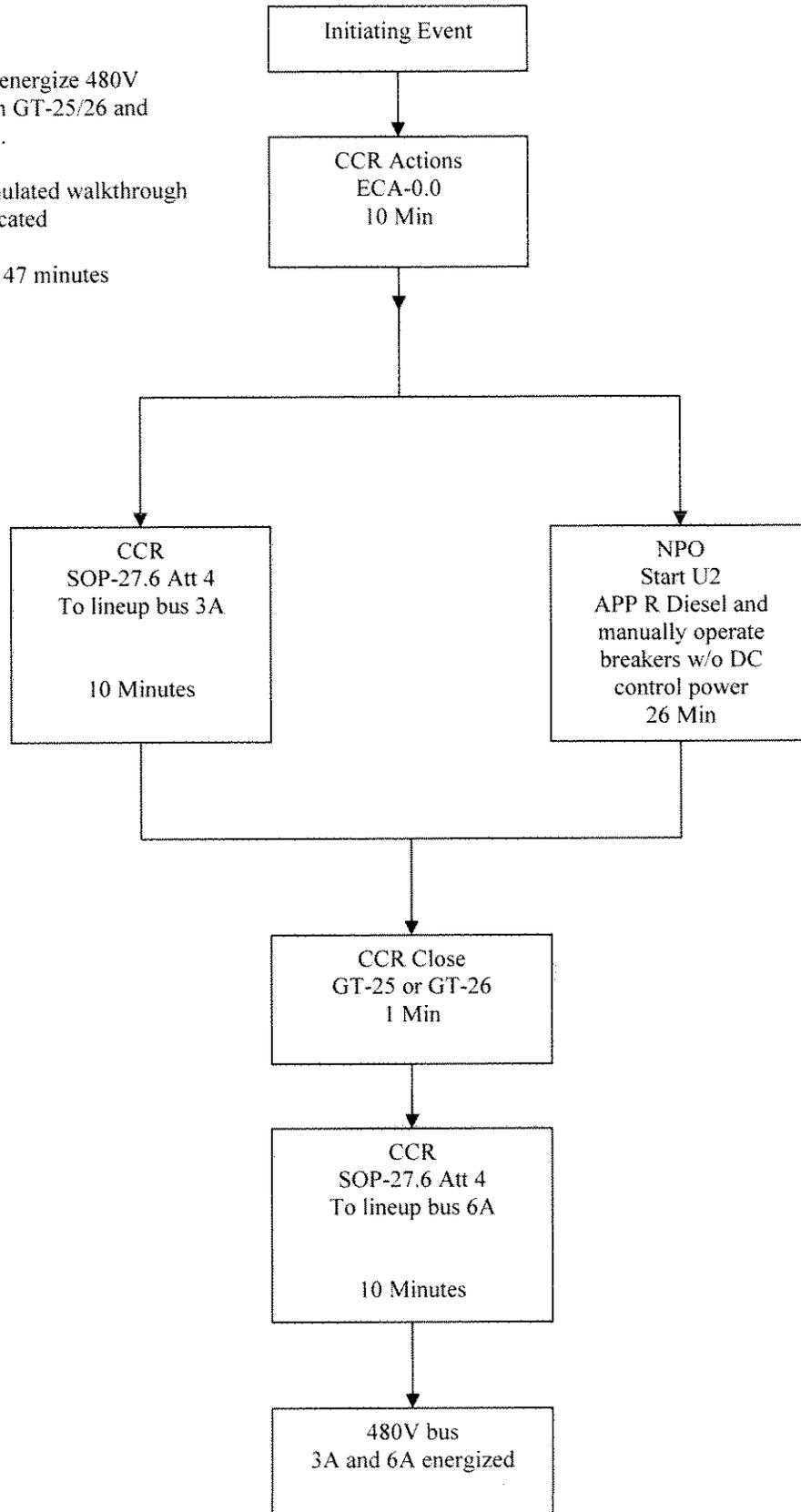


SBO Event:  
Time line to energize 480V  
Bus 6A from GT-25/26 and  
App R diesel.

Operator simulated walkthrough  
times as indicated

Total time is 47 minutes



### **Timed Walk Through of operating APP R diesel breakers without DC control power:**

I performed a timed walk through with NPO Dustin Martin on 6/12/08 for operating APP R diesel breakers without DC control power. We used 2-SOP-27.6 section 4.5 and 4.9 to time this section. Each breaker could be operated in under one minute. He was able to don his PPE (50 cal suit, hood, rubber and leather gloves) in 1:20. The breakers that were already in their correct position were verified by opening the breaker cubicle door since the indicating lights would not be on. The auxiliaries transfer switch was also operated in about one minute using section 4.9.

We also looked at the operation of the 13.8 kv light and power breaker B3-3 since we would have to operate this in an ASSD scenario. This breaker is also easy to operate in manual. If the breaker is found DISCHARGED (unlikely), it would take several additional minutes to manually charge the springs. The charging lever is stored in the L&P room.

In summary it took a total of 8:45 to operate all of the required App R diesel breakers without control power. Add this to the 17:00 already accounted for in the previous timed walk through to start the APP R diesel plus the 10:00 in ECA-0.0 and we come up with 35:45 until the APP R diesel is ready to accept 6.9kv loads. In parallel the Control room operators are performing a line up in 2-SOP-27.6 Att 4. As currently written it was demonstrated to take 10 minutes to line up bus 3A. The next bus to line up is bus 6A which we can also assume to take an additional 10 minutes after the APP R diesel is running based on the bus 3A demonstration. This could extend the total time until 6A is power to 45:45. A procedure revision is in the works to make 6A the first bus energized and therefore removing 10 minutes from this time.

The procedures used for this walk through follow this page.

Don Dewey  
Unit 2 SRO

**UNIT 2 APPENDIX R DIESEL GENERATOR  
OPERATION**

No: 2-SOP-27.6

Rev: 0

Page 28 of 63

\_\_\_\_\_ 4.4.15 ENSURE the Lube Oil Supply Reservoir is refilled with the proper grade of oil. (SAE 15W – 40)

\_\_\_\_\_ 4.4.16 TURN the 0/MANUAL/AUTO switch to the AUTO position.

**4.5 Engine Start (Loss Of AC Power/ SBO)**

**NOTE**

- This section is written for emergency operation. If one of the steps can NOT be met the Supervisor in charge must evaluate continued action.
- If DC control power is not available for breaker operation, breakers may be operated manually using Section 4.9, Manual Breaker and Transfer Switch Operation.
- The starting of the Appendix R DG should not be delayed.
- SO Phone Number: (212) 580-6789
- DO Phone Number: (212) 580-6754

\_\_\_\_\_ 4.5.1 REQUEST the CCR to initiate the performance of Attachment 4

**NOTE**

- Opening The Tool Room Roll up door may affect Centac operation. CCR permission is required prior to opening the Tool Room Roll-up door.
- The design maximum temperatures for the Unit 2 Appendix R DG are:  
104 °F for the electrical distribution equipment  
122 °F for the Diesel Generator air intake

\_\_\_\_\_ 4.5.2 PERFORM the following as necessary to prevent exceeding design maximum temperatures:

\_\_\_\_\_ 4.5.2.1 ENSURE the Delay Gate is Closed

\_\_\_\_\_ 4.5.2.2 IF the Tool Room Roll-up door will be opened, THEN REQUEST permission from the CCR to open the Tool Room Roll-up door.

**UNIT 2 APPENDIX R DIESEL GENERATOR  
OPERATION**

No: 2-SOP-27.6

Rev: 0

Page 29 of 63

4.5.2.3 ENSURE one of the following is Open:

- The Maintenance Loading Bay overhead door (15' Elevation)
- Tool Room Roll-up door (15 'Elevation)

4.5.3 ENSURE the following Appendix R Diesel Generator Fuel Oil Day Tank Indications are Illuminated:

- System Ready Yellow LED flashing
- Power Available Green LED illuminated

4.5.3.1 CHECK NO abnormal condition exists as indicated by a LED in a flashing ON state and horn sounding.

4.5.4 ENSURE that breaker SBO/ASS is OPEN. (SBO/APP R Diesel Generator Switchgear) *Found open*

4.5.5 ENSURE that breaker ASS is OPEN. (SBO/APP. R Switchgear 13.8KV Bus) *Found closed*

4.5.6 ENSURE that breaker OSP is OPEN. (SBO/APP. R Switchgear 13.8KV Bus) *Found closed*

4.5.7 ENSURE that breaker SBOH is OPEN. (SBO/APP. R Switchgear 13.8KV Bus) *Found open*

4.5.8 ENSURE the following at the Appendix R DG Switch Panel (Control Panel):

4.5.8.1 Shutdown Status indicator – Extinguished

4.5.8.2 Warning Status indicator – Extinguished

4.5.9 PLACE the UNIT-PARALLEL switch in UNIT. (SBO/ APP R Switchgear 6.9KV Bus)

4.5.10 At the Appendix R DG Switch Panel (Control Panel) PRESS and HOLD the Panel Lamp/Lamp Test button for at least 3 Seconds

4.5.10.1 CHECK all control panel LEDs illuminate

4.5.10.2 RELEASE Panel Lamp/Lamp Test button

4.5.11 IF City Water will be the cooling source, THEN ALIGN City Water to The Appendix R DG as follows:

4.5.11.1 OPEN the following:

*Down PPE 1:20*  
*09:1*

**UNIT 2 APPENDIX R DIESEL GENERATOR  
OPERATION**

No: 2-SOP-27.6

Rev: 0

Page 30 of 63

- \_\_\_\_\_ a) UW-854
- \_\_\_\_\_ b) UW-855

**NOTE**

Maintaining the City Water flows specified ensures that adequate volume in the City Water Storage Tank is reserved for other plant activities.

- \_\_\_\_\_ 4.5.11.2 ADJUST Cooling Water flow as follows:
  - \_\_\_\_\_ a) THROTTLE UW-840 to achieve approximately 87 gpm as indicated by FI-7980, Aftercooler Water Flow.
  - \_\_\_\_\_ b) THROTTLE UW-836 to achieve approximately 118 gpm as indicated by FI-7979, Jacket Water Flow.
- \_\_\_\_\_ 4.5.12 IF Conventional Service Water is available AND the CRS gives permission to use it as the cooling source, THEN ALIGN Conventional Service Water to The Appendix R DG as follows:
  - \_\_\_\_\_ 4.5.12.1 OPEN SWT-837
  - \_\_\_\_\_ 4.5.12.2 ADJUST Cooling Water flow as follows:
    - \_\_\_\_\_ a) THROTTLE UW-840 to achieve approximately 137 gpm as indicated by FI-7980, Aftercooler Water Flow.
    - \_\_\_\_\_ b) THROTTLE UW-836 to achieve approximately 160 gpm as indicated by FI-7979, Jacket Water Flow.

**NOTE**

- There is no time delay when starting the engine in manual mode.
- The default starting sequence is 3 start cycles, comprised of 10 seconds of cranking and 10 seconds of rest.
- When the coolant reaches operating temperature OR the warm-up at idle time is completed, the generator will ramp up to rated speed and voltage.

- \_\_\_\_\_ 4.5.13 TURN the 0/MANUAL/AUTO switch to the MANUAL position.
- \_\_\_\_\_ 4.5.14 PRESS AND HOLD the Manual Run/Stop button for a minimum of 3 seconds

4.5.14.1 RELEASE the Manual Run/Stop button.

**NOTE**

- The \_ momentary pushbutton on Menu A of the Operator Panel is used to close and open breaker SBO/ASS.
  - \_ indicates breaker SBO/ASS is open, PUSH to close
  - - indicates breaker SBO/ASS is closed, PUSH to open
- When using the \_ momentary pushbutton, breaker SBO/ASS will close only when set-up conditions allow (i.e. dead bus OR generator synchronized with bus).

:45 ○ 4.5.15 IF Manually closing breaker SBO/ASS, THEN PRESS the Manual Close Button on the front of the Breaker.

4.5.16 CLOSE breaker SBO/ASS as follows:

4.5.16.1 PRESS AND HOLD the \_ momentary pushbutton until the symbol indicates - (breaker SBO/ASS closed).

4.5.16.2 RELEASE the momentary pushbutton.

**NOTE**

- A fault that could result in engine damage, causes an immediate engine shutdown.
- All other faults allow the engine to run during the cool-down sequence before engine shutdown.
- Warning alarms will not cause a shutdown but may indicate abnormal operation.

4.5.17 IF a Warning Condition occurs (Warning Status Indicator illuminates yellow), THEN PERFORM the following:

4.5.17.1 IF the Alarm Module warning horn annunciated, THEN momentarily PUSH the PUSH TO SILENCE HORN button.

4.5.17.2 REFER to the following for assistance in correcting the condition:

- ATTACHMENT 2, WARNING AND SHUTDOWN FAULT CODES
- ATTACHMENT 3, APPENDIX R DG TROUBLESHOOTING PROCEDURES

- \_\_\_\_\_ 4.5.17.3 WHEN the condition is corrected, THEN the Warning Status Indicator may be reset as follows:
- \_\_\_\_\_ a) PRESS the front panel FAULT ACKNOWLEDGE button

**NOTE**

If a shutdown condition occurs the Shutdown Status Indicator will illuminate red and the engine will shutdown immediately or on a cool-down timer at any time an abnormal condition is sensed:

- \_\_\_\_\_ 4.5.18 IF a shutdown condition occurs (Shutdown Status Indicator illuminates red), THEN PERFORM the following:
- \_\_\_\_\_ 4.5.18.1 IF the Alarm Module warning horn annunciated, THEN momentarily PUSH the PUSH TO SILENCE HORN button.
- \_\_\_\_\_ 4.5.18.2 REFER to the following for assistance in correcting the condition:
- \_\_\_\_\_ • ATTACHMENT 2, WARNING AND SHUTDOWN FAULT CODES
  - \_\_\_\_\_ • ATTACHMENT 3, APPENDIX R DG TROUBLESHOOTING PROCEDURES
- \_\_\_\_\_ 4.5.18.3 PERFORM the following to reset the shutdown condition:
- \_\_\_\_\_ a) IF the EMERGENCY STOP button was pressed, THEN PULL the EMERGENCY STOP button out
  - \_\_\_\_\_ b) PLACE the 0/MANUAL/AUTO switch in 0
  - \_\_\_\_\_ c) PRESS the front panel FAULT ACKNOWLEDGE button
  - \_\_\_\_\_ d) PLACE the 0/MANUAL/AUTO switch in AUTO
- \_\_\_\_\_ 4.5.19 IF desired to ALIGN the Appendix R DG Auxiliaries MCC to the Appendix R DG THEN PERFORM the following:
- \_\_\_\_\_ 4.5.19.1 CHECK the generator is at rated speed and voltage as indicated by the LCD display message.
- \_\_\_\_\_ 4.5.19.2 CHECK the Appendix R DG Auxiliary Transfer Switch is aligned as follows:

1:00

USED section 4.9 to perform

**UNIT 2 APPENDIX R DIESEL GENERATOR  
OPERATION**

No: 2-SOP-27.6

Rev: 0

Page 33 of 63

- \_\_\_\_\_ a) Source 2 Available (Yellow Light illuminated)
- \_\_\_\_\_ 4.5.19.3 ROTATE and HOLD the Appendix R DG Auxiliaries Normal/Standby Switch in the NORMAL position (Aligned to the Appendix R DG Output) (Appendix R DG Auxiliaries MCC)
  - \_\_\_\_\_ a) WHEN the CHECK Source 2 Connected (Red Light) illuminates, THEN RELEASE the switch
- \_\_\_\_\_ 4.5.20 CHECK that the DG Area Fan is running
- \_\_\_\_\_ 4.5.21 ENSURE that breaker SBO/ASS is Closed. (SBO/APP R Diesel Generator Switchgear) *OPEN door to check position*
- \_\_\_\_\_ 4.5.22 ADJUST cooling water throttle valves to maintain normal cooling temperatures.
  - \_\_\_\_\_ • UW-836
  - \_\_\_\_\_ • UW-840

**NOTE**

One set of data should be taken, even if engine is operated for less than an hour.

- \_\_\_\_\_ 4.5.23 IF time permits, THEN RECORD Appendix R DG parameters once per hour using ATTACHMENT 1, APPENDIX R DG DATA SHEETS.

**NOTE**

When the Appendix R DG Day Tank is operating in AUTO, the The Appendix R DG Day Tank Level should be maintained between 7/8 and Full.

- \_\_\_\_\_ 4.5.24 MONITOR Appendix R DG Day Tank Level.
- \_\_\_\_\_ 4.5.25 MONITOR Lube Oil Supply Reservoir gauge glass level.
  - \_\_\_\_\_ 4.5.25.1 WHEN gauge glass level indicates less than 1/4 full, THEN REFILL Lube Oil Supply Reservoir with proper grade of oil. (SAE 15W – 40)
- \_\_\_\_\_ 4.5.26 CHECK the engine systems for leakage

- \_\_\_\_\_ 4.5.26.1 IF leakage is observed, THEN INITIATE a WRT as necessary:
- 05: [ \_\_\_\_\_ 4.5.27 ENSURE breaker SBO/ASS is Closed (SBO/APP R Diesel Generator Switchgear) *open door to verify*
- 1:00: [ \_\_\_\_\_ 4.5.28 REQUEST the CCR to verify the following breakers are OPEN:
  - \_\_\_\_\_ 4.5.28.1 GT25 } *simulated radio call*
  - \_\_\_\_\_ 4.5.28.2 GT26 }
- 2:00: [ \_\_\_\_\_ 4.5.29 CLOSE breaker SBOH. (SBO/APP. R Switchgear 13.8KV Bus)
- \_\_\_\_\_ 4.5.30 CLOSE breaker SBOL (SBO/APP. R Switchgear 6.9KV Bus)
- \_\_\_\_\_ 4.5.30.1 CLOSE breaker SBOL

NOTE

- The Appendix R Diesel Generator's maximum continuous load is 2045 kW. During an emergency, maximum generator load is 2700 kW for 25 hours/yr.
- When starting equipment, coordination with the CRS will be necessary to ensure adequate generator capacity is available.

\_\_\_\_\_ 4.5.31 INFORM the CCR that the Appendix R DG is energized up to GT25 and GT26 and ready to be loaded.

Control Room Inaccessibility  
 Safe Shutdown Control  
 Attachment 6  
 Gas Turbine Black Start / Unit 1 Power  
 Page 1 of 11

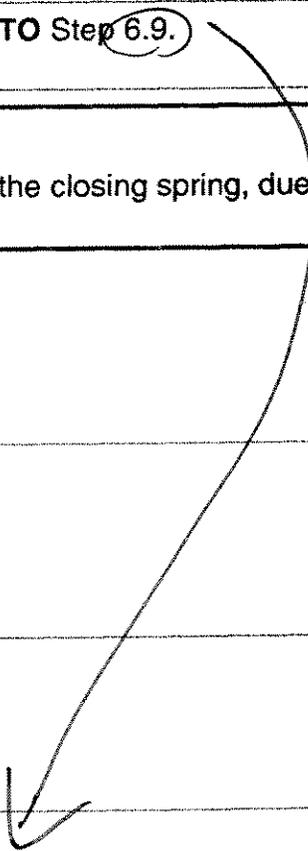
ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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<b>NOTE</b>
<ul style="list-style-type: none"> <li>• Figure 1 (Electrical Distribution For ASSS (Gas Turbine) Power) (last page of this attachment) provides the 13.8KV Bus layout to aid in understanding power alignment from the gas turbines.</li> <li>• Proper PPE must be worn to open cubicle door on energized equipment.</li> </ul>

6.1 <input type="checkbox"/> IAAT DC power is <b>NOT</b> available to 13.8KV breakers, <b>AND</b> a step in this attachment directs closure of a 13.8KV breaker, <b>THEN PERFORM</b> Steps 6.2 through 6.10:	<input type="checkbox"/> <b>GO TO</b> Step 6.11.
6.2 <input type="checkbox"/> Open breaker door.	
6.3 <input type="checkbox"/> Remove trip and close fuses.	
6.4 <input type="checkbox"/> Does the breaker indicate "DISCHARGED"?	<input checked="" type="checkbox"/> <b>GO TO</b> Step 6.9.

<b>NOTE</b>
More than 100 strokes may be required to fully charge the closing spring, due to the limited range of motion with the breaker cover in place.

6.5 <input type="checkbox"/> Engage manual charging clutch by loosening locking bolt using 9/16" socket, and turning counter-clockwise until locking lever is forward against stop.	
6.6 <input type="checkbox"/> Charge closing spring by advancing charging shaft clockwise as viewed from left side of breaker, using 1" socket on charging motor shaft nut.	
6.7 <input type="checkbox"/> Observe "DISCHARGED" indicator gradually moving to confirm that spring is being charged.	



Control Room Inaccessibility  
 Safe Shutdown Control  
 Attachment 6  
 Gas Turbine Black Start / Unit 1 Power  
 Page 3 of 11

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.8 ___ When spring is fully charged, cams will lock into place and "CHARGED" indicator will pop out flush with cabinet cover.	
<del>6.9</del> ___ Press MANUAL CLOSE pushbutton.	
<del>6.10</del> ___ Close breaker door.	

<p><b>NOTE</b></p> <p>Proper PPE must be worn to open cubicle door on energized equipment.</p>
--

<p>6.11 ___ <b>IAAT</b> DC power is <b>NOT</b> available to 13.8KV breakers, <b>AND</b> a step in this attachment directs opening of a 13.8KV breaker, <b>THEN</b> perform the following for the specified breaker:</p> <p>A. ___ Open breaker door.</p> <p>B. ___ Remove trip and close fuses.</p> <p>C. ___ Press MANUAL TRIP pushbutton.</p> <p>D. ___ Close breaker door.</p>	
<p>6.12 ___ Is Gas Turbine 1 available?</p>	<p>1. ___ <b>IF</b> the Unit 2 Appendix R Diesel is available, <b>THEN GO TO</b> 2-SOP-27.6 (Unit 2 Appendix R Diesel Generator Operation).</p> <p>2. ___ <b>IF</b> the Unit 3 Appendix R Diesel is available, <b>THEN GO TO</b> AOI 27.1.9.2 (Providing Appendix R Power From Unit 3).</p> <p>3. ___ <b>GO TO</b> Step 6.27</p>