

Level SRO Tier 1 Group 1 K/A# 057 2.2.25 Imp. RO 2.5 Imp. SRO 3.7

6. Reference available: T.S. LCO 3.8.9, "Distribution Systems – Operating."

On June 10 at 1000, Unit 1 was in Mode 1 at 98% power.

Sequence of events:

- 06/10 @ 1000, 480v motor control center (MCC) 1X1 was declared inoperable due to a concern about the seismic mounting of the MCC. Unit 1 entered T.S. LCO 3.8.9.
- 06/10 @ 1800, A power reduction was started per Action D.
- 06/10 @ 1925, 480v MCC 1X2 was also declared inoperable.
- 06/10 @ 2355, Unit 1 entered Mode 3.
- 06/11 @ 0100, Unit 1 started a cooldown to Mode 5.
- 06/11 @ 0615, Arcing was observed in 120v AC panel 113. The panel was de-energized and a status evaluation was started.
- 06/11 @ 0730, 480v MCCs 1X1 and 1X2 were declared OPERABLE. Plant cooldown was stopped with Unit 1 at 390°F.

What action(s) is required for this event and when must the action(s) be accomplished?

- a. The cooldown should resume immediately. Unit 1 must be in Mode 5 by 06/12/03 @ 0600. Cooldown may be stopped when Panel 113 is again OPERABLE.
- b. The cooldown should resume immediately. Unit 1 must be in Mode 5 by 06/12/03 @ 1400. Cooldown may be stopped when Panel 113 is again OPERABLE.
- c. The cooldown should resume immediately. Unit 1 must be in Mode 5 by 06/12/03 @ 1815. Cooldown may be stopped when Panel 113 is again OPERABLE.
- d. Panel 113 must be returned to an OPERABLE status by 06/11/03 @ 0815 or Unit 1 must start a cooldown and be in Mode 5 by 06/12/03 @ 2015.

ANSWER: B

To answer this question the SRO must understand the completion time of 16 hours from entering the LCO which is explained in the bases section.

- a Plausible since this is the time when Mode 5 was required if Condition A was not meet. However, Condition A was exited and now Condition C is limiting and not met but an additional 8 hours are available.
- b Correct. Action C is entered at 0615 on the 11<sup>th</sup> but the cumulative a completion time of 16 hours has already been exceeded. We must comply with the completion times of Action D.
- c Plausible if the 36 hour completion time is indexed to entering Action C instead of not meeting the LCO.
- d Plausible if Action C is referenced without considering the fact the LCO has not been meet since Action A was entered.

Explanation:

Technical References: T.S. LCO and Bases for 3.8.9.

Objective: P8186L-015

KA Statement: Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (Loss of Vital AC Instrument Bus)

Cog. Level: HIGH 10CFR55.41: 10CFR55.43: YES New Question: YES

**Recommend changing the keyed answer to A vice B for SRO Question 6.**

The following is a step by step explanation of the event described in the question stem.

Date	Time	Condition	Completion Time	Explanation
6/10	1000	A	8 hours	When the 8 hour Completion Time expires Condition D must be entered. If LCO is not met in 16 hours, then Condition D must also be entered for this reason.
6/10	1800	D due to A not met	6 hours 36 hours	Enter Condition D 6 hours to enter Mode 3. 36 hours to enter Mode 5 will force a Mode 5 entry on 6/12 @ 0600
6/10	1925	A	8 hours	This is a 2 <sup>nd</sup> entry into Condition A which is already not met. No new time line is established.
6/11	0100	-	-	Information only. Not related to the time line.
6/11	0200	D due to LCO-16 not met	6 hours 36 hours	6 hours to enter Mode 3. 36 hours to enter Mode 5 based on initial entry into Condition D will force a Mode 5 entry on 6/12 @ 0600.
6/11	0615	C	2 hours	This does not affect the 16 hour clock, which has timed out. Enter Condition D for this reason.
6/11	0730	Exit A Remain in C & D	-	This does NOT clear the requirement to be in Mode 5 by 0600 on 6/12 because Condition D is not exited.

The key concept here is that initial entry into Condition D establishes the time line, requiring entry into Mode 5 by 0600 on 6/12. Additional entries into Condition D do not reset the time line. Also, removing the initial reason (inoperable MCC 1X1) for entry into Condition D, does not reset the time line since Condition D was never exited because of the inoperability of Panel 113. Thus the original time to achieve Mode 5 remains at 0600 on 6/12; the correct answer is A and B is incorrect. This derives from T.S. 1.3 Description which states, "An ACTIONS Condition remains in effect and the Required Actions apply until the Condition no longer exists or the unit is not within the LCO Applicability."

Ref: T.S. 3.8.9 (pages 3.8.9-1 and 2) and Bases B3.8.9 (pages B3.9.9-4 through 9)  
T.S. Section 1.3 "Completion Times," pages 1.3-1, 2 and 7-9



3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems-Operating

LCO 3.8.9 Train A and Train B safeguards AC and DC, and Reactor Protection Instrument AC electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One or more safeguards AC electrical power distribution subsystems inoperable.</p>	<p>-----NOTE----- Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," for DC trains made inoperable by inoperable power distribution subsystems. -----</p> <p>A.1 Restore safeguards AC electrical power distribution subsystems to OPERABLE status.</p>	<p>8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO</p>

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. One or more safeguards DC electrical power distribution subsystems inoperable.</p>	<p>B.1 Restore safeguards DC electrical power distribution subsystems to OPERABLE status.</p>	<p>2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO</p>
<p>C. One Reactor Protection Instrument AC panel inoperable.</p>	<p>C.1 Restore Reactor Protection Instrument AC panel to OPERABLE status.</p>	<p>2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO</p>
<p>D. Required Action and associated Completion Time not met.</p>	<p>D.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 5.</p>	<p>6 hours  36 hours</p>

BASES (continued)

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APPLICABILITY     The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

- a.     Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs; and
- b.     Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.10, "Distribution Systems-Shutdown."

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ACTIONS

A.1

With one or more safeguards AC electrical power distribution subsystems, inoperable, the remaining AC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, required safeguards AC electrical power, distribution subsystems to be restored to OPERABLE status within 8 hours.

Condition A worst scenario is one train without AC power (i.e., no offsite power to the train and the associated DG inoperable). In this Condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operator's attention be focused on minimizing the potential for loss of power to the remaining train by stabilizing the unit, and on restoring power to the affected train. The 8 hour time limit before requiring a unit shutdown in this Condition is acceptable because of:

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BASES

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ACTIONS

A.1 (continued)

- a. The potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected train, to the actions associated with taking the unit to shutdown within this time limit; and
- b. The potential for an event in conjunction with a single failure of a redundant component in the train with AC power.

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a DC bus is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 2 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the AC distribution system. At this time, a DC circuit could again become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.

The Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition A was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

Required Action A.1 is modified by a Note that requires the applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," to be entered for DC trains made inoperable by inoperable AC power distribution subsystems. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components. Inoperability of a distribution system can result in loss of charging power to batteries and eventual loss of DC power. This Note ensures that the appropriate attention is given to restoring charging power to batteries, if necessary, after loss of distribution systems.

BASES

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ACTIONS  
(continued)

B.1

With one or more safeguards DC electrical power distribution subsystem panel(s) inoperable, the remaining safeguards DC electrical power distribution subsystem is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining safeguards DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the required DC panels must be restored to OPERABLE status within 2 hours by powering the bus from the associated battery, charger, or portable charger.

The worst case scenario is one train without safeguards DC power; potentially with both the battery significantly degraded and the associated charger nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining trains and restoring power to the affected train.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

- a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and



BASES

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ACTIONS

B.1 (continued)

- c. The potential for an event in conjunction with a single failure of a redundant component.

The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

With one Reactor Protection Instrument AC panel inoperable, the remaining OPERABLE Reactor Protection Instrument AC panels are capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum ESF functions not being supported. Therefore, the required Reactor Protection Instrument AC panel must be restored to OPERABLE status within 2 hours by powering the panel from the associated inverter, inverter bypass transformer, or interruptible panel.



BASES

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ACTIONS

C.1 (continued)

Condition C represents one Reactor Protection Instrument AC panel without power. In this situation, the unit is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining instrument panels and restoring power to the affected instrument panel.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate instrument AC power. Taking exception to LCO 3.0.2 for components without adequate instrument AC power, that would have the Required Action Completion Times shorter than 2 hours if declared inoperable, is acceptable because of:

- a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without adequate instrument AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and
- c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time takes into account the importance to safety of restoring the Reactor Protection Instrument AC panel to OPERABLE status, the redundant capability afforded by the other OPERABLE instrument panels, and the low probability of a DBA occurring during this period.

BASES

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ACTIONS

C.1 (continued)

The second Completion Time for Required Action C.1 establishes a limit on the maximum allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition C is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the vital bus distribution system. At this time, an AC train could again become inoperable, and vital bus distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock."

This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition C was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

D.1 and D.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 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 plant systems.



## 1.0 USE AND APPLICATION

### 1.3 Completion Times

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**PURPOSE** The purpose of this section is to establish the Completion Time convention and to provide guidance for its use.

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**BACKGROUND** Limiting Conditions for Operation (LCOs) specify minimum requirements for ensuring safe operation of the unit. The ACTIONS associated with an LCO state Conditions that typically describe the ways in which the requirements of the LCO can fail to be met. Specified with each stated Condition are Required Action(s) and Completion Time(s).

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**DESCRIPTION** The Completion Time is the amount of time allowed for completing a Required Action. It is referenced to the time of discovery of a situation (e.g., inoperable equipment or variable not within limits) that requires entering an ACTIONS Condition unless otherwise specified, providing the unit is in a MODE or specified condition stated in the Applicability of the LCO. Required Actions must be completed prior to the expiration of the specified Completion Time. An ACTIONS Condition remains in effect and the Required Actions apply until the Condition no longer exists or the unit is not within the LCO Applicability.

If situations are discovered that require entry into more than one Condition at a time within a single LCO (multiple Conditions), the Required Actions for each Condition must be performed within the associated Completion Time. When in multiple Conditions, separate Completion Times are tracked for each Condition starting from the time of discovery of the situation that required entry into the Condition.

Once a Condition has been entered, subsequent trains, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry

### 1.3 Completion Times

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DESCRIPTION (continued) into the Condition, unless specifically stated. The Required Actions of the Condition continue to apply to each additional failure, with Completion Times based on initial entry into the Condition.

However, when a subsequent train, subsystem, component, or variable expressed in the Condition is discovered to be inoperable or not within limits, the Completion Time(s) may be extended. The Completion Time extension cannot be used to extend the stated Completion Time for the first inoperable train, subsystem, component, or variable. To apply this Completion Time extension, two criteria must first be met. The subsequent inoperability:

- a. Must exist concurrent with the first inoperability; and
- b. Must remain inoperable or not within limits after the first inoperability is resolved.

The total Completion Time allowed for completing a Required Action to address the subsequent inoperability shall be limited to the more restrictive of either:

- a. The stated Completion Time, as measured from the initial entry into the Condition, plus an additional 24 hours; or
- b. The stated Completion Time as measured from discovery of the subsequent inoperability.

The above Completion Time extensions do not apply to those Specifications that have exceptions that allow completely separate re-entry into the Condition (for each train, subsystem, component, or variable expressed in the Condition) and separate tracking of Completion Times based on this re-entry. These exceptions are stated in individual Specifications.



1.3 Completion Times

EXAMPLES  
(continued)

EXAMPLE 1.3-3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Function X train inoperable.	A.1 Restore Function X train to OPERABLE status.	7 days <u>AND</u> 10 days from discovery of failure to meet the LCO
B. One Function Y train inoperable.	B.1 Restore Function Y train to OPERABLE status.	72 hours <u>AND</u> 10 days from discovery of failure to meet the LCO

## 1.3 Completion Times

## EXAMPLES

EXAMPLE 1.3-3 (continued)ACTIONS

C. One Function X train inoperable.	C.1 Restore Function X train to OPERABLE status.	72 hours
<u>AND</u>	<u>OR</u>	
One Function Y train inoperable.	C.2 Restore Function Y train to OPERABLE status.	72 hours

When one Function X train and one Function Y train are inoperable, Condition A and Condition B are concurrently applicable. The Completion Times for Condition A and Condition B are tracked separately for each train starting from the time each train was declared inoperable and the Condition was entered. A separate Completion Time is established for Condition C and tracked from the time the second train was declared inoperable (i.e., the time the situation described in Condition C was discovered).

If Required Action C.2 is completed within the specified Completion Time, Conditions B and C are exited. If the Completion Time for Required Action A.1 has not expired, operation may continue in accordance with Condition A. The remaining Completion Time in Condition A is measured from the time the affected train was declared inoperable (i.e., initial entry into Condition A).



### 1.3 Completion Times

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#### EXAMPLES

#### EXAMPLE 1.3-3 (continued)

The Completion Times of Conditions A and B are modified by a logical connector with a separate 10 day Completion Time measured from the time it was discovered the LCO was not met. In this example, without the separate Completion Time, it would be possible to alternate between Conditions A, B, and C in such a manner that operation could continue indefinitely without ever restoring systems to meet the LCO. The separate Completion Time modified by the phrase "from discovery of failure to meet the LCO" is designed to prevent indefinite continued operation while not meeting the LCO. This Completion Time allows for an exception to the normal "time zero" for beginning the Completion Time "clock". In this instance, the Completion Time "time zero" is specified as commencing at the time the LCO was initially not met, instead of at the time the associated Condition was entered.