NRC Job Performance Measure "G"

Facility: **Vogtle**

Task No: V-LO-TA-11007

Task Title: Returning ESF Bus from Diesel Generator to Normal Supply

JPM No: V-NRC-JP-13427-HL17

K/A Reference: 062 A4.07 RO 3.1 SRO 3.1

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance _____ Actual Performance _____

Classroom _____ Simulator _____ Plant _____

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and will provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Instructions: ***Students should be pre-briefed to save simulator time for this JPM.***

Initial Conditions: **The Normal Feeder Breaker to 1BA03 was tripped by actuation of a faulty overcurrent relay. DG1B automatically started and reenergized the bus. The faulty relay has been repaired and the OAO has reset the RESET FROM LOCA/LOSP pushbutton locally.**

Initiating Cue: **The Shift Supervisor has directed you to Parallel Normal Incoming Source (RAT "B") to 1BA03 and then discontinue parallel operation by removing DG1B from 1BA03 using 13427B-1, "4160V AC Bus 1BA03 1E Electrical Distribution System".**

Task Standard: RAT 1B paralleled to 1BA03 and DG1B removed from bus.

Required Materials: 13427B-1, "4160V AC Bus 1BA03 1E Electrical Distribution System"
13145B-1, "Diesel Generator Train B"

Time Critical Task: No

Validation Time: 20 minutes

SIMULATOR SETUP:

Reset to IC # 14 (Snap to 217 for HL-17 NRC Exam)

1. Reset to IC14 (MOL 100%)
2. Open normal supply feeder breaker to 1AA02 (1BA03)
3. Secure AFW pumps after DG ties on bus
4. Reset DG emergency start (RF DG07A/B)
5. Ack/Reset alarms
6. Freeze simulator

Setup time: 5 minutes

Performance Information

Critical steps denoted with an asterisk

Section 4.2.2 of 13427B-1, "4160V AC Bus 1BA03 1E Electrical Distribution System", selected for paralleling Normal incoming source to 1BA03.

4.2.2 Paralleling Normal Incoming Source (RAT or SAT) To 4160V AC Bus 1BA03 Being Supplied From DG 1B

Standard: 13427B-1 selected and opened to Section 4.2.2.

Comment:

CAUTION

Placing two sync switches to ON position at the same time will blow PT fuses. A sync scope meter indication of 12 o'clock may indicate a sync switch is ON.

4.2.2.1 IF it is desired to Parallel the 1B DG to:

The SAT, THEN applicable sections of 13418B-1, "Standby Auxiliary Transformer Unit One Train B Operations" should be performed PRIOR to continuing with this section.

OR

IF it is desired to Parallel the 1B DG to the RAT, THEN applicable sections of 13415-1, "Reserve Auxiliary Transformers" should be performed PRIOR to performing this section.

CUE: "The applicable sections of 13415-1 have been performed"

Standard: The DG will be paralleled to RAT 1B and NOT to the SAT.

Comment:

4.2.2.2 Verify Breakers 1BA03-19 and 1BA0305 Synchronizing switches are OFF:

- 1BA0319 SYNCHRONIZING SWITCH OFF
- 1BA0305 SYNCHRONIZING SWITCH OFF

Standard: Removable handles are inserted into the Sync Switch holes to verify switches are off.

Comment:

***4.2.2.3 Place the BRKR 1BA0301 SYCHRONIZING SWITCH to ON.**

Standard: Removable handle inserted into 1BA0301 Sync Switch and placed to ON.

Comment:

CAUTION

4160V Incoming Line Voltage should be between 4025V and 4326V prior to paralleling the bus being carried by the DG to the grid to ensure bus voltage will remain less than 4326V and greater than 4025V while loading. If required, coordinate as necessary with the PCC to establish these conditions.

4.2.2.4 Check Normal Incoming Source voltage between 4025V and 4326V.

a. IF NOT, coordinate with PCC to establish Normal Incoming Source voltage between 4025V and 4326V.

Standard: ~ 4160 volts reading on Train B System Voltmeter.

Comment:

NOTE

It may be necessary to adjust DG speed slightly in order to verify the next step.

4.2.2.5 Check that the Sync Scope needle is rotating AND that the Synchronizing Lights are bright at 6 o'clock position AND dark at the 12 o'clock position.

Standard: Train B Synchroscope is rotating. Lights are bright at 6 o'clock position and dark at 12 o'clock position.

Comment:

4.2.2.6 IF the DG is running from an emergency start, verify it has been reset from LOCAL/LOSP per 13145B-1.

CUE: "Refer to Initial Conditions"

Standard: Step read and initial conditions noted.

Comment:

***4.2.2.7** **IF in the UNIT Mode, place the DSL GEN 1B UNIT/PARALLEL Switch 1HS-4452B momentarily to PARALLEL position and check the blue UNIT MODE/FAST START light is not lit.**

Standard: 1HS-4452B turned clockwise to the Para/Slow Start position. Blue Unit Mode Fast Start light lit. (Located above DG Loading Set Pot)

Comment:

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*4.2.2.8 **Using the DG 1B VOLTAGE CONTROL pushbutton, adjust DG voltage by momentarily depressing the RAISE OR LOWER pushbutton until it is slightly higher than the Normal Incoming Source voltage.**

Standard: Uses voltage control pushbuttons until DG Voltmeter reads slightly higher than Normal Incoming Voltage. (Normal Incoming Voltmeter is top left gauge-left of Synchroscope).

Comment:

NOTE

Since the Normal Incoming Source frequency, (the grid), cannot be adjusted, the following steps will increase DG frequency to slightly greater than grid frequency to ensure the DG picks up load when the Normal Incoming Breaker is closed.

*4.2.2.9 **WHILE observing the Sync Scope, adjust DG speed using the DG 1B SPEED CONTROL pushbuttons (RAISE OR LOWER) until the Sync Scope needle is rotating slowly in the counterclockwise (Slow) direction [greater than 10 seconds per revolution].**

Standard: Uses Speed Control pushbuttons (next to Unit/Parallel switch) to adjust Sync Scope until rotation is counterclockwise with> 10 second rotation.

Comment:

4.2.2.10 Set DSL GEN 1B LOADING SET PT CONTROL 1SE-4916 to the current DG load.

Pot setting is calculated using the following formula:

$$\frac{\text{D/G LOAD [kW]}}{700} = \text{LOAD POT SETTING}$$

Standard: DG Loading Pot set properly.

Comment:

4.2.2.11 Review Precaution 2.1.1 on indication and operation of the synchroscope prior to proceeding.

Standard: Precaution 2.1.1 read. (shown below)

2.1 PRECAUTIONS

2.1.1 When paralleling two AC sources, the following guidelines must be followed:

a. The speed of rotation of the sync scope should be relatively slow (at least 10 seconds per revolution), indicating the frequencies of the two sources are close to each other.

b. Normally, when paralleling two AC sources, the incoming breaker should be closed as close as possible to the 12 o'clock position to minimize the phase difference between the two sources. The slower the sync scope is rotating, the closer to the 12 o'clock position the sync scope needle should be before trying to close the breaker. In all cases, the breaker should be closed as close as possible to the 12 o'clock position on the 11 o'clock side of the sync scope.

c. Since grid frequency cannot be adjusted, to prevent motoring the Diesel Generator, its frequency is adjusted to slightly higher than grid frequency causing the sync scope to rotate counterclockwise. The breaker should be closed as close to the 12 o'clock position as possible. (It is preferred for the breaker to close slightly on the 11 o'clock side of 12 rather than the 1 o'clock side because it produces less of a transient on the DG to attain synchronization with the grid, however, the intent is to close the incoming breaker at the 12 o'clock position.)

Comment:

*4.2.2.12 **WHEN the Sync Scope needle reaches 12 o'clock, close NORM INCM BRKR 1BA0301.**

CUE: "When asked, CV has been noted."

Standard: Sync Scope at 12 o'clock, closes in breaker 1BA0301.

Comment:

4.2.2.13 Place BRKR 1BA0301 SYCHRONIZING SWITCH to OFF.

Standard: Places 1BA0301 Sync Scope to OFF.

Comment:

4.2.2.14 Record DG data required by 11885B-1, "DG 1B Operating Log."

CUE: "OAO will record operating data"

Standard: OAO noted as taking operating data.

Comment:

4.2.2.15 If desired, continue Parallel Operation of the DG, per Step 4.2.1.19.

CUE: "DG1B will be removed from bus"

Standard: Noted that DG1B will be removed from bus and continues with next step.

Comment:

4.2.2.16 WHEN it is desired to discontinue Parallel Operation, refer to:

Section 4.2.4 to remove the Normal Incoming Source from the Bus.

OR

Section 4.2.5 to remove the DG from the Bus.

Standard: Section 4.2.5, "Discontinue Parallel Operation By Removing The DG 1B From Bus 1BA03", selected.

Comment:

NOTES

- As DG load is adjusted, DG voltage should be adjusted concurrently to maintain kVAR loading positive (Out) and no more than half the kW load.
- The DG should be loaded/unloaded in increments of approximately 1000kW and 500kVAR in time increments of approximately 5 minutes between load changes.
- DSL GEN 1B LOADING SET PT CONTROL 1SE-4916 has a range of 10% [1.00] to 110% [11.00] D/G LOAD which corresponds to 700kW to 7700kW.
- 13145B-1 should be reviewed for shutdown of the DG and aligning for automatic operation after DG is removed from the bus.

CAUTION

With the DG paralleled to the bus, depressing the DG SPEED CONTROL pushbuttons [RAISE or LOWER] will shift the span of the DSL GEN 1B LOADING SET PT CONTROL and the pot settings will no longer reflect 10% to 110% load. This shift can be nulled by using the RAISE or LOWER pushbuttons to match DG load with current pot setting. Discontinuing parallel operation will automatically reset any bias that may have occurred.

4.2.5.1 IF Load is greater than 3000 kW:

a. Lower load in increments of 1000 kW and 500 kVAR in time increments of 5 minutes to 3000 kW using DSL GEN 1B LOADING SET PT CONTROL 1SE-4916.

b. Concurrently lower kVAR load to maintain kVAR loading positive (Out) and NO more than half the kW load using DG 1B VOLTAGE CONTROL pushbuttons.

NOTE TO EXAMINER: Load is lowered in 5 minute increments. If desired for time compression, cue the following for each increment:

CUE: "Five minutes have elapsed"

Standard: 1SE-4916 Load Set Pot setting is lowered to reduce kW load to 3000 kW in 1000 kW increments. Voltage Control LOWER pushbutton is depressed to reduce kVAR load to no more than half the kW load and to maintain positive (out).

Comment:

CAUTION

DG operation at low loads should be minimized. The following steps must be performed without delay.

4.2.5.2 WHEN load has been stable at 3000 kW for 5 minutes OR IF Load was less than 3000 kW in the previous step, continue load reduction to minimum:

a. Lower load to 700 kW using DSL GEN 1B LOADING SET PT CONTROL 1SE-4916.
b. Concurrently lower kVAR loading to 200 to 300 kVARs positive (out) using DG 1B VOLTAGE CONTROL pushbuttons.

Standard: 1SE-4916 Load Set Pot setting is lowered to reduce kW load to 700 kW. Voltage Control LOWER pushbutton is depressed to reduce kVAR load to 200 to 300 kVARs positive (out).

Comment:

*** 4.2.5.3 WHEN minimum load is attained, open DG 1B OUTPUT BRKR 1BA0319 using handswitch 1HS-1BA0319.**

Standard: DG1B output breaker is opened using 1HS-1BA0319.

Comment:

4.2.5.4 Check DG1B OUTPUT BRKR 1BA0319 OPEN by observing green light lit on handswitch 1HS-1BA0319.

Standard: Green light is lit and red light is not lit on 1HS-1BA0319.

Comment:

NOTE

The DG must idle for 30 seconds after UNIT/PARALLEL Switch is placed in UNIT to verify Governor Slow Start timer can time out and permit DG to Fast Start after shutdown. If DG is shutdown before the UNIT/PARA Switch has been placed in UNIT, DG will be INOPERABLE from the time it is shutdown until 30 seconds after the UNIT/PARA Switch has been placed in UNIT.

4.2.5.5 Momentarily place DSL GEN 1B UNIT/PARALLEL switch 1HS-4452B to UNIT and check that the blue UNIT MODE/FAST START light is lit.

Standard: 1HS-4452B momentarily placed in the UNIT position and the blue UNIT MODE/FAST START light is lit.

Comment:

4.2.5.6 WHEN DG has operated in UNIT Mode for 30 to 45 seconds, shutdown DG1B per 13145B-1, "Diesel Generators" and align for automatic operation.

CUE: "An extra operator will shutdown DG1B per 13415B-1 and align for automatic operation"

Standard: Candidate addresses step.

Comment:

Terminating cue: Student returns initiating cue sheet.

Verification of Completion

Job Performance Measure No: V-NRC-JP-13427-HL17

Examinee's Name:

Examiner's Name:

Date Performed:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____
_____
_____

Response: _____
_____
_____
_____

Result: Satisfactory / Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions: The Normal Feeder Breaker to 1BA03 was tripped by actuation of a faulty overcurrent relay. DG1B automatically started and reenergized the bus. The faulty relay has been repaired and the OAO has reset the RESET FROM LOCA/LOSP pushbutton locally.

Initiating Cue: The Shift Supervisor has directed you to Parallel Normal Incoming Source (RAT "B") to 1BA03 and then discontinue parallel operation by removing DG1B from 1BA03 using 13427B-1, "4160V AC Bus 1BA03 1E Electrical Distribution System".