed surveillance on September 04, 2018
- (5) 3CM instrument air compressor, 3C charging pump, Unit 3 startup transformer, and E232/V76 electrical equipment room HVAC OOSs on September 12, 2018
- (6) 4D32 125VDC battery charger, 4B EDG, 3B CCW HX, and 3C ICW pump OOSs on September 26 and 27, 2018

### 71111.15 - Operability Determinations and Functionality Assessments (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) AR 2273378, Unit 4 EDG found with starter solenoid damaged after engine start
- (2) AR 2274477, 3B accumulator tank level increasing
- (3) AR 2276246, Unit 4 reactor coolant system high delta-temperature bistable tripped will not clear
- (4) AR 2279713 and 2280008, 4B EDG failure to start during surveillance testing
- (5) AR 2281752, Steam leak downstream of trip and throttle valve during surveillance testing of A AFW pump

### 71111.18 - Plant Modifications (1 Sample)

The inspectors evaluated the following permanent modification:

- (1) EC-291396, Unit 3 Reactor Coolant Pump Seal Water Injection Cooling Modification



### 71111.19 - Post Maintenance Testing (3 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Work orders (WOs) 40515602 & 406106453, B EDG speed switch replacement on July 14, 2018
- (2) WO 40541974, 3AB19, 3A 4kV bus to 3D 4kV tie breaker on August 09 and 17, 2018
- (3) WO 40606032, Acceptance testing for seal water injection modification on August 17 and 20, 2018

### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

#### Routine (4 Samples)

- (1) 4-OSP-075.1, Auxiliary Feedwater Train 1 Operability Verifications on July 24, 2018
- (2) 3-OSP-075.9, B AFW Overspeed Test, on July 30, 2018
- (3) 3-OSP- 023.1, Diesel Generator Operability Test (3A EDG) on August 21, 2018
- (4) 4-OSP-028.6, Rod Control Cluster Assembly Periodic Exercise on August 23, 2018

#### In-service (2 Samples)

- (1) 3-OSP-019.1, 3A Intake Cooling Water Pump In-service Test, on July 27, 2018
- (2) 3-OSP-068.5A, 3A Containment Spray Pump In-service Test on August 30, 2018

## **OTHER ACTIVITIES – BASELINE**

### 71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below for the period from July 2017, through June 2018 (2 Samples)

- (1) Unit 3 Safety System Functional Failures
- (2) Unit 4 Safety System Functional Failures

### 71152 - Problem Identification and Resolution

#### Annual Follow-up of Selected Issues (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to all open ARs in the corrective action program with NFPA 805 in the subject line or description since the NFPA go live date on May 6, 2016. This issue was selected to verify the licensee was appropriately correcting and resolving NFPA 805 analysis, fire modeling, or program issues, and as necessary, implementing compensatory measures for identified impaired fire protection features or unanalyzed conditions. The review included the following ARs:

2130309	2150536	2181441
2130518	2153778	2194696
2134032	2156812	2208789
2134673	2156987	2213117
2146406	2159233	2257479
2148314	2167700	2266273

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

Licensee Event Reports (1 Sample)

The inspectors evaluated the following licensee event reports which can be accessed at <https://lersearch.inl.gov/LERSearchCriteria.aspx>:

LER 05000251/2018-001-00: Inoperable Auxiliary Feedwater Steam Supply Flowpath

**INSPECTION RESULTS**

Unresolved Item (Open)	Vital Inverter Alternate AC Supply Cables Were Not Included in the Nuclear Safety Capability Assessment	71152
<p><u>Description:</u> 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 NFPA 805 Nuclear Safety Capability Assessment (NSCA) circuit analysis failed to include and analyze cables associated with the alternate power supply to all vital inverters on either Turkey Point Unit. The vital inverters power vital plant instruments and controls and are normally powered by the vital DC batteries. The NSCA analysis incorrectly considered that the alternate AC power supply would be always available to power the vital inverters if the DC power supply was damaged by fire. However, the alternate power supply cables may be impacted by 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 performed. The inspectors inquired why compensatory measures in the form of fire watches were not established for the non-conservative NSCA analysis.</p> <p>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 considered that if the fire Probabilistic Risk Assessment (PRA) evaluation determines the issue to not result in a risk increase of more than 1E-7/year for core damage frequency and no more than 1E-8/year for large early release frequency, that the change to the fire protection program to correctly analyze the vital inverter power supplies is no more than minimal risk impact. FPL initiated interim compensatory measures in the form of roving fire watches in all the affected Unit 3 and Unit 4 fire areas. FPL initiated AR 2270522 to document the associated interim compensatory measures. AR 2270522 also tracks completion of the necessary NSCA change and an associated fire PRA evaluation to correctly model the vital inverter power supply cables. FPL expects to complete the fire PRA evaluation in December 2018.</p> <p>Units 3 and 4 Operating License Condition 3.D., <i>Transition License Conditions 1</i>. requires, in part, that risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in Operation License Condition 3.D., <i>Other</i></p>		

*Changes that May be Made Without Prior NRC Approval, 2. Fire Protection Program Changes that Have No More than Minimal Risk Impact.* The results of FPL's fire PRA evaluation expected to complete in December 2018 are necessary to determine if this issue is a violation of Units 3 and 4 Operating License Condition 3.D., *Transition License Conditions* 1. This issue remains unresolved pending review of FPL's fire PRA evaluation.

Planned Closure Action: A review of FPL's fire PRA evaluation of the issues as described in AR 2270522 is required for closure and to determine if a violation of a Units 3 and 4 Operating License Condition 3.D., *Transition License Conditions* 1 exists.

Licensee Actions: FPL entered this issue into the corrective action program as AR 2270522 to update the NSCA and to complete a fire PRA evaluation. Interim actions included establishing compensatory measures in the form of roving fire watches in all the affected Unit 3 and Unit 4 fire areas.

Corrective Actions Reference: This issue was entered into FPL's CAP as AR 2270522.

NRC Tracking Number: URI 05000250,251/2018003-01

Inoperable Auxiliary Feedwater Steam Supply Flow Path			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000251/2018003-02 Closed	None	71153
A self-revealing Green NCV of 10 CFR 50, Appendix B, Criterion V, Procedures, was identified when FPL failed to ensure that the torque arm of the 4A steam generator (SG) auxiliary feedwater (AFW) steam supply valve, MOV-4-1403, remained engaged with its valve stem key. A disengaged torque arm subsequently caused the geared limit switch settings for the 4-1403 motor operator to become out of sync with the valve travel and rendered the AFW 4A SG supply flow path inoperable.			
<p><u>Description:</u> On May 7, 2018, during surveillance testing of the AFW system, MOV-4-1403, was demanded open by main control room operators. When demanded open, the MOV-4-1403 open and close indicating lights extinguished on the main control room (MCR) panel. Field operators identified that the 'B' AFW pump turbine started as expected and MOV-4-1403 was open. Field operators additionally identified that the 125Vdc line starter thermal overloads tripped. When the thermal overloads were reset, MOV-4-1403 would not close from the MCR because the motor operator limit switch remained at the full closed position. MCR operators shutdown the 'B' AFW pump and secured the surveillance test.</p> <p>Maintenance technicians and valve engineers later determined the MOV-4-1403 torque arm, a valve stem anti-rotation device, was out of position and disengaged from its stem key. With the torque arm disengaged from the key, the valve stem was able to rotate causing the geared limit switch settings on the motor operator to become out of sync with the valve travel. As a result, the limit switches did not actuate at the expected stem travel setpoints and the MOV motor stalled when the valve ran into the open backseat.</p>			

FPL determined the torque arm disengagement and limit switch misalignment occurred during previous surveillance testing on April 11, 2018, when the MOV was left in its normally closed position. FPL additionally determined in its equipment failure investigation, documented in CR 2262955, that the Turkey Point preventive maintenance procedure, General MOV Inspection, 0-PME-102.07, did not have steps to periodically ensure the torque arm was properly positioned and correctly tightened on the valve stem.

Corrective Actions: FPL implemented corrective actions to: 1) repair the torque arm, overhaul the motor-operator, and reset the limit switches. Additionally, the torque arm key was replaced and a modification was implemented to install a set screw as a secondary restraint on the torque arm; 2) revise maintenance procedures to verify the position and tightness of the torque arm or anti-rotation device during preventative maintenance activities and to perform this activity at a 4.5 year interval (MOV 4-1403 operated successfully for 9 years before the it was rendered inoperable on April 11, 2018) ; and, 3) address extent of condition and verify that the torque arm and valve stem key of the remaining AFW valves susceptible to the same condition were properly positioned and tightened. Set screws were additionally installed in the remaining AFW valves susceptible to the same condition. Additional corrective actions were planned for valves in other systems that are susceptible to this condition.

Corrective Action Reference: This issue was entered into FPL's CAP as AR 2262955.

#### Performance Assessment:

Performance Deficiency: The failure to ensure through preventative maintenance activities that the torque arm of the 4A SG AFW steam supply valve, MOV-4-1403, would not disengage from the valve stem key, and to maintain the AFW 4A SG supply flow path operable, was a performance deficiency. The cause of the issue was reasonably within FPL's ability to foresee and correct because MOV-4-1403 had a similar failure in January 2009 and the anti-rotation torque arm was the subject of an emergent work order in October 2008. The corrective action evaluation after the January 2009 failure investigated the human performance aspects of the maintenance performed in October 2008, and determined there were no human performance errors. FPL did not further investigate any design or maintenance procedure inadequacies and no corrective actions were assigned in 2009.

Screening: The inspectors determined that the performance deficiency was more than minor because it was associated with the Mitigating Systems cornerstone attribute of procedure quality and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, preventive maintenance procedures did not have steps to periodically ensure the torque arm of MOV-4-1403 was properly positioned and correctly tightened on the valve stem. This was a contributing cause that resulted in MOV-4-1403 being rendered inoperable.

Significance: Using Inspection Manual Chapter (IMC) 0609, Attachment 4, "Initial Characterization of Findings," Table 2, the finding was determined to affect the Mitigating Systems cornerstone due to an inoperable AFW steam supply valve which affected decay heat removal. IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," was used to further

evaluate this finding. The finding screened as Green because the inoperability 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. With the 4A SG supply flow path inoperable, two redundant flow paths from the 4B and 4C steam generators were operable to support operation of the AFW system.

Cross-cutting Aspect: No cross cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance. There were no AFW steam supply MOV failures related to insufficient tightening of setscrews, keys, or stakes in the previous three years.

Enforcement:

Violation: 10 CFR 50, Appendix B, Criterion V, Procedures, required, in part, that procedures shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Contrary to this, maintenance procedure, General MOV Inspection, 0-PME-102.07, used to perform inspections of safety-related MOVs such as MOV-4-1403, did not ensure the torque arm or anti-rotation device was in the correct position, engaged with the valve stem, and torqued per vendor specifications or other appropriate general maintenance procedures. The lack of appropriate quantitative or qualitative acceptance criteria contributed to MOV-4-1403 being rendered inoperable from April 11 to May 7, 2018 and additionally resulted in a Unit 4 Technical Specification 3.7.1.2 violation on April 18, 2018, because this period exceeded the seven-day allowed out of service time for an inoperable AFW steam supply flow path.

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

## **EXIT MEETINGS AND DEBRIEFS**

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

On October 18, 2018, the resident inspectors presented the quarterly resident inspector inspection results to Mr. Bob Coffey, Regional Vice President – Southern Region, and other members of the licensee staff.