



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 28, 2017

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

SUBJECT: TURKEY POINT NUCLEAR GENERATING UNIT NOS. 3 AND 4 - ISSUANCE OF AMENDMENTS REGARDING TECHNICAL SPECIFICATIONS FOR AUXILIARY FEEDWATER ACTUATION INSTRUMENTATION (CAC NOS. MF9069 AND MF9070)

Dear Mr. Nazar:

The U.S. Nuclear Regulatory Commission (NRC or the Commission) has issued the enclosed Amendment No. 276 to Renewed Facility Operating License No. DPR-31 and Amendment No. 271 to Renewed Facility Operating License No. DPR-41 for Turkey Point Nuclear Generating Unit Nos. 3 and 4, respectively. The amendments change the Technical Specifications (TSs) in response to the application from Florida Power & Light Company dated December 21, 2016 (L-2016-033), as supplemented by letter L-2017-086 dated May 18, 2017.

The amendments revise the instrumentation TSs for auxiliary feedwater actuation on bus stripping and on a trip of all main feedwater pump breakers. The amendments change the completion times for required actions for inoperable instrument channels. The NRC staff's safety evaluation of the amendments is enclosed. A Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink, appearing to read "Wentzel".

Michael J. Wentzel, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosures:

1. Amendment No. 276 to DPR-31
2. Amendment No. 271 to DPR-41
3. Safety Evaluation

cc w/enclosures: Distribution via Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

FLORIDA POWER & LIGHT COMPANY

DOCKET NO. 50-250

TURKEY POINT NUCLEAR GENERATING UNIT NO. 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 276
Renewed License No. DPR-31

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Florida Power & Light Company (the licensee) dated December 21, 2016, as supplemented by letter dated May 18, 2017, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Renewed Facility Operating License and Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B. of Renewed Facility Operating License No. DPR-31 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 276 are hereby incorporated into this renewed license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Undine Shoop, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed
Facility Operating License
and Technical Specifications

Date of Issuance: September 28, 2017



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

FLORIDA POWER & LIGHT COMPANY

DOCKET NO. 50-251

TURKEY POINT NUCLEAR GENERATING UNIT NO. 4

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 271
Renewed License No. DPR-41

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Florida Power & Light Company (the licensee) dated December 21, 2016, as supplemented by letter dated May 18, 2017, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Renewed Facility Operating License and Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B. of Renewed Facility Operating License No. DPR-41 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 271 are hereby incorporated into this renewed license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Undine Shoop, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed
Facility Operating License
and Technical Specifications

Date of Issuance: September 28, 2017

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 276 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-31

AMENDMENT NO. 271 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-41

TURKEY POINT NUCLEAR GENERATING UNIT NOS. 3 AND 4

DOCKET NOS. 50-250 AND 50-251

Replace page 3 of Renewed Facility Operating License No. DPR-31 with the attached page 3. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Replace page 3 of Renewed Facility Operating License No. DPR-41 with the attached page 3. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Replace the following page of the Appendix A Technical Specifications with the attached page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove

3/4 3-19

3/4 3-22

Insert

3/4 3-19

3/4 3-22

- E. Pursuant to the Act and 10 CFR Parts 40 and 70 to receive, possess, and use at any time 100 milligrams each of any source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactively contaminated apparatus;
 - F. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of Turkey Point Units Nos. 3 and 4.
3. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Sections 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified below:
- A. Maximum Power Level

The applicant is authorized to operate the facility at reactor core power levels not in excess of 2644 megawatts (thermal).
 - B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 276, are hereby incorporated into this renewed license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.
 - C. Final Safety Analysis Report

The licensee's Final Safety Analysis Report supplement submitted pursuant to 10 CFR 54.21(d), as revised on November 1, 2001, describes certain future inspection activities to be completed before the period of extended operation. The licensee shall complete these activities no later than July 19, 2012.

The Final Safety Analysis Report supplement as revised on November 1, 2001, described above, shall be included in the next scheduled update to the Final Safety Analysis Report required by 10 CFR 50.71(e)(4), following the issuance of this renewed license. Until that update is complete, the licensee may make changes to the programs described in such supplement without prior Commission approval, provided that the licensee evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59 and otherwise complies with the requirements in that section.

- E. Pursuant to the Act and 10 CFR Parts 40 and 70 to receive, possess, and use at any time 100 milligrams each of any source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactively contaminated apparatus;
 - F. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of Turkey Point Units Nos. 3 and 4.
3. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Sections 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified below:
- A. Maximum Power Level

The applicant is authorized to operate the facility at reactor core power levels not in excess of 2644 megawatts (thermal).
 - B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 271, are hereby incorporated into this renewed license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.
 - C. Final Safety Analysis Report

The licensee's Final Safety Analysis Report supplement submitted pursuant to 10 CFR 54.21(d), as revised on November 1, 2001, describes certain future inspection activities to be completed before the period of extended operation. The licensee shall complete these activities no later than April 10, 2013.

The Final Safety Analysis Report supplement as revised on November 1, 2001, described above, shall be included in the next scheduled update to the Final Safety Analysis Report required by 10 CFR 50.71(e)(4), following the issuance of this renewed license. Until that update is complete, the licensee may make changes to the programs described in such supplement without prior Commission approval, provided that the licensee evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59 and otherwise complies with the requirements in that section.

TABLE 3.3-2 (Continued)
ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

<u>FUNCTIONAL UNIT</u>	<u>TOTAL NO. OF CHANNELS</u>	<u>CHANNELS TO TRIP</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABLE MODES</u>	<u>ACTION</u>
6. Auxiliary Feedwater### (Continued)					
b. Stm. Gen. Water Level-- Low-Low	3/steam generator	2/steam generator in any steam generator	2/steam generator	1, 2, 3	15
c. Safety Injection	See Item 1. above for all Safety Injection initiating functions and requirements.				
d. Bus Stripping	1/bus	1/bus	1/bus	1, 2, 3	23(a)
e. Trip of all Main Feed- water Pumps Breakers	1/breaker	(1/breaker) /operating pump	(1/breaker) /operating pump	1, 2	23(b)
7. Loss of Power					
a. 4.16 kV Busses A and B (Loss of Voltage)	2/bus	2/bus	2/bus	1, 2, 3, 4	18
b. 480 V Load Centers 3A, 3B, 3C, 3D and 4A, 4B, 4C, 4D Undervoltage	2 per load center	2 on any load center	2 per load center	1, 2, 3, 4	18
Coincident with: Safety Injection	See Item 1. above for all Safety Injection initiating functions and requirements.				

TABLE 3.3-2 (Continued)

TABLE NOTATION (Continued)

- ACTION 18 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 6 hours. Both channels of any one load center may be taken out of service for up to 8 hours in order to perform surveillance testing per Specification 4.3.2.1.
- ACTION 19 - With less than the Minimum Number of Channels OPERABLE, within 1 hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.
- ACTION 20 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours; however, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.3.2.1 provided the other channel is OPERABLE.
- ACTION 21 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or declare the associated valve inoperable and take the ACTION required by Specification 3.7.1.5.
- ACTION 22 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 6 hours; however, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.3.2.1 provided the other channel is OPERABLE.
- ACTION 23 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement,
- (a) Restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
 - (b) Restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours.
- ACTION 24 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, within 1 hour isolate the control room Emergency Ventilation System and initiate operation of the Control Room Emergency Ventilation System in the recirculation mode.
- ACTION 25 - With number of OPERABLE channels one less than the Total number of channels, STARTUP and/or POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 6 hours. For subsequent required DIGITAL CHANNEL OPERATIONAL TESTS the inoperable channel may be placed in bypass status for up to 4 hours.



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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
AMENDMENT NO. 276 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-31
AMENDMENT NO. 271 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-41
FLORIDA POWER & LIGHT COMPANY
TURKEY POINT NUCLEAR GENERATING UNIT NOS. 3 AND 4
DOCKET NOS. 50-250 AND 50-251

1.0 INTRODUCTION

By application dated December 21, 2016 (L-2016-233),¹ as supplemented by letter L-2017-086, dated May 18, 2017,² Florida Power & Light Company (the licensee) requested changes to the Technical Specifications (TSs) for Turkey Point Nuclear Generating Unit Nos. 3 and 4 (Turkey Point 3 and 4), which are contained in Appendix A of Renewed Facility Operating License Nos. DPR-31 and DPR-41. The licensee proposed to revise the instrumentation TSs for auxiliary feedwater (AFW) system actuation on bus stripping and on the trip of all main feedwater (MFW) pump breakers. The licensee proposed to modify completion times in TS 3/4.3.2, "Engineered Safety Features Actuation System [ESFAS] Instrumentation," for required actions to take when the number of OPERABLE AFW Functional Unit (FU) 6(d), "Bus Stripping," or AFW FU 6(e), "Trip of All Main Feedwater Pump Breakers," instrument channels listed in Table 3.3-2, "Engineered Safety Features Actuation System Instrumentation," are one less than the minimum channels OPERABLE requirement in the Table.

By electronic mail (e-mail) dated April 19, 2017,³ the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff sent the licensee a request for additional information (RAI). The licensee responded to the RAI by letter dated May 18, 2017. The licensee's RAI response letter provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the original proposed no significant hazards consideration (NSHC) determination that was published in the *Federal Register* (FR) on March 14, 2017 (82 FR 13666).

¹ Agencywide Documents Access and Management System (ADAMS) Accession No. ML17012A084.

² ADAMS Accession No. ML17138A377.

³ ADAMS Accession No. ML17112A031.

2.0 REGULATORY EVALUATION

2.1. Description of AFW Actuation and Instrumentation

The AFW system supplies feedwater to the steam generators (SGs) during transients when normal feedwater is not available. The dual train AFW system is shared between the two units. The AFW system has three quick starting steam turbine-driven AFW pumps installed such that each pump supplies AFW to either unit or both, with any pump supplying the total feedwater requirement of either unit. The AFW pumps are automatically supplied with steam from the unit that has lost its normal feedwater supply, but can also be supplied from the unit having normal feedwater supply, or the unit's auxiliary steam supply. The steam supply valves to the pumps will automatically open by various signals, including the loss of both feedwater pumps under normal operating conditions or bus stripping (i.e., a loss of voltage on either the A or B 4.16-kilovolt (kV) bus, instantaneous degraded voltage on one 480-volt (V) load center coincident with safety injection and the diesel generator breaker open, or delayed degraded voltage on one 480-V load center coincident with the diesel generator breaker open). For a loss of normal feedwater or a loss of non-emergency alternating current (AC) power, the AFW system provides sufficient heat removal capability to prevent reactor coolant inventory relief through the pressurizer power-operated relief valves or the code safety valves. For each event, the worst single active failure is assumed to occur in the AFW system, resulting in the availability of only one AFW pump supplying three SGs.

The ESFAS measures temperatures, pressures, flows, and levels in the reactor coolant, steam, reactor containment, and auxiliary systems, and actuates the engineered safety features and monitors their operation. The quantity and types of process instrumentation provided ensure safe and orderly operation of all systems and processes over the full operating range of the units. The ESFAS is actuated by channels that combine redundant sensors, independent channel circuitry, coincident trip logic, and different parameter measurements so that a safe and reliable system is provided in which a single failure will not defeat the channel function. The ESFAS instrumentation actuates the safety injection, containment isolation, emergency containment cooling, and the containment spray systems.

In the ESFAS, there are two AFW auto-start channels per unit. For AFW FU 6(d), each 4.16-kV bus has one associated sequencer, and each sequencer actuates one AFW auto-start channel. Hence, there is one AFW Actuation on Bus Stripping channel per applicable 4.16-kV bus (i.e., 1/bus). Upon a loss of voltage to either 4.16-kV bus, the associated sequencer will initiate bus stripping and AFW auto-start. For AFW FU 6(e), there are two MFW pumps per unit, each powered by a 4.16-kV breaker and with one control room control switch. Because each MFW pump breaker and control switch circuit has but one input into each AFW auto-start channel, there is one "AFW actuation on Trip of all MFW Pump Breakers" channel per operating pump breaker (i.e., 1/breaker/operating pump). A MFW pump breaker in the tripped position inputs into the AFW auto-start circuitry such that AFW is initiated upon trip of the second operating pump. If only one MFW pump is running, trip of its associated breaker will initiate AFW. If both pump breakers are intentionally opened, the circuitry defeats the "AFW actuation on Trip of All MFW Pump Breakers" function.

Pressurized water reactors have backup equipment, diverse from the Reactor Protection System (RPS), to automatically initiate the AFW system and turbine trip under conditions

indicative of an anticipated transient without a scram (ATWS) event. This is accomplished by the ATWS Mitigation System Actuation Circuitry (AMSAC), which also trips the reactor. AMSAC serves as a non-safety related backup protective system that prevents over-pressurization of the reactor coolant system, conserving SG inventory, and inserting the reactor control rods following an ATWS event. AMSAC initiates when low SG level is sensed and RPS does not respond with an automatic reactor trip.

TS 3/4.3.2 provides the limiting condition for operation (LCO), ACTIONs, and surveillance requirements for the ESFAS instrumentation. LCO 3.3.2 requires the ESFAS instrumentation channels and interlocks shown in Table 3.3-2 to be operable with their trip setpoints set consistent with the values shown in the trip setpoint column of Table 3.3-3. ACTION c requires the licensee to take the ACTION shown in Table 3.3-2 when an ESFAS instrumentation channel or interlock is inoperable. ACTION 23 in Table 3.3-2 requires that with the number of OPERABLE AFW FU 6(d) or 6(e) channels one less than the Minimum Channels OPERABLE requirement, the licensee must "comply with Specification 3.0.3" (i.e., take the actions described in LCO 3.0.3 without entering LCO 3.0.3). The actions described in LCO 3.0.3 are to initiate action within 1 hour to place the unit, as applicable, in at least HOT STANDBY (i.e., MODE 3) within the next 6 hours, at least HOT SHUTDOWN (i.e., MODE 4) within the following 6 hours, and at least COLD SHUTDOWN (i.e., MODE 5) within the subsequent 24 hours.

The TS Bases⁴ for TS 3/4.3.2 indicate that the ESFAS senses selected plant parameters and determines whether predetermined limits are being exceeded. If they are, the signals are combined into logic matrices sensitive to combinations indicative of various accidents events, and transients. Once the required logic combination is completed, the system sends actuation signals to those engineered safety features components whose aggregate function best serves the requirements of the condition. For example, starting the AFW pumps and automatically positioning valves are actions that may be initiated by the ESFAS to mitigate the consequences of a steam line break or loss-of-coolant accident. The operability of the ESFAS instrumentation ensures that: (1) the associated ACTION and/or reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches its trip setpoint, (2) the specified coincidence logic is maintained, (3) sufficient redundancy is maintained to permit a channel to be out-of-service for testing or maintenance, and (4) sufficient system functional capability is available from diverse parameters. The OPERABILITY of these systems is required to provide the overall reliability, redundancy, and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions.

2.2 Regulatory Review

The NRC staff reviewed the licensee's application to determine whether (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) activities proposed will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or the health and safety of the public. The NRC staff considered the following regulatory requirements, guidance, and licensing and design-basis information during its review of the proposed changes.

⁴ ADAMS Accession No. ML16320A166.

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Paragraph 50.36(a)(1) states that each applicant for an operating license shall include in the application proposed TSs in accordance with the requirements of 10 CFR 50.36. Paragraph 50.36(b) of 10 CFR states, in part, that the TSs will be derived from the analyses and evaluations included in the safety analysis report. Paragraph 50.36(c) of 10 CFR requires that the TSs include items in the following categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls. Paragraph 50.36(c)(2) states, in part, that when an LCO is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met.

The NRC staff reviewed the accident analysis provided in Chapter 14 of the licensee's Updated Final Safety Analysis Report (UFSAR) to determine how the starting auxiliary feedwater is accounted for in the analysis assumptions.

2.3 Licensee's Proposed Changes

The licensee proposes to revise instrumentation TSs for AFW system actuation on bus stripping and on the trip of all MFW pump breakers. The licensee proposed to modify completion times in TS 3/4.3.2, "Engineered Safety Features Actuation System Instrumentation," for required actions to take when the number of OPERABLE AFW FU 6(d) and 6(e) instrument channels listed in Table 3.3-2, "Engineered Safety Features Actuation System Instrumentation," are one less than the minimum channels OPERABLE requirement in the Table.

The licensee proposed to revise ACTION 23 in Table 3.3-2 as follows, with deletions shown in stricken text and additions underlined:

With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, ~~comply with Specification 3.0.3;~~

(a) Restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

(b) Restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours.

In addition, the licensee proposed to revise the ACTION for FUNCTIONAL UNITS 6d and 6e in Table 3.3-2 from 23 (in both cases) to 23(a) and 23(b), respectively.

3.0 TECHNICAL EVALUATION

The staff evaluated the licensee's application to determine if the proposed changes are consistent with the guidance, regulations, and plant-specific design and licensing basis information discussed in Section 2.3 of this safety evaluation. The staff reviewed the proposed changes for compliance with 10 CFR 50.36.

3.1 Changes to TS ACTION for Inoperable AFW FU 6(d) Channel

In its application dated December 21, 2016, the licensee proposed to modify the completion times in ACTION 23 of Table 3.3-2 for restoring AFW FU 6(d) to OPERABLE status. ACTION 23 in Table 3.3-2 requires that with the number of OPERABLE AFW FU 6(d) channels one less than the Minimum Channels OPERABLE requirement (i.e., 1/bus) in MODES 1, 2, or 3 (i.e., POWER OPERATION, STARTUP, OR HOT STANDBY), the licensee must comply with LCO 3.0.3. LCO 3.0.3 requires the licensee to restore operability or initiate action within 1 hour to place the unit, as applicable, in at least MODE 3 within the next 6 hours, in at least MODE 4 within the following 6 hours, and in at least MODE 5 within the subsequent 24 hours. The licensee proposed to change ACTION 23 to require restoring operability of AFW FU 6(d) within 48 hours (versus 1 hour), or be in at least MODE 3 within the next 6 hours and in MODE 5 within the following 30 hours. This change would also remove the requirement to be in MODE 4 within 6 hours following MODE 3.

In its RAI e-mail dated April 19, 2017, the NRC staff noted that the proposed changes did not include a requirement to be in at least MODE 4 within 6 hours after the MODE 3 entry, as required by the existing ACTION 23 via LCO 3.0.3. The NRC staff requested the licensee to provide a justification for the removal of the requirement to be in at least MODE 4 within the following 6 hours of entering MODE 3 when operability is not restored within the proposed completion time. Further, the NRC staff noted that if either Turkey Point 3 or 4 were already in MODE 3 when the required actions are not met, the proposed changes would permit continuation of MODE 3 conditions for several hours and would only effectively require a time limit for entry into MODE 5. The NRC staff's interpretation of the TS Bases for LCO 3.0.3 is that if the inoperability is discovered while in MODE 3, then the time limits for reaching MODE 4 would apply. However, the licensee's proposed shut down times for ACTION 23 did not include the MODE 4 timing requirements equivalent to those in LCO 3.0.3. Therefore, the NRC staff requested the licensee to provide a justification for the proposed longer time the plant can remain in MODE 3, or to propose an alternative and associated justification, such as timing and mode entry requirements equivalent to LCO 3.0.3.

In its response letter dated May 18, 2017, the licensee stated that, upon further evaluation, entry into MODE 5 is not necessary in the event of an inoperable FU 6(d) instrument channel in excess of the proposed 48-hour completion time, because the TS no longer applies once the plant is outside the TS Mode of Applicability (i.e., MODES 1, 2, or 3 for AFW FU 6(d)). Therefore, the licensee revised its request to create a new ACTION 23(a) that would require restoring operability of AFW FU 6(d) within 48 hours or be in MODE 3 within 6 hours and MODE 4 within the following 6 hours.

In its application dated December 21, 2016, the licensee stated that the emergency power distribution system response to an undervoltage signal is controlled by load sequencers that initiate bus stripping action on the affected 4.16-kV and associated 480-V load centers. The licensee stated that the following ESFAS functions provide protection against a loss of non-emergency power: (1) reactor trip on low-low water level in any SG and (2) three turbine-driven AFW pumps started on any of the following: low-low level in a SG, any safety injection signal, loss of offsite power (automatic transfer to the diesel generators), loss of the A or B 4.16-kV bus on either unit, or manual actuation.

In its application dated December 21, 2016, the licensee stated that per the accident analyses, the sequence of events following a loss of non-emergency power credit AFW flow 95 seconds after a reactor trip triggered by low-low SG level. In the case of an ATWS, AFW flow is credited after AMSAC initiation triggered by low SG water level. As such, the loss of normal power transient does not rely on AFW auto-start on Bus Stripping as the primary success path for postulated accident mitigation. Auto-start of the AFW system on Bus Stripping would provide diverse initiation of AFW and earlier addition of water to the SGs, but it lacks the redundancy and reliability of the auto start of the AFW system on low-low level in one SG. The licensee stated that the FU 6(d) function is an anticipatory ESFAS function neither credited in accident analyses nor relied on for safe shutdown or accident mitigation.

In its application dated December 21, 2016, the licensee stated that Turkey Point has just one FU 6(d) channel for each applicable safety-related bus and, as such, loss of an FU 6(d) channel on either bus requires the commencement of a shutdown on the applicable unit within 1 hour. The licensee stated that because the primary success path for safe shutdown and accident mitigation is provided by the SG low-low level signal, loss of the anticipatory ESFAS/AFW actuation function (i.e., FU 6(d)) does not place the plant in an unanalyzed condition and, therefore, an immediate unit shutdown should not be required. The licensee stated that a unit shutdown for an inoperable ESFAS function that is neither relied upon for accident mitigation nor credited in accident analyses places an unreasonable burden on plant personnel and equipment. The license stated that the proposed changes would not alter the manner in which the instrumentation and controls are operated; rather they would continue to be maintained in accordance with the surveillance frequency control and maintenance program procedures such that the existing defense in depth and diversity described in the UFSAR would remain unchanged.

The NRC staff reviewed the description of the AFW system in UFSAR Chapter 9 and the accident analyses in UFSAR Chapter 14. The NRC staff determined that both UFSAR chapters identify diverse signals to start the AFW system, including the loss of normal power AFW auto-start provided by FU 6(d), and verified that AFW was not credited to start on FU 6(d), bus stripping. The NRC staff finds that the UFSAR shows the FU 6(d) function is an anticipatory ESFAS function that is neither credited in accident analyses nor relied on for safe shutdown or accident mitigation. As part of its review, the NRC staff also verified that the UFSAR Chapter 14 analysis of the plant transient following a loss of all AC power conservatively assumed that the loss of power occurred coincident with a reactor trip on low-low SG level following a loss of normal feedwater, thereby minimizing available SG feedwater inventory, and assumed a limiting single failure that permitted only one AFW pump to run, which minimized AFW flow. Although the FU 6(d) trip would provide an anticipatory start of the AFW system, the redundancy of components with only one channel per bus and the scope of the monitoring is not adequate to rely on this FU as the principal means for safe shutdown and accident mitigation. However, the SG low-low level FU consists of three channels per SG, with two of the three channels from any one SG required to initiate AFW, thereby providing a reliable signal to initiate AFW, and initiation on low SG water level addresses a broad scope of initiating events where AFW flow would be important for mitigation. Therefore, the proposed 48-hour completion time to restore an inoperable channel of FU 6(d) to OPERABLE status is commensurate with its importance to

safety and is consistent with previous NRC-approved amendments⁵ for these anticipatory ESFAS functions.

The NRC staff finds the requirement to be “in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours” acceptable as these times are consistent with the current ACTION 23, which requires compliance with LCO 3.0.3. Further, the NRC staff finds these times reasonable, based on operating experience to reach HOT SHUTDOWN from full power conditions in an orderly manner without challenging Unit systems. In addition, the NRC staff finds that eliminating the requirement to go to COLD SHUTDOWN (MODE 5) within 24 hours following entry into HOT SHUTDOWN (MODE 4), as is required by LCO 3.0.3, is acceptable because FU 6(d) is only required to be OPERABLE in MODES 1, 2, and 3, and, therefore, once in MODE 4, further remedial actions are not necessary.

The regulation, 10 CFR 50.36(c)(2)(i), requires that when an LCO is not met, “licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.” For the reasons discussed above, the NRC staff finds the proposed addition of ACTION 23(a) for AFW FU 6(d) in TS Table 3.3-2 to be acceptable remedial actions for when the LCO is not met; therefore, the NRC staff finds that the licensee’s proposed change satisfy the requirements of 10 CFR 50.36.

3.2 Changes to TS ACTION for Inoperable AFW FU 6(e) Channel

In its application dated December 21, 2016, the licensee proposed to modify the completion times in ACTION 23 of Table 3.3-2 for restoring AFW FU 6(e) to OPERABLE status. ACTION 23 in Table 3.3-2 requires that with the number of OPERABLE AFW FU 6(e) channels one less than the Minimum Channels OPERABLE requirement (i.e., 1/breaker/operating pump) in MODES 1 or 2, the licensee must restore operability or initiate action within 1 hour to place the unit, as applicable, in at least MODE 3 within the next 6 hours, at least MODE 4 within the following 6 hours, and at least MODE 5 within the subsequent 24 hours. The licensee proposed to change ACTION 23 to require restoring operability of AFW FU 6(e) within 48 hours (versus 1 hour), or be in at least MODE 3 within the next 6 hours and in MODE 5 within the following 30 hours. This change would also remove the requirement to be in MODE 4 within 6 hours following MODE 3.

By e-mail dated April 19, 2017, the NRC staff noted that the proposed changes did not include a requirement to be in at least MODE 4 within 6 hours after the MODE 3 entry, as required by the existing ACTION 23 via LCO 3.0.3. The NRC staff asked the licensee to provide a justification for the removal of the requirement to be in at least MODE 4 within the following 6 hours of entering MODE 3 when operability is not restored within the proposed completion time.

In its response letter dated May 18, 2017, the licensee stated that, upon further evaluation, entry into MODE 5 is not necessary in the event of an inoperable FU 6(e) instrument channel in excess of the proposed 48-hour completion time, because the TS no longer applies once the plant is outside the TS Mode of Applicability (i.e., MODES 1 or 2 for AFW FU 6(e)). Similarly, entry into MODE 4 would not be required for an inoperable FU 6(e) instrument channel.

⁵ E.g., Donald C. Cook Nuclear Plant Unit 1 (ADAMS Accession No. ML15187A002) and Watts Bar Nuclear Plant, Unit 1 (ADAMS Accession No. ML090480566).

Therefore, the licensee revised its request to create a new ACTION 23(b) that would require restoring operability of AFW FU 6(e) within 48 hours or be in MODE 3 within 6 hours.

In its application dated December 21, 2016, the licensee stated that a trip of all MFW pumps is an indication of the need for some method of decay heat and sensible heat removal to bring the reactor back to no-load temperature and pressure. The licensee stated that the following ESFAS functions provide protection against a loss of MFW: (1) reactor trip on low-low water level in any SG and (2) three turbine-driven AFW pumps started on any of the following: low-low level in a SG, any safety injection signal, loss of offsite power (automatic transfer to the diesel generators), loss of the A or B 4.16-kV bus on either unit, or manual actuation.

In its application dated December 21, 2016, the licensee stated that per the accident analyses in UFSAR Chapter 14, the sequence of events following a loss of MFW conservatively credit AFW flow initiation 95 seconds after a reactor trip triggered by low-low SG water level. In the case of an ATWS, AFW flow is credited 95 seconds after AMSAC initiation triggered by low SG water level. As such, the loss of normal feedwater transient does not rely on AFW auto-start on a loss of normal feedwater as the primary success path for postulated accident mitigation. Auto-start of the AFW system on a loss of normal feedwater would provide diverse initiation of AFW and earlier addition of water to the SGs, but lacks the redundancy and reliability of the auto-start of the AFW system on low-low level in one SG. The licensee stated that the FU 6(e) function is an anticipatory ESFAS function neither credited in accident analyses nor relied on for safe shutdown or accident mitigation.

In its application dated December 21, 2016, the licensee stated that Turkey Point has one FU 6(e) channel for each MFW pump and, as such, loss of an FU 6(e) channel on either MFW pump requires the commencement of a shutdown on the applicable unit within 1 hour. The licensee stated that because the primary success path for safe shutdown and accident mitigation is provided by the SG low-low level signal, loss of the anticipatory ESFAS/AFW actuation function (i.e., FU 6(e)) does not place the plant in an unanalyzed condition and, therefore, an immediate unit shutdown should not be required. The licensee stated that a unit shutdown for an inoperable ESFAS function that is neither relied upon for accident mitigation nor credited in accident analyses places an unreasonable burden on plant personnel and equipment. The licensee stated that the proposed changes would not alter the manner in which the instrumentation and controls are operated; rather they would continue to be maintained in accordance with the surveillance frequency control and maintenance program procedures such that the existing defense in depth and diversity described in the UFSAR would remain unchanged.

In Section 4.2 of the Enclosure to the application dated December 21, 2016, the licensee identified precedent license amendments that established a 48-hour completion time for one inoperable normal feedwater pump trip channel. These amendments are documented in the following references:

- Donald C. Cook Nuclear Plant Unit 1 – Issuance of Exigent Amendment Regarding Revision to Technical Specifications for Engineered Safety Feature Actuation System Instrumentation (TAC No. MF6390), dated July 10, 2015. (ADAMS Accession No. ML15187A002)

- Watts Bar Nuclear Plant, Unit 1 – Issuance of Amendment Regarding Auxiliary Feedwater Start Upon Trip of Main Feedwater Pumps (TAC No. MD9713), dated March 5, 2009. (ADAMS Accession No. ML090480566)

The NRC staff reviewed the description of the AFW system in UFSAR Chapter 9 and the accident analyses in UFSAR Chapter 14. The NRC staff determined that both UFSAR chapters identify diverse signals to start the AFW system, including the loss of normal feedwater AFW auto-start provided by FU 6(e), and the staff verified that AFW was not credited to start on FU 6(e), Trip of all Main Feedwater Pumps Breakers. The NRC staff finds that the licensee is correct that the FU 6(e) function is an anticipatory ESFAS function that is neither credited in accident analyses nor relied on for safe shutdown or accident mitigation. As part of its review, the NRC staff also verified that the analysis of the plant transient following a loss of normal feedwater conservatively assumed that the auto-start of the AFW system was generated by the resulting low-low SG level, thereby minimizing available SG feedwater inventory, and assumed a limiting single failure that permitted only one AFW pump to run, which minimized AFW flow. Although the FU 6(e) trip would provide an anticipatory start of the AFW system, the redundancy of components with only one channel per feedwater pump breaker and the scope of the monitoring are not adequate to rely on this FU as the principal means for safe shutdown and accident mitigation. However, the SG low-low level FU consists of three channels per SG, with two of the three channels from any one SG required to initiate AFW, thereby providing a reliable signal to initiate AFW, and initiation on low SG water level addresses a broad scope of initiating events where AFW flow would be important for mitigation. Furthermore, the NRC staff verified that the proposed completion time is consistent with that established through the previous NRC-approved amendments involving one inoperable normal feedwater pump trip channel discussed above. Therefore, the proposed 48-hour completion time to restore an inoperable channel of FU 6(e) to OPERABLE status is commensurate with its importance to safety and is consistent with previous NRC-approved amendments regarding these anticipatory ESFAS functions.

The NRC staff finds the requirement to be “in at least HOT STANDBY within the next 6 hours” acceptable as this time is consistent with the original ACTION when complying with LCO 3.0.3. Further, the NRC staff finds these times reasonable, based on operating experience to reach HOT STANDBY from full power conditions in an orderly manner without challenging Unit systems. In addition, the NRC staff finds that eliminating the requirement to go to HOT SHUTDOWN (MODE 4) within the following 6 hours and COLD SHUTDOWN (MODE 5) within 24 hours is acceptable because FU 6(e) is only required to be OPERABLE in MODES 1 and 2, and, therefore, once in MODE 3, further remedial actions are not necessary.

The regulation, 10 CFR 50.36(c)(2)(i), requires that when an LCO is not met, “licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.” For the reasons discussed above, the NRC staff finds the proposed addition of ACTION 23(b) for AFW FU 6(e) in TS Table 3.3-2 to be acceptable remedial actions for when the LCO is not met; therefore, the NRC staff finds that the licensee’s proposed change satisfy the requirements of 10 CFR 50.36.

4.0 STATE CONSULTATION

In accordance with the Commission’s regulations, the NRC staff notified the State of Florida official (Ms. Cynthia Becker, M.P.H., Chief of the Bureau of Radiation Control, Florida

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the NRC staff notified the State of Florida official (Ms. Cynthia Becker, M.P.H., Chief of the Bureau of Radiation Control, Florida Department of Health) on August 29, 2017,⁶ of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to the use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding, which was published in the FR on March 14, 2017 (82 FR 13666), that the amendments involve NSHC, and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the aforementioned considerations, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: Robert Beaton
Steve Jones

Date: September 28, 2017

⁶ The NRC staff notified the State official by telephone and by e-mail (ADAMS Accession No. ML17241A233).

TURKEY POINT NUCLEAR GENERATING UNIT NOS. 3 AND 4 - ISSUANCE OF AMENDMENTS REGARDING TECHNICAL SPECIFICATIONS FOR AUXILIARY FEEDWATER ACTUATION (CAC NOS. MF9069 AND MF9070) DATED: SEPTEMBER 29, 2017

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ADAMS Accession No.: ML17209A319

*by memorandum

**by e-mail

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