# EMERGENCY SHUTDOWN

## 1.0 SYMPTOMS

NOTE: If shutdown is due to loss of offsite power refer to Emergency Operating Instruction S-3-5.30.

1.1 Reactor plant first-out trip alarm.

1.2 Turbine-generator first-out trip alarm.

1.3 Plant electrical protection trip alarm.

1.4 Manual reactor and/or turbine trip.

## 2.0 AUTOMATIC ACTION

2.1 Reactor trip.

2.2 Turbine trip.

2.3 Automatic steam dump actuation (if trip occurs above 30% reactor power).

2.4 Turbine stop valves and control valves close.

2.5 Unit 1, PCB 412 and PCB 612 open (one (1) minute after turbine stop valves close).

2.6 At 40% nominal generator terminal voltage (7200 volts) on generator coastdown, which takes ∿ four (4) minutes following the trip, the following occurs:

2.6.1 Reactor coolant pumps A, B and C trip.

2.6.2 Exciter motor breaker opens.

2.6.3 Exciter field breaker opens.

2.7 If the trip is from electrical protection or from remote turbine trip push button, there is no generator coastdown. The following occurs:

2.7.1 Unit 1 PCB 412 and PCB 612 open immediately.

2.7.2 Exciter field breaker opens immediately.

2.7.3 Auxiliary transformer A feeder ACB 11A04 opens.

2.7.4 Auxiliary transformer B feeder ACB 11B04 opens.

2.7.5 Reactor coolant pumps A, B and C trip.

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2.0 AUTOMATIC ACTION (Con't)

2.8 If the voltage regulator is on manual control at the time of the trip:

2.8.1 Field breaker trips open.

2.8.2 18KV voltage decays.

2.8.3 Generator inertia coastdown is not effective.

2.9 When Tavg < 545°F, steam generator feedwater valves position to pass 5% of full load flow.

2.10 When turbine lube oil pressure <10 psig, auxiliary lube oil pump starts automatically.

2.11 When turbine speed reaches "0", turbine is automatically placed on the turning gear operation.

3.0 IMMEDIATE OPERATOR ACTION

3.1 Verify the following:

3.1.1 Reactor trip.

3.1.2 Control rods fully inserted into the core.

3.1.3 Turbine stop and control valves closed.

3.1.4 Unit 1 PCB 412 and PCB 612 open.

3.1.5 Exciter field breaker open.

3.2 Observe operation of feedwater control system.

3.2.1 Assume manual control, if steam generator level is abnormally low or high.

3.2.2 Slowly re-establish normal water level to approximately 50%.

3.3 Observe steam dump system operation, transfer to "Atmos-Condenser" when Tavg approaches 535°F.

3.4 Transfer NIS recorder to intermediate range channels.

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4.0 SUBSEQUENT OPERATOR ACTION

NOTE: List pre-trip and first-out alarms before resetting annunciators.

4.1 Verify termination of generator coastdown at 40% of nominal terminal voltage (7200 volts).

4.2 Restore power to 4KV buses 1A and 1B (from Auxiliary Transformer C).

4.1.1 Open auxiliary transformer A feeder ACB 11A04.

4.1.2 Open auxiliary transformer B feeder ACB 11B04.

4.1.3 Close bus 1A-1C tie ACB 11C01.

4.1.4 Close bus 1B-1C tie ACB 12C02.

4.3 Immediately within one (1) minute following the reactor coolant pumps' trip, start pumps A and C, or B for recirculation and pressurizer sprays.

CAUTION: If all three pumps are tripped for more than one (1) minute, no pump may be restarted until thrity (30) minutes after reactor coolant temperature has stabilized and all feedwater flow has been secured.

CAUTION: Allow two (2) minutes between the start of additional pumps.

4.4 Open turbine drain valves.

4.5 Close reheater steam supply MOV's.

4.6 Verify start of turbine auxiliary oil pump.

4.7 Align backup station power (220KV/18KV System).

4.7.1 Open generator motor operated disconnect switch.

4.7.2 If trip was not from transformer protection:

.1 Reset lockup bus.

.2 Close Unit 1 PCB 412 and PCB 612.

.3 Notify Mira Loma Switching Center as soon as practical.

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4.0 SUBSEQUENT OPERATOR ACTION (Con't)

4.8 Upon a unit trip, notify the "duty" station administrator and discuss the situation. If unable to contact any station administrator in the normal reporting chain within 15-20 minutes following the trip, notify the NRC via the red phone.

4.9 Verify proper operation of automatic turbine turning gear engagement.

4.10 Determine cause of the emergency shutdown and initiate the necessary corrective actions.

4.11 As soon as possible following a unit trip and prior to return to criticality, conduct a containment inspection to check for any fluid system leakage including RCP oil leakage.

4.12 Establish Hot Standby (S-3-1.4), Hot Shutdown (S-3-1.13) or Cold Shutdown (S-3-1.5) as conditions warrant.

4.13 Isotopic analysis for iodine in the reactor coolant must be made between 2 and 6 hours following a thermal power change exceeding 15% within a one hour period.

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