This procedure may be affected by an O T.S.C (On The Spot Change) verify information prior to use.
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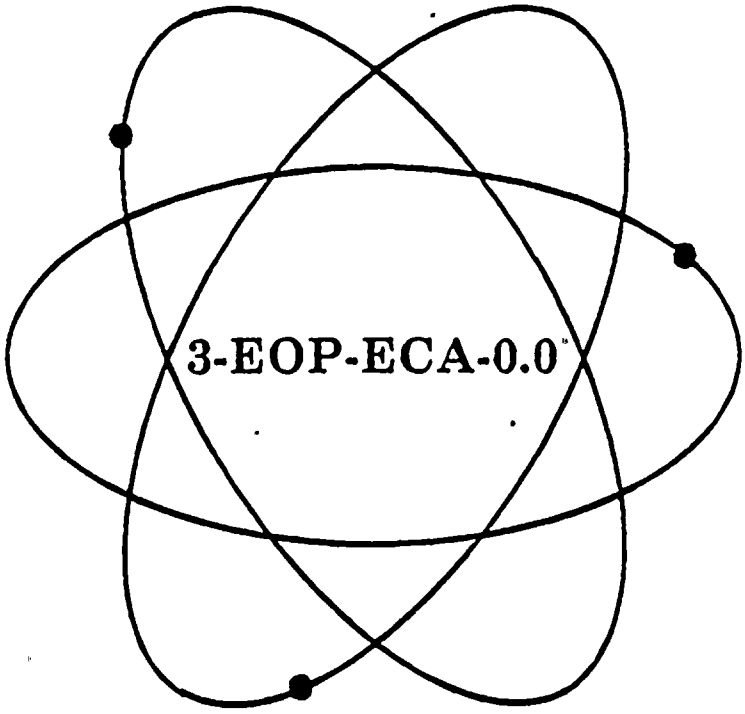
Florida Power & Light Company

Turkey Point Nuclear Plant

Unit 3



Title:

LOSS OF ALL AC POWER

Safety Related Procedure

Responsible Department:	Operations
Reviewed by PNSC:	89-121
Approved by Plant Manager-N:	3/21/89

RTSs 87-0742, 88-0450P, 88-0599P, 88-2137P, 88-2761P, 88-2789
RTS 89-0821P *PC/M 88-461*

*/HEB/ec/dj/bc

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1.0 PURPOSE

This procedure provides actions to respond to a loss of all ac power.

2.0 SYMPTOMS OR ENTRY CONDITIONS

2.1 The symptom of a loss of all ac power is the indication that all 4KV buses are deenergized.

2.2 This procedure is entered from E-O, REACTOR TRIP OR SAFETY INJECTION, Step 3, on the indication that all 4KV buses are deenergized.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

- *Steps 1 through 4 are IMMEDIATE ACTION steps.*
- *CSF Status Trees should be monitored for information only. FRPs should not be implemented.*

1 Verify Reactor Trip:

- Rod bottom lights - ON
- Reactor trip and bypass breakers - OPEN
- Rod position indicators - AT ZERO
- Neutron flux - DECREASING

Manually trip reactor.

2 Verify Turbine Trip:

a. All turbine stop valves - CLOSED

a. Manually trip turbine.

b. Generator Breaker - OPEN (Normally 30 second delay)

b. Manually open breakers. IF breaker position indication is NOT available AND turbine speed is NOT decreasing, THEN direct Turbine Operator to locally trip the generator breakers from the switchyard.

1) 8W33

2) 8W68

NOTE

If trip occurred while timing in the reheater, manual isolation of the timing valves is required.

c. CLOSE - Reheat steam supply MOVs

c. Manually isolate.

3 Check if RCS is Isolated:

a. PRZ PORVs - CLOSED

a. IF PRZ pressure less than 2335 psig, THEN manually close PORVs.

b. Letdown isolation valves - CLOSED

b. Manually close valves.

c. Excess letdown isolation valves - CLOSED

c. Manually close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

In the event that both Units require AFW under Natural Circulation conditions and only one AFW pump is operable, within 3 minutes the AFW flow controllers should be placed in manual and adjusted to 300 GPM per Unit rather than the 130 GPM per S/G value given in Step 4.

4 Verify AFW Flow - GREATER THAN 130 GPM per S/G

Perform the following

a. Verify AFW pump running IF NOT THEN manually open steam supply valves

b. Verify proper alignment of AFW valves, IF NOT, THEN manually align valves as necessary.

c. If AFW cannot be established, THEN refer to Attachment C to restore power to Bus 3C in order to repower standby SGFP while continuing with Step 5.

CAUTION

- *When power is restored to any 4KV bus, recovery actions should continue starting with Step 23.*
- *IF an SI signal exists or IF an SI signal is actuated during this procedure, it should be reset to permit manual loading of equipment on the 4KV bus.*

5 Place Following Equipment Switches in PULL-TO-LOCK or OFF Position:

a. High-head SI pumps

b. RHR pumps

c. Containment spray pumps

d. CCW pumps

e. | Emergency containment filter and cooler fans |

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6	Try to Restore Power to the 4KV Buses	
	a. Start diesel generator	a. Emergency start diesel generators by performing steps of Attachment A.
	b. Energize the 4KV buses by manually closing the A(B) D/G output breaker	b. Go to Attachment B, energizing the 3A 4KV Bus Utilizing the Unit 4 Startup Transformer.
	c. Verify 4KV Buses - AT LEAST ONE ENERGIZED	c. Go to Step 8
	d. Go to Step 23	
7	Continue to Next Step	
8	Dispatch Personnel To Locally Close The Following Isolation Valves: a. 3-297A RCP-A Seal Injection Manual Isolation Valve b. 3-297B RCP-B Seal Injection Manual Isolation Valve c. 3-297C RCP-C Seal Injection Manual Isolation Valve d. MOV-3-381 RCP seal return isolation valve e. MOV-3-626 RCP thermal barrier CCW return isolation valve	
9	Continue To Next Step	
10	Check S/G Status:	Manually close valves. IF valves can NOT be manually closed, THEN locally close valves.
	a. Main steamline isolation and bypass valves -CLOSED	
	b. Main FW control and bypass valves - CLOSED	
	c. S/G Blowdown isolation valves - CLOSED	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

A faulted or ruptured S/G that is isolated should remain isolated. Steam supply to the AFW pump must be maintained from at least one S/G.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11	Check If S/Gs Are Not Faulted:	
	a. Check pressures in all S/Gs - • NO S/G PRESSURE DECREASING IN AN UNCONTROLLED MANNER • NO S/G COMPLETELY DEPRESSURIZED	a. Isolate faulted S/G(s): • Isolate AFW flow. • Reset SI IF necessary • Place S/G feedwater pump cntrl sw to off. • Close steam supply valve from faulted S/G to AFW pump. • Verify S/G steam dump to atmosphere. closed. IF NOT, THEN manually close.
12	Check If S/G Tubes Are Not Ruptured: • Condenser air ejector radiation- NORMAL • S/G blowdown radiation - NORMAL	Try to identify ruptured S/G(s). Continue with Step 13. WHEN ruptured S/G(s) identified, THEN isolate ruptured S/G(s): • Reset SI is necessary • Place S/G feedwater pump cntrl sw to OFF • Isolate AFW flow, to the affectea S/G. • Close steam supply valve from ruotured S/G to AFW pump. • WHEN S/G pressure less than 1060 PSIG, THEN verify S/G steam dump to atmosphere closed IF NOT, THEN manually close.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

In the event that S/G C is ruptured valve 3-006 and 3-007 will require repositioning to provide steam supply to the A AFW pump.

13 Check Intact S/G Levels:

a. Narrow range level - GREATER THAN 6% [32%]

b. Control AFW flow to maintain narrow range level between 6% [32%] and 50%

a. Maintain maximum AFW flow until narrow range level greater than 6% [32%]

b. IF narrow range level in any S/G continues to increase in an uncontrolled manner, THEN isolate ruptured S/G:

- Reset SI if necessary
- Place S/G feedwater pump cntrl sw to OFF
- Isolate AFW flow.
- Close steam supply valve from ruptured S/G to AFW pump.
- WHEN S/G pressure less than 1035 PSIG, THEN verify S/G steam dump to atmosphere valves closed. IF NOT, THEN manually close.

14 Check DC Bus Loads:

a. Shed all large non-essential DC loads:

1) Perform steps of Attachment D while continuing with procedure

b. Dispatch personnel to locally monitor DC power supply.

15 Check CST Level - GREATER THAN 10%

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

S/G pressures should not be decreased to less than 90 PSIG to prevent injection of accumulator nitrogen into the RCS.

NOTE

- *The S/Gs should be depressurized at maximum rate to minimize RCS inventory loss.*
- *PRZ level may be lost and reactor vessel upper head voiding may occur due to depressurization of S/Gs. Depressurization should not be stopped to prevent these occurrences.*

16 **Depressurize Intact S/Gs To 190 PSIG:**

a. Check S/G narrow range levels - GREATER THAN 6% [32%] in at least one S/G

a. Perform the following:

1) Maintain maximum AFW flow until narrow range level greater than 6% [32%] in at least one S/G.

2) Continue with step 17. WHEN narrow range level greater than 6% [32%] in at least one S/G, THEN do Steps 16b, c,d and e.

b. Manually dump steam at maximum rate using S/G steam dump to atmosphere valves

c. Check RCS cold leg temperatures - GREATER THAN 346°F [347°F]

c. Perform the following:

1) Control S/G steam dump to atmosphere valves to stop S/G depressurization.

2) Continue with Step 17.

d. Check S/G pressures -LESS THAN 190 PSIG

d. Continue with Step 17. WHEN S/G pressures decreased to less than 190 PSIG, THEN do Step 16e.

e. Manually control S/G steam dump to atmosphere to maintain S/G pressures at 190 PSIG

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

17 Check Reactor Subcritical:

- INTERMEDIATE RANGE CHANNELS - ZERO OR NEGATIVE STARTUP RATE
- SOURCE RANGE CHANNELS - ZERO OR NEGATIVE STARTUP RATE

Control S/G Steam Dump to Atmosphere valves to stop S/G depressurization and allow RCS to heat up.

NOTE

Depressurization of S/Gs will result in SI actuation. SI should be reset to permit manual loading of equipment on 4KV bus.

18 Check SI Signal Status:

a. SI - HAS BEEN ACTUATED

a. Go to Step 22. WHEN SI actuated, THEN do Steps 18b, 19, 20 and 21.

b. Reset SI if necessary

19 Verify Containment Isolation Phase A:

a. Phase A - ACTUATED

a. Manually actuate Phase A.

b. Phase A valves - CLOSED

b. Manually close valves. IF valves can NOT be manually closed, THEN locally close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20	Verify Containment Ventilation Isolation:	
	a. Containment purge and supply fans OFF	a. Place control switch in OFF position
	b Purge valves - CLOSED	b. Manually close purge valves. IF purge valves can NOT be manually closed, THEN locally close purge valves.
	c. Instrument air bleed valves - CLOSED	c. Manually close valves.
21	Check Containment Pressure - HAS REMAINED LESS THAN 20 PSIG	Perform the following: a. Verify containment spray signal actuated. IF NOT, THEN manually actuate. b. Verify containment isolation Phase B valves closed. IF NOT, THEN manually close valves. IF valves can not be manually closed, THEN locally close valves. c. Reset containment spray signal.
22	Check Containment Radiation -LESS THAN CONTAINMENT Ventilation Isolation Setpoint.	Manually close containment isolation valves as necessary. IF valves can NOT be manually closed, THEN locally close valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23	**Check If 4KV Bus Power Is Restored:**	
	a. Check 4KV buses - AT LEAST ONE ENERGIZED	a. Continue to control RCS conditions and monitor plant status: 1) Check status of local actions: • 4 KV Bus power restoration • RCP seal isolation • DC power supply 2) Check status of auxiliary boration systems: IF • BAST temperature is less than 155°F THEN consult TSC staff for possible boric acid concentration reduction or drainage of the BASTs 3) Check status of spent fuel cooling: • Spent fuel pit low level alarm cleared (H1/1) IF low level alarm is ON THEN dispatch personnel to initiate makeup to the spent fuel pit: Per ONOP-033.1, SPENT FUEL PIT EMERGENCY COOLING 4) Return to Step 15.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24	Stabilize S/G Pressures: a. Manually control S/G steam dump to atmosphere Valves.	

CAUTION

Loading on the EDG should not exceed the Orange mark (2000 hour rating of 2850 KW). However, loads placed on the energized 4 KV buses (the power source) may approach the Red mark (168 hour rating) on the wattmeter for short periods.

25	Verify Following Equipment Loaded On 4KV Bus	Manually load equipment as necessary.
	a. 480 Volt Load Centers - ENERGIZED	a. Manually close load control center breakers as necessary.
	b. IF A and B 4KV buses ENERGIZED THEN verify proper battery charger and inverter operation.	
26	Continue to Next Step	
27	Select Recovery Guideline:	
	a. Check RCS subcooling based on core exit TCs -GREATER THAN 30°F [45%]	a. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	b. Check PRZ level - GREATER THAN 12% [50%]	b. Go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.
	c. Check if SI HAS BEEN ACTUATED	c. Go to ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, Step 1.
	d. IF SI actuated, THEN go to ECA-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, Step 1.	

END OF TEXT

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A

MANUAL START OF DIESEL GENERATOR

1.	Verify All Breakers On The Affected 4KV 3A(38) Buses Are In The OPEN Position	1 Manually trip breakers
2.	Place the LOCAL/NORMAL selector switch to OFF.	
3.	Verify That The Following Conditions Exist At The local Diesel Generator A (B) Alarm Panel	3. Take required action.
	a. Low fuel light is OFF	a. Gravity feed fuel using local pushbutton.
	b. Low air light OFF	b. Valve in isolated air tank.
	c. Power light is ON	c. Refer to DG breaker alignment as per 0-OP-023,EMERGENCY DIESEL GENERATOR
	d. Verify overspeed trip light OFF	d. Reset overspeed trip relay.
	e. Verify hot engine light - OFF	e. Position key switch to BYPASS
	f. Verify crank case pressure light OFF	f. Position key switch to BYPASS
	g. Verify low water light OFF	g. Position key switch to BYPASS
	h. Verify oil pressure light OFF	h. Position key switch to BYPASS
	i. Verify oil TEMP light OFF	i. Position key switch to BYPASS
	j. Verify start failure light OFF	j. Push the ALARM RESET and STOP pushbutton.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A (Cont'd)

MANUAL START OF DIESEL GENERATORS

3.	Cont'd.	
	k. Verify the following D/G relay status: 1) D/G lockout relay - No Trip Target 2) Voltage Relay Flag - No Flag 3) Reverse Power flag - No Flag 4) Overcurrent Phase A - No Flag 5) Overcurrent Phase B - No Flag 6) Overcurrent Phase C - No Flag 7) Differential Phase A - No Flag 8) Differential Phase B - No Flag 9) Differential Phase C - No Flag	IF D/G lockout relay target is present and any of the 8 relays flags are present THEN go to the other Diesel A(B) and Step 2 of Attachment A IF relay flags exist on both diesel generators, Go to Attachment B, ENERGIZING 3A 4KV BUS USING THE UNIT 4 STARTUP TRANSFORMER.
4.	Verify The Diesel Generator Lockout Relay Is Reset	4. Push the Alarm Reset and Stop pushbutton and Reset the D/G lockout relay.
5.	Verify The Diesel Generator Trouble Key Switch Is In The BYPASS Position.	5. Place the Key Switch in the BYPASS position.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A (Cont'd)

MANUAL START OF DIESEL GENERATORS

CAUTION

Depressing the "Alarm Reset and Stop" Pushbutton while diesel is in operation will stop the diesel.

6.	Push The "Alarm Reset And Stop" Pushbutton On The Diesel Panel	

NOTE

IF the emergency start signal still exists, the EDG should start on actions of Step 7.

7.	Place the LOCAL/NORMAL selector switch to normal and verify diesel starts.	7. Notify Control Room that EDG is ready for remote start attempt and operation.
8.	Verify With Control Room That Remote Diesel Operation Is Satisfactory	8 Go to Step 10.
9.	Go To Step 6b Of ECA-0.0, LOSS OF ALL AC POWER	
10.	IF Instructed To Operate Diesel Locally THEN Go To Step 11	
11.	Place The LOCAL/NORMAL Switch To Local	
12.	Push The D/G Start Button And Verify The DG Starts	12 Go to other D/G (A) (B) and perform steps of Attachment A steps 1 through 12, IF other D/G (A) (B) will not start THEN go to Attachment B.
13.	Verify Diesel Generator Reaches 900 RPM	13 Adjust Diesel RPM to 900.
14.	Verify Diesel Generator Frequency Is At 60 HZ	14 Adjust Diesel frequency to 60 HZ.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT A (Cont'd)

MANUAL START OF DIESEL GENERATORS

15.	Verify Diesel Generator Voltage And Frequency With Control Room RCO	
16.	Place Synchronizing Key Into Switch And Turn To "ON"	
17.	Close Diesel Generator Output Breaker To 4KV (3A) (3B) Bus	17 Go to other Diesel (A), (B) and perform steps of Attachment A steps 1 through 16. IF other diesel breaker will not close to 4KV bus. THEN Go to Attachment B.
18.	Verify Droop On Diesel Generator Is At Zero	18 Adjust Droop to zero
19.	Go To Step 6c Of ECA-0.0 LOSS OF ALL AC POWER	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT B

ENERGIZING THE 3A 4KV BUS UTILIZING THE UNIT 4 SU TRANSFORMER

1.	Verify That All Breakers On The 3A 4KV Bus Are In The OPEN Position	1. Manually open all breakers
2.	Verify Potential On The Unit 4 Start Up Transformer (white light above frequency recorder)	2. Go to Attachment C, Energizing the 3A 4KV bus utilizing the unit 1 and 2 cranking diesels.
3.	Verify That 3A 4KV Bus Lockout Has Not Occurred	3. Reset lockout relay.
4.	Unlock feeder Breaker 3AA22, Unit 4 Start Up Transformer To The 3A 4KV Bus	4. Go to Attachment C
5.	Rack In Breaker 3AA22, Unit 4 Start Up Transformer To The 3A 4KV Bus	5. Go to Attachment C
6.	Close Breaker 3AA22, Unit 4 Start Up Transformer To The 3A 4KV Bus	6. Go to Attachment C
7.	Verify 4160V On 3A 4KV Bus	7. Go to Attachment C
8.	Go To ECA-0.0, LOSS OF ALL AC POWER Step 23	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT C

ENERGIZING THE 4KV BUS UTILIZING THE UNIT 1 AND 2 CRANKING DIESELS

1.	Unlock And Rack In The Following Breakers a 1W134-Cranking diesel tie to 4KV bus b 3AC03-C bus tie to cranking diesels c 4AC03-Unit 4 C bus tie to cranking diesels d 3AC13-3C bus supply breaker to 3A and 3B 4KV bus	
2.	Verify All Breakers On The 3C 4KV Bus In The OPEN Position	2. Manually open breakers.
3.	Request Unit 1 And 2 Watch Engineer To Start Any Two Cranking Diesels	
4.	CLOSE Breaker 1W134, Cranking Diesel Tie To 4KV C Bus	4. Manually close breaker.
5.	CLOSE Breaker 3AC03, C Bus Tie To Cranking Diesels	5. Go to ECA-0.0, LOSS OF ALL AC POWER, Step 8.
6.	Verify 4160V On Bus 3C	6. Go to ECA-0.0, LOSS OF ALL AC POWER, Step 8.
7.	Verify All Breakers On The 3A 4KV Bus In The OPEN Position	7. Manually open all breakers.
8.	Verify That 3A 4KV Bus Lockout Has Not Occurred	8. Reset lockout relay.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT C (Cont'd)

ENERGIZING THE 4160V 4KV BUS UTILIZING THE UNIT 1 AND 2 CRANKING DIESELS

CAUTION

The load on the tie line from the Cranking Diesels is limited to 5000 KW. Maintaining equal to or less than 630 AMPS total on the Cranking Diesel Ammeter is required.

9.	CLOSE Bus Tie Breaker 3AC13, 3C Bus Supply Breaker To 3A And 3B 4KV Bus	9. Manually close breaker.
10.	Rack In And Close Bus Tie Breaker 3AA09, 3C Bus Supply Breaker To 3A 4KV Bus	10. Manually close breaker.
11.	Verify 4160V On 3A 4KV Bus	11. IF 4160V cannot be verified on the 3A 4KV bus, energize the 3B 4KV bus by closing Breaker 3AB22. IF 3B 4KV bus cannot be energized THEN go to ECA-0.0, LOSS OF ALL AC POWER Step 8.
12.	Go to ECA-0.0, LOSS OF ALL AC POWER, Step 23	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT D

125V DC BUS SHEDDING

1 Dispatch Operator to 125V DC Bus 3A (3DO1) and place the following Breakers in the OFF position.

a. 3D01-2 GEN 3 Excitation SWGR

b. 3D01-10 Gas Stripper Panel 3C30

c. 3D01-11 Main Transformer 3(3X01)

d. 3D01-12 Radwaste Building DISTR Panel DP-65

e. 3D01-13 Unit AUX Transformer (3X02)

f. 3D01-17 Water Treatment Panel C22

g. 3D01-30 CRD MG set 3A Flashing and Breaker Control

h. 3D01-34 CRD MG set 3A Flashing and Breaker Control

i. 3D01-38 Rx Trip SWGR Rx Trip BKR A and Bypass BKR B (3C35)

j. 3D01-40 Rx Protection Relay Racks 3QR32, 3QR33, 3QR34, 3QR35 and 3QR36.

k. 3D01-49 Supply to Rod Position Inverter 3Y03

2 When visual Inspection reveals that the turbine is not rotating place the Emergency Bearing Oil Pump control switch in the PULL-TO-LOCK position.

3 Dispatch operator to 125V DC Bus 3D31 and place the following breakers in the OFF position.

a. 3D31-26 Air Side Seal Oil Backup Pump

b. 3D31-27 Emergency Bearing Oil Pump

4 Dispatch operator to begin a CO_2 purge of the main generator.

FINAL PAGE