FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT NO. 1
EMERGENCY OPERATING PROCEDURE NUMBER 1-0030143
REVISION 0

1.0 TITLE:

TOTAL LOSS OF AC POWER

2.0 APPROVAL:

Reviewed by Facility Review Group August 7 19 82

Approved by C M Wethy Plant Manager 8-4- 1982

Revision ____ Reviewed by FRG _____ 19____

Approved by _____ Plant Manager _____ 19____

3.0 PURPOSE AND DISCUSSION:

3.1 See Appendix A.

4.0 SYMPTOMS:

4.1 Loss of power to 1A1, 1B1 6.9KV Bus.

4.2 Loss of power to 1A2, 1A3, 1B2, 1B3 and 1AB 4.16KV Bus.

5.0 INSTRUCTIONS:

5.1 Automatic Actions

5.1.1 Reactor Trip.

5.1.2 Turbine Trip/Generator Lockout.

5.1.3 Auxiliary Feedwater Auto Actuation.

5.1.4 PORV's Operate.

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5.0 INSTRUCTIONS: (Cont.)

5.2 Immediate Operator Actions

5.2.1 Insure all CEA's on bottom, and reactor trip breakers open.

5.2.2 Insure Auxiliary Feedwater Pump 1C is restoring Steam Generator level.

5.2.3 Place Reheat Control System in MANUAL and close TCV's.

5.2.4 Insure PORV's reseat if actuated. If not, close appropriate block valve(s).

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5.0 INSTRUCTIONS: (Cont.)

5.3 Subsequent Actions

5.3.1 Insure generator OCB's and field breaker open.

5.3.2 Open 30102 (S.U. Transformer to 1A1 6.9KV bus).
Open 30202 (S.U. Transformer to 1B1 6.9KV bus).
Open 20102 (S.U. Transformer to 1A2 4.16KV bus).
Open 20302 (S.U. Transformer to 1B2 4.16KV bus).

5.3.3 Insure D/G breakers open (1A-20211 and 1B-20401).

5.3.4 Insure 1AB 4.16KV bus feeders are open:

20208, 20505 (1A3 4.16KV to 1AB 4.16KV bus).
20409, 20504 (1B3 4.16KV to 1AB 4.16KV bus).

5.3.5 Open 40103 (1A2 4.16KV feed to 1A1 L.C.-Hi side).
Open 20110 (1A2 4.16KV feed to 1A1 L.C.-Lo side).
Open 40203 (1A3 4.16KV feed to 1A2 L.C.-Hi side).
Open 20210 (1A3 4.16KV feed to 1A2 L.C.-Lo side).

5.3.6 Open 40403 (1B2 4.16KV feed to 1B1 L.C.-Hi side).
Open 20310 (1B2 4.16KV feed to 1B1 L.C.-Lo side).
Open 40503 (1B3 4.16KV feed to 1B2 L.C.-Hi side).
Open 20402 (1B3 4.16KV feed to 1B2 L.C.-Lo side).

5.3.7 Insure 1AB 480V Load Center Feeders are open:

40204, 40702 (1A2 480V L.C. to 1AB).
40706, 40504 (1B2 480V L.C. to 1AB).

5.3.8 Close HCV-08-1A (1A S/G MSIV).
Close MV-08-1A (1A S/G MSIV bypass).
Close HCV-08-1B (1B S/G MSIV).
Close MV-08-1B (1B S/G MSIV bypass).

5.3.9 Open 1A and 1B Atmospheric Dump Valves to reduce Steam Generator pressure below safety lift pressure.

1. If instrument air pressure has decayed, local operation is necessary.

2. Maintain communication with local operator.

5.3.10 Close AOV-2515 and AOV-2516 (CVCS Letdown Isolation).

5.3.11 Close FCV 23-3, 4, 5 and 6 (1A and 1B S/G Blowdown Isolations).

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5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5.3.12 Close FCV-23-7 and FCV-23-9 (1A and 1B S/G Blowdown Sample Isolations).

5.3.13 Close AOV-5200, 5201, 5202, 5203, 5204 and 5205 (RCS Sample Isolations).

5.3.14 Implement the Emergency Plan as necessary in accordance with EP 3100021E, "Duties of the Emergency Coordinator."

5.3.15 Minimize atmospheric steam dump use thereby insuring minimum RCS heat loss; however,

1. Maintain S/G pressure less than S/G safety setpoint.

2. With decreasing RCS pressure, maintain hot leg temperature (Th) at least 20°F below the saturation temperature corresponding to the RCS pressure.

5.3.16 Verify by the following indications that natural circulation flow has been established within approximately 15 minutes after RCP's were stopped.

1. Loop Delta T less than normal full power Delta T (<46°F).

2. Cold leg (Tc) constant or decreasing.

3. Hot leg (Th) stable (i.e., not steadily increasing).

5.3.17 If RCS pressure decreases to 1700 psia, verify receipt of block permissive annunciator R-6 and block SIAS.

5.3.18 Notify system dispatcher of plant conditions and request most urgent priority in restoring off-site power.

5.3.19 If 1C Auxiliary Feedwater Pump is stopped or flow is lost, and Steam Generator level is less than 42%, then:

1. Reinitiate auxiliary feed flow as soon as possible; however, do not exceed a flow rate of 150 GPM per affected Steam Generator.

2. Limit feed flow rate to 150 GPM per affected Steam Generator until continuous feed flow to the affected Steam Generator has been maintained for five minutes.

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5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5.3.20 Use all available resources to restore one emergency diesel generator to operable status.

i. (Insert techniques later)

5.3.21 The following restoration sequence assumes "A" train power supply is restored first.

1. Strip all vital and non-vital load center breakers in preparation for a systematic power restoration.

2. Energize 1A3 4.16KV bus by either:

   a. Starting 1A D/G and closing D/G breaker. Adjust and maintain voltage and frequency at 4.16KV/60 HERTZ.

   or

   b. Close 20102 (S.U. Transformer to 1A2 4.16KV bus). Close 20109 (1A2 4.16KV to 1A3 4.16KV bus). Insert sync plug and close 20209 (1A2 4.16KV to 1A3 4.16KV bus).

3. Energize 1A2 480V Load Center as follows:

   a. Close 40203 (1A3 4.16KV feed to 1A2 L.C.-Hi side).

   b. Close 20210 (1A3 4.16KV feed to 1A2 L.C.-Lo side).

4. Energize 1AB 480V Load Center by closing 40204 and 40702 (1A2 480V L.C. feed to 1AB L.C.).

5. Energize 1A5, 1A6, 1A7 and 1A8 480V MCC's as follows:

   a. Close 40214 (1A2 480V L.C. feed to 1A5 MCC).

   b. Close 40218 (1A2 480V L.C. feed to 1A6 MCC).

   c. Close 40219 (1A2 480V L.C. feed to 1A7 MCC).

   d. Close 40215 (1A2 480V L.C. feed to 1A8 MCC).

   e. Open 41230 (1A5 MCC supply to 1A containment instrument air compressor).

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5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5.3.21 (Cont.)

6. Energize non-essential sections of 1A5, 1A6 and 1A8 MCC's as follows:

   a. Close 41230 (MCC 1A5 non-essential breaker).

   b. Close 41325 (MCC 1A6 non-essential breaker).

   c. Close 41513 (MCC 1A8 non-essential breaker).

7. Insure 1A battery charger is "ON LINE" supplying the 1A DC bus by observing 1A DC bus voltage on RTGB 101 to be greater than 120V DC.

8. Align and start emergency cooling water to the instrument air compressor. Start the 1A instrument air compressor and observe restoration of instrument air pressure.

9. Start 1A Charging Pump and 1A HPSI pump, if necessary, to reestablish pressurizer level.

   a. Evaluate RCS temperature, pressure, and level instrumentation to determine if a bubble exists other than in the Pressurizer.

   b. If evaluation confirms, then continue charging to increase RCS pressure.

   c. When greater than 20°F subcooled, operate Charging and/or HPSI pumps to maintain Pressurizer level greater than 30% level.

10. Insure closed 20204 (Pressurizer heater transformer 1A 4.16KV feed).

11. When pressurizer level indicates greater than 30%, energize pressurizer heaters B-1, B-2, B-3, and P-1.

12. Reestablish CVCS letdown to maintain Pressurizer level at normal operating level.

13. Commence boration to Cold Shutdown boron concentration.

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5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5.3.21 (Cont.)

14. Start one set of cavity and support cooling fans.

15. If power was restored via 1A emergency D/G, proceed to step 16; otherwise:

    a. Energize 1A1 480V Load Center by closing 20110 (1A2 4.16KV feed to 1A1 480V L.C.).

    b. Start 1A Domestic Water Pump to supply water for Intake Cooling Water Pump start. Go to step 17.

16. Energize 1A1 480V Load Center as follows:

    a. Insert sync plug, close 20109, and hold control switch closed while closing 20209.

    b. Close 20209 and release 20109 hand switch.

    c. Close 20110 (1A2 4.16KV feed to 1A1 480V load center).

    d. While loading secondary plant equipment, insure diesel loading remains less than 3500 KW.

17. Start 1A Domestic Water Pump to supply water for Intake Cooling Water Pump start.

18. Reestablish "A" train Intake Cooling Water System as follows:

    a. Establish seal water.

    b. Throttle 1A I.C.W. pump dishcarge valve.

    c. Start 1A I.C.W. pump; pressurize and vent "A" I.C.W. header.

    d. After venting, open 1A I.C.W. pump discharge valve.

5.0 INSTRUCTIONS: (Cont.)

5.3 (Cont.)

5.3.21 (Cont.)

19. Reestablish "A" train Component Cooling Water System as follows:

    a. Isolate CCW to RCP's by closing HCV-14-1, 2, 6 and 7 (to prevent thermal shocking RCP seals)

    b. Throttle 1A CCW pump discharge valve.

    c. Insure surge tank at normal level.

    d. Start 1A CCW pump; pressurize and slowly open 1A CCW pump discharge valve.

20. Proceed to EOP 0120040, "Natural Circulation/Cooldown," step 5.3.9, and perform in conjunction with the balance of this procedure.

21. Restore balance of secondary plant in accordance with EOP 0030140, "Blackout Operation."

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APPENDIX A

DISCUSSION

The "Total Loss of AC Power" event consists of a loss of off-site power in conjunction with failure of the Emergency Diesel Generators to provide emergency power. This results in a loss of all AC electrical power except that provided by inverters powered from the vital DC busses. The termination of AC power causes a loss of forced reactor coolant flow, main feedwater flow, steam flow to the turbine and pressurizer pressure control. The reactor trips on either low reactor coolant flow, high reactor coolant system (RCS) pressure or low steam generator level depending on initial conditions.

The "Total Loss of AC Power" event also causes a loss of all reactor coolant system makeup capability which includes charging and safety injection flow. Inventory losses through leakage, reactor coolant pump controlled bleedoff, and primary relief valve releases are the major contributors to the degradation of pressure and level control during the event. The other contributor to coolant system shrinkage and pressure reduction is system heat loss, primarily through the pressurizer walls.

Core heat removal is accomplished through natural circulation. Reactor coolant system heat removal is accomplished using atmospheric dump valves and the steam driven auxiliary feedwater pump.

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ADDENDUM INSTRUCTION SHEET

FOR PROCEDURE COMPLETION TO BE DONE BY TECHNICAL STAFF

VERTICAL LINES must be added as follows:

CHARTS AND GRAPHS must be added as follows:

HORIZONTAL LINES must be added as follows:

OTHER SYMBOLS must be added as follows:

Verified by Vault Custodian