Industry/TSTF Standard Technical Specification Change Traveler

Provide Actions for One Steam Supply to Turbine Driven AFW/EFW Pump Inoperable

Classification: 1) Technical Change

Priority: 2)Medium

NUREGs Affected: ☑ 1430 ☑ 1431 ☑ 1432 ☐ 1433 ☐ 1434

Description:
ISTS 3.7.5, Auxiliary Feedwater (BWOG: Emergency Feedwater), is revised to address the condition of one or two motor driven AFW/EFW trains inoperable and the turbine driven AFW/EFW train inoperable with one steam supply inoperable.

Justification:
BACKGROUND

The Auxiliary Feedwater System (AFW) (BWOG: Emergency Feedwater System, EFW) automatically supplies feedwater to the steam generators to remove decay heat from the Reactor Coolant System upon the loss of normal feedwater supply. The AFW/EFW pumps take suction through separate and independent suction lines from the condensate storage tank (CST) and pump to the steam generator secondary side. The steam generators function as a heat sink for core decay heat. The heat load is dissipated by releasing steam to the atmosphere from the steam generators or by the main condenser, if available.

For Westinghouse and Combustion Engineering designs, the AFW System consists of two motor driven AFW pumps and one steam turbine driven pump configured into three trains. Each motor driven AFW pump is powered from an independent Class 1E power supply and feeds one (Combustion Engineering) or [two] (Westinghouse) steam generator(s), although each pump has the capability to be realigned to feed other steam generators. The steam turbine driven AFW pump receives steam from two main steam lines upstream of the main steam isolation valves. Each of the steam feed lines will supply 100% of the requirements of the turbine driven AFW pump. The steam turbine driven AFW pump can feed all steam generators.

For Babcock and Wilcox designs, the EFW System consists of two turbine driven EFW pumps, each of which provides a nominal 100% capacity, and one nonsafety grade motor driven EFW pump configured in [three] trains. The steam turbine driven EFW pumps receive steam from either of the two main steam headers, upstream of the main steam isolation valves. The EFW System supplies a common header capable of feeding either or both steam generators. The EFW System normally receives a supply of water from the condensate storage tank.

The AFW/EFW System is capable of supplying feedwater to the steam generators during normal unit startup, shutdown, and hot standby conditions.

NEED FOR CHANGE

This change is proposed to clarify the OPERABILITY of the turbine driven AFW/EFW pump(s) with one steam supply inoperable.

The Bases for LCO 3.7.5 states in part: "The turbine driven AFW (EFW) pump is required to be OPERABLE with redundant steam supplies from each of [two] main steam lines upstream of the MSIVs, ..."

With one steam supply inoperable, Condition A would be entered for an inoperable steam supply. Assuming that a motor driven AFW/EFW pump were declared inoperable (at the same time a steam supply was inoperable), Condition B would be entered for an inoperable motor driven AFW/EFW train as well as entry into Condition C for two inoperable AFW/EFW trains. However, the affected turbine driven AFW/EFW train remains capable of performing its specified function, but with a lack of redundancy with respect to its steam supplies.

This change provides the appropriate Conditions and Required Actions for considering a turbine driven AFW/EFW train inoperable but still capable of performing its specified function with one steam supply inoperable.

PROPOSED CHANGE

The following changes are proposed to STS 3.7.5, "Auxiliary Feedwater System" (BWOG: "Emergency Feedwater System":

1. Condition A is modified to state: "Turbine driven AFW (EFW) train inoperable due to one inoperable steam supply."

2. A new Condition C is added for one motor driven AFW/EFW pump train inoperable and one turbine driven AFW/EFW train inoperable due to one inoperable steam supply. For new Condition C, Required Action C.1 requires restoration of the affected to OPERABLE status in 24 hours. The existing Conditions C, D, and E are revised to Conditions D, E, and F, respectively. The associated Bases are revised.

JUSTIFICATION

A turbine driven AFW/EFW pump with a single OPERABLE steam supply is capable of performing its safety function in the absence of a single failure. The ITS ACTIONS in many specifications recognize that loss of single failure protection is a less degraded condition than inoperability and provide longer Completion Times for those situations.

Condition A is modified to clearly indicate that a turbine driven AFW/EFW train is inoperable with one steam supply inoperable. With one steam supply inoperable, the turbine driven AFW/EFW train is considered inoperable but is still capable of performing its specified function. A new Condition C is proposed that will require restoring an AFW/EFW train to OPERABLE status in 24 hours if one motor driven AFW/EFW train is inoperable and the turbine driven AFW/EFW train is inoperable with one steam supply inoperable. This Completion Time is reasonable based on the remaining OPERABLE motor driven AFW/EFW train, the remaining OPERABLE steam supply to the turbine driven AFW/EFW pump, and the turbine driven AFW/EFW pump still capable of performing its specified function.

The proposed new Condition C is based on the ability of the AFW/EFW system to mitigate the most limiting design basis events (e.g., a feedwater line break or a loss of main feedwater), excluding a single failure, with one inoperable steam supply to a turbine driven train and an inoperable motor driven train. This is applicable to all typical Westinghouse, Combustion Engineering, and Babcock and Wilcox AFW/EFW system designs that can feed any steam generator from each motor driven or turbine driven AFW/EFW train. For example, a typical Westinghouse three-loop design feeds all three steam generators with two motor driven AFW/EFW trains and a turbine driven train. The turbine driven AFW/EFW steam supplies are taken from two of the steam generators. If the turbine driven AFW/EFW train is inoperable due to one steam supply inoperable and a motor driven AFW/EFW train is inoperable, and the steam generator with the remaining steam supply is faulted, the remaining motor driven train will be able to feed two intact steam generators. Therefore, the design basis is met. For Babcock and Wilcox and Combustion Engineering plants,

However, this Condition may not be applicable for some designs, such as some Westinghouse four-loop designs. In a typical Westinghouse four-loop design, each motor driven AFW/EFW train feeds two steam generators, and the turbine driven train feeds all four steam generators. As with the three-loop design, the success criteria for the AFW/EFW system require that two intact steam generators receive AFW/EFW flow. The new Condition for an inoperable turbine driven AFW/EFW train with one steam supply inoperable and an inoperable motor driven AFW/EFW train cannot be applied unless the combination of inoperabilities allow the success criteria to still be met. Consequently, a Reviewer's Note is applied to the new Condition.

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

In accordance with the criteria set forth in 10 CFR 50.92, the proposed changes to NUREG-1431 have been evaluated and determined they do not represent a significant hazards consideration. The following is provided in support of this conclusion:

Standard I - Involves a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated

The Auxiliary Feedwater System (AFW) (BWOG: Emergency Feedwater System, EFW) is not an initiator of any design basis accident or event, and therefore the proposed changes do not increase the probability of any accident previously evaluated. The proposed changes to address the condition of one or two motor driven AFW/EFW trains inoperable and the turbine driven AFW/EFW train inoperable with one steam supply inoperable do not change the response of the plant to any accidents.

The proposed changes do not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, and configuration of the facility or the manner in which the plant is operated and maintained. The proposed changes do not alter or prevent the ability of structures, systems, and components (SSCs) from performing their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits. The proposed changes do not affect the source term, containment isolation, or radiological release assumptions used in evaluating the radiological consequences of an accident previously evaluated. Further, the proposed changes do not increase the types and amounts of radioactive effluent that may be released offsite, nor significantly increase individual or cumulative occupational/public radiation exposures. The proposed changes are consistent with the safety analysis assumptions and resultant consequences.

Therefore, it is concluded that this change does not increase the probability of occurrence of a malfunction of equipment important to safety.

Standard II - Create the Possibility of a New or Different Kind of Accident from any Previously Evaluated

The proposed changes do not result in a change in the manner in which the AFW/EFW System provides plant protection. The AFW/EFW System will continue to supply water to the steam generator to remove decay heat and other residual heat by delivering at least the minimum required flow rate to the steam generators. There are no design changes associated with the proposed changes. The changes to the Conditions and Required Actions do not change any existing accident scenarios, nor create any new or different accident scenarios.

The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. In addition, the changes do not impose any new or different requirements or eliminate any existing requirements. The changes do not alter assumptions made in the safety analysis. The proposed changes are consistent with the safety analysis assumptions and current plant operating practice.

Therefore, the possibility of a new or different malfunction of safety related equipment is not created.

Standard III - Involve a Significant Reduction in the Margin of Safety

The proposed changes do not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not impacted by these changes. The proposed changes will not result in plant operation in a configuration outside the design basis.

Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

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Revision History

OG Revision 0 Revision Status: Closed

Revision Proposed by: WOG

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 13-Aug-99

Owners Group Comments
(No Comments)

Owners Group Resolution: Superceeded Date:

OG Revision 1 Revision Status: Closed

Revision Proposed by: WOG

Revision Description:
Proposed Condition E is modified to contain a Note, similar to the Note in Condition F, which suspends requirements to change MODES until an AFW train is restored to OPERABLE status.

Owners Group Review Information

Date Originated by OG: 08-Dec-99

Owners Group Comments
(No Comments)

Owners Group Resolution: Superceeded Date: 08-Dec-99

OG Revision 2 Revision Status: Closed

Revision Proposed by: WOG

Revision Description:
Reworded Condition A to "Turbine driven AFW train inoperable due to one inoperable steam supply OR, etc." New Conditions C and E are be reworded in the same fashion. Clarification was made in the Bases that the turbine driven train remains capable of performing its specified function, but it is considered inoperable because of the lack of redundant steam supplies to the pump. This is consistent with the statements in the other Conditions regarding an AFW train inoperable for reasons than Condition....

Owners Group Review Information

Date Originated by OG: 29-Nov-00

Owners Group Comments
WOG approved with editorial corrections to the justification.

Owners Group Resolution: Approved Date: 08-Mar-01

TSTF Review Information

OG Revision 2 Revision Status: Closed

TSTF Received Date: 06-Apr-01 Date Distributed for Review 06-Apr-01

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:

5/2/01 - CEOG recommends reconsidering need for the new Condition E. Recommend that the new Condition be deleted and that for this situation the three AFW trains inoperable Condition be entered.

TSTF Resolution: Superceeded Date: 02-May-01

OG Revision 3 Revision Status: Active Next Action: TSTF

Revision Proposed by: WOG

Revision Description:
Eliminated proposed Condition E.

Owners Group Review Information

Date Originated by OG: 03-May-01

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 03-May-01

TSTF Review Information

TSTF Received Date: 25-May-01 Date Distributed for Review 10-Jun-01

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:

Approved on 5/2/01 pending resolution of need for Condition E.

6/10/2001 - Change prepared. Need CEOG and BWOG prioritization information.

TSTF Resolution: Approved Date: 25-May-01

Incorporation Into the NUREGs

File to BBS/LAN Date: TSTF Informed Date: TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

Action 3.7.5.A	AFW Systems	NUREG(s)- 1431 1432 Only
Action 3.7.5.A Bases	AFW Systems	NUREG(s)- 1431 1432 Only
Action 3.7.5.C	AFW Systems	NUREG(s)- 1431 1432 Only
	Change Description: Renamed to D and modified	

Action 3.7.5.C	AFW Systems		NUREG(s)- 1431 1432 Only
	Change Description:	New Action	
Action 3.7.5.C Bases	AFW Systems		NUREG(s)- 1431 1432 Only
	Change Description:	New Action	
Action 3.7.5.C Bases	AFW Systems		NUREG(s)- 1431 1432 Only
	Change Description:	Renamed to D and modified	
Action 3.7.5.D	AFW Systems		NUREG(s)- 1431 1432 Only
	Change Description:	Renamed to E	
Action 3.7.5.D Bases	AFW Systems		NUREG(s)- 1431 1432 Only
	Change Description:	Renamed to E	
Action 3.7.5.E	AFW Systems		NUREG(s)- 1431 1432 Only
	Change Description:	Renamed to F	
Action 3.7.5.E Bases	AFW Systems		NUREG(s)- 1431 1432 Only
	Change Description:	Renamed to F	
Action 3.7.5.C	EFW Systems		NUREG(s)- 1430 Only
	Change Description:	Renamed to D and modified	
Action 3.7.5.C	EFW Systems		NUREG(s)- 1430 Only
	Change Description:	New Action	
Action 3.7.5.D	EFW Systems		NUREG(s)- 1430 Only
	Change Description:	Renamed to E	
Action 3.7.5.E	EFW Systems		NUREG(s)- 1430 Only
	Change Description:	Renamed to F	
Action 3.7.5.A	EFW Systems		NUREG(s)- 1430 Only
Action 3.7.5.E Bases	EFW Systems		NUREG(s)- 1430 Only
	Change Description:	Renamed to F	
Action 3.7.5.A Bases	EFW Systems		NUREG(s)- 1430 Only
Action 3.7.5.C Bases	EFW Systems		NUREG(s)- 1430 Only
	Change Description:	Renamed to D and modified	
Action 3.7.5.C Bases	EFW Systems		NUREG(s)- 1430 Only
	Change Description:	New Action	
Action 3.7.5.D Bases	EFW Systems		NUREG(s)- 1430 Only
	Change Description:	Renamed to E	

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3.7 PLANT SYSTEMS

3.7.5 Emergency Feedwater (EFW) System

LCO 3.7.5 [Three] EFW trains shall be OPERABLE.

- NOTE -

Only one EFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. [~~One steam supply to turbine driven EFW pump inoperable.~~ One turbine driven EFW train inoperable due to one inoperable steam supply. OR ---------- **- NOTE -** Only applicable if MODE 2 has not been entered following refueling. ---------- One turbine driven EFW pump inoperable in MODE 3 following refueling.	A.1 Restore affected equipment to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the LCO]
B. One EFW train inoperable [for reasons other than Condition A] in MODE 1, 2, or 3.	B.1 Restore EFW train to OPERABLE status.	72 hours AND [10 days from discovery of failure to meet the LCO

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Insert 1

ACTIONS (continued)

D CONDITION	D REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A [or B] not met. [OR Two EFW trains inoperable in MODE 1, 2, or 3.]	C.1 Be in MODE 3. AND C.2 Be in MODE 4. D [for reasons other than Condition C]	6 hours [18] hours
D. E. [Three] EFW trains inoperable in MODE 1, 2, or 3.	D.1 E. ---------- **- NOTE -** LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one EFW train is restored to OPERABLE status. ---------- Initiate action to restore one EFW train to OPERABLE status.	 Immediately
E. F. Required EFW train inoperable in MODE 4.	E.1 F. Initiate action to restore EFW train to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.5.1	Verify each EFW manual, power operated, and automatic valve in each water flow path and in both steam supply flow paths to the steam turbine driven pumps, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days

INSERT 1 (BWOG)

CONDITION	REQUIRED ACTIONS	COMPLETION TIME
[----REVIEWER'S NOTE---- The following Condition may be applied provided that the EFW System design basis can be met, excluding consideration of a single failure. The remaining OPERABLE EFW train must be capable of feeding the intact steam generators. If the design basis cannot be met given all combinations of inoperable steam supplies, EFW trains and faulted steam generators, the following Condition must be modified by a Note such as the following: "The inoperable motor driven EFW train and the inoperable steam supply must not defeat the delivery of the required EFW flow to the required intact SGs."] ---------- C. [One motor driven EFW train inoperable. AND One turbine driven EFW train inoperable due to one inoperable steam supply.	C.1 Restore affected equipment to OPERABLE status.	24 hours]

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ACTIONS

[A.1

If a

With one of the two steam supplies to the turbine driven EFW pump is inoperable, or if a turbine driven pump is inoperable while in MODE 3 immediately following refueling, action must be taken to restore the inoperable equipment to an OPERABLE status within 7 days. The 7 day Completion Time is reasonable, based on the following reasons:

due to one inoperable steam supply

and the turbine driven train is still capable of performing its specified function

a. For the inoperability of a steam supply to the turbine driven EFW pump, the 7 day Completion time is reasonable since there is a redundant steam supply line for the turbine driven pump.

b. For the inoperability of a turbine driven EFW pump while in MODE 3 immediately subsequent to a refueling, the 7 day Completion time is reasonable due to the minimal decay heat levels in this situation.

due to an inoperable steam supply

c. For both the inoperability of a steam supply line to the turbine driven pump and an inoperable turbine driven EFW pump while in MODE 3 immediately following refueling, the 7 day Completion Time is reasonable due to the availability of redundant OPERABLE motor driven EFW pumps, and due to the low probability of an event requiring the use of the turbine driven EFW pump.

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.

The 10 day Completion Time provides a limitation time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The AND connector between 72 hours and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

Condition A is modified by a Note which limits the applicability of the Condition to when the unit has not entered MODE 2 following a refueling. Condition A allows one EFW train to be inoperable for 7 days vice the 72 hour Completion Time in Condition B. This longer Completion Time is based on the reduced decay heat following refueling and prior to the reactor being critical.]

B.1

When one of the required EFW trains (pump or flow path) is inoperable, action must be taken to restore the train to OPERABLE status within

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72 hours. This Condition includes the loss of two steam supply lines to one of the turbine driven EFW pumps. The 72 hour Completion Time is reasonable, based on the redundant capabilities afforded by the EFW System, time needed for repairs, and the low probability of a DBA occurring during this time period. The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.

The 10 day Completion Time provides a limitation time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The AND connector between 72 hours and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

Insert 2

~~D~~.1 and ~~D~~.2 D

When either Required Action A.1 ~~or Required Action B.1~~ [B.1, or C.1] cannot be completed within the required Completion Time, [for reasons other than Condition C,] [or when two EFW trains are inoperable in MODE 1, 2, or 3,] the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 4 within [18] hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

In MODE 4, with two EFW trains inoperable, operation is allowed to continue because only one motor driven EFW train is required in accordance with the Note that modifies the LCO. Although not required, the unit may continue to cool down and initiate DHR.

E ~~D~~.1

Required Action ~~D~~.1 E is modified by a Note indicating that all required MODE changes or power reductions are suspended until at least one EFW train is restored to OPERABLE status.

With [all] EFW trains 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

Insert 2 (BWOG)

[C.1

----------REVIEWER'S NOTE----------
The following Condition may be applied provided that the EFW System design basis can be met, excluding consideration of a single failure. If the design basis cannot be met given all combinations of inoperable steam supplies, EFW trains, and faulted steam generators, the following Condition must be modified by a Note such as the following: "The inoperable motor driven EFW train and the inoperable steam supply must not defeat the delivery of the required EFW flow to the required intact SGs."

With one of the required EFW trains (pump or flow path), which includes the motor driven pump, inoperable, and a turbine driven EFW train inoperable due to one inoperable steam supply, action must be taken to restore the affected equipment to OPERABLE status within 24 hours. This Completion Time is reasonable, based on the redundant OPERABLE steam supply to the turbine driven EFW pump, the availability of the remaining OPERABLE turbine driven EFW pump, and the low probability of an event occurring that requires the inoperable steam supply to the turbine driven EFW pump. [This Condition is modified by a Note stipulating that the inoperable motor driven EFW train and the inoperable steam supply to the turbine driven EFW pump must not defeat the delivery of the required EFW flow to the required intact SGs, assuming a fault in any SG, but not assuming a single failure due to the Completion Time limitation of the Condition.]]

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ACTIONS (continued)

nonsafety grade equipment. In such a condition, the unit should not be perturbed by any action, including a power change, that might result in a trip. The seriousness of this condition requires that action be started immediately to restore at least one EFW train to OPERABLE status. LCO 3.0.3 is not applicable, as it could force the units into a less safe condition.

F ~~E~~.1

In MODE 4, either the steam generator loops or the DHR loops can be used to provide heat removal, which is addressed in LCO 3.4.6, "RCS Loops - MODE 4." With one EFW train inoperable, action must be taken to immediately restore the inoperable train to OPERABLE status.

SURVEILLANCE REQUIREMENTS

SR 3.7.5.1

Verifying the correct alignment for manual, power operated, and automatic valves in the EFW water and steam supply flow paths provides assurance that the proper flow paths exist for EFW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since those valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

SR 3.7.5.2

Verifying that each EFW pump's developed head at the flow test point is greater than or equal to the required developed head ensures that EFW pump performance has not degraded during the cycle. Flow and differential head are normal tests of pump performance required by Section XI of the ASME Code (Ref. 3). Because it is undesirable to introduce cold EFW into the steam generators while they are operating, this test is performed on recirculation flow.

This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component

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3.7 PLANT SYSTEMS

3.7.5 Auxiliary Feedwater (AFW) System

LCO 3.7.5 [Three] AFW trains shall be OPERABLE.

- NOTE -

[Only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.]

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. [~~One steam supply to turbine driven AFW pump inoperable.~~ OR --- **- NOTE -** Only applicable if MODE 2 has not been entered following refueling. --- One turbine driven AFW pump inoperable in MODE 3 following refueling.	A.1 Restore affected equipment to OPERABLE status. Turbine driven AFW train inoperable due to one inoperable steam supply.	7 days AND 10 days from discovery of failure to meet the LCO]
B. One AFW train inoperable in MODE 1, 2 or 3 [for reasons other than Condition A].	B.1 Restore AFW train to OPERABLE status.	72 hours AND [10 days from discovery of failure to meet the LCO]

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Insert 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~C.~~ D. Required Action and associated Completion Time for Condition A ~~[or B]~~ , [B, or C] not met. [OR Two AFW trains inoperable in MODE 1, 2, or 3.] [for reasons other than Condition C]	~~C.~~ D.1 Be in MODE 3. AND ~~C.~~ D.2 [Be in MODE 4.	6 hours [18] hours]
E. ~~D.~~ [[Three] AFW trains inoperable in MODE 1, 2, or 3.	~~D.~~ E.1 ---------- **- NOTE -** LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. ---------- Initiate action to restore one AFW train to OPERABLE status.	 Immediately]
F. ~~E.~~ Required AFW train inoperable in MODE 4.	~~E.~~ F.1 Initiate action to restore AFW train to OPERABLE status.	Immediately

INSERT 1 (WOG)

CONDITION	REQUIRED ACTIONS	COMPLETION TIME
[----REVIEWER'S NOTE---- The following Condition may be applied provided that the AFW System design basis can be met, excluding consideration of a single failure. For four and three loop plants, the remaining OPERABLE motor driven AFW train or the turbine driven AFW train must be capable of feeding two intact steam generators. For a two loop design, the remaining steam generator must be capable of being fed by a motor driven AFW train. If the design basis cannot be met given all combinations of inoperable steam supplies, motor driven AFW trains and faulted steam generators, the following Condition must be modified by a Note such as the following: "The inoperable motor driven AFW train and the inoperable steam supply must not defeat the delivery of the required AFW flow to the required intact SGs."] ---------- C. [One motor driven AFW train inoperable. AND Turbine driven AFW train inoperable due to one inoperable steam supply.	C.1 Restore affected equipment to OPERABLE status.	24 hours]

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BASES

APPLICABILITY

In MODES 1, 2, and 3, the AFW System is required to be OPERABLE in the event that it is called upon to function when 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.

In MODE 4 the AFW System may be used for heat removal via the steam generators.

In MODE 5 or 6, the steam generators are not normally used for heat removal, and the AFW System is not required.

ACTIONS

[A.1

due to one inoperable steam supply

If ~~one of the two steam supplies to~~ the turbine driven AFW train is inoperable~~,~~ or if a turbine driven pump is inoperable while in MODE 3 immediately following refueling, action must be taken to restore the inoperable equipment to an OPERABLE status within 7 days. The 7 day Completion Time is reasonable, based on the following reasons:

due to one inoperable steam supply

a. For the inoperability of ~~a steam supply to~~ the turbine driven AFW pump, the 7 day Completion Time is reasonable since there is a redundant steam supply line for the turbine driven pump and the turbine driven train is still capable of performing its specified function.

b. For the inoperability of a turbine driven AFW pump while in MODE 3 immediately subsequent to a refueling, the 7 day Completion Time is reasonable due to the minimal decay heat levels in this situation.

c. For both the inoperability of ~~a steam supply line to~~ the turbine driven pump due to an inoperable steam supply and an inoperable turbine driven AFW pump while in MODE 3 immediately following a refueling outage, the 7 day Completion Time is reasonable due to the availability of redundant OPERABLE motor driven AFW pumps, and due to the low probability of an event requiring the use of the turbine driven AFW pump.

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.

The 10 day Completion Time provides a limitation time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The AND connector between 7 days and 10 days

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ACTIONS (continued)

dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

Condition A is modified by a Note which limits the applicability of the Condition to when the unit has not entered MODE 2 following a refueling. Condition A allows one AFW train to be inoperable for 7 days vice the 72 hour Completion Time in Condition B. This longer Completion Time is based on the reduced decay heat following refueling and prior to the reactor being critical.]

B.1

With one of the required AFW trains (pump or flow path) inoperable in MODE 1, 2, or 3 [for reasons other than Condition A], action must be taken to restore OPERABLE status within 72 hours. This Condition includes the loss of two steam supply lines to the turbine driven AFW pump. The 72 hour Completion Time is reasonable, based on redundant capabilities afforded by the AFW System, time needed for repairs, and the low probability of a DBA occurring during this time period.

The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.

The 10 day Completion Time provides a limitation time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The AND connector between 72 hours and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

INSERT 2

D

~~C~~.1 and ~~C~~.2

, [B.1, or C.1]

When Required Action A.1 ~~[or B.1]~~ cannot be completed within the required Completion Time, [or if two AFW trains are inoperable in MODE 1, 2, or 3, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4 within [18] hours.

[for reasons other than Condition C]]

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

Insert 2 (WOG)

[C.1

----------REVIEWER'S NOTE----------
The following Condition may be applied provided that the AFW System design basis can be met, excluding consideration of a single failure. For four and three loop plants, the remaining OPERABLE motor driven AFW train must be capable of feeding two intact steam generators. For a two loop design, the remaining steam generator must be capable of being fed by a motor driven AFW train. If the design basis cannot be met given all combinations of inoperable steam supplies, motor driven AFW trains, and faulted steam generators, the following Condition must be modified by a Note such as the following: "The inoperable motor driven AFW train and the inoperable steam supply must not defeat the delivery of the required AFW flow to the required intact SGs."

With one of the required AFW trains (pump or flow path), which includes a motor driven pump, inoperable, and the turbine driven AFW train inoperable due to one inoperable steam supply, action must be taken to restore the affected equipment to OPERABLE status within 24 hours. This Completion Time is reasonable, based on the redundant 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 requires the inoperable steam supply to the turbine driven AFW pump. [This Condition is modified by a Note stipulating that the inoperable motor driven AFW train and the inoperable steam supply to the turbine driven AFW pump must not defeat the delivery of the required AFW flow to the required intact SGs, assuming a fault in any SG, but not assuming a single failure due to the Completion Time limitation of the Condition.]]

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BASES

ACTIONS (continued)

In MODE 4 with two AFW trains inoperable, operation is allowed to continue because only one motor driven pump AFW train is required in accordance with the Note that modifies the LCO. Although not required, the unit may continue to cool down and initiate RHR.

E ~~B~~.1

Editorial change for consistency with the CEOG and BWOG NUREGs

If all [three] AFW trains are 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 nonsafety related equipment. In such a condition, the unit should not be perturbed by any action, including a power change, that might result in a trip. The seriousness of this condition requires that action be started immediately to restore one AFW train to OPERABLE status.

Required Action E ~~B~~.1 is modified by a Note indicating that all required MODE changes or power reductions are suspended until one AFW train is restored to OPERABLE status. In this case, LCO 3.0.3 is not applicable because it could force the unit into a less safe condition.

F ~~E~~.1

In MODE 4, either the reactor coolant pumps or the RHR loops can be used to provide forced circulation. This is addressed in LCO 3.4.6, "RCS Loops - MODE 4." With one required AFW train inoperable, action must be taken to immediately restore the inoperable train to OPERABLE status. The immediate Completion Time is consistent with LCO 3.4.6.

SURVEILLANCE REQUIREMENTS

SR 3.7.5.1

Verifying the correct alignment for manual, power operated, and automatic valves in the AFW System water and steam supply flow paths provides assurance that the proper flow paths will exist for AFW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position.

The SR is modified by a Note that states one or more AFW trains may be considered OPERABLE during alignment and operation for steam

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3.7 PLANT SYSTEMS

3.7.5 Auxiliary Feedwater (AFW) System

LCO 3.7.5 [Three] AFW trains shall be OPERABLE.

- NOTE -
Only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.

APPLICABILITY: MODES 1, 2, and 3,
[MODE 4 when steam generator is relied upon for heat removal].

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. [~~One steam supply to turbine driven AFW pump inoperable.~~ Turbine driven AFW train inoperable due to one inoperable steam supply. OR **- NOTE -** Only applicable if MODE 2 has not been entered following refueling. One turbine driven AFW pump inoperable in MODE 3 following refueling.	A.1 Restore affected equipment to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the LCO]
B. One AFW train inoperable [for reasons other than Condition A] in MODE 1, 2, or 3.	B.1 Restore AFW train to OPERABLE status.	72 hours AND [10 days from discovery of failure to meet the LCO]

Insert 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A [or B] not met. , [B, or C]	D.1 Be in MODE 3.	6 hours
AND		
[OR [Two] AFW trains inoperable in MODE 1, 2, or 3.] [for reasons other than Condition C]	D.2 Be in MODE 4. Edit	[18] hours
E. [[Three] AFW trains inoperable in MODE 1, 2, or 3.	E.1 ---------- **- NOTE -** LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. ---------- Initiate action to restore one AFW train to OPERABLE status.	Immediately]
F. Required AFW train inoperable in MODE 4.	F.1 ---------- **- NOTE -** LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. ---------- Initiate action to restore one AFW train to OPERABLE status.	Immediately

INSERT 1 (CEOG)

CONDITION	REQUIRED ACTIONS	COMPLETION TIME
[----REVIEWER'S NOTE---- The following Condition may be applied provided that the AFW System design basis can be met, excluding consideration of a single failure. If the design basis cannot be met given all combinations of inoperable steam supplies, motor driven AFW trains and faulted steam generators, the following Condition must be modified by a Note such as the following: "The inoperable motor driven AFW train and the inoperable steam supply must not defeat the delivery of the required AFW flow to the required intact SGs."] ---------- C. [One motor driven AFW train inoperable. AND Turbine driven AFW train inoperable due to one inoperable steam supply.	C.1 Restore affected equipment to OPERABLE status.	24 hours]

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BASES

APPLICABILITY (continued)

generator secondary inventory, lost as the unit cools to MODE 4 conditions.

In MODE 4, the AFW System may be used for heat removal via the steam generator.

In MODES 5 and 6, the steam generators are not normally used for decay heat removal, and the AFW System is not required.

ACTIONS [A.1

due to one inoperable steam supply

If ~~one of the two steam supplies to~~ the turbine driven AFW pumps is inoperable, or if a turbine driven pump is inoperable while in MODE 3 immediately following refueling, action must be taken to restore the inoperable equipment to an OPERABLE status within 7 days. The 7 day Completion Time is reasonable based on the following reasons:

and the turbine driven train is still capable of performing its specified function

a. For the inoperability of ~~a steam supply to~~ the turbine driven AFW pump, the 7 day Completion time is reasonable since there is a redundant steam supply line for the turbine driven pump.

b. For the inoperability of a turbine driven AFW pump while in MODE 3 immediately subsequent to a refueling outage, the 7 day Completion time is reasonable due to the minimal decay heat levels in this situation.

due to an inoperable steam supply

c. For both the inoperabilty of ~~a steam supply line to~~ the turbine driven pump, and an inoperable turbine driven AFW pump while in MODE 3 immediately following a refueling outage, the 7 day Completion time is reasonable due to the availability of redundant OPERABLE motor driven AFW pumps; and due to the low probability of an event requiring the use of the turbine driven AFW pump.

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.

The 10 day Completion Time provides a limitation time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The AND connector between 7 days and 10 days dictates that both Completion Times apply simultaneously and the more restrictive must be met.

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BASES

ACTIONS (continued)

Condition A is modified by a Note which limits the applicability of the Condition to when the unit has not entered MODE 2 following a refueling. Condition A allows one AFW train to be inoperable for 7 days vice the 72 hour Completion Time in Condition B. This longer Completion Time is based on the reduced decay heat following refueling and prior to the reactor being critical.]

B.1

With one of the required AFW trains (pump or flow path) inoperable, action must be taken to restore OPERABLE status within 72 hours. This Condition includes the loss of two steam supply lines 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 steam generators. The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.

The 10 day Completion Time provides a limitation time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The AND connector between 72 hours and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

Insert 2

D ~~C~~.1 and ~~C~~.2 D

[B.1, or C.1]

[for reasons other than Condition C,]

When either Required Action A.1 ~~or B.1~~ cannot be completed within the required Completion Time, [or if two AFW trains are inoperable in MODES 1, 2, and 3], the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4 within [18] hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

In MODE 4, with [two AFW trains inoperable in MODES 1, 2, and 3], operation is allowed to continue because only one motor driven AFW pump is required in accordance with the Note that modifies the LCO.

Insert 2 (CEOG)

[C.1

----------REVIEWER'S NOTE----------
The following Condition may be applied provided that the AFW System design basis can be met, excluding consideration of a single failure. If the design basis cannot be met given all combinations of inoperable steam supplies, motor driven AFW trains, and faulted steam generators, the following Condition must be modified by a Note such as the following: "The inoperable motor driven AFW train and the inoperable steam supply must not defeat the delivery of the required AFW flow to the required intact SGs."

With one of the required AFW trains (pump or flow path), which includes a motor driven pump, inoperable, and the turbine driven AFW train inoperable due to one inoperable steam supply, action must be taken to restore the affected equipment to OPERABLE status within 24 hours. This Completion Time is reasonable, based on the redundant 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 requires the inoperable steam supply to the turbine driven AFW pump. [This Condition is modified by a Note stipulating that the inoperable motor driven AFW train and the inoperable steam supply to the turbine driven AFW pump must not defeat the delivery of the required AFW flow to the required intact SGs, assuming a fault in any SG, but not assuming a single failure due to the Completion Time limitation of the Condition.]]

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BASES

ACTIONS (continued)

Although it is not required, the unit may continue to cool down and start the SDC.

E ~~D~~.1

Required Action ~~D~~ E.1 is modified by a Note indicating that all required MODE changes or power reductions are suspended until one AFW train is restored to OPERABLE status.

With all [three] AFW trains inoperable in MODES 1, 2, and 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 nonsafety grade equipment. In such a condition, the unit should not be perturbed by any action, including a power change, that might result in a trip. The seriousness of this condition requires that action be started immediately to restore one AFW train to OPERABLE status. LCO 3.0.3 is not applicable, as it could force the unit into a less safe condition.

F ~~E~~.1

Required Action ~~E~~ F.1 is modified by a Note indicating that all required MODE changes or power reductions are suspended until one AFW train is restored to OPERABLE status.

With one AFW train inoperable, action must be taken to immediately restore the inoperable train to OPERABLE status or to immediately verify, by administrative means, the OPERABILITY of a second train. LCO 3.0.3 is not applicable, as it could force the unit into a less safe condition.

In MODE 4, either the reactor coolant pumps or the SDC loops can be used to provide forced circulation as discussed in LCO 3.4.6, "RCS Loops - MODE 4."

SURVEILLANCE REQUIREMENTS

SR 3.7.5.1

Verifying the correct alignment for manual, power operated, and automatic valves in the AFW water and steam supply flow paths provides assurance that the proper flow paths exist for AFW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to