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10 CFR 50.90

1CAN081801

August 10, 2018

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Response to Request for Additional Information Related to License
Amendment Request – Revision to Technical Specification Bases related to
Emergency Feedwater Turbine-Driven Pump Steam Supply Valves
Arkansas Nuclear One, Unit 1
Docket No. 50-313
License No. DPR-51

By letter dated October 2, 2017 (Reference 1), Entergy Operations, Inc. (Entergy), requested NRC approval of a proposed change to the Arkansas Nuclear One, Unit 1 (ANO-1) Technical Specification (TS) 3.7.5, "Emergency Feedwater (EFW) System," Bases. The change would stipulate the conditions in which the TS 3.7.5, Condition A, 7-day Completion Time should apply to the ANO-1 turbine-driven EFW pump steam supply valves. The proposed amendment did not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c).

By letter dated April 26, 2018 (Reference 3), Entergy provided additional information supporting the Reference 1 request. This information did not affect or invalidate the original no significant hazards consideration determination contained in the Reference 1 request.

In the course of review, the NRC has determined that additional information is required with respect to the subject matter. Entergy's response to the Reference 4 request is included in the enclosure to this letter. Associated TS Bases page that was included in the original Reference 1 letter have been updated as a result of implementation ANO-1 TS Amendment 260 (Reference 5) which occurred at the site following original submittal of this TS change request (Reference 1). An additional TS Bases page which requires revision in response to this request for additional information (RAI) is also incorporated. The affected TS Bases pages are included in attachments to the enclosure. The Entergy response to the Reference 4 RAI does not invalidate the original no significant hazards consideration contained in the Reference 1 letter.

No new regulatory commitments are included in this amendment request.

In accordance with 10 CFR 50.91, Entergy is notifying the State of Arkansas of this amendment request by transmitting a copy of this letter and enclosure to the designated State Official.

If there are any questions or if additional information is needed, please contact Stephenie Pyle at 479-858-4704.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on August 10, 2018.

Sincerely,

ORIGINAL SIGNED BY RICHARD L. ANDERSON

RLA/dbb

Enclosure: Response to Request for Additional Information – EFW DC-Powered Steam MOVs

REFERENCES

1. Entergy letter dated October 2, 2017, *License Amendment Request – Revision to Technical Specification Bases related to Emergency Feedwater Turbine-Driven Pump Steam Supply Valves* (1CAN101701) (ML17275A910)
2. NRC letter dated April 13, 2018, *Request for Additional Information Regarding License Amendment Request to Revise Technical Specification Bases 3.7.5, "Emergency Feedwater (EFW) System"* (EPID L-2017-LLA-0349) (1CNA041802) (ML18094A800)
3. Entergy letter dated April 26, 2018, *License Amendment Request – Revision to Technical Specification Bases related to Emergency Feedwater Turbine-Driven Pump Steam Supply Valves* (1CAN041803) (ML18117A492)
4. NRC email dated July 18, 2018, *Request for Additional Information Regarding License Amendment Request to Revise Technical Specification Bases 3.7.5, "Emergency Feedwater System"* (EPID L-2017-LLA-0349) (1CNA071801) (ML18199A323)
5. NRC letter dated June 19, 2018, *Arkansas Nuclear One, Unit 1 - Issuance of Amendment Re: Technical Specification Changes Pursuant to Technical Specifications Task Force (TSTF) Traveler TSTF-412, Revision 3* (CAC No. MG0009; EPID L-2017-LLA-0267) (1CNA061801) (ML18115A282)

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Enclosure to

1CAN081801

Response to Request for Additional Information

EFW DC-Powered Steam MOVs

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
EFW DC-POWERED STEAM MOVS**

By letter dated October 2, 2017 (Reference 1), Entergy Operations, Inc. (Entergy), requested NRC approval of a proposed change to the Arkansas Nuclear One, Unit 1 (ANO-1) Technical Specification (TS) 3.7.5, "Emergency Feedwater (EFW) System," Bases. The change would stipulate the conditions in which the TS 3.7.5, Condition A, 7-day Completion Time should apply to the ANO-1 turbine-driven EFW pump steam supply valves.

By letter dated April 13, 2018 (Reference 2), the NRC issued a request for additional information (RAI) with respect the Reference 1 license amendment request.

By letter dated April 26, 2018 (Reference 3), Entergy provided additional information supporting the Reference 1 request. This information did not affect or invalidate the original no significant hazards consideration determination contained in the Reference 1 request.

In the course of further review, the NRC has determined that additional information is required with respect to the subject matter. The specific questions presented in the Reference 4 RAI are repeated below for ease of review. Entergy's response is provided thereafter. Supporting Entergy's response are updated markups and revised versions of the associated TS Bases that were included in the original Reference 1 letter. Updated TS Bases markups are included in Attachment 1 of this enclosure. Revised versions of the updated TS Bases are included in Attachment 2 of this enclosure.

RAI-1

- a. For the proposed OPERABLE steam paths (i.e., paths consisting of an OPERABLE alternating current (AC) powered steam supply valve (CV-2617 or CV-2667), an OPERABLE DC-powered steam supply valve (CV-2613 or CV-2663), and an OPERABLE DC-powered steam supply bypass valve (CV-2615 or CV-2665), clarify the necessary state (regarding valve position) of an inoperable valve in each pair that would be necessary to maintain an OPERABLE steam path and avoid impacting the turbine governor function.
- b. If an inoperable steam supply MOV was not fully closed, describe what action would be taken in accordance with TSs.
- c. For a proposed OPERABLE steam path with one OPERABLE red train DC MOV and one OPERABLE green train DC MOV, describe how existing surveillance testing would provide reasonable assurance that each proposed OPERABLE steam path supply would satisfactorily automatically start and operate the TD EFW pump.
- d. In Entergy's response to RAI-1a, the licensee stated, in part, "In the case where the red train DC-powered steam supply MOVs are deenergized closed such that these MOVs cannot inadvertently impact P-7A governor function (ramp circuitry), TS entry is not specifically required." However, the last sentence of the response refers to other red train DC-powered steam supply MOV configurations that do require TS entry. Identify those configurations and explain why TS entry is required.

Entergy Response

- a. The following table provides a description of necessary state (regarding valve position) of an inoperable valve in each pair that would be necessary to maintain an operable steam path and avoid impacting the turbine governor function. As stated in the RAI, this assessment assumes an operable AC-powered steam supply valve (CV-2617 or CV-2667), an operable direct current (DC)-powered steam supply valve (CV-2613 or CV-2663), and an operable DC-powered steam supply bypass valve (CV-2615 or CV-2665).

Inoperable Valve State	TS Required Actions	Impact on EFW Availability
One AC-supply valve (CV-2617 or CV-2667) deactivated CLOSED	TS 3.7.5, Condition A – 7 days to restore flow path.	EFW available with a steam supply from one Steam Generator (SG).
One AC-supply valve (CV-2617 or CV-2667) deactivated OPEN	TS 3.6.3 ¹ , Condition C – 72 hours to deactivate valve closed.	EFW available with steam from both SGs.
One DC-Main supply valve (CV-2613 or CV-2663) deactivated CLOSED	TS 3.7.5, Condition A – 7 days to restore flow path.	EFW available with a steam supply from both SGs through one flow path.
One DC-Main supply valve (CV-2613 or CV-2663) NOT CLOSED	If the valve cannot be closed, both AC-powered steam supply valves (CV-2617 and CV-2667) must be deactivated closed to isolate the steam supply (otherwise, turbine would be rotating). With both AC-powered steam supply valves deactivated closed, TS 3.7.5, Condition B is applicable – 72 hours to restore EFW train.	EFW train is inoperable with both AC-powered steam supply valves deactivated closed. AC-powered steam supply valves cannot remain energized since the turbine could overspeed if either AC-powered steam supply valve automatically opened on Emergency Feedwater Initiation and Control (EFIC) actuation.
One DC-Bypass supply valve (CV-2615 or CV-2665) deactivated CLOSED ²	TS 3.7.5, Condition A – 7 days to restore flow path.	EFW available with a steam supply from both SGs through one flow path.

Inoperable Valve State	TS Required Actions	Impact on EFW Availability
One DC-Bypass supply valve (CV-2615 or CV-2665) NOT CLOSED	If the valve cannot be closed, both AC-powered steam supply valves (CV-2617 and CV-2667) must be closed to isolate the steam supply (otherwise, turbine would be rotating). Because the AC-powered steam supply valves automatically open upon receipt of an EFIC signal, the EFW train remains operable. A single failure of any other steam supply valve (AC or DC) cannot prevent the EFW pump from receiving a steam supply upon a start demand.	The DC-powered steam supply bypass valves (CV-2615 or CV-2665) immediately receive an EFIC open signal and the common line downstream of the valves contains a flow orifice. Therefore, relying on the automatic opening of the closed AC-powered steam supply valves with an already open but inoperable DC-powered steam supply bypass valve will have no adverse effect on turbine governor function following a start demand.

Note 1: The AC-powered steam valves are also credited as General Design Criteria (GDC)-57 valves and, therefore, must be capable of remote manual closure to satisfy Reactor Building Isolation requirements. If deactivated or stuck open, ANO-1 TS 3.6.3, "Reactor Building Isolation Valves," is applicable.

Note 2: The main DC-powered steam supply valves do not depend on the position of the DC-powered steam supply bypass valves to function as designed. Therefore, an inoperable DC-powered steam supply bypass valve, regardless of valve position or whether powered from a red or green power source, cannot affect the function of either main DC-powered steam supply valve.

- b. The TS applicability for different steam supply valve inoperabilities when not placed in the fully closed position is provided in the following table. These conditions are addressed in Appendix A of procedure OP-1106.006.

Component	TS Applicability
Inoperable AC-powered valve not closed	If de-energized open, the EFW pump would not be affected. However, if the valve is de-energized open or cannot be closed, GDC-57 requirements are not met and TS 3.6.3 is applicable (72-hour Completion Time to de-energize the valve closed). If the valve is partially open, the EFW pump would be inoperable (7-day or 72-hour Completion Time, depending on whether one or both valves failed), since sufficient flow to the EFW turbine cannot be guaranteed through the affected path. If sufficient steam flow is verified to be available based on valve position by engineering calculation, evidence that the valve is not capable of changing position would be required. However, a stuck open or partially open valve would require entry into TS 3.6.3.

Component	TS Applicability
Inoperable AC-powered valve not closed (continued)	Note that with both AC-powered steam supply valves closed and either is capable of automatically opening upon receipt of an EFIC signal <u>AND</u> any main DC-powered steam supply valve (CV-2613 or CV-2663) is not closed, the EFW pump is inoperable and TS 3.7.5, Condition B applies (72-hour Completion Time).
Inoperable Main DC-powered valve not closed	EFW pump is inoperable (72-hour Completion Time). This is the case regardless of whether the upstream AC-powered steam supply valves are closed to stop steam flow (see discussion in the response to Part a above regarding potential pump/turbine effects).
Inoperable DC-powered bypass valve not closed	<p>An open DC-powered steam supply bypass valve does not directly interfere with the turbine governor sequencing on a start demand or prevent the EFW pump from performing its specified safety function. However, both upstream AC-powered steam supply valves would have to be closed to prevent the turbine from continuously operating at idle speed. Since it is undesirable to close both AC-powered steam supply valves (which can lead to eventual EFW pump inoperability due to the buildup of moisture in the steam supply line), the inoperable DC-powered steam supply bypass valve would be closed out of necessity. Whether the inoperable bypass valve remained open or closed, there would be no adverse impact on EFW pump start capability or subsequent operation.</p> <p>Therefore, entry into TS 3.7.5 is not required for inoperability of the red-train DC-powered steam supply bypass valve. TS 3.7.5 entry is required if the green-train DC-powered steam supply bypass valve is inoperable and closed, because a single failure of the red DC electrical train would prevent the red-train DC-powered steam supply bypass valve from opening and prevent the electrical driven EFW pump from starting (loss of DC control power to pump breaker), in turn resulting in a loss of safety function. This configuration was previously described in the failure modes table provided in the original Reference 1 request for amendment. With single failure criterion not met, TS entry is required.</p>

- c. The testing in question is associated with Surveillance Requirement (SR) 3.7.5.3 and SR 3.7.5.4. These SRs state, respectively:

Verify each EFW automatic valve that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.

Verify each EFW pump starts automatically on an actual or simulated actuation signal.

These verifications are required once every 18 months and are performed as part of Engineered Safeguards (ES) response time testing during a refueling outage. Valve stroke times are also recorded as part of a quarterly valve stroke surveillance performed in

accordance with the Inservice Testing Program. The valve stroke time operability limits are established to ensure overall ES response time testing is not invalidated should valve degradation occur during the operating cycle. Following valve maintenance, stroke times are verified to be within limits, thus ensuring ES response time test criteria continues to be met.

The main DC-powered steam supply valve does not rely upon the position of the DC-powered steam supply bypass valve in order to open. When a start demand is received (either manual or automatic), any available DC-powered bypass steam supply valve will open, beginning at time zero. Simultaneously, the main DC-powered steam supply valve receives an open signal, but is delayed by ~15 seconds by a time-delay circuit. After ~15 seconds, the main DC-powered steam supply will begin opening, regardless of the position of the DC-powered bypass valve(s). Because the opening of the main DC-powered steam valve is not dependent on the position of any DC-powered bypass steam valve, the power train supporting any of these valves can have no effect on valve response or pump start sequencing.

- d. As discussed in responses to Parts a and b above, an inoperable main DC-powered steam supply valve (CV-2613 or CV-2663) would result in the EFW pump being inoperable if not fully closed (i.e., 72-hour Completion Time is applicable). The proposed 7-day Completion Time cannot be applied in this case because the turbine governor can be adversely affected by an open or partially open main DC-powered steam supply valve. Likewise, the EFW pump is also considered inoperable (72-hour Completion Time) if the valve is closed but work is being performed on the valve operator such that maintaining the valve closed cannot be guaranteed. Finally, if the main DC-powered steam supply valve is closed and remains energized, but there is not reasonable assurance that the time delay open circuit is operable, then the EFW pump must be considered inoperable (72-hour Completion Time). OP-1106.006, Appendix A, clearly states that the EFW pump can only be considered operable if an inoperable red-train main DC-powered steam supply valve is "de-energized" closed. The EFW pump is considered inoperable where a main DC-powered steam supply is open, partially open, or has the potential to open out of sequence, since such circumstances could result in an overspeed trip of the turbine (see response to Part b for further detail).

With respect to an open or partially open (but inoperable) red-train DC-powered steam supply bypass valve, the EFW pump turbine governor sequence and pump operation is not directly impacted (see response to Part b above).

RAI-2

A definition of an operable steam path for Condition C has not been defined as the licensee proposed for Condition A. Please explain and define what constitutes an operable steam path when in Condition C.

Entergy Response

The definition of an operable steam path is no different for Condition C than Condition A. For human factors purposes, this definition is being added to the TS Bases for Condition C. This requires submittal of an additional TS Bases page. For completeness, the TS Bases page for

Condition A from the original Reference 1 letter and the new page for Condition C are included in attachment to this response. Attachment 1 contains a markup of the affected pages and Attachment 2 contains a revised (clean) version. The attached TS Bases pages are based on those implemented in support of NRC approval of TSTF-412, Revision 3, "Provide Actions for One Steam Supply to Turbine Driven AFW/EFW Pump Inoperable," for ANO-1 (Reference 5).

ATTACHMENTS

1. Technical Specification Bases Page Markup
2. Retyped Technical Specification Bases Page

REFERENCES

1. Entergy letter dated October 2, 2017, *License Amendment Request – Revision to Technical Specification Bases related to Emergency Feedwater Turbine-Driven Pump Steam Supply Valves* (1CAN101701) (ML17275A910)
2. NRC letter dated April 13, 2018, *Request for Additional Information Regarding License Amendment Request to Revise Technical Specification Bases 3.7.5, "Emergency Feedwater (EFW) System"* (EPID L-2017-LLA-0349) (1CNA041802) (ML18094A800)
3. Entergy letter dated April 26, 2018, *License Amendment Request – Revision to Technical Specification Bases related to Emergency Feedwater Turbine-Driven Pump Steam Supply Valves* (1CAN041803) (ML18117A492)
4. NRC email dated July 18, 2018, *Request for Additional Information Regarding License Amendment Request to Revise Technical Specification Bases 3.7.5, "Emergency Feedwater System"* (EPID L-2017-LLA-0349) (1CNA071801) (ML18199A323)
5. NRC letter dated June 19, 2018, *Arkansas Nuclear One, Unit 1 - Issuance of Amendment Re: Technical Specification Changes Pursuant to Technical Specifications Task Force (TSTF) Traveler TSTF-412, Revision 3* (CAC No. MG0009; EPID L-2017-LLA-0267) (1CNA061801) (ML18115A282)

**Enclosure Attachment 1 to
1CAN081801
Technical Specification Bases Page Markup**

APPLICABILITY (continued)

In MODE 4, the EFW system must be OPERABLE when the steam generators are relied upon for decay heat removal since EFW is the safety related source of feedwater to the steam generators. In MODE 4, the steam generators are normally used for heat removal until the DHR system is in operation.

In MODES 5 and 6, the steam generators are not used for DHR and the EFW system is not required.

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable EFW train when entering MODE 1. There is an increased risk associated with entering MODE 1 with EFW 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.

A.1

With one of the two steam supply pathies to the turbine driven EFW pump inoperable, or if the turbine driven EFW pump is inoperable in MODE 3 immediately following refueling, action must be taken to restore the steam supply to OPERABLE status within 7 days. An OPERABLE steam supply path must include an OPERABLE AC-powered steam supply valve (CV-2617 or CV-2667), an OPERABLE DC-powered steam supply valve (CV-2613 or CV-2663), and an OPERABLE DC-powered steam supply bypass valve (CV-2615 or CV-2665). The 7-day Completion Time is reasonable, based on the following reasons:

- a. For the inoperability of a turbine driven EFW pump due to one inoperable steam supply, the 7-day Completion Time is reasonable since there is a redundant steam line for the turbine driven pump and the turbine driven train is still capable of performing its specified safety function for most postulated events.
- b. For the inoperability of the 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.
- c. For both the inoperability of a turbine driven pump due to one inoperable steam supply and an inoperable turbine driven EFW pump while in MODE 3 immediately following a refueling, the 7-day Completion Time is reasonable due to the availability of the redundant OPERABLE EFW pump, and due to the low probability of an event requiring the use of the inoperable 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 required EFW components to be inoperable during any continuous failure to meet this LCO.

The 10-day Completion Time provides a limitation on the time allowed in this specified Condition after discovery of failure to meet the LCO. The AND connector between 7 days and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

ACTIONS (continued)

A.1 (continued)

Condition A is modified by a Note which limits the applicability of the Condition for an inoperable turbine driven EFW pump in MODE 3 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 in MODE 1, 2, or 3 for reasons other than Condition A, action must be taken to restore the train to OPERABLE status within 72 hours. This Condition includes the loss of two steam supply lines to the turbine driven EFW pump. 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 an event requiring EFW 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 required EFW components to be inoperable during any continuous failure to meet this LCO.

The 10-day Completion Time provides a limitation on the time allowed in this specified Condition after discovery of failure to meet the LCO. The AND connector between 72 hours and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

C.1 and C.2

With the required motor driven EFW train (pump or flow path) inoperable and ~~one of~~ the turbine driven EFW trains inoperable due to one inoperable steam supply, action must be taken to restore the affected equipment to OPERABLE status within 24 hours. [With respect to the turbine driven EFW train, an OPERABLE steam supply path must include an OPERABLE AC-powered steam supply valve \(CV-2617 or CV-2667\), an OPERABLE DC-powered steam supply valve \(CV-2613 or CV-2663\), and an OPERABLE DC-powered steam supply bypass valve \(CV-2615 or CV-2665\).](#) Assuming no single active failures when in this condition, the accident (a FWLB or MSLB) could result in the loss of the remaining steam supply to the inoperable turbine driven EFW pump due to the faulted SG. In this condition, the EFW system may no longer be able to meet the required flow to the SGs assumed in the safety analysis.

The 24-hour Completion Time is reasonable based on the remaining OPERABLE steam supply to the affected turbine driven EFW pump and the low probability of an event occurring that would require the inoperable steam supply to be available for the affected turbine driven EFW pump.

D.1 and D.2

When Required Action A.1, B.1, C.1, or C.2 cannot be met within the required Completion Time, 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.

Enclosure Attachment 2 to

1CAN081801

Retyped Technical Specification Bases Page

APPLICABILITY (continued)

In MODE 4, the EFW system must be OPERABLE when the steam generators are relied upon for decay heat removal since EFW is the safety related source of feedwater to the steam generators. In MODE 4, the steam generators are normally used for heat removal until the DHR system is in operation.

In MODES 5 and 6, the steam generators are not used for DHR and the EFW system is not required.

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable EFW train when entering MODE 1. There is an increased risk associated with entering MODE 1 with EFW 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.

A.1

With one of the two steam supply paths to the turbine driven EFW pump inoperable, or if the turbine driven EFW pump is inoperable in MODE 3 immediately following refueling, action must be taken to restore the steam supply to OPERABLE status within 7 days. An OPERABLE steam supply path must include an OPERABLE AC-powered steam supply valve (CV-2617 or CV-2667), an OPERABLE DC-powered steam supply valve (CV-2613 or CV-2663), and an OPERABLE DC-powered steam supply bypass valve (CV-2615 or CV-2665). The 7-day Completion Time is reasonable, based on the following reasons:

- a. For the inoperability of a turbine driven EFW pump due to one inoperable steam supply, the 7-day Completion Time is reasonable since there is a redundant steam line for the turbine driven pump and the turbine driven train is still capable of performing its specified safety function for most postulated events.
- b. For the inoperability of the 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.
- c. For both the inoperability of a turbine driven pump due to one inoperable steam supply and an inoperable turbine driven EFW pump while in MODE 3 immediately following a refueling, the 7-day Completion Time is reasonable due to the availability of the redundant OPERABLE EFW pump, and due to the low probability of an event requiring the use of the inoperable 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 required EFW components to be inoperable during any continuous failure to meet this LCO.

The 10-day Completion Time provides a limitation on the time allowed in this specified Condition after discovery of failure to meet the LCO. The AND connector between 7 days and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

ACTIONS (continued)

A.1 (continued)

Condition A is modified by a Note which limits the applicability of the Condition for an inoperable turbine driven EFW pump in MODE 3 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 in MODE 1, 2, or 3 for reasons other than Condition A, action must be taken to restore the train to OPERABLE status within 72 hours. This Condition includes the loss of two steam supply lines to the turbine driven EFW pump. 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 an event requiring EFW 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 required EFW components to be inoperable during any continuous failure to meet this LCO.

The 10-day Completion Time provides a limitation on the time allowed in this specified Condition after discovery of failure to meet the LCO. The AND connector between 72 hours and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

C.1 and C.2

With the required motor driven EFW train (pump or flow path) inoperable and the 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. With respect to the turbine driven EFW train, an OPERABLE steam supply path must include an OPERABLE AC-powered steam supply valve (CV-2617 or CV-2667), an OPERABLE DC-powered steam supply valve (CV-2613 or CV-2663), and an OPERABLE DC-powered steam supply bypass valve (CV-2615 or CV-2665). Assuming no single active failures when in this condition, the accident (a FWLB or MSLB) could result in the loss of the remaining steam supply to the inoperable turbine driven EFW pump due to the faulted SG. In this condition, the EFW system may no longer be able to meet the required flow to the SGs assumed in the safety analysis.

The 24-hour Completion Time is reasonable based on the remaining OPERABLE steam supply to the affected turbine driven EFW pump and the low probability of an event occurring that would require the inoperable steam supply to be available for the affected turbine driven EFW pump.

D.1 and D.2

When Required Action A.1, B.1, C.1, or C.2 cannot be met within the required Completion Time, 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.