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LOSS OF OFF-SITE POWER/STATION BLACKOUT

SECTION	Page
A. Loss of Off-Site Power	1
B. Station Blackout	10

NOTE: The attached decision tree should be folded out and used in conjunction with this instruction.

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A. LOSS OF OFF-SITE POWER

1.0 SYMPTOMS

- 1.1 No voltage on 4KV buses 1A, 1B, 1C and 2C.
- 1.2 No voltage on 480V buses 1, 2 and 3.

2.0 AUTOMATIC ACTION

- 2.1 Reactor and turbine trip.
- 2.2 Unit 1 CB-4012 and CB-6012 open immediately.
- 2.3 Following major components trip.
 - 2.3.1 Heater drain pumps A and B.
 - 2.3.2 Turbine plant cooling water pumps A and B.
 - 2.3.3 Circulating water pumps A and B.
 - 2.3.4 Feedwater pumps A and B.
 - 2.3.5 Condensate pumps A, B, C and D.
 - 2.3.6 Charging pumps A and B.
 - 2.3.7 Reactor coolant pumps A, B and C (no generator inertia coastdown).
 - 2.3.8 Auxiliary transformer "A" feeder ACB 11A04 opens.
 - 2.3.9 Auxiliary transformer "B" feeder ACB 11B04 opens.
 - NOTE: "Loss of 220 KV - 18 KV System Isolated" indicating light illuminates.
 - 2.3.10 Auxiliary transformer "C" feeder ACB 11C02 opens.
 - 2.3.11 Auxiliary transformer "C" feeder ACB 12C02 opens.
- 2.4 No. 1 and No. 2 diesel generators start.

NOTE: The diesel generator will be operating without forced air cooling as the radiator fans are AC powered. This may result in a "Jacket Water High Temperature Alarm" if operation without forced cooling exceeds - 39 minutes.

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A. LOSS OF OFF-SITE POWER

2.0 AUTOMATIC ACTION (continued)

- 2.5 Steam dump is initiated when trip is from above 30% of full power.
- 2.6 Following DC pumps will automatically start:
 - 2.6.1 Turbine and generator DC oil pumps.
 - 2.6.2 RCP thermal barrier pump.
- 2.7 Steam driven auxiliary feedwater pump starts and CV-4213 opens on low steam generator water level (5%) in two out of three (2/3) steam generators.
- 2.8 Station loss of voltage automatic transfer initiates with the below listed actions completed within ~ 2 minutes of initiation:
 - 2.8.1 Generator motor operated disconnect (MOD) opens.
 - 2.8.2 152-11C01, bus 1A-1C tie breaker, closes.
 - 2.8.3 152-12C01, bus 1B-2C tie breaker, closes.
 - 2.8.4 152-11A04, auxiliary transformer "A" feeder, closes.
 - 2.8.5 152-11B04, auxiliary transformer "B" feeder, closes.

NOTE: When the automatic transfer is completed the "Loss of 220KV Auto Transfer End of Sequence" indicating light illuminates.

3.0 IMMEDIATE OPERATOR ACTION

- 3.1 Verify reactor trip breakers open.
- 3.2 Verify control rods fully inserted into the core.
- 3.3 Observe that the steam dump system is lowering Tave to its no-load value of 535°F.
- 3.4 Verify feedwater flow to the steam generators from the emergency auxiliary feedwater system.
- 3.5 Verify turbine stop and turbine control valves closed.
- 3.6 Verify Unit 1 CB-4012 and CB-6012 opened.

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A. LOSS OF OFF-SITE POWER

4.0 SUBSEQUENT OPERATOR ACTION

- 4.1 Verify exciter field breaker open.
- 4.2 Verify that the following DC pumps are operating:
 - 4.2.1 Turbine DC lube oil pump.
 - 4.2.2 Generator DC seal oil pump.
 - 4.2.3 RCP DC thermal barrier pump.
- 4.3 Transfer NIS recorder to intermediate range channels.
- 4.4 Transfer steam dump control to "PRESSURE CONTROL ATMOS-CONDENSER" when Tavg approaches 535°F.
- 4.5 After "Loss of 220KV Auto Transfer End of Sequence" indicating light illuminates, restore off-site power using the 220/18KV system and Auxiliary Transformers A and B as follows:
 - 4.5.1 Reset the lockup bus.
 - 4.5.2 Verify open or open the generator motor operated disconnect switch.
 - 4.5.3 Close Unit 1 CB-4012 or CB-6012, to energize 4KV buses 1A, 1B, 1C and 2C.

CAUTION: Do not close both CB-4012 and CB-6012 until it has been verified that the Northwest and Northeast 220KV buses are in parallel.

- 4.6 If offsite AC power cannot be immediately re-established:
 - 4.6.1 The Watch Engineer shall determine if this event is classified as an emergency under Initiating Conditions (IC) in Emergency Procedure S01-VIII-11, "Recognition and Classification of Emergencies". If this event is not so classified, notification shall be made in accordance with S01-14-13, "Notification to NRC of Significant Events".
 - 4.6.2 Verify or establish ≤ 150 gpm flow to the steam generators and increase level to approximately 50% by use of the steam driven Auxiliary Feedwater Pump and FGV-3300, 3301, 2301 and 2300.

NOTE: Flow shall be maintained ≤ 150 gpm whenever the feeding is uncovered ($< 26\%$ on narrow range recorders) and feedwater temperature is less than 300°F.

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4.0 SUBSEQUENT OPERATOR ACTION (continued)

4.6 (continued)

4.6.3 Refer to SOI-3-6, "Plant Operation with Natural Circulation" while continuing to restore off-site power.

4.6.4 Close MOV-20, 21, and 22, feedwater block valves, as personnel become available.

4.6.5 Diesel Generator Operation

1. Verify that one or both diesel generator(s) has auto-started and is operating at normal frequency and voltage.

1.1 If both diesel generators have failed to start, go to "Section B", page 10, of this instruction for actions to be taken during a Station Blackout.

4.6.6 Align the 4KV system for energizing from the diesel generator(s) as follows:

1. Open or verify open 4KV ACB-11C01, bus tie 1C-1A.
2. Open or verify open 4KV ACB-11C02, auxiliary transformer "C" feeder to bus 1C.
3. Open or verify open 4KV ACB-12C01, bus tie 2C-1B.
4. Open or verify open 4KV ACB-12C02, auxiliary transformer "C" feeder to bus 2C.
5. Open or verify open 4KV ACB-RX1, current limiting reactor bypass breaker.
6. Open or verify open 4KV ACB-RY1, current limiting reactor bypass breaker.

4.6.7 Energize bus 1C and/or 2C with the diesel generator(s) as follows:

NOTE: If the following steps are not accomplished within ~39 minutes of diesel generator start, a high jacket water temperature condition may develop due to unavailability of AC power for the radiator fans.

1. Reset LOP at remote surveillance panels 1 and 2.
2. Verify that the diesel generator(s) is operating at normal frequency and voltage.

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A. LOSS OF OFF-SITE POWER

4.0 SUBSEQUENT OPERATOR ACTION (continued)

4.6.7 (continued)

- 3 Close 4KV ACB-11C14, if No. 1 diesel generator is available.
- 4 Close 4KV ACB-12C15, if No. 2 diesel generator is available.

CAUTION: Under no circumstances should you parallel the diesel generator with the SCE system while the governor is in the "Isochronous" position as the diesel generator will go to an overload or no-load condition.

4.6.8 When 4KV bus 1C and/or 2C is restored, start or verify the restart of the following equipment as available:

- 1 Start or verify running the electric Auxiliary Feedwater Pump and continue to bring the steam generator level to ~50% using the Emergency Auxiliary Feedwater Regulators (FCV-3300, 3301, 2301 and 2300).
- 2 Start a salt water cooling pump, (north or south).
- 3 Verify the component cooling water pump in automatic starts and stop the Emergency Thermal Barrier Cooling Pump.
- 4 Verify an air compressor starts.
- 5 Start a charging pump and establish charging and letdown.
- 6 Return turbine plant cooling (TPCW) water system to service as follows:

NOTE: If a circulating water pump is to be started, backup cooling to the turbine plant cooling water heat exchanger is not required.

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A. LOSS OF OFF-SITE POWER

4.0 SUBSEQUENT OPERATOR ACTION (continued)

4.6.8.6 (continued)

- .6.1 Close CV-516 and CV-515, TPCW supply and return valves to containment.
- .6.2 Start the inservice turbine plant cooling water pump.
- .6.3 Align the saltwater cooling pump discharge to the shell side of the TPCW heat exchanger.
- .6.4 Dispatch an operator to close the isolation block valve upstream of CV-516.
- .6.5 Open CV-516 and CV-515.
- .6.6 Slowly open the isolation block valve upstream of CV-516.

CAUTION: Failure to re-establish TPCW flow to containment coolers in a slow and controlled manner may cause a failure to one or more fan cooler heat exchangers.

- .7 Start fans A-9 and A-9S, reactor cavity fans.

CAUTION: Failure to restart these fans may cause the nuclear instrumentation detectors to overheat.

- .8 Start fans A-8, A-8S and A-8SS. Start other containment sphere fans as required.
- .9 Start a primary makeup pump.
- .10 Start a service water pump.
- .11 Place boric acid blend system in automatic. Adjust the boron concentration to the hot standby value.
- .12 As soon as possible restore power to the security UPS and the station lighting transformer.
- .13 Start the turbine auxiliary oil pump and generator air side and hydrogen side seal oil pumps. Stop the DC pumps.

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A. LOSS OF OFF-SITE POWER

4.0 SUBSEQUENT OPERATOR ACTION (continued)

4.6.8 (continued)

- .14 Start a circulating water pump, if desired.

NOTE: If a circulating water pump is started, backup cooling to the turbine plant cooling water heat exchanger is not required.

- .15 Open turbine drain valves, and close reheater steam supply MOVs.

- 4.7 Verify proper operation of automatic turbine turning gear engagement.
- 4.8 Establish hot standby conditions as per operating instruction SOI-3-4, "Plant Shutdown from Full Power to Hot Standby," or cold shutdown per SOI-3-5, "Plant Shutdown from Hot Standby to Cold Shutdown" as conditions warrant.
- 4.9 If station power is being supplied by the diesel generator(s), notify the SCE Energy Resource Supervisor, Mira Loma Switching Center and SDG&E Resource Coordinator that San Onofre does not have off-site power available.
- 4.10 When off-site power is restored, transfer loads from the diesel generator(s) to either Auxiliary Transformers A and B or Auxiliary Transformer C.
- 4.10.1 Transfer all auxiliary load to one diesel generator.
- 4.10.2 Verify open or open the appropriate 4KV ACB to de-energize the unloaded 4 KV bus.
- 4.10.3 Restore power to the unloaded 4KV bus (1C or 2C) from available off-site power.
- 4.10.4 Transfer all auxiliary load to the 4KV bus being supplied from off-site power.
- 4.10.5 Open the appropriate 4KV ACB to de-energize the 4KV bus being supplied by the diesel generator.
- 4.10.6 Restore power to the de-energized 4KV bus (1C or 2C) from available off-site power.
- 4.10.7 Reset LOP at remote surveillance panels 1 and 2.
- 4.10.8 Stop the diesel generator(s), as directed by the Watch Engineer, when the source of off-site power has stabilized.

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A. LOSS OF OFF-SITE POWER

4.0 SUBSEQUENT OPERATOR ACTION (continued)

4.10 (continued)

4.10.9 Start reactor coolant pumps as per S01-4-4, "Reactor Coolant Pump Startup".

CAUTION: No reactor coolant pump may be restarted until thirty (30) minutes after coolant temperature has stabilized and all feedwater flow has been secured. Allow two (2) minutes between start of each pump.

4.11 If desired, restore normal auxiliary feedwater system to service as follows:

4.11.1 Reset Auto Auxiliary Feedwater initiation and open MOV-1204.

4.11.2 Establish flow through CV-142, 143 and 144.

4.11.3 Reduce flow via FCV-3300, 3301, 2301 and 2300 to zero while increasing flow through CV-142, 143 and 144.

4.11.4 Close MOV-1202 and CV-3213.

4.11.5 Either shut down the steam driven Auxiliary Feedwater Pump or open its discharge valve to the west feedwater line as desired.

4.12 Isotopic analysis for iodine in the reactor coolant must be made between two (2) and six (6) hours following a thermal power change exceeding 15% within a one (1) hour period. Request the chemistry department to perform the required analysis.

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B. STATION BLACKOUT

Page

B.1 Parallel Operations to Contend with
Station Blackout (loss of all AC)

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NOTE: The operations outlined in B.1 shall be performed in parallel with the following section of this instruction.

B.2 Options for Power Restoration.

B.2.1 Diesel Generator Start And Load

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B.2.2 12KV/480V Transformer Utilization

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B.2.3 AC Power Restoration (220KV)

4.1 Offsite Power Restored Via
Auxiliary Transformers "A"
and "B".

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4.2 Offsite Power Restored Via
Auxiliary Transformer "C"

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NOTE: At any time, during the performance of this instruction, a source of AC power becomes available (offsite or D/G's), refer to the applicable section of B.2 for power restoration.

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B 1. PARALLEL OPERATIONS TO CONTEND WITH STATION BLACKOUT

4.0 Subsequent Operator Actions

NOTE: If the blackout lasts for more than 2 hours, the loss of 125VDC must be anticipated. Local manual control of the steam driven auxiliary feedwater pump and associated emergency feedwater valves may be required. Depending on the existing rate and location of RCS leakage (pressurizer steam leakage versus pressurizer liquid or loop leakage), loss of RCS subcooling will occur after approximately 2 hours.

4.1 Notifications

4.1.1 Notify the SCE Energy Resource Supervisor, Mira Loma Switching Center and SDG&E Resource Coordinator that San Onofre does not have off-site or on-site A.C. Power.

4.1.2 The Watch Engineer shall determine if this event is classified as an emergency under Initiating Conditions (IC) in Emergency Procedure SOI-VIII-11, "Recognition and Classification of Emergencies". If this event is not so classified, notification shall be made in accordance with SOI-14-13, "Notification to NRC of Significant Events".

4.2 Note the time at which the Station Blackout began, as a reference point for subsequent actions based on elapsed time.

4.3 To conserve RCS inventory, perform the following actions:

4.3.1 Close or verify closed CV-525, Letdown Containment Isolation Valve.

4.3.2 Close or verify closed CV-287, Excess Letdown Isolation Valve.

4.3.3 Close or verify closed CV-992, Pressurizer Sample Line Isolation Valve.

4.3.4 Close or verify closed CV-957, RCS Loop Sample Line Isolation Valve.

4.3.5 Close or verify closed CV-527, RCP Seal Return Line Containment Isolation Valve.

4.3.6 Verify PORVs CV-545 and CV-546 closed.

B.1 OPERATIONS TO CONTEND WITH STATION BLACKOUT

4.4 Maintain the RCS in Hot Standby. Control RCS temperature and pressure with the turbine driven auxiliary feed pump and operation of the atmospheric steam dump valves until buses 1C and 2C are energized either from off-site power or the emergency diesel generators.

4.4.1 Maintain TAVE at $\sim 535^{\circ}\text{F}$.

NOTE: FCV-3300, 3301, 2300 and 2301 have N2 backup supply to provide \sim eight (8) hours of valve operation.

4.4.2 Close the reheater steam supply MOV's.

4.5 Consideration should be given to purging the hydrogen from the generator as per SOI-I-4.50, as it may become necessary to reduce the load on the battery. Upon completion of hydrogen purge, the DC Emergency Seal Oil pump may be stopped.

4.6 Utilize the diesel driven air compressor to supply station air per SOI-7-1, "Instrument and Service Air Systems."

4.7 Turn off the equipment listed below to prevent restart when AC power is restored.

4.7.1 Safety Injection Pumps

4.7.2 Charging Pumps

4.7.3 Saltwater Cooling Pumps

4.7.4 Component Cooling Water Pumps

4.7.5 Turbine Plant Cooling Water Pumps

4.7.6 Refueling Water Pumps

4.7.8 Spent Fuel Pit Cooling Pump

4.7.9 Service Water Pumps

4.7.10 Containment Sump Pumps

4.7.11 Primary Makeup Water Pumps

4.7.12 Motor Driven Auxiliary Feedwater Pump

4.8 Provide local ventilation (air horns, gas powered fire ventilating blowers, open cabinet doors) to critical equipment such as the control room cabinet area.

NOTE: Station air is being supplied via the diesel driven air compressor. Air horn operation should not interfere with supplying the instrument air header.

B.1 OPERATIONS TO CONTEND WITH STATION BLACKOUT

- 4.9 Cooling water to the CCW heat exchanger may be supplied, as needed, as follows:
- 4.9.1 Operation of the gasoline engine driven screen wash pump cross-connected to the saltwater cooling system.
 - 4.9.2 Operation of the Unit 2 and 3 engine driven fire pump with Unit 2 and 3 fire protection system cross-connected to Unit 1 and the Unit 1 fire protection header cross-connected to the screen wash system and then to the saltwater cooling system.
- 4.10 Assign personnel, as available, to monitor the following:
- 4.10.1 AC power restoration status
 - 4.10.2 RCS status (pressure, temperature, pressurizer level, etc.)
 - 4.10.3 Containment status (pressure, temperature, humidity)
 - 4.10.4 Battery life status
 - 4.10.5 Boric acid tank temperature
 - 4.10.6 Spent fuel pit temperature
- 4.11 Break condenser vacuum by opening CV-62. When the turbine generator has stopped the Bearing Emergency Oil Pump may be stopped.

NOTE: It will be necessary to de-energize selected loads to conserve battery power if AC power has not been restored at blackout plus one hour. Increased battery life is needed to provide indication to monitor plant status.

- 4.12 If after blackout plus one hour, power has not been restored to at least bus 1C or 2C, de-energize the following DC loads:
- 4.12.1 Reheater Steam Dump control, 72-101
 - 4.12.2 4160V Switchgear, Buses 1A, 1B and 1C, 72-103
 - 4.12.3 Area Load Frequency Control, 72-106
 - 4.12.4 4160V ACD Test Panel, 72-107
 - 4.12.5 Generator and Transformer Relay Bus, 72-108

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B.1 OPERATIONS TO CONTEND WITH STATION BLACKOUT

4.12 (continued)

- 4.12.6 Hydrogen Control Panel, 72-109, if purging of the generator is not in progress and is not desired.
- 4.12.7 Oscillograph, 72-110
- 4.12.8 Turbine Control, 72-111
- 4.12.9 480V Switchgear No. 1, 72-112
- 4.12.10 Turbine Protection, 72-113
- 4.12.11 Generator Field Control, 72-115
- 4.12.12 480V Switchgear, No. 3, 72-116
- 4.12.13 Chemical Control board, 72-121
- 4.12.14 Containment Spray SV-600, Misc. Water CV-537, RCS CV-539 and CV-533, Radwaste CV-536, 72-122
- 4.12.15 Sphere Isolation Valve, 72-123
- 4.12.16 Portable Exciter Control, 72-125
- 4.12.17 Condenser Steam Dump Control, 72-128
- 4.12.18 Feedwater Pump HVs, 72-130
- 4.12.19 Hydraulic Stop Gate Control, 72-131
- 4.12.20 Generator Bus Disconnect Switch, 72-132 (verify disconnect switch is open prior to de-energizing)
- 4.12.21 Instrument Repair Room, 72-134
- 4.12.22 Control Rods, 72-141
- 4.12.23 480V Switchgear No. 3, 72-204
- 4.12.24 480V Switchgear No. 2, 72-205
- 4.12.25 4160V Switchgear 2C, 72-206
- 4.12.26 Feedwater Pump HVs, 72-211
- 4.12.27 RCS CV-532 and CV-534, Radwaste CV-535, Containment Spray SV-601, 72-220.

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B.1 OPERATIONS TO CONTEND WITH STATION BLACKOUT

4.12 (continued)

4.12.28 When the generator purging has been completed, the D.C. Emergency Seal Oil pump may be stopped.

4.12.29 When turbine coastdown is complete, the D. C. Emergency Bearing Oil Pump may be stopped.

4.13 If necessary, alternate sources of water may be aligned to the auxiliary feedwater pumps as per S01-7-3, "Auxiliary Feedwater System", Section "C".

B.2 OPTIONS FOR POWER RESTORATION

B.2.1 Diesel Generator Start And Load

4.0 Subsequent Operator Actions

4.1 Attempt to manually start the diesel generators from the Control Room.

4.2 If either diesel generator fails to start from the Control Room, dispatch an operator to start the diesel generators locally per SO1-10-1, "Diesel Generator Operation."

4.3 If the diesel generators fail to start:

4.3.1 Proceed to B.2.2 of this instruction.

4.3.2 Investigate problem and initiate repairs.

4.4 If the diesel generator(s) has started perform the following steps:

4.4.1 Open or verify open the following 4 KV breakers:

1 ACB 11C01, bus tie 1C-1A.

2 ACB 11C02, auxiliary transformer "C" feeder to bus 1C.

3 ACB 12C01, bus tie 2C-1B.

4 ACB 12C02, auxiliary transformer "C" feeder to bus 2C.

5 ACB RX1, current limiting reactor bypass breaker.

6 ACB RY1, current limiting reactor bypass breaker.

4.4.2 Reset LOP at remote surveillance pannels 1 and 2.

4.4.3 Verify that the diesel generator(s) is operating at normal frequency and voltage.

4.5 Energize buses 1C and/or 2C with the diesel generators as follows:

NOTE: If the following steps are not accomplished within ~39 minutes of diesel generator start, a high jacket water temperature condition may develop due to unavailability of AC power for the radiator fans.

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B.2 OPTIONS FOR POWER RESTORATION

B.2.1 Diesel Generator Start And Load (continued)

4.5.1 Close ACB 11C14, if No. 1 diesel is available.

4.5.2 Close ACB 12C15, if No. 2 diesel is available.

CAUTION: Under no circumstances should you parallel the diesel generator with the SCE system while the governor is in the "Isochronous" position as the diesel generator will go to an overload or no-load condition.

4.6 When 4KV bus 1C and/or 2C is restored, start or verify the restart of the following equipment as required:

4.6.1 Start or verify running the electric Auxiliary Feedwater Pump and continue to bring the steam generator level to ~50% using the Emergency Auxiliary Feedwater Regulators (FCV-3300, 3301, 2301 and 2300).

4.6.2 Start a salt water cooling pump.

4.6.3 Start a component cooling water pump, and stop the Emergency Thermal Barrier Cooling Pump.

4.6.4 Start an air compressor. The Diesel driven air compressor may be stopped as directed by the Watch Engineer.

4.6.5 Start a charging pump and establish charging and letdown.

4.6.6 Return turbine plant cooling (TPCW) water system to service as follows:

- 1 Close CV-516 and CV-515, TPCW supply and return valves to containment.
- 2 Start a turbine plant cooling water pump.
- 3 Align the saltwater cooling pump discharge to the shell side of the TPCW heat exchanger.
- 4 Dispatch an operator to close the isolation block valve upstream of CV-516.
- 5 Open CV-516 and CV-515.

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B.2 OPTIONS FOR POWER RESTORATION

B.2.1 Diesel Generator Start And Load (continued)

4.6.6 (continued)

6. Slowly open the isolation block valve upstream of CV-516.

CAUTION: Failure to re-establish TPCW flow to containment coolers in a slow and controlled manner may cause a failure to one or more fan cooler heat exchangers.

- 4.6.7 Start reactor cavity fans A-9 and A-9S.

CAUTION: Failure to restart these fans may cause the nuclear instrumentation detectors to overheat.

- 4.6.8 Start fans A-8, A-8S and A-8SS. Start other containment sphere fans as required.

- 4.6.9 Start a primary makeup pump.

- 4.6.10 Start a service water pump.

- 4.6.11 Place boric acid blend system in automatic. Adjust the boron concentration to the hot standby value.

- 4.6.12 As soon as possible restore power to the security UPS and the station lighting transformer.

- 4.6.13 Start the turbine auxiliary oil pump and generator air side and hydrogen side seal oil pumps. Stop the DC pumps, if still in operation.

- 4.6.14 Open turbine drain valves

- 4.7 Refer to SOI-3-6 Section B, "Natural Circulation Cooldown", while continuing to restore off-site power.

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B.2 OPTIONS FOR POWER RESTORATION

B.2.2 12KV/480V TRANSFORMER UTILIZATION

4.0 Subsequent Operator Actions

4.1 Verify the status of the 12KV/480V transformer.

4.1.1 If 12KV/480V transformer is not available proceed to section B.2.3 of this instruction.

4.1.2 If this transformer is available, perform the following steps:

.1 Open all ACBs on 480V switchgear #2.

.2 Close ACB 52-1200 to energize 480V switchgear #2.

NOTE: ACB 52-1200 is interlocked with ACB 52-1202 and ACB 52-1203 to prevent paralleling the SCE and SDG&E systems through the 480V system as they are out of phase by 60 degrees at this point.

4.2 Energize loads, as needed, from 480V switchgear #2 (pressurizer heater group D, test pump, saltwater cooling pump, component cooling water pump, etc.)

NOTE: The 12KV/480V transformer has a load carrying capacity of 1200 amps.

4.3 Energize loads as needed to maintain pressure and RCS inventory while continuing to restore off-site power.

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B.2 OPTION FOR POWER RESTORATION

B.2.3 A.C. Power Restoration (220KV)

4.0 Subsequent Operator Actions

4.1 Off-site Power Restored Via Aux Transformer A and B

4.1.1 If the diesel Generators are NOT operating, energize the 4KV buses as follows:

NOTE: If the diesel generator(s) are operating go to Step 4.1.3, page 23, of this instruction.

- 1 Reset the lockup bus
- 2 Verify open or open the generator motor operated disconnect switch.
- 3 Verify open or open 4KV ACB-11C02 and 12C02.
- 4 Close Unit 1 CB-4012 or CB-6012, this will energize 4KV buses 1A, 1B, 1C and 2C.

CAUTION: Do not close both Unit 1 CB-4012 and CB-6012 until it has been verified that the Northeast and Northwest 220KV buses are in parallel.

4.1.2 When the 4KV buses are restored, start or verify the start of the following equipment as required:

- 1 Start or verify running the electric Auxiliary Feedwater Pump and continue to bring the steam generator level to -50% using the Emergency Auxiliary Feedwater Regulators (FCV-3300, 3301, 2301 and 2300).
- 2 Start a salt water cooling pump, (north or south) and secure alternate supply from screen wash or fire protection.
- 3 Start a component cooling water pump.

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B.2 OPTION FOR POWER RESTORATION

B.2.3 A.C. Power Restoration (220KV)

4.1.2 (continued)

- 4 Start an air compressor. The diesel driven compressor may be secured as directed by the Watch Engineer.
- 5 Start a charging pump and establish charging and letdown.
- 6 Return turbine plant cooling (TPCW) water system to service as follows:

NOTE: If a circulating water pump is to be started, backup cooling to the turbine plant cooling water heat exchanger is not required.

- 6.1 Close CV-516 and CV-515, TPCW supply and return valves to containment.
- 6.2 Start a turbine plant cooling water pump.
- 6.3 Align the saltwater cooling pump discharge to the shell side of the TPCW heat exchanger.
- 6.4 Dispatch an operator to close the isolation block valve upstream of CV-516.
- 6.5 Open CV-516 and CV-515.
- 6.6 Slowly open the isolation block valve upstream of CV-516.

CAUTION: Failure to re-establish TPCW flow to containment coolers in a slow and controlled manner may cause a failure to one or more fan cooler heat exchangers.

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B.2 OPTION FOR POWER RESTORATION

B.2.3 A.C. Power Restoration (220KV)

4.0 Subsequent Operator Action (continued)

4.1.2 (continued)

- .7 Start RCPs as per Operating Instruction SOI-4-4, "Reactor Coolant Pump Startup."

CAUTION: No reactor coolant pump may be restarted until thirty (30) minutes after coolant temperature has stabilized and all feedwater flow has been secured. Allow two (2) minutes between start of each pump.

- .8 Start fans A-9 and A-9S, reactor cavity fans

CAUTION: Failure to restart these fans may cause the nuclear instrumentation detectors to overheat.

- .9 Start fans A-8, A-8S and A-8SS. Start other containment sphere fans as required.

- .10 Start a primary makeup pump.

- .11 Start a service water pump.

- .12 Place the boric acid blend system in automatic. Adjust the boron concentration to the desired concentration.

- .13 As soon as possible, restore power to the security UPS and the station lighting transformer.

- .14 Start the turbine auxiliary oil pump and generator air side and hydrogen side seal oil pumps. Stop the associated Emergency DC pumps if still in operation.

- .15 Start a circulating water pump if desired.

NOTE: If a circulating water pump is started, backup cooling to the turbine plant cooling water heat exchanger is not required.

- .16 Open turbine drain valves, and verify closed or close reheater steam supply MOVs.

NOTE: Efforts shall continue to restore the diesel generators to operable status.

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B.2 OPTION FOR POWER RESTORATION

B.2.3 A.C. POWER RESTORATION (220KV)

4.0 Subsequent Operator Action (continued)

4.1.2 (continued)

- .17 Establish hot standby conditions as per operating instruction SO1-3-4, "Plant Shutdown from Full Power to Hot Standby," or cold shutdown per SO1-3-5, "Plant Shutdown from Hot Standby to Cold Shutdown" as conditions warrant.

4.1.3 If the diesel generator(s) are operating, restore offsite power and transfer loads to Auxiliary transformers A and B as follows:

- .1 Transfer all auxiliary load to one diesel generator.
- .2 Open the appropriate 4KV ACB to de-energize the unloaded 4KV bus.
- .3 Restore power to the unloaded 4KV bus (1C or 2C) from auxiliary transformer A and B by closing 4KV ACB 12C01 or 11C01.
- .4 Transfer all auxiliary load to the 4KV bus being supplied from off-site power.
- .5 Open the appropriate 4KV ACB to de-energize the 4KV bus being supplied by the diesel generator.
- .6 Restore power to the de-energized 4KV bus from auxiliary transformer A and B by closing 4KV ACB 11C01 or 12C01.
- .7 Stop diesel generators, as directed by the Watch Engineer, when the source of off-site power is stabilized.
- .8 RCP's may be started as per SO1-4-4, "Reactor Coolant Pump Startup"

CAUTION: No reactor coolant pump may be restarted until thirty (30) minutes after coolant temperature has stabilized and all feedwater flow has been secured. Allow two (2) minutes between start of each pump.

- .9 Distribute auxiliary load between 4KV buses 1C and 2C as necessary.

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B.2 OPTION FOR POWER RESTORATION

B.2.3 A.C. Power Restoration (220KV)

4.0 Subsequent Operator Action (continued)

4.1.3.10 Establish hot standby conditions as per operating instruction SO1-3-4, "Plant Shutdown from Full Power to Hot Standby", or cold shutdown per SO1-3-5, "Plant Shutdown from Hot Standby to Cold Shutdown" as conditions warrant.

4.2 Off-site Power Restored via Aux Transformer "C".

4.2.1 If the diesel generators are NOT operating, energize the 4 KV buses as follows:

NOTE: If the diesel generators are operating, go to Step 4.2.3, page 27, of this instruction.

- .1 Verify open or open 4KV ACB 11A04, 11B04 and 11A02.
- .2 Verify closed or close 4KV ACB 11C02, 12C02, 11C01 and 12C01.
- .3 Verify closed or close current limiting reactor bypass breakers ACB RX1 and RY1.
- .4 Close auxiliary transformer "C" CB-4032 or CB-6032, this will energize 4KV buses 1A, 1B, 1C and 2C.

CAUTION: Do not close both CB's for auxiliary transformer "C" until it has been verified that the Northwest and Northeast 220KV buses are in parallel.

4.2.2 When the 4KV buses are restored, start or verify the start of the following equipment as required.

- .1 Start or verify running the electric Auxiliary Feedwater Pump and continue to bring the steam generator level to -50% using the Emergency Auxiliary Feedwater Regulators (FCV-3300, 3301, 2301 and 2300).
- .2 Start a salt water cooling pump (north or south) and secure alternate supply from screen wash or fire protection system.
- .3 Start a component cooling water pump.
- .4 Start an air compressor. The diesel driven compressor may be secured as directed by the watch engineer.
- .5 Start a charging pump, and establish charging and letdown.

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B.2 OPTION FOR POWER RESTORATION

B.2.3 A.C. POWER RESTORATION (220KV)

4.0 Subsequent Operator Action (continued)

4.2.2 (continued)

- 6 Return turbine plant cooling (TPCW) water system to service as follows:

NOTE: If a circulating water pump is to be started, backup cooling to the turbine plant cooling water heat exchanger is not required.

- 7 Close CV-516 and CV-515, TPCW supply and return valves to containment.
- 8 Start the inservice turbine plant cooling water pump.
- 9 Align the saltwater cooling pump discharge to the shell side of the TPCW heat exchanger.
- 10 Dispatch an operator to close the isolation block valve upstream of CV-516.
- 11 Open CV-516 and CV-515.
- 12 Slowly open the isolation block valve upstream of CV-516.

CAUTION: Failure to re-establish TPCW flow to containment coolers in a slow and controlled manner may cause a failure to one or more fan cooler heat exchangers.

- 13 Start RCPs if station power is from the 220KV system. Refer to Operating Instruction SOI-4-4, "Reactor Coolant Pump Startup."

CAUTION: No reactor coolant pump may be restarted until thirty (30) minutes after coolant temperature has stabilized and all feedwater flow has been secured. Allow two (2) minutes between start of each pump.

- 14 Start fans A-9 and A-9S, reactor cavity fans.

CAUTION: Failure to restart these fans may cause the nuclear instrumentation detectors to overheat.

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B.2 OPTION FOR POWER RESTORATION

B.2.3 A.C. POWER RESTORATION (220KV)

4.0 Subsequent Operator Action (continued)

4.2 Off-site Power Restored via Aux Transformer "C".

- 15 Start fans A-8, A-8S and A-8SS. Start other containment sphere fans as required.
- 16 Start a primary makeup pump.
- 17 Start a service water pump.
- 18 Place boric acid blend system in automatic. Adjust the boron concentration to the hot standby value.
- 19 As soon as possible restore power to the security UPS and the station lighting transformer.
- 20 Start the turbine auxiliary oil pump and generator air side and hydrogen side seal oil pumps. Stop the DC pumps, if in operation.
- 21 Start a circulating water pump if desired.

NOTE: If a circulating water pump is started, backup cooling to the turbine plant cooling water heat exchanger is not required.

- 22 Open turbine drain valves and verify closed or close reheater steam supply MOVs.

NOTE: Efforts shall continue to restore the diesel generators to operable status.

- 23 Establish hot standby conditions as per operating instruction SO1-3-4, "Plant Shutdown from Full Power to Hot Standby," or cold shutdown per SO1-3-5, "Plant Shutdown from Hot Standby to Cold Shutdown" as conditions warrant.

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B.2 OPTION FOR POWER RESTORATION

B.2.3 A.C. POWER RESTORATION (220KV)

4.0 Subsequent Operator Action (continued)

4.2 Off-site Power Restored via Aux Transformer "C".

4.2.3 If the diesel generator(s) is operating, restore off-site power and transfer loads to auxiliary transformer "C" as follows:

- 1 Verify open or open 4KV ACB's 11A04, 11A02, and 11B04.
- 2 Transfer all auxiliary load to one diesel generator.
- 3 Open the appropriate 4KV ACB to de-energize the unloaded 4KV bus (1C or 2C).
- 4 Close the appropriate 4KV ACB to energize the unloaded bus from the off-site source.
- 5 Close Auxiliary Transformer CB-4032 or CB-6032 to energize 4KV Bus 1C and/or 2C.

CAUTION: Do not close both CB's for Auxiliary Transformer "C" until it has been verified that the Northwest and Northeast 220KV buses are in parallel.

- 6 Transfer all auxiliary load to the 4KV Bus being supplied from off-site power.
- 7 Open the appropriate 4KV ACB to de-energize the 4KV Bus being supplied from the diesel generator.
- 8 Close the appropriate 4KV ACB's to restore power to the de-energized bus (1C or 2C).
- 9 Stop the diesel generators, as directed by the Watch Engineer, when the off-site power source is stabilized.
- 10 RCP's may be started as per SO1-4-4, "Reactor Coolant Pump Startup."

CAUTION: No reactor coolant pump may be restarted until thirty (30) minutes after coolant temperature has stabilized and all feedwater flow has been secured. Allow two (2) minutes between start of each pump.

B.2 OPTION FOR POWER RESTORATION

B.2.3 A.C. POWER RESTORATION (220KV)

4.0 Subsequent Operator Action (continued)

4.2 Off-site Power Restored via Aux Transformer "C".

4.2.3.11 Start a circulating water pump, if desired.

NOTE: If a circulating water pump is started, backup cooling to the turbine plant cooling water heat exchanger is not required.

- 12 Open turbine drain valves and verify closed reheater steam supply MOV's.
- 13 Establish hot standby conditions as per operating instruction S01-3-4, "Plant Shutdown from Full Power to Hot Standby," or cold shutdown per S01-3-5, "Plant Shutdown from Hot Standby to Cold Shutdown" as conditions warrant.

H. E. Morgan
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OPERATIONS MANAGER

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ATTACHMENT: (1 page)

