



FEB 14 2018

L-2018-040
10 CFR 50.90

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington D C 20555-0001

RE: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Renewed Facility Operating Licenses DPR-67 and NPF-16

Response to Request for Additional Information Regarding License Amendment Request to
Add New Required Actions for an Inoperable Auxiliary Feedwater Pump Steam Supply

References:

1. Florida Power & Light Company letter L-2017-139, License Amendment Request to Add New Required Actions for an Inoperable Auxiliary Feedwater Pump Steam Supply, September 14, 2017 (ADAMS Accession No. ML17257A300)
2. NRR E-Mail Capture, Request for Additional Information - St. Lucie Inop AFW Steam Supply LAR (L-2017-LLA-0296) January 18, 2018 (ADAMS Accession No. ML18019A071)

In Reference 1, Florida Power & Light Company (FPL) submitted license amendment requests to modify the St. Lucie Unit 1 and St. Lucie Unit 2 Technical Specifications (TS) by establishing new TS required ACTION(s) for an inoperable Auxiliary Feedwater (AFW) pump steam supply and for an inoperable AFW pump steam supply concurrent with an inoperable motor-driven AFW pump. The proposed license amendments additionally renumber existing TS required ACTION(s) for the AFW system to accommodate the new TS required ACTION(s).

In Reference 2, the NRC determined that additional information is required to complete its review.

The enclosure to this letter provides FPL's response to the request for additional information (RAI). In addition, as discussed in the enclosure, FPL is proposing additional changes to the St. Lucie Unit 1 and St. Lucie Unit 2 TS pages that were included in Reference 1.

Attachment 1 to this enclosure provides the existing St. Lucie Unit 1 and St. Lucie Unit 2 TS pages marked up to show the proposed changes. Attachment 2 provides the St. Lucie Unit 1 and St. Lucie Unit 2 TS pages retyped (clean copy) with revision bars to identify the proposed changes. Attachment 3 provides the existing St. Lucie Unit 1 and St. Lucie Unit 2 TS Bases pages marked up to show the proposed changes. The pages in Attachments 1, 2 and 3 supersede the corresponding pages provided in Reference 1. The TS Bases changes are provided for information only and will be incorporated in accordance with the TS Bases Control Program upon implementation of the approved amendments.

The supplements included in this response provide additional information that clarifies the application, do not expand the scope of the application as originally noticed, and should not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register*.

This letter contains no new or revised regulatory commitments.

Should you have any questions regarding this submittal, please contact Mr. Michael Snyder, St. Lucie Licensing Manager, at (772) 467-7036.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on **FEB 14 2018**

Sincerely,

A handwritten signature in black ink, appearing to read "Daniel DeBoer", with a stylized flourish at the end.

Daniel DeBoer
Site Director
St. Lucie Plant

Enclosure: FPL Response to Request for Additional Information

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, St. Lucie Nuclear Plant, Units 1 and 2
USNRC Senior Resident Inspector, St. Lucie Nuclear Plant, Units 1 and 2
Ms. Cindy Becker, Florida Department of Health

Enclosure

FPL response to NRC Request for Additional Information (RAI) dated January 18, 2018
Regarding License Amendment Request to Add New Required Actions for an
Inoperable Auxiliary Feedwater Pump Steam Supply

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Attachment 1 - Proposed Unit 1 and Unit 2 Technical Specifications Pages (markup)

Attachment 2 - Proposed Unit 1 and Unit 2 Technical Specifications Pages (clean copy)

Attachment 3 - Proposed Unit 1 and Unit 2 Technical Specifications Bases Pages (markup)

Enclosure

In an email memorandum dated January 18, 2018, the Balance of Plant Branch (SBSB) of the NRC Office of Nuclear Reactor Regulation requested in RAI-LLA0296-SBPB-01, additional information regarding FPL's License Amendment Request (LAR) dated September 14, 2017 for St. Lucie Unit 1 and St. Lucie Unit 2. FPL's response follows:

RAI-LLA0296-SBPB-01

The licensee proposed a new TS ACTION for an inoperable AFW pump steam supply concurrent with an inoperable motor-driven AFW pump. The proposed change would establish a 48-hour Completion Time to restore either the inoperable steam supply or the inoperable motor-driven AFW pump to OPERABLE status. The licensee supported this change with the following statement from Section 3.2 of the Enclosure to the LAR:

A 48-hour completion time for an inoperable AFW pump steam supply concurrent with an inoperable motor-driven AFW pump is reasonable based on the remaining motor-driven AFW pump's capability to provide the requisite AFW flow credited in the respective Feedwater Line Break (FLB) and Main Steam Line Break (MSLB) safety analyses for St. Lucie Unit 1 and St. Lucie Unit [2] without assuming a concurrent single active failure. Hence, the proposed 48-hour completion time to restore either the inoperable steam supply or the inoperable motor-driven pump to OPERABLE status satisfies the condition specified in Technical Specification Task Force (TSTF) Traveler, TSTF-412, Revision 3, [“]Provide Actions for One Steam Supply to Turbine Driven AFW /EFW Pump Inoperable (Reference 6.2), [”] for plants with motor-driven AFW trains fully capable of mitigating postulated accidents in accordance with applicable accident analyses.

However, the staff found the ability of the motor-driven pump to provide the required AFW flow to mitigate the FLB or MSLB was not adequately supported, which is necessary to permit a 48-hour rather than a 24-hour completion time, consistent with the discussion in TSTF-412, Rev. 3.

Each St. Lucie Unit has two steam generators (SGs). The turbine-driven AFW pumps automatically supply feedwater to both SGs, but each motor-driven AFW pump automatically supplies feedwater only to its associated SG (e.g., “A” motor-driven AFW pump to “A” SG). The licensee described that normally-isolated cross-connection piping is available to enable either motor-driven pump to discharge flow to either SG, but the staff identified no statement in either the LAR or either units' updated final safety analysis report indicating this cross-connection could satisfy the flow rate and timing requirements of the AFW system for any limiting accident.

Without adequate cross-connect flow and with one turbine-driven pump steam supply and one motor-driven pump inoperable, the remaining operable equipment may not be able to provide adequate AFW flow to mitigate a FLB accident. For example, assuming the following conditions: “B” steam supply to the turbine-driven AFW pump inoperable, “B” motor-driven AFW pump inoperable, and “A” SG experiences a FLB accident; the remaining AFW equipment would not be able to provide AFW flow to the intact “B” SG because the operable “A” steam supply is connected to the faulted SG and the operable “A” motor-driven pump would deliver its flow to the faulted SG

until isolated. Without adequate mitigation, assuming no additional single failure, the discussion in TSTF-412, Rev. 3, would call for a 24-hour completion time. Accordingly, either provide analysis indicating that the motor-driven pumps may be cross-connected to deliver adequate AFW flow at an acceptable time to the alternate SG for FLB accident mitigation or reduce the requested completion time for the new proposed action for one inoperable steam-supply to the turbine-driven AFW pump and, concurrently, one inoperable motor-driven AFW pump to 24 hours from the requested 48 hours.

FPL Response

FPL acknowledges that the full-flow capacity of the St. Lucie motor-driven AFW pumps does not necessarily assure the timely availability of an AFW train capable of providing 100% of the flow credited in the FLB and MSLB analyses by means of the cross-connection piping. More specifically, the St. Lucie accident analyses do not explicitly credit AFW flow to the non-faulted S/G via the cross-connection flowpath. As such, FPL cannot demonstrate without further analysis that, in the unlikely event of an inoperable AFW pump steam supply concurrent with an inoperable motor-driven AFW pump, the remaining motor-driven AFW train can be both timely aligned and provide the requisite AFW flow credited in the FLB and MSLB safety analyses by means of the cross-connection piping.

As such, FPL hereby revises the proposed license amendments in Reference 1 to request a 24-hour Completion Time, in lieu of a 48-hour Completion Time, for an inoperable AFW pump steam supply concurrent with an inoperable motor-driven AFW pump. The proposed changes would allot 24 hours to restore either the inoperable steam supply or the inoperable motor-driven pump to OPERABLE status or the affected Unit must be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours. The revised amendment requests align with TSTF-412, Revision 3 (Reference 2), which calls for a 24-hour Completion Time for plants that cannot demonstrate sufficient flow to the SGs should a MSLB or FLB occur that renders the remaining steam supply to the turbine driven AFW pump inoperable.

Attachment 1 to this enclosure provides the existing St. Lucie Unit 1 and St. Lucie Unit 2 TS pages marked up to show the proposed changes. Attachment 2 provides the St. Lucie Unit 1 and St. Lucie Unit 2 TS pages retyped (clean copy) with revision bars to identify the proposed changes. Attachment 3 provides the existing St. Lucie Unit 1 and St. Lucie Unit 2 TS Bases pages marked up to show the proposed changes. The pages in Attachments 1, 2 and 3 supersede the corresponding pages provided in Reference 1. The TS Bases changes are provided for information only and will be incorporated in accordance with the TS Bases Control Program upon implementation of the approved amendments.

References:

1. Florida Power & Light Company letter L-2017-139, License Amendment Request to Add New Required Actions for an Inoperable Auxiliary Feedwater Pump Steam Supply, September 14, 2017 (ADAMS Accession No. ML17257A300)

2. Technical Specification Task Force (TSTF) Traveler, TSTF-412, Revision 3, Provide Actions for One Steam Supply to Turbine Driven AFW/EFW Pump Inoperable (ADAMS Accession No. ML070100363)

Attachment 1

**ST. LUCIE UNIT 1 and ST. LUCIE UNIT 2
PROPOSED TECHNICAL SPECIFICATIONS PAGES (MARKUP)**

(2 pages follow)

Attachment 1

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least three independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:

- a. Two motor driven feedwater pumps, and
- b. One feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

☒ b. With one auxiliary feedwater pump inoperable, restore the auxiliary feedwater pump to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

☒ d. With two auxiliary feedwater pumps inoperable, be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

NOTE

LCO 3.0.3 and all other LCO Actions requiring MODE changes are suspended until one AFW pump is restored to OPERABLE status.

☒ e. With three auxiliary feedwater pumps inoperable, immediately initiate corrective action to restore at least one auxiliary feedwater pump to OPERABLE status.

☒ f. LCO 3.0.4.b is not applicable.

SURVEILLANCE REQUIREMENTS

4.7.1.2 Each auxiliary feedwater pump shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by:

☒ c. With one auxiliary feedwater pump steam supply inoperable and one motor-driven auxiliary feedwater pump inoperable, either restore the inoperable auxiliary feedwater pump steam supply OR restore the inoperable motor-driven auxiliary feedwater pump to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

☒ a. With one auxiliary feedwater pump steam supply inoperable, restore the inoperable auxiliary feedwater pump steam supply to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

Attachment 1

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

- 3.7.1.2 At least three independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:
- Two feedwater pumps, each capable of being powered from separate OPERABLE emergency busses, and
 - One feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

b. a. With one auxiliary feedwater pump inoperable, restore the auxiliary feedwater pump to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

d. b. With two auxiliary feedwater pumps inoperable, be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

NOTE
LCO 3.0.3 and all other LCO Actions requiring MODE changes are suspended until one AFW pump is restored to OPERABLE status.

e. c. With three auxiliary feedwater pumps inoperable, immediately initiate corrective action to restore at least one auxiliary feedwater pump to OPERABLE status.

f. d. LCO 3.0.4.b is not applicable.

SURVEILLANCE REQUIREMENTS

- 4.7.1.2 Each auxiliary feedwater pump shall be demonstrated OPERABLE:
- In accordance with the Surveillance Frequency Control Program by:
 - Verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. With one auxiliary feedwater pump steam supply inoperable and one motor-driven auxiliary feedwater pump inoperable, either restore the inoperable auxiliary feedwater pump steam supply OR restore the inoperable motor-driven auxiliary feedwater pump to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

a. With one auxiliary feedwater pump steam supply inoperable, restore the inoperable auxiliary feedwater pump steam supply to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

Attachment 2

**ST. LUCIE UNIT 1 and ST. LUCIE UNIT 2
PROPOSED TECHNICAL SPECIFICATIONS PAGES (Clean Copy)**

(2 pages follow)

Attachment 2

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least three independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:

- a. Two motor driven feedwater pumps, and
- b. One feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

- a. With one auxiliary feedwater pump steam supply inoperable, restore the inoperable auxiliary feedwater pump steam supply to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- b. With one auxiliary feedwater pump inoperable, restore the auxiliary feedwater pump to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- c. With one auxiliary feedwater pump steam supply inoperable and one motor driven auxiliary feedwater pump inoperable, either restore the inoperable auxiliary feedwater pump steam supply OR restore the inoperable motor driven auxiliary feedwater pump to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- d. With two auxiliary feedwater pumps inoperable, be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

NOTE

LCO 3.0.3 and all other LCO Actions requiring MODE changes are suspended until one AFW pump is restored to OPERABLE status.

- e. With three auxiliary feedwater pumps inoperable, immediately initiate corrective action to restore at least one auxiliary feedwater pump to OPERABLE status.
- f. LCO 3.0.4.b is not applicable.

SURVEILLANCE REQUIREMENTS

4.7.1.2 Each auxiliary feedwater pump shall be demonstrated OPERABLE:

- a. In accordance with the Surveillance Frequency Control Program by:

Attachment 2

PLANT SYSTEMS

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

- 3.7.1.2 At least three independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:
- Two feedwater pumps, each capable of being powered from separate OPERABLE emergency busses, and
 - One feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

- With one auxiliary feedwater pump steam supply inoperable, restore the inoperable auxiliary feedwater pump steam supply to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- With one auxiliary feedwater pump inoperable, restore the auxiliary feedwater pump to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- With one auxiliary feedwater pump steam supply inoperable and one motor driven auxiliary feedwater pump inoperable, either restore the inoperable auxiliary feedwater pump steam supply OR restore the inoperable motor driven auxiliary feedwater pump to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- With two auxiliary feedwater pumps inoperable, be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

NOTE

LCO 3.0.3 and all other LCO Actions requiring MODE changes are suspended until one AFW pump is restored to OPERABLE status.

- With three auxiliary feedwater pumps inoperable, immediately initiate corrective action to restore at least one auxiliary feedwater pump to OPERABLE status.
- LCO 3.0.4.b is not applicable.

SURVEILLANCE REQUIREMENTS

- 4.7.1.2 Each auxiliary feedwater pump shall be demonstrated OPERABLE:
- In accordance with the Surveillance Frequency Control Program by:
 - Verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

Attachment 3

**ST. LUCIE UNIT 1 and ST. LUCIE UNIT 2
PROPOSED TECHNICAL SPECIFICATIONS BASES PAGES (Markup)**

(3 pages follow)

Attachment 3

SECTION NO.: 3/4.7	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 9 OF ADM-25.04 PLANT SYSTEMS ST. LUCIE UNIT 1	PAGE: 4 of 16
REVISION NO.: 8		

3/4.7 PLANT SYSTEMS (continued)

BASES (continued)

3/4.7.1 TURBINE CYCLE (continued)

106.5 = Power Level-High Trip Setpoint for two loop operation

X= Total relieving capacity of all safety valves per steam line in lbs/hour (6.192×10^6 lbs/hr.)

Y= Maximum relieving capacity of any one safety valve in lbs/hour (7.74×10^5 lbs/hr.)

Surveillance Requirement 4.7.1.1 verifies the OPERABILITY of the MSSVs by the verification of each MSSV lift setpoint in accordance with the INSERVICE TESTING PROGRAM. The MSSV setpoints are 1000 psia +/-3% (4 valves each header) and 1040 psia +/-3% (4 valves each header) for OPERABILITY; however, the valves are reset to 1000 psia +/-1% and 1040 psia +/- 1%, respectively, during the Surveillance to allow for drift. The LCO is expressed in units of psig for consistency with implementing procedures.

3/4.7.1.2 AUXILIARY FEEDWATER PUMPS

The OPERABILITY of the auxiliary feedwater pumps ensures that the Reactor Coolant System can be cooled down to less than 325°F from normal operating conditions in the event of a total loss of off-site power.

Any two of the three auxiliary feedwater pumps have the required capacity to provide sufficient feedwater flow to remove reactor decay heat and reduce the RCS temperature to 325°F where the shutdown cooling system may be placed into operation for continued cooldown.

INSERT A → Action ~~4~~ prohibits the application of LCO 3.0.4.b to an inoperable AFW train. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an AFW train inoperable and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

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Attachment 3

SECTION NO.: 3/4.7	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 9 OF ADM-25.04 PLANT SYSTEMS ST. LUCIE UNIT 2	PAGE: 5 of 22
REVISION NO.: 12		

3/4.7 PLANT SYSTEMS (continued)

BASES (continued)

3/4.7.1 TURBINE CYCLE (continued)

3/4.7.1.2 AUXILIARY FEEDWATER SYSTEM (continued)

The steam turbine-driven AFW pump receives steam from either main steam header upstream of the main steam isolation valve. Each of the steam feed lines will supply 100% of the requirements of the turbine driven AFW pump. The turbine driven AFW pump supplies a common header capable of feeding both steam generators, with DC powered control valves actuated to the appropriate steam generator by the Auxiliary Feedwater Actuation System (AFAS).

The AFW System supplies feedwater to the steam generators during normal unit startup, shutdown, and hot standby conditions.

The AFW System mitigates the consequences of any event with a loss of normal feedwater. The limiting Design Basis Accidents and transients for the AFW System are as follows:

1. Feedwater Line Break, and
2. Loss of normal feedwater.

INSERT A → Action ~~X~~ prohibits the application of LCO 3.0.4.b to an inoperable AFW train. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an AFW train inoperable and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

f →

Attachment 3

INSERT A

In MODES 1, 2, and 3, the AFW System is required to be OPERABLE and to function in the event that the MFW is lost. In addition, the AFW System is required to supply enough makeup water to replace the steam generator secondary inventory lost as the Unit cools to MODE 4 conditions. The following ACTION(s) apply during MODES 1, 2, and 3.

ACTION a establishes a 7-day Completion Time to restore an inoperable turbine driven AFW pump due to an inoperable AFW pump steam supply. The 7-day Completion Time is reasonable since in addition to the two OPERABLE motor-driven AFW pumps, the redundant OPERABLE steam supply line is available for the turbine driven AFW pump to perform its specified function, assuming no single active failure, and the low probability of an event requiring the use of the turbine driven AFW pump.

ACTION b establishes a 72-hour Completion Time to restore an inoperable AFW pump. This condition includes the loss of both steam supplies to the turbine driven AFW pump. The 72 hour Completion Time is reasonable based on the redundant capabilities afforded by the AFW System, the time needed for repairs, and the low probability of a DBA event occurring during this period. Two AFW pumps and flow paths remain to supply feedwater to the SGs.

ACTION c establishes a 24-hour Completion Time to restore either an inoperable motor-driven AFW pump or an inoperable turbine driven AFW pump steam supply in the event of an inoperable motor-driven AFW pump concurrent with an inoperable AFW pump steam supply. The 24 hour Completion Time is reasonable based on the remaining OPERABLE steam supply to the turbine driven AFW pump, the availability of the remaining OPERABLE motor driven AFW pump, and the low probability of an event occurring that would require the inoperable steam supply to be available for the turbine driven AFW pump.

ACTION d requires the Unit to be placed in HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours in the event of two inoperable AFW pumps. The allowed Completion Times are reasonable, based on operating experience, to reach the required MODE from full power conditions in an orderly manner and without challenging Unit systems.

ACTION e requires the immediate restoration of an AFW pump to OPERABLE status in the event of three inoperable AFW pumps. A note to ACTION e suspends LCO 3.0.3 and all other LCO actions requiring MODE changes until one AFW pump is restored to OPERABLE status. With all three AFW pumps inoperable in MODE 1, 2, or 3, the Unit is in a seriously degraded condition with no safety-related means for conducting a cooldown, and only limited means for conducting a cooldown with non-safety grade equipment. In such a condition, the Unit should not be perturbed by any action, including a power change that might result in a reactor trip. The seriousness of this condition requires that corrective action be started immediately to restore one AFW pump to OPERABLE status.