3.4 INSTRUMENTATION

3.3.8 Emergency Diesel Generator (EDG) Loss of Power Start (LOPS)

LCO 3.3.8 Three channels of loss of voltage Function and three channels of degraded voltage Function EDG LOPS instrumentation per EDG shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
When associated EDG is required to be OPERABLE by LCO 3.8.2 "AC Sources-Shutdown."

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel of loss of voltage Function per EDG inoperable.	A.1 Restore the channel to OPERABLE status.	72 hours
B. One or two channels of degraded voltage Function per EDG inoperable.	B.1 Place the channel(s) in trip.	1 hour
C. Two or more channels of loss of voltage Function per EDG inoperable or three channels of degraded voltage Function per EDG inoperable.	C.1 Enter applicable Condition(s) and Required Action for EDG made inoperable by EDG LOPS.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met.	D.1 Be in Mode 3. AND D.2 Be in Mode 5.	6 hours 12 hours
E. Required Action and associated Completion Time of Condition B not met.	E.1 Enter applicable Condition(s) and Required Action for EDG made inoperable by EDG LOPS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.8.1	----------NOTE ---------- When EDG LOPS instrumentation is placed in an inoperable status solely for performance of this Surveillance, entry into associated Conditions and Required Actions is not required provided the applicable Conditions(s) and Required Actions for the EDG made inoperable by EDG LOPS are entered. ---------- Perform CHANNEL FUNCTIONAL TEST.	31 days
SR 3.3.8.2	----------NOTE---------- Voltage sensors may be excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION with setpoint Allowable Value as follows: a. Degraded voltage ≥ 3933 and ≤ 3970 V with a time delay of 5.0 seconds ± 0.5 seconds; and b. Sudden loss of voltage from full voltage to 0.0 V with a time delay of 7.8 seconds ± 0.55 seconds at 0.0 V.	18 months

BASES

LCO (continued)

FLURs

The FLURs instrumentation associated with each ES 4160 V bus is required to be OPERABLE upon a loss of voltage. For each voltage value, the associated channel response time is based on the physical characteristics of the loss of voltage sensing relays. The loss of voltage channels respond to a complete loss of ES bus voltage, providing automatic starting and loading of the associated EDG. However, their response time is not critical to the overall ES equipment response time following an actuation, since the SLURs instrumentation will also respond to the complete loss of voltage, and will do so earlier than the loss of voltage instrumentation. Upon a complete loss of voltage from full voltage to 0.0V, the loss of voltage relays will respond in 7.8 seconds with a tolerance of 7% or ± 0.55 seconds.

APPLICABILITY

The EDG LOPS actuation Function for each EDG shall be OPERABLE in MODES 1, 2, 3, and 4 to provide protection for equipment powered from the Class 1E AC Electrical Power Distribution System in these MODES. The ability to start the EDG on a degraded or loss of voltage condition is also required for the EDG required to be OPERABLE by LCO 3.8.2, "AC Sources-Shutdown."

ACTIONS

A Note has been added to the ACTIONS indicating that separate Condition entry is allowed for each Function. Since the required channels are specified on a per EDG basis, the Condition may be entered separately for each EDG.

A.1

A loss of one channel of loss of voltage (FLUR) Function results in a loss of redundancy for that Function, e.g., the two remaining operable channels are still capable of providing an EDG start signal assuming no additional single failures. With one channel of loss of voltage Function inoperable, the channel must be restored to OPERABLE status within 72 hours. The 72 hour Completion Time is reasonable to evaluate and take action to correct the degraded condition in an orderly manner, and is consistent with the allowed outage time for a loss of redundancy condition for other safety systems.

(continued)

BASES

ACTIONS

B.1

A loss of one or more channels of degraded voltage (SLUR) Function results in a loss of safety Function. With up to two channels of degraded voltage Function (SLUR) per EDG inoperable, the channel(s) must be tripped within 1 hour. Since there is no installed trip for the SLUR relays, a more liberal reading of the requirements is that the function of the relay must be accomplished and maintained. This involves jumpering the relay or taking other action such that the function is accomplished. The 1 hour Completion Time is reasonable to evaluate and take action to correct the degraded condition in an orderly manner and takes into account the low probability of an event requiring this instrumentation occurring during this interval.

C.1

Condition C applies when two or more undervoltage or all three degraded voltage channels associated with a single ES 4160 V bus are operable.

With two or more FLUR channels or three SLUR channels inoperable, the logic is not capable of providing an automatic EDG LOPS signal for valid loss of voltage or degraded voltage conditions. Tripping the inoperable channels is not a viable Action for this Condition since doing so would result in an EDG start. In addition, it is unlikely that repair/restoration of multiple failed channels could be accomplished in an acceptable time frame for a condition representing a loss of the affected Function. Therefore, Required Action C.1 requires that the EDG associated with the inoperable FLUR or SLUR be declared inoperable. Depending on MODE, the Actions specified in LCO 3.8.1, "AC Sources-Operating," or LCO 3.8.2, are required to be entered immediately.

(continued)

BASES

ACTIONS (continued)

D.1 and D.2

If the inoperable channel cannot be restored to OPERABLE status within the associated Completion Time, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 5 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required MODES from full power conditions in an orderly manner and without challenging plant systems.

E.1

Condition E is the default Condition should Required Action A.1 or B.1 not be met within the associated Completion Time.

Required Action E.1 ensures that Required Actions for affected diesel generator inoperabilities are initiated. Depending on MODE, the Actions specified in LCO 3.8.1, "AC Sources-Operating," or LCO 3.8.2, are required to be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.3.8.1

A CHANNEL FUNCTIONAL TEST is performed on each required EDG LOPS channel to ensure the entire channel will perform the intended function. This test ensures functionality of each channel to output relays.

The Frequency of 31 days is considered reasonable based on the reliability of the components and on operating experience.

A Note has been added to allow performance of the SR without taking the ACTIONS for inoperable instrumentation channels although during this time period the relay instrumentation cannot initiate a diesel start. This allowance is based on the assumption that the EDG is maintained inoperable during this functional test and the appropriate actions for the inoperable EDG are entered.

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