DOCUMENT REVISION DISTRIBUTION SHEET - OFF NORMAL & EMERGENCY OPER. PROCEDURE

DOCUMENT TITLE Charging and Letdown - Off-Normal Operation

DOCUMENT FILE NUMBER 0210030

DOCUMENT REVISION NUMBER 6

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FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT #1
OFF-NORMAL OPERATING PROCEDURE NO. 0210030, REV. 6

1.0 Title:

Charging and Letdown - Off Normal Operation

2.0 Review and Approval:

Reviewed by Plant Nuclear Safety Committee July 29 1975
Approved by R.E. Uhrig Plant Manager August 25 1975

Revision 3 Reviewed by FRG September 21 1976
Approved by J.H. Barrow, Jr. Plant Manager 9-21 1976

Revision 6 reviewed by FRG November 6, 1981.
Approved by C.M. Wethy Plant Manager Nov. 11 1981.

3.0 Purpose or Discussion:

3.1 This procedure provides instructions for re-establishing charging and letdown flow or isolating affected components following a malfunction in the charging or letdown systems.

4.0 Symptons:

4.1 Charging pumps low flow (M-14)

4.2 Charging pumps low header pressure (M-15

4.3 Letdown high flow (M-13)

4.4 Letdown high-low pressure (M-5)

4.5 Volume control tank high temperature (M-19)

4.6 Boronometer and process radiation monitor Low Flow (M-17)

4.7 Ion exchanger bypass high temperature (M-10)

4.8 VCT outlet valve V2501 indicates not open

4.9 Charging pumps not running (M-22, M-23, M-24, M-30, M-31, M-32, M-46, M-47 and M-48)

4.10 Pressurizer level deviation (H-19, H-20, H-25, and H-26)

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CHARGING AND LETDOWN - OFF NORMAL OPERATING

5.0 Instructions:

5.1 Immediate automatic operations

5.1.1 Regenerative heat exchanger high outlet temperature of 470°F closes letdown isolation valve V2515.

5.1.2 Hi ΔP across the regenerative Hx of 275 psi closes letdown isolation valve V2516.

5.1.3 Charging pumps trip on low suction pressure of 10 psia.

5.1.4 Letdown heat exchanber high outlet temperature of 145°F isolates flow to the boronometer and process radiation monitor and diverts letdown flow past the purification ion exchangers.

5.2 Immediate Operator Actions

5.2.1 Verify any automatic actions have occurred if called upon to do so.

5.2.2 Immediately secure charging (letdown) if letdown (charging) is lost.

5.2.3 On any abnormal condition involving loss of letdown or charging flow, hold power constant to minimize pressurizer level deviations.

5.2.4 Investigate cause of problem.

5.3 Subsequent actions

5.3.1 Notify plant supervisor-nuclear of any abnormal conditions.

5.3.2 Re-establish charging and letdown flow _____ as follows:

5.3.2.1 The VCT should be within its normal operating level band.

5.3.2.2 Start one charging pump per procedure 0210020 Charging and Letdown - Normal Operation and observe 44 GPM flow on FI 2212.

5.3.2.3 Check that the letdown level control valve selector switch HS1110-1 and the letdown pressure control valve selector switch HS 2201 are selected to the level/pressure control valves in service.

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CHARGING AND LETDOWN - OFF NORMAL OPERATING

5.0 Instructions: (Cont.)

5.3 (Cont.)

5.3.2. (Cont.)

5.3.2.4 Match the auto-manual output of the letdown level controller, shift to manual, and close.

5.3.2.5 Check the letdown pressure controller in Auto and set to maintain 340 psig. /R6

5.3.2.6 Place flow limited bypass switch in the bypass position.

5.3.2.7 Check that regenerative heat exchanger high temp. alarm, SIAS, or CIS alarms are not present and open letdown isolation valves V2515 and V2516.

5.3.2.8 Open letdown control valve and establish 5 GPM letdown flow.

5.3.2.9 When letdown temperature stabilizes increase letdown flow until letdown and charging flows are matched.

CAUTION: Increase letdown flow at a rate not to exceed 5-10 GPM in any one minute. Insure charging temperature does not increase more than 60°F per minute.

5.3.2.10 Insure the letdown pressure controller maintains letdown pressure at 340 PSIG.

5.3.2.11 Balance the letdown level control auto-manual outputs and shift to auto.

5.3.2.12 Take flow limited by-pass switch out of by-pass.

5.3.2.13 If a loss of charging occurs secure letdown immediately. The above steps should then be followed to return the system to normal operation.

5.3.3 Transferring letdown level control to the alternate control valve.

5.3.3.1 Unisolate alternate control valve by opening:
V2342 and V2341 (LCV-2110P) or
V2344 and V2343 (LCV-2110Q)

5.3.3.2 Place letdown level controller (HIC 1110) in manual and adjust for minimum letdown flow.

5.3.3.3 Select Position on HS 1110.1 letdown level valves selector switch.

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CHARGING AND LETDOWN - OFF NORMAL OPERATING

5.0 Instructions: (Cont.)

5.3 (Cont.)

5.3.3 (Cont.)

5.3.3.4 Select desired valve.

5.3.3.5 Place letdown level controller (H1C 1110) in automatic.

5.3.3.6 Isolate letdown valve not in service by closing:
V2342 and V2341 (LCV-2110P)
V2344 and V2343 (LCV-2110Q) or

5.3.4 Transferring letdown pressure control to the alternate control valve.

5.3.4.1 Unisolate alternate control valve by opening:
V2350 and V2348 (PCV-2201P)
V2349 and V2347 (PCV-2201Q) or

5.3.4.2 Place letdown level controller (H1C 1110) in manual and adjust for minimum letdown flow.

5.3.4.3 Select position on HS-2201 letdown pressure control valve selector switch.

5.3.4.4 Select desired valve.

5.3.4.5 Place letdown level controller (H1C 1110) in automatic.

5.3.4.6 Isolate pressure control valve not in service by closing:
V2350 and V2341 (PCV-2201P)
V2349 and V2347 (PCV-2201Q) or

6.0 References:

6.1 FSAR, Chapter 9

6.2 C.E. P & I Diagrams E-193630210-120 and E-19367-210-121

7.0 Records Required:

7.1 Normal log entries.

DOCUMENT REVISION DISTRIBUTION SHEET - OFF NORMAL & EMERGENCY OPER. PROCEDUR

DOCUMENT TITLE D.C. Ground Isolation

DOCUMENT FILE NUMBER 0960030

DOCUMENT REVISION NUMBER 7

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FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT NO. 1
OFF-NORMAL OPERATING PROCEDURE NO. 0960030
REVISION 7

1.0 Title:

DC Ground Isolation

2.0 Review and Approval:

Reviewed by Facility Review Group February 25, 1976

Approved by K. N. Harris Plant Manager February 26, 1976

Revision 7 Reviewed by F R G SEP 23 1981

Approved by C M Wethy Plant Manager Oct. 20-1981

3.0 Purpose:

3.1 Provide instructions for isolating a DC system ground without affecting plant operation.

3.2 Discussion:

This procedure shall be used as a guideline for DC ground location and isolation. The Nuclear Plant Supervisor and the Nuclear Watch Engineer shall use any section, in any order, as they deem necessary to maintain the plant stability and to insure that no limiting condition for operation from the Standard Technical Specification is violated.

4.0 Precautions and Limits:

Maintain two-way radio communication between control center and operating point. Verify control center operator is observing ground light on RTGB-101 when isolating circuits to minimize time each circuit is switched off.

5.0 Related System Status:

None

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6.0 References:

6.1 Ebasco Power Distribution Motor Data 8770-B-335 series drawings

6.2 Ebasco Control Wiring Diagrams 8770-B-327 series drawings

7.0 Records Required:

Plant Work Order for the grounded circuits

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8.0 Instructions:

8.1 If the ground appears on a bus which is tied to the A, B, or C D/C bus, then proceed to Step 8.1.1. If the ground is on a separate isolated bus, then proceed to Step 8.1.5.

____ 8.1.1 Energize the standby battery charger and verify that all the 125 V DC buses are being supplied from their respective chargers.

8.1.2 Open or verify open the following breakers:

____ 8.1.2.1 Bkr. 60311, 125 V DC bus 1C.

____ 8.1.2.2 Bkr. 60315, tie to DC swgr. 1A.

____ 8.1.2.3 Bkr. 60316, tie to DC swgr. 1B.

____ 8.1.3 The 1AB 125 V DC bus is now isolated from the 1A & 1B 125 V DC buses, and the 1C 125 V DC bus is isolated from the 1AB 125 V DC bus. Determine which DC bus is grounded.

____ 8.1.4 Return the 125 V DC system to its original line up.

____ 8.1.5 Proceed to the appropriate section as follows:

125 V DC bus 1A ground:	Section 8.2
125 V DC bus 1B ground:	Section 8.3
125 V DC bus 1AB ground:	Section 8.4
125 V DC bus 1C ground:	Section 8.5

8.2 Isolate a ground on 125 V DC bus 1A as follows:

8.2.1 The following breakers can be momentarily opened and closed without affecting plant operation:

____ 8.2.1.1 Bkr. 60110, aux. transformer 1A
Note: Annunciator window C-48 will alarm.

____ 8.2.1.2 Bkr. 60112, startup transformer 1A
Note: Annunciator window B-21 will alarm.

____ 8.2.1.3 Bkr. 60114, main transformer 1A
Note: Annunciator window C-36 will alarm.

____ 8.2.1.4 Bkr. 60120, DC lighting panel #127

____ 8.2.1.5 Bkr. 60129, Battery charger 1A

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8.0 Instructions: (continued)

8.2 (continued)

____ 8.2.2 Operate breaker 60101, 480V switchgear 1A2.
Note: Annunciator window B-29 will alarm. If the ground does not clear, proceed to section 8.2.3. If the ground does momentarily clear, proceed to 480V switchgear 1A2 and perform the following:

____ 8.2.2.1 Open compartment 6A (instrumentation) and momentarily remove and replace the 1A2 swgr. UV relay fuses.
Note: Annunciator window B-29 will alarm. Close compartment 6A.

____ 8.2.2.2 At the rear of each compartment listed below, momentarily remove and replace the close and trip circuit fuses for the listed breakers:

	Compt.	Bkr.	Equipment
_____	1A	40218	MCC 1A 6
_____	1B	40219	MCC 1A 7
_____	2A	40214	MCC 1A 5
_____	2B	40215	MCC 1A 8
_____	4A	40209	Fire Pump 1A
_____	4B	40210	Charging Pump 1A
_____	4C	40211	CEDM Cool. Fan (HVE-21A)
_____	5A	40205	Containment Cooler 1A
_____	5B	40206	Containment Cooler 1B
_____	5C	40207	CEA Drive MG Set 1A
_____	5D	40208	Aux. Bldg. Main. Ex. Fan (HVE-10A)
_____	6B	40203	Main Feed
_____	6C	40204	480V Load Center 1AB

8.2.3 Momentarily open and reclose breaker #60103, 480 switchgear 1A1. If ground does not clear, proceed to section 8.2.4. If the ground did clear, proceed to 480V switchgear 1A1 and perform the following:

8.2.3.1 At the rear of each compartment listed below, momentarily remove and replace the close and trip circuit fuses for the listed breakers:

	Compt.	Bkr.	Equipment
_____	7B	40119	MCC 1C
_____	7C	40120	Serv. Bldg. Feed
_____	7D	40121	MCC 1A 2
_____	6B	40115	MCC 1A 1
_____	6C	40116	MCC 1A 3
_____	6D	40117	Swyd. Norm. Feed
_____	6A	40114	Main Trans. 1B Clg. Equip. Source 2
_____	5B	40111	Turb. Bldg. crane
_____	5C	40112	Main Trans. 1A Clg. Equip. Source 1
_____	5D	40113	MCC 1A 4
_____	3C	40107	Air compressor
_____	2B	40103	Main feed

8.0 Instructions: (continued)

8.2 (continued)

8.2.4 Momentarily open and reclose bkr. 60106, 4.16 KV swgr. 1A2.
Note: Annunciator window B4 & B12 will alarm. If the ground did not clear, proceed to section 8.2.5. If the ground did clear, proceed to 4.16 KV switchgear 1A2 and perform the following:

____ 8.2.4.1 Open cubicle 1 and momentarily remove and replace the close and trip circuit fuses for bkr. 20101. If the ground did not clear, momentarily remove and replace the 4.16 KV 1A2 undervoltage fuses. Close cubicle 1.

____ 8.2.4.2 Open cubicle 2 and momentarily remove and replace the close and trip circuit fuses for breaker 20102. If the ground did not clear, momentarily remove and replace the Startup Standby transformer 1A lockout relay fuses.
Note: Annunciator window B12 will annunciate. Close cubicle 2.

____ 8.2.4.3 Open cubicle 10 and momentarily remove and replace the close and trip circuit fuses for bkr. 20110. If the ground did not clear, momentarily remove and replace the 4.16 KV swgr. 1A2 differential relay fuses.
Note: Annunciator window B4 will alarm.

8.2.4.4 Open the cubicles listed below and momentarily remove and replace the close and trip circuit fuses for the listed breakers:

	Cubicle	Breaker	Equipment
_____	03	20103	Circ. water pump 1A1
_____	04	20104	Circ. water pump 1B1
_____	06	20106	Turb. Plant Cool. Wtr. Pump 1A
_____	07	20107	Condensate pump 1A
_____	08	20108	Htr. drain pump 1A
_____	09	20109	Feed to 4.16 KV swgr. 1A3

Note: Cubicle 5 is a spare

8.2.5 Momentarily open and reclose bkr. 60107 D/G 1A control panel.
Note: Annunciator window B36 on RTGB 101 and B24 on D/G 1A annunciator will alarm. If the ground did not clear, proceed to step 8.2.6. If the ground did clear, proceed to D/G 1A control panel and perform the following:

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8.0 Instructions: (continued)

8.2 (continued)

____ 8.2.5.1 Momentarily remove and replace start circuit fuses F1 & F2.
Note: Annunciator windows B36 on RTGB 101 and B24 on D/G 1A annunciator will alarm.

8.2.5.2 Momentarily remove and replace the fuses listed below:

_____	F3 & F4	D/G 1A lockout relay
_____	F13 & F14	D/G 1A governor control
_____	F15 & F16	D/G 1A voltage adjusts
_____	F17 & F18	D/G 1A annunciator
_____	F5 & F6	Fuel Prime pump 1A1 motor B1/a
_____	F7 & F8	Fuel Prime pump 1A2 motor B1/b
_____	F9 & F10	Emerg. Oil Circ. pump 1A1 motor B2/a
_____	F11 & F12	Emerg. Oil Circ. pump 1A2 motor B2/b

8.2.6 Momentarily open and reclose bkr. 60108, 4.16 KV swgr. 1A3.
Note: Annunciator windows B4, 15, 52, 54, 56, 57 & 59; E-46; G-44, R-51, 55, 58 & S-51 will alarm. If the ground did not clear, proceed to sectio 8.2.7. If the ground did clear, proceed to 4.16 kv swgr. 1A3 and perform the following:

____ 8.2.6.1 Open cubicle 6 and momentarily remove and replace the close and trip circuit fuses for bkr. 20207, component cooling water pump 1A.
Note: Annunciator window S-51 will alarm. If the ground did not clear, momentarily remove and replace the 4.16 KV swgr. 1A3 differential relay fuses. Note: Annunciator window B4 will alarm.

____ 8.2.6.2 Open cubicle 11 and momentarily remove and replace the close and trip circuit fuses for bkr. 20211 diesel generator 1A.
Note: Annunciator window B56 will alarm. If the ground does not momentarily clear, momentarily remove and replace the 4.16 KV swgr. 1A3 load shedding relays fuses. Note: Annunciator window B15 will alarm.

8.2.6.3 Open the cubicles listed below and momentarily remove and replace the close and trip circuit fuses for the listed breakers.
Note: Listed annunciator windows will alarm.

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8.0 Instructions: (continued)

8.2 (continued)

	Cubicle	Breaker	Ann.Window	Equipment
_____	1	20201	R-55	LPSI Pump 1A
_____	2	20202	R-58	LPSI Pump 1A
_____	3	20203	R-51	Cont. Spray Pump 1A
_____	4	20204	B-55	Feed to 480V Press. Htr. Load Ctr. 1A3
_____	6	20206		CCW Pump 1A
_____	7	20207	E-46	ICW Pump 1A
_____	8	20208	B-54	Feed to 4.16KV Swgr. 1AB
_____	9	20209	B-52	Supply from 4.16KV Swgr.1A2
_____	10	20210	B-47	Feed to 480V Load Ctr.1A2
_____	12	20211	G-44	Aux. Feedwater Pump 1A

Note: Compt. 5 is a spare.

8.2.7 Verify all reactor trip breakers are closed, then inform the control room that TCB-1 and TCB-5 will be tripped. Momentarily open and reclose breaker 60109, reactor trip swgr. (Note: Annunciator windows K-7 & K-8 will alarm) If the ground did not clear, reset TCB-1 and TCB-5 and proceed to section 8.2.8. If the ground did momentarily clear, proceed to reactor trip switchgear, unit 001 and perform the following:

____ 8.2.7.1 Momentarily remove and replace the close and trip circuit fuses for TCB-1.

____ 8.2.7.2 Momentarily remove and replace the close and trip circuit fuses for TCB-5.

____ 8.2.7.3 Reset the ungrounded breaker as determined from steps 8.2.7.1 and 8.2.7.2.

8.2.8 Verify all reactor trip breakers are closed, then inform the control room that TCB-3 and TCB-7 will be tripped. Momentarily open and reclose breaker 60111 reactor trip swgr.

Note: Annunciator windows K4 & K5 will alarm. If the ground did not clear, reset TCB-3 and TB-7 and proceed to step 8.2.9. If the ground did momentarily clear, proceed to reactor trip swgr. unit 004 and perform the following: /R7

____ 8.2.8.1 At compt. V004A momentarily remove and replace the close and trip circuit fuses for bkr. TCB-3.

____ 8.2.8.2 At compt. V004C momentarily remove and replace the close and trip circuit fuses for breaker TCB-7.

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8.0 Instructions: (continued)

8.2 (continued)

___ 8.2.8.3 Reset the ungrounded breaker as determined from 8.2.8.1 & 8.2.8.2

___ 8.2.9 Remove static inverter 1C from service by performing sections 8.3.1 thru 8.3.8 of Operating Procedure #0970020.

___ 8.2.10 If the ground did not clear, perform sections 8.1.1 thru 8.1.9 of Operating Procedure #0970020 to return static inverter 1C to service.

___ 8.2.11 Remove static inverter 1A from service by performing sections 8.3.1 thru 8.3.8 of Operating Procedure #0970020.

___ 8.2.12 If the ground did not clear, perform section 8.1.1 thru 8.1.9 of Operating Procedure 0970020 to return static inverter 1A to service.

___ 8.2.13 Momentarily open & reclose breaker #60115 component cooling water surge tank.
Note: LCV-14-1 (CCW surge tank inlet) fails closed; RSE-14-1 (CCW surge tank vent) fails open.

___ 8.2.14 Verify SS/189-1, SS/158, SS-3/603, SS-1/603, SS/130, and SS-1/157 in isolation panel 1A are in "normal" position. Momentarily open and close Bkr. 60116, isolation panel 1A.

___ 8.2.15 Momentarily open & reclose breaker #60117, RTGB-103 (Fuses RR-1-10). See Appendix A for load list.

___ 8.2.16 Momentarily open & reclose breaker #60118, Aux. spray valve ISE-02-3.
Note: Valve fails closed, loses indication.

___ 8.2.17 Check circuit by removing individual fuses, RTGB-106 (fuses CCC-1-36) See Appendix C for load list. Certain fuses will be noted: "DO NOT REMOVE"

___ 8.2.17.1 CAUTION: Before removing fuses 27 to 30 (HCV-14-1,2), ensure that the air-supply solenoid valves HSE14-1, 2 are mechanically jumpered to prevent closure of HCV-14-1, 2. After checking for a ground, install fuses 27 to 30 and reset HCV-14-1, 2 control switches in the Control Room.

___/___ 8.2.17.2 Remove mechanical jumpers on I.V. HSE-14-1, 2.

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8.0 Instructions: (continued)

8.2 (continued)

____ 8.2.18 Momentarily open & reclose breaker #60123, RTGB-106 (fuses CCC 41-69). See Appendix D for load list.

____ 8.2.19 Momentarily open & reclose breaker #60124, DC PP-118. See Appendix E for load list.

____ 8.2.20 Momentarily remove & replace the DC bus 1A undervoltage relay fuses in DC bus 1A.

____ 8.2.21 Momentarily remove & replace the DC bus 1A ground relay fuses in DC bus 1A.

CAUTION: Performance of Step #8.2.22 will cause an autostart of "A" and "C" auxiliary feed water pumps and the feeding of "A" steam generator.

____ 8.2.22 Momentarily open and reclose breaker #60119, RTGB-105 (fuses HH 19-63). See Appendix B for load list.

8.3 Isolate a ground on 125V DC bus 1B as follows:

8.3.1 The following breakers can be momentarily opened and reclosed without affecting plant operations: Unless otherwise noted.

____ 8.3.1.1 Bkr. 60210, Aux. transformer 1B

____ 8.3.1.2 Bkr. 60202, Start-up transformer 1B

____ 8.3.1.3 Bkr. 60214, Main transformer 1B

____ 8.3.1.4 Bkr. 60226, DC ltg. panel LP-128

____ 8.3.1.5 Bkr. 60229, Battery Charger 1B output

____ 8.3.2 Open and reclose breaker 60201, H2 control panel.
Note: The annunciator horn at the H2 control panel must be reset locally.

____ 8.3.3 Open and reclose breaker 60203, line repeat panel.
Note: The line repeat panel annunciator must be reset at the panel.

____ 8.3.4 Momentarily open and reclose breaker 60205, 480V swgr. 1B2. If the ground did not clear, proceed to section 8.3.5. If the ground did momentarily clear, proceed to 480V swgr. 1B2 and perform the following:

____ 8.3.4.1 Open compt. 2A (instrumentation) and momentarily remove and replace the 1B2 swgr. undervoltage relay fuses. Close compt. 2A.

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OFF-NORMAL OPERATING PROCEDURE NO. 0960030
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8.0 Instructions: (continued)

8.3 (continued)

____ 8.3.4.2 At the rear of each compartment listed below momentarily remove and replace the close and trip circuit fuses for the listed breakers.

	Compt.	Bkr.	Equipment
_____	2B	40503	Main feed
_____	2C	40504	480V Ld. Cen. 1AB
_____	3A	40505	Cont. Cooler HVS-1C
_____	3B	40506	Cont. Cooler HVS-1D
_____	3C	40507	CEA Drive MG 1B
_____	3D	40508	Aux. Bldg. Main Exh. HVE-10B
_____	4A	40509	Fire Pump 1B
_____	4B	40510	Charging Pump 1B
_____	4D	40512	CEDM Clg. fan HVE-21B
_____	6A	40514	MCC 1B5
_____	6B	40515	MCC 1B8
_____	6C	40516	Rx. Bldg. Crane #1
_____	7A	40518	MCC 1B6
_____	7B	40519	MCC 1B7

____ 8.3.5 Momentarily open and reclose breaker 60206, 4.16 KV swgr. 1B2.

Note: Annunciator windows A4 & A16 will alarm. If the ground does not clear, proceed to section 8.3.6. If the ground did clear, proceed to 4.16 KV swgr. 1B2 and perform the following:

____ 8.3.5.1 Open cubicle 10 and momentarily remove and replace the close and trip fuses for breaker 20301. If the ground did not clear, momentarily remove and replace 4.16 KV swgr. 1B2 undervoltage fuses. Close cubicle 10.

____ 8.3.5.2 Open cubicle 9 and momentarily remove and replace close and trip fuses for breaker 20302. If the ground did not clear, momentarily remove and replace the startup standby transformer 1B lockout relay fuses.

Note: Annunciator window A15 will alarm. Close cubicle 9.

____ 8.3.5.3 Open cubicle 1 and momentarily remove and replace the close and trip fuses for breaker 20310. If the ground did not clear, momentarily remove and replace the 4.16 KV swgr. 1B2 differential relay fuses.

Note: Annunciator window A4 will alarm.

____ 8.3.5.4 Open the cubicle doors listed below and momentarily remove and replace the close and trip circuit fuses for the listed breakers:

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8.0 Instructions: (continued)

8.3 (continued)

8.3.5.4 (continued)

Bkr.#	Cubicle #	Equipment
20303	08	Circ. Water Pump 1A2
20304	07	Circ. Water Pump 1B2
20305	06	Spare
20306	05	Turb. Plt.Cool. Water pump 1B
20307	04	Condensate pump 1B
20308	03	Heater Drain pump 1B
20309	02	Feed to 4.16KV vital swgr. 1B3

____ 8.3.6 Momentarily open and reclose breaker 60207, 480V swgr. 1B1. If the ground does not clear proceed to section 8.3.7. If the ground did clear, proceed to the 480V swgr. 1B1 and perform the following:

____ 8.3.6.1 At the rear of each compartment listed below, momentarily remove and replace the close and trip fuses for the listed breakers:

Bkr.#	Cubicle #	Equipment
40403	6B	Main Feed (4.16KV swgr. 1B2)
40404	6C	Bus tie to 480V load center 1A
40410	3A	MCC 1C (turbine)
40411	3B	MCC 1B1 (turbine)
40412	3C	MCC 1B3 (intake)
40413	3D	MCC 1B4 (wtr. treatment plant)
40415	2B	Serv. Bldg. Feed (PP-3B)
40416	2C	Mn. Trans. 1B cool. equip.source 1
40417	2D	Switchyard Feed (Alt.)
40418	1A	Service Bldg. water heater
40419	1B	Mn.Trans. 1A Cool. equip. source 2
40420	1C	Aux. boiler MCC 1B10
40421	1D	MCC 1B2 (rad. waste)

____ 8.3.7 Momentarily open and reclose breaker 60208, 4.16KV swgr. 1B3.
Note: Annunciator windows A4, A15, A52, A54, A56, A57, A59, E47, G45, R52, R56, R59, and S52 will alarm. If the ground did not clear proceed to section 8.3.8. If the ground did clear, proceed to 4.16KV swgr. 1B3 and perform the following:

____ 8.3.7.1 Open cubicle 4 and momentarily remove and replace the close and trip fuses for breaker 20404.
Note: Annunciator window S-52 will alarm. If the ground did not clear, momentarily remove and replace the 4.16KV swgr. 1B3 differential relay fuses.
Note: Annunciator window A4 will alarm.

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8.0 Instructions: (continued)

____ 8.3.7.2 Open cubicle 1 and momentarily remove and replace the close and trip fuses for breaker 20401.
Note: Annunciator window A-56 will alarm. If the ground did not clear, momentarily remove and replace the 4.16KV swgr. 1B3 load shedding relay fuses.
Note: Annunciator window A4 will alarm.

8.3.7.3 Open the cubicles listed below and momentarily remove and replace the close and trip fuses for the listed breakers.
Note: Listed annunciators will alarm.

	Cubicle	Breaker	Ann.Window	Equipment
_____	02	20402	A-57	Feed to 480V Vital Load ctr. 1B2
_____	03	20403	A-59	Feed to 480V Press. htrld. cent. 1B3
_____	04	20404		CCW pump 1B
_____	05	20405	R-56	H.P.Safety Injection pump 1B
_____	06	20406	R-59	L.P.Safety Injection pump 1B
_____	07	20407	R-52	Containment Spray pump 1B
_____	08	20408		Spare
_____	09	20409	A-54	Feed to 416KV Vital swgr.1AB
_____	10	20410	E-47	Intake cool. water pump 1B
_____	11	20411	A-52	Supply from 4.16KV swgr. 1AB
_____	12	20412	G-45	Aux. Feedwater pump 1B

8.3.8 Momentarily open and reclose breaker 60213, D/G 1B control panel.
Note: Annunciator window A-36 on RTGB 101 and 24 on DG/DP annunciator will alarm. If ground did not clear, proceed to section 8.3.9. If the ground did clear, proceed to D/G 1B control panel and perform the following:

____ 8.3.8.1 Momentarily remove and replace start circuit fuses F1 & F2.
Note: Annunciator windows A-36 on RTGB-101 and 24 on DG 1B annunciator will alarm.

____ 8.3.8.2 Momentarily remove and replace the fuse listed below:

Fuse #	Equipment
_____ F3 & F4	D/G 1B lockout relay
_____ F13 & F14	D/G 1B governor control
_____ F15 & F16	D/G 1B voltage adjust
_____ F17 & F18	D/G 1B annunciator
_____ F5 & F6	Fuel Prime pump 1B1 motor B1/a
_____ F7 & F8	Fuel Prime pump 1B2 motor B1/b
_____ F9 & F10	Emerg.Oil Circ.Pump 1B1 motor B2/a
_____ F11 & F12	Emerg.Oil Circ.Pump 1B2 motor B2/b

8.0 Instructions: (continued)

___ 8.3.9 Remove static inverter 1D from service by performing section 8.3.1 thru 8.3.8 of operating procedure #0970020.

___ 8.3.10 If the ground did not clear, perform section 8.1.1 to 8.1.9 of operating procedure #0970020 to return static inverter 1D to service.

___ 8.3.11 Verify the reactor trip breakers TCB-1 thru 8 are closed.

CAUTION: Completing Step 8.3.12 will place plant in an unstable condition. TCB-9, TCB-2 & TCB-6 will open, resulting in one MG set supplying load to CEA's. Since synchronizing across trip breakers is impossible, the unloaded MG set output breaker must be opened, TCB-9 closed, and unloaded MG set resynchronized to grid. Ground should be checked by completing Steps 8.3.12.1 through 8.3.12.2.

___ 8.3.12 Inform the control room the TCB-2 and TCB-6 & TCB-9 will be tripped. Momentarily open & reclose breaker 60220.
Note: Annunciator windows K-1, K-2 & K-3 will alarm. If the ground did not clear, reset TCB-2 & TCB-6 & TCB-9 per caution statement above and proceed to section 8.3.13. If the ground did clear, proceed to reactor trip swgr. unit 002 and perform the following:

___ 8.3.12.1 Momentarily remove and replace the close & trip fuses for TCB-2.

___ 8.3.12.2 Momentarily remove and replace the close & trip fuses for TCB-6.

___ 8.3.12.3 Reset the ungrounded breakers as determined from 8.3.12.1 & 8.3.12.2.

___ 8.3.13 Verify all reactor trip breakers are closed, then inform the control room the TCB-4 & 8 will be tripped. Momentarily open and reclose breaker 60222.
Note: Annunciator window K-10 and K-11 will alarm. If the ground did not clear, reset TCB-4 and 8 and proceed to section 8.3.14. If the ground did clear, proceed to reactor trip swgr. unit 005 and perform the following: /R7

___ 8.3.13.1 Momentarily remove and replace the close and trip fuses for TCB-4.

___ 8.3.13.2 Momentarily remove and replace the close and trip fuses for TCB-8.

8.0 Instructions: (continued)

8.3 (continued)

___ 8.3.13.3 Reset the ungrounded breakers as determined from steps 8.3.13.1 and 8.3.13.2.

___ 8.3.14 Remove static inverter 1B from service by performing steps 8.3.1 to 8.3.8 of operating procedure #0970020.

___ 8.3.15 If the ground did not clear, return static inverter 1B to service by performing steps 8.1.1 to 8.1.9 of operating procedure #0970020.

___ 8.3.16 Momentarily open and reclose breaker 60202 relief valve V-1404.
Note: Valve fail closed, lose indication, annunciator window D-30 alarms.

___ 8.3.17 Momentarily open and reclose breaker 60217, RTGB-103, -104 (fuses QQ-1 to 10, - 104 fuses 13 & 14. See Appendix F for load list.

___ 8.3.18 Momentarily open and reclose breaker 60215, RTGB-106 (-106 buses GG 41-70) See Appendix I for load list.

___ 8.3.19 Momentarily open and reclose breaker 60218 Letdown stop valve V-2515.
Note: Valve fails closed, loses indication, and must be opened and reclosed quickly to prevent loss of letdown.

___ 8.3.20 Check circuit by removing individual fuses, RTGB-106 (fuses GG-1 to 40). See Appendix H for load list. Certain fuses will be noted: DO NOT REMOVE.

___ 8.3.20.1 CAUTION: Before removing fuses 27 to 30 (HCV-14-6, 7), ensure that the air-supply solenoid valves HSE-14-6, 7 are mechanically jumpered to prevent closure of HCV-14-6, 7. After checking for a ground, install fuses 27 to 30 and reset HCV-14-6, 7 control switches in the Control Room.

___/___ 8.3.20.2 Remove mechanical jumpers on I.V. HSE-14-6,7.

___ 8.3.21 Momentarily open and reclose breaker 60223, DC PP-119. See Appendix J for load list.

___ 8.3.22 Momentarily open and reclose breaker 60228 Aux. spray valve ISWE-02-A.
Note: Valve fails closed, loses indication.

8.0 Instructions: (continued)

8.3 (continued)

____ 8.3.23 Momentarily remove and replace the DC bus 1B undervoltage relay fuses in DC Bus 1B.

____ 8.3.24 Momentarily remove and replace the DC Bus 1B ground relay fuses in DC Bus 1B.

____ 8.3.25 Momentarily open and reclose Breaker 60219, RTGB-105 (fuses EE-19 to 54). See Appendix G for load list.

CAUTION: Performance of Step 8.3.25 will result in an autostart of "B" and "C" auxiliary feed water pumps and the feeding of "B" steam generator.

____ 8.3.26 If the ground has not cleared at this point, notify Electrical Maintenance that the ground is apparently in the generator excitation switchgear. DO NOT operate breaker 60209 (main generator will trip on loss of DC).

8.4 Isolate a ground on the 1AB 125V DC Bus as follows:

8.4.1 The following breakers can be momentarily opened and reclosed without affecting plant operation:

Bkr.	Equipment
60304	4.16 KV Swgr. 1A3 & 1B3 Test Stand
60305	6.9 KV Swgr. Test Stand
60306	RTGB 101 & 102 Annunciator Power Supply Cont. Hi Press. CIS pretrip Cont. Hi Rad. CIS pretrip Przr Lo Press. pretrip
60307	4.16 KV Swgr. 1A2 & 1B2 Test Stand
60309	4.16 KV Swgr. 1AB Test Stand

8.4.2 Momentarily open and reclose breaker 60301, 4.16KV swgr. 1AB.
Note: Annunciator windows A5, A54, B54, E91, S53 & R57 will alarm. If the ground did not clear, proceed to section 8.4.3. If the ground did clear, proceed to 4.16KV swgr. 1AB and perform the following:

____ 8.4.2.1 Open cubicle 1 and momentarily remove and replace the close and trip fuses for breaker 20501.
Note: Annunciator window S-53 will alarm. If the ground did not clear, remove and replace the 4.16KV swgr. 1AB differential lockout relay fuses.

8.0 Instructions: (continued)

8.4 (continued)

____ 8.4.2.2 Open cubicle 4 and momentarily remove and replace the close and trip fuses for breaker 20504.
Note: Annunciator window A54 will alarm. If the ground did not clear, remove and replace the 4.16KV swgr. 1AB load shedding relay fuses.
Note: Annunciator window A5 will alarm.

____ 8.4.2.3 Open the cubicles listed below and momentarily remove and replace the close & trip fuses for the listed breakers.
Note: Listed annunciators will alarm.

_____	20502	02	R-57	Component Cooling water pump 1S
_____	20503	03	E-51	Intake Cooling water pump 1S
_____	20505	05	B-54	Supply from 4.16KV swgr. 1A3.

8.4.3 Momentarily open and reclose breaker 60302, 480V swgr. 1AB. If the ground did not clear, proceed to section 8.4.4. If the ground did clear, proceed to 480V swgr. 1AB and perform the following:

____ 8.4.3.1 Open compt. 2A (instrumentation) and momentarily remove and replace the 480V swgr. 1AB undervoltage relay fuses. Close compt. 2A.

8.4.3.2 At the rear of each component listed below, momentarily remove and replace the close and trip fuses for the listed breakers:

_____	40702	1B	Supply from 480V Vital Load Ctr. 1A2
_____	40703	1C	MCC 1AB (reactor)
_____	40704	1D	Spare
_____	40706	2B	Supply from 480V Vital Load Ctr. 1B2
_____	40707	2C	Charging pump 1S
_____	40708	2D	Spare

____ 8.4.4 Momentarily open and reclose breaker 60303. Reset annunciators on RTGB-103, 104, 105 and 106.

____ 8.4.5 Verify that aux. feedwater pump 1C is not running and open and reclose the following breakers:

_____ Bkr. 60308
_____ Bkr. 60310

____ 8.4.6 Remove the Vital AC Static Inverter from service by performing steps 8.4.1 thru 8.4.12 of operating procedure #0970021.

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8.0 Instructions: (continued)

8.4 (continued)

____ 8.4.7 If the ground did not clear, perform, steps 8.5.1 thru 8.5.11 of operating procedure #0970021 to return Vital AC Static Inverter to service.

____ 8.4.8 Momentarily remove and replace the DC Bus 1AB undervoltage relay fuses in DC bus 1AB.

____ 8.4.9 Momentarily remove and replace the DC Bus 1AB ground relay fuses in DC Bus 1AB.

8.5 Isolate a ground on 125V DC bus 1C as follows:

8.5.1 The following breakers can be momentarily opened and reclosed:

____ 8.5.1.1 Battery charger 1C output

____ 8.5.1.2 Load Test

____ 8.5.2 The emergency oil pump is not normally in use. Verify with the Control Room that the emergency oil pump is not running, then open and reclose breaker 60711.
Note: Annunciator window C-56 will alarm.

____ 8.5.3 Verify that the air side seal oil pump (25 HP) is not running, then open and reclose breaker 60231.

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APPENDIX A

PP DC 1A CKT 17 RTGB 103 TB RR CWD 394 Rev. 9 Ref. 8.2.18
Bkr. #60117

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
1	P1A	121	V-1400	Quench Tank Vent Valve	Fail closed, lose indication
2	N1A				
3	P2A	97	63x/PIC-1100		Backup & prop. heaters encrgize (all banks) if in auto. Lose indication of spray valve position
4	N2A	130	PCV-1100	Pressurizer Press.	
5	P3A	117	63x/P-1102		
6	N3A		74-3	Power Oper. Relief Valves	Annunc. at H-22. Valve fail closed
7	P4A	139	L-1110-2		Backup prop. heaters de-energize-must be reset after return to normal. Annunc. at H-19,20,25,26,31,32. Backup chg. pumps start if in "auto".
8	N4A				
9	P5A	138	63x/LC-1100XL	Pzr. Level Control	Backup & prop. heaters de-evergize if HS-1110-2/139 selected to "X" or "BOTH". Both backup chg. pumps start if in "auto" and control selected to "X"
10	N5A		63x/LA-1100XL		

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APPENDIX B

PP DC 1A CKT 19 RTCB 105 TB HH CWD 645 Rev. 7

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
19	P1A	159	V-2205	RCP controlled bleedoff	Fail closed; lose indication.
20	N1A			isolation	
21	P2A	159	V-2516	Letdown isolation	Fail closed, lose indication.
22	N2A	157			
23	P3A	159	V-2510	B.A. tank 1A recirc.	Fail closed, lose indication.
24	N3A				
25	P4A	563	V-6301	Reactor drain tank isol.	Fail closed, lose indication.
26	N4A				
27	P5A	564	V-6554	Waste gas isolation	Fail closed, lose indication.
28	N5A				
29	P6A	159	V-2511	B.A. tank 1B recirc.	Fail closed, lose indication
30	N6A				
31	P7A	576	LCV-07-11A	Cont. sump isol.	Fail closed, lose indication.
32	N7A				
33	F8A	176	FCV-2161	B.A. pump disch. to VCT	Fail closed, lose indication.
34	N8A				
35	P9A	158	LCV-2110P	Letdown throttle valves	Lose indication, stay as is.
36	N9A		LCV-2110Q		
37	P10A	160	V-2507	RCP controlled bleedoff	Fail open, lose indication.
38	N10A			relief stop	
39	P11A	160	V-2513	VCT vent	Fail closed, lose indication.
40	N11A				
41	P12A	189	ISE-02-3	Auxiliary Spray	Fail closed, lose indication.
42	N12A				

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APPENDIX B

PP DC 1A CKT 19 RTGB 105 TB HH CWD 645 Rev. 7

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
43	P13A	176	ISE-02-1	1B1 Charging line	Fail open, lose indication.
44	N13A				
45	P14A	176	ISE-02-2	1A2 charging line	Fail open, lose indication.
46	N14A				
47	P15A	562	V-6307	Flash tank diverter valve	Diverts to hold-up tank, lose indication.
48	N15A				
49	P16A	562	V-6308	Flash tank N2 stop valve	Fail closed, lose indication.
50	N16A				
51	P17A	562	LCV-6604	Flash tank level control	Lose indication, stay as is.
52	N17A				
53	P18A	565	FCV-6627X	Liquid waste flow control	Fail closed, lose indication
54	N18A		FCV-6627Y	valves	
55	P19A	151	PCV-2201P	Letdown pressure control	Lose indication, stay as is.
56	N19A		PCV-2201Q	valves	
62				"A" and "C"	"A" and "C" AFW pumps will start and
63				AFW pumps and valves	feed "A" steam generator.

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APPENDIX C

PP DC 1A CKT 21 RTGB 106 TB CCC CWD 647 Rev. 5

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
1	P1A	211	HCV-14-3A	CCW from S/D Ht. exch. 1A	Fails open
2	N1A				
3	P2A	242	V-3621	SI tank 1A1 fill & drain	Fail closed, lights
4	N2A				
5	P3A	242	V-3641	SI tank 1B2 fill & drain	Fail closed, lights
6	N3A				
7	P4A	243	V-3623	SI tank 1A1 vent	Fail closed, lights
8	N4A				
9	P5A	243	V-3643	SI tank 1B2 vent	Fail closed, lights
10	N5A				
11	P6A	274	FCV-3306	S/D cool. return flow	Fail open, lights
12	N6A				
13	P7A	536	HCV-25-1	RAB Sump drain valves	Fail closed, lose indication
14	N7A		thru 7		
15	P8A	1000	BT1A-1A8	125V DC transfer control	
16	N8A				
17	P9A	289	FCV-07-1A	Containment spray	Fail open, lights
18	N9A				
19	P10A	312	HCV-08-1A	Main steam isol. valve	Valve will open when control circuit is de-energized if supply air is available. (Check Plant Condition)
20	N10A				
21	P11A	578	V-5200	Prim. sampling sample valve	Fails closed, lights out-lose sampling capability
22	N11A				

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APPENDIX C

PP DC 1A CKT 21 RTGB 106 TB CCC CWD 647 Rev. 5

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
23	P12A	579	V-5201	Prim. sampling sample	Fails closed, lights out-lose sampling
24	N12A			valve	capability
25	P13A	580	V-5202	Primary sampling sample	Fails closed, lights out-lose sampling
26	N13A			valve	capability
27	P14A	212	HCV-14-1	CCW to RCP	Fails closed
28	N14A				
29	P15A	212	HCV-14-2	CCW from RCP	Fails closed
30	N15A				
31	P16A				
32	N16A				
33	P17A	281	HCV-3628	Check valve leakage drain	Lose lights
34	N17A			to RWT	
35	P18A	283	HCV-3648	Check valve leakage drain	Lose lights
36	N18A			to RWT	
37	P19A	Spare			
38	N19A	Spare			
39	P20A	312	HCV-08-1A (4YA)	Main Steam Isol. Valve	Valve Closes
40	N20A	312	(4YA1)	HCV-08-1A Opening & Closing	HCV-08-1B (Trips Plant) (DO NOT REMOVE FUSE)

APPENDIX D

PP DC 1A CKT 23 RTGB 106 TB CCC CWD 648 Rev. 5

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
41	P21A	283	V-3661	SI Check valve return to	Fail closed, lose lights
42	N21A			reactor drain tank	
43	P22A	274	V-3661	SI check valve return to	Fail closed, lose lights
44	N22A			reactor drain tank	
45	P23A	202	HCV-14-8A	CCW Normal supply hdr.	Fail closed, lose lights
46	N23A			isolation	
47	P24A	202	HCV-14-9	CCW normal return hdr.	Fail closed, lose lights
48	N24A			isolation	
49	P25A				
50	N25A				
51	P26A	511	FCV-25-1, 3, 5	Cont. Purge Isol. valves Refueling dampers	Fail closed lose indication
52	N26A		SE-25-5		
53	P27A	529	FCV-25-6	Vacuum relief valve	Fail closed lose indication
54	N27A				
55	P28A	320	FCV-26-2, 4, 6	Cont. Monitor sample valves	Fail closed lose indication
56	N28A				
57	P29A	461	FCV-23-7, 9	S/G 1A & 1B blowdown sample isolation	Fail closed lose indication
58	N29A				
59	P30A	319	FCV-23-3	S/G 1A blowdown isol.	Fail closed lose lights
60	N30A				
61	P31A	319	FCV-23-5	S/G 1B blowdown isol.	Fail closed lose lights
62	N32A				

APPENDIX D

PP DC 1A CKT 23 RTGB 106 TB CCC CWD 648 Rev. 5

GE FUSE NO.	EBASCO LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
63	P32A	256	V-3622	SI tank 1A1 N2 supply	Fail closed lose lights
64	N32A				
65	P33A	256	V-3642	SI tank 1B2 N2 supply	Fail closed lose lights
66	N33A				
67	P34A	281	HCV-3623	SI tank 1A1 check valve	Fail closed lose lights
68	N34A			leakage to RWT	

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APPENDIX E

PP 118 CKT 24 RTGB _____ TB _____ CWD _____ Rev. _____

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
Ckt. 2		799/2		RTGB 101 ZZ Fuse 1-6	
Ckt. 3		587/4		Annunciator "W"	Out of service, no remote alarm.
Ckt. 4		1191/1		RTGB-103 Annunciators	Will be changed with re-flash
Ckt. 5		117/4	V-1402	Pzr. relief valve	Lose indication, prevent valve from opening, actuate ann. H-22 - do not do concurrent with DC 1A Ckt. 2
Ckt. 6		1191/1		RTGB-104 Annunciators	Will be changed with re-flash

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APPENDIX E

PP 118 CKT 2 RTGB 101 TB ZZ CWD 799 Rev. 6

GE FUSE NO.	EBASCO LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
1	P1A	710	20/AST	Turbine auto stop trip	1. IL-710 (by trip pb) goes out 2. Lose elec. turbine trips other than man. 86 GP, 86GB, and 63-2/AST. 3. Prevents high exh. temp trip of 86GB
2	N1A				
3	P2A	883	86/GP	Prim. gen. lockout	1. Lose light actuate ann. C-31 2. Prevent associated trips 3. Give bkr. open signal to DEH, field bkr. telemetry EOP, speed/valve position recorder will shift to speed (most also require signal from 86 GB bkr. position. Do not energize when PP-119 ckt. 3 is down.
4	N2A				
5	P3A	720	86/LFT	EH pump low low level lockout	1. Lose light, actuate ann. D-58 2. Prevent low low level trip
6	N3A				

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APPENDIX F

1

PP DC 1B CKT 17 RTGB 103 TB QQ CWD 394 Rev. 9

GE FUSE NO.	EBASCO LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
1	P1B	121	V-1401	Quench tank drain valve	Fail closed, lose indication
2	N1B				
3	P2B	138	63Y/LC-1110YL	Pzr. level control	Backup & proportional htrs. de-energize if HS-1110-2/139 is selected to "Y" or both. Both backup charging pumps start if in auto & control selected to "Y".
4	N2B		63X/LA-1110YL		
5	P3B	187	ISE-02-4	Aux. spray valve	Fail closed, lose indication
6	N3B			(normal supply)	
7	P4B	855		H2 seal oil fire prot.	
8	N4B				
9	P5B	855		Lube oil fire prot.	
10	N5B				
TB DD	RTGB 104				
13	N5B	749		Steam Dump to Cond.	Fail closed
14	P5B	749		Valves PCV-8802 & 8803	

OPERATING PROCEDURE NO. 0960030, D.C. GROUND ISOLATION, REVISION 7

APPENDIX G

PP DC 1B CKT 19 RTGB 105 TB EE CWD 645 Rev. 7

GE FUSE NO.	EBASCO LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
19	P1B	159	V-2515	Letdown stop valve	Fail closed
20	N1B				
21	P2B	159	ISE-01-1	RCP controlled bleedoff	Fail closed
22	N2B			isol.	
23	P3B	163	V-2512	Makeup stop	Fail closed
24	N3B				
25	P4B	565	V-6739	Spent resin to drumming	Closed
26	N4B			station	
27	P5B	576	LCV-07-11B	Cont. sump isol. valve	Fail closed, lose indication
28	N5B				
29	P6B	563	V-6302	RDT Cont. isol. valve	Closed
30	N6B				
31	P7B	564	V-6555	Waste gas cont. isol.	Closed
32	N7B			valve	
33	P8B	566	V-6741	N2 hdr. cont. isol. valve	Closed
34	N8B				
35	P9B	163	FCV-2210Y	Boric acid flow	Fail closed
36	N9B				
37	P10B	160	V-2507	RCP controlled bleedoff	Fail open
38	N10B			relief stop	
39	P11B	160	V-2513	Volume control tank vent	Fail closed
40	N11B				
41	P12B	160	V-2500	Volume control tank inlet	De-energized to volume control tank
42	N12B				

OPERATING PROCEDURE NO. 0960030, D.C. GROUND ISOLATION, REVISION 7

APPENDIX G

PP DC 1B CKT 19 RTGB 105 TB EE CWD 645 Rev. 7

GE FUSE NO.	EBASCO LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
43	P13B	174	PS-2206	Boric acid P1A disch. press.	
44	N13B		PS-2208	Boric acid P1B disch. press.	Ann. N 39
45	P14B	563	V-6300	RDT vent stop valve	Closed
46	N14B				
47	P15B	564	V-6565	Waste gas stop valve	Closed
48	N15B				
49	P16B	566	V-6728	Resin disch. stop valve	Closed
50	N16B				
51	P17B	163	FCV-2210Y	Reactor makeup water flow	Fails closed
52	N17B				
53				"B" and "C"	"B" and "C" AFW pumps will start and
54				AFW pumps and valves	feed "B" steam generator

OPERATING PROCEDURE NO. 0960030, D.C. GROUND ISOLATION, REVISION 7

APPENDIX H

PP DC 1B CKT 21 RTGB 106 TB GG CWD 647 Rev. 5

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
1	P1B	211	HCV-14-3B	CCW from S/D ht. exch. 1B	Fails open
2	N1B				
3	P2B	242	V-3611	SI tank 1A2 fill & drain	Fail closed, lose lights
4	N2B				
5	P3B	242	V-3631	SI tank 1B1, fill & drain	Fail closed, lose lights
6	N3B				
7	P4B	243	V-3613	SI tank 1A2 vent	Fail closed, lose lights
8	N4B				
9	P5B	243	V-3633	SI tank 1B1 vent	Fail closed, lose lights
10	N5B				
11	P6B	274	HCV-3657	S/D cooling heat exch.	Fail closed, lose lights
12	N6B				
13	P7B				
14	N7B				
15	P8B	1000	BT-1B-1AB	125V DC bus transfer	
16	N8B			control	
17	P9B	289	FCV-07-B	Containment spray	Fail open, lose lights
18	N9B				
19	P10B	315	HCV-08-1B	Main steam isol. valve	Valve will open and remain open when control
20	N10B				circuit is de-energized if suppl' air is available. (Check Plant Condition)
21	P11B	578	V-5203	Prim. sampling sample	Fails closed, lights out - lose sampling
22	N11B			valve	capability

OPERATING PROCEDURE NO. 0960030, D.C. GROUND ISOLATION, REVISION 7

APPENDIX H

PP DC 1B CKT 21 RTGB 106 TB GG CWD 647 Rev. 5

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
23	P12B	579	V-5204	Prim. sampling sample	Fails closed, lights out - lose sampling
24	N12B			valve	capability
25	P13B	580	V-5205	Prim. sampling sample	Fails closed, lights out - lose sampling
26	N13B			valve	capability
27	P14B	212	HCV-14-7	CCW to RCP	Fails closed
28	N14B				
29	P15B	212	HCV-14-6	CCW from RCP	Fails closed
30	N15B				
31	P16B				
32	N16B				
33	P17B	280	HCV-3618	Check valve leakage	Fail closed, lose lights
34	N17B			drain to RWT	
35	P18B	282	HCV-3638	Check valve leakage	Fail closed, lose lights
36	N18B			drain to RWT	
37	P19B	315	HCV-08-1A	Main steam Isol Valve	Valve closes
38	N19B	315	(4YB) (4YB1)	HCV-08-1B Opening & Closing	HCV-08-1A (DO NOT REMOVE FUSE) (Trips Plant)
39	P20B	Spare			
40	N20B	Spare			

OPERATING PROCEDURE NO. 0900030, D.C. GROUND ISOLATION, REVISION 7

APPENDIX I

PP DC 1B CKT 15 RTGB 106 TB GG CWD 698 Rev. 5

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	TAG	TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
41	P21B	282	HCV-3638	1B1 SI check valve leakage	Valve will fail closed
42	N21B			to RWT	
43	P22B	202	HCV-14-8B	CCW normal supply hdr. isol.	Fail closed, stop CCW
44	N22B				
45	P23B	202	HCV-14-10	CCW normal return hdr. isol.	Fail closed, stop CCW
46	N23B				
47	P24B				
48	N24B				
49	P25B				
50	N25B				
51	P26B	512	FCV-25-2,	Cont. purge isol. valves	Fail closed, lose indication, stop fans
52	N26B		4, 6		
53	P27B	529	FCV-25-8	Vacuum relief valve	Fail closed, lose indication
54	N27B				
55	P28B	320	FCV-26-1,	Cont. sample isol.	Cont. sample pumps should be secured by
56	N28B		3, 5		de-energizing
57	P29B				
58	N29B				
59	P30B	319	FCV-23-4	S/G 1A blowdown isol.	Fail closed
60	N30B				
61	P31B	319	FCV-23-6	S/G 1B blowdown isol.	Fail closed
62	N31B				
63	P32B	256	V-3612	1A2 SI tank N2 valve	Fail closed, lose indication
64	N32B				

OPERATING PROCEDURE NO. 0960030, D.C. GROUND ISOLATION, REVISION 7

APPENDIX I

PP DC 1B CKT 15 RTGB 106 TB GG CWD 698 Rev. 5

GE FUSE NO.	EBASCO LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
65	P33B	256	V-3632	1B1 SI tank N2 valve	Fail closed, lose indication
66	N33B				
67	P34B	280	HCV-3618	1A2 SI check valve leakage	Lose indication, stays as is
68	N34B			to RWT	
69	P35B				
70	N35B				

OPERATING PROCEDURE NO. 0960030, D.C. GROUND ISOLATION, REVISION 7

APPENDIX J

PP 119 CKT _____ RTGB _____ TB _____ CWD _____ Rev. _____

GE FUSE NO.	EBASCO LINE NO.	LOAD CWD	LOAD TAG	LOAD TITLE	CONDITIONS REQUIRED TO DE-ENERGIZE
Ckt. 1		438/5		Radiation monitor Annun. Actuate ann. Q-36	
Ckt. 3		799/6		RTGB-102 XX Fuse 7-12, 43 & 44	
Ckt. 4		1192/1		RTGB-105 Annunciators	Will be changed with reflash
Ckt. 5		740/3		SC-10-3A, 3B, 4A, 4B (Reverse current valve)	Vent air off operator, spring will tend to close
Ckt. 6		1192/1		RTGB-106 annunciators	Will be changed with reflash
Ckt. 7		740/3		SC-10-5A (Reverse current valve)	Vent air off operator, spring will tend to close
Ckt. 10		740/3		SC-10-5B (Reverse current valve)	Vent air off operator, spring will tend to close

OPERATING PROCEDURE NO. 0960030, D.C. GROUND ISOLATION, REVISION 7

APPENDIX K

PP 119 CKT 3 RTGB 101 TB ZZ CWD 799 Rev. 6

GE FUSE NO.	EBASCO LINE NO.	LOAD			CONDITIONS REQUIRED TO DE-ENERGIZE
		CWD	TAG	TITLE	
1	P1B	711	20/ET	Emergency turbine trip	1. Lose IL710, actuate ann. D-17
2	N1B				2. Prevent backup electrical trips
3	P2B	885	86/GB	Backup generator lockout	1. Lose light, actuate ann. C-31
4	N2B				2. Prevent trips, prevent closing unit aux. bkr. 3. May prevent start of trans. coolers. 4. Give bkr. open signal to DEH, EOP, isophase cooler alarms, field bkr. (also require signal from 86/GP). Do not de-energize when 118 ckt. 2 is down.
5	P3B	882	86/UF	Underfrequency lockout	1. Lose light, actuate ann. C-39
6	N3B				2. Prevent underfrequency trip of switchyard
7	P4B	888	CAB/SA	Synchro acceptor	Cannot use auto-sync.
8	N4B				

DOCUMENT REVISION DISTRIBUTION SHEET - OFF NORMAL & EMERGENCY OPER. PROCEDURE

DOCUMENT TITLE SDC/LPSI - OFF NORMAL OPERATION

DOCUMENT FILE NUMBER 0440030

DOCUMENT REVISION NUMBER 4

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*Note: New distribution per instructions. Effective 9-12-79.

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT NO. 1
OFF NORMAL OPERATING PROCEDURE 0440030
REVISION 4

1.0 Title:

SDC/LPSI - OFF NORMAL OPERATION

2.0 Approval:

Reviewed by Plant Nuclear Safety Committee NOVEMBER 26 1974
Approved by L W Hanson Plant Manager DECEMBER 10 1974

Revision 4 Reviewed by Facility Review Group NOVEMBER 3 1981
Approved by C M Wethy Plant Manager 11-11- 1981

3.0 Purpose and Discussion:

Purpose: This procedure provides instructions to be followed in the event of a component malfunction which could degrade the systems ability to provide shutdown cooling or safety injection flow.

Discussion: No single active component failure will prevent the system from performing its design functions. However, manual action may be required to maintain maximum system effectiveness.

Operation with a partial system means only that the cooldown process will take a longer period of time.

4.0 Symptoms:

4.1 The following are indications of SDC/LPSI leakage.

4.1.1 Safe guards room sump high level alarms.
4.1.2 Local visual leakage indications.

4.2 The following are indications of a loss of shutdown cooling capacity

4.2.1 LPSI pump trip
4.2.2 SDC low flow as indicated by FI-3312, 3322, 3332, 3342, or FIC-3306.

4.2.3 Increasing temperature on SDCHX outlets as indicated on TI-3303X, 3303Y or TR 3351.
4.2.4 LPSI pump low discharge pressure as indicated on PI-3307.

4.2.5 SDC high pressure alarm
4.2.6 FCV-3306 Failed Open
4.2.7 FCV-3657 Failed Closed

5.0 Instructions:

5.1 Immediate automatic actions:

5.1.1 SDC loop suction valves trip closed on high pressure

5.2 Immediate Operator Actions

5.2.1 If leakage is indicated:

5.2.1.1 Isolate affected portion of system.
5.2.1.2 Re-establish flow to core using remaining portion of system.
5.2.1.3 If leak cannot be isolated proceed to step 5.3.

5.2.2 If a loss of SDC capacity has occurred:

5.2.2.1 Check LPSI pumps operating and restart if necessary.
5.2.2.2 Check CCW flow to SDC HX. Start additional CCW pumps as required.

5.2.2.3 Check for Intake Cooling Water flow to be normal and if necessary increase flow thru Heat Exchangers.

5.2.2.4 Check ICW strainer for High ΔP.

5.2.2.5 Verify proper valve lineup for SDC operation as follows:

MV-3481	SDC suction from loop 1A	Open
MV-3480	SDC suction from loop 1A	Open
MV-3651	SDC suction from loop 1B	Open
MV-3652	SDC suction from loop 1B	Open
MV-3615	LPSI header discharge to loop 1A2	Open
MV-3625	LPSI header discharge to loop 1A1	Open
MV-3635	LPSI header discharge to loop 1A2	Open
MV-3645	LPSI header discharge to loop 1B2	Open
V-3658	LPSI pump discharge to SDC HX	Open
FCV-3306	SDC HX bypass flow control	Throttled
HCV-3657	SDC HX flow control	Throttled

5.2.2.6 If SDC loop suction valves MV-3651, MV-3652, MV-3480, or MV-3481 have tripped closed due to high pressure, perform the following:

1. Stop both LPSI pumps
2. Reduce system pressure to < 265 psig.
3. Open MV-3651, MV-3652, MV-3480, MV-3481.
4. Close HCV-3657 SDC HX Flow Control
5. Throttle FCV-3306, SDC HX Bypass Flow Control to 5% open.
6. Start LPSI pumps and slowly re-open FCV-3306 to its original position and return to auto control.
7. Slowly open HCV-3657 to obtain desired heat exchanger flow.

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5.3 Subsequent Action

5.3.1 If a plant cooldown is in progress and shutdown cooling capability cannot be restored, perform the following:

5.3.1.1 Isolate the shutdown cooling system by closing the following valves:

MV-3481 SDC suction from loop 1A
MV-3480 SDC suction from loop 1A
MV-3651 SDC suction from loop 1B
MV-3652 SDC suction from loop 1B
MV-3615 LPSI header discharge to loop 1A2
MV-3625 LPSI header discharge to loop 1A1
MV-3635 LPSI header discharge to loop 1B1
MV-3645 LPSI header discharge to loop 1B2

5.3.1.2 If the PRZ bubble is still established, increase RCS pressure to 400 psig and start at least one RCP in the "B" loop.

NOTE: If the RCS is solid, rely on natural convection circulation, and do not start RCP's.

5.3.1.3 Establish feedwater flow to each steam generator using the auxiliary feedwater pumps.

5.3.1.4 Re-establish cooldown using the atmospheric steam dumps and proceed to cold shutdown.

5.3.2 If refueling operations are in progress and shutdown cooling capability cannot be restored, perform the following:

5.3.2.1 Secure refueling operations and restore containment integrity.

5.3.2.2 Verify the fuel pool cooling system is in operation per OP-0350020.

5.3 Subsequent Action (Cont'd)

5.3.2.3 (Cont'd)

5.3.2.3 Line up to recirculate the refueling cavity with the fuel pool purification pump as follows:

1. Verify that the purification pump is stopped.
2. Position the following valves:

V-4221	Fuel Pool skimmer suction	Closed
V-4220	Purification pump low suction	Open
V-4222	Purification pump suction	Open
V-4226	Purification pump discharge	Open
V-4228	Purification filter inlet	Closed
V-4229	Purification filter bypass	Open
V-4236	Fuel Pool ion exch. inlet	Closed
V-4251	Fuel Pool ion exch. bypass	Open
V-4252	Purification loop to fuel pool	Closed
V-7206	Purification loop to refueling cavity (OC)	Open
V07189	Purification loop to refueling cavity (IC)	Open

3. Start the purification pump and verify flow from fuel pool to the refueling cavity. Return flow will be via the fuel transfer tube.

4. Continue this mode of operation until the shutdown cooling system can be returned to service.

5.3.3 Loss of Power to FCV3306, HCV 3657, or FIC 3306.

5.3.3.1 FCV 3306 fails open

5.3.3.1.1 Throttle valve manually to maintain 3,000 GPM flow to RCS.

5.3.3.2 HCV 3657 fails closed

5.3.3.2.1 Throttle valve manually to maintain RCS temperature as required on TR3351.

5.3.3.3 FIC 3306 fails resulting in loss of flow indication and full opening of FCV 3306.

5.3.3.3.1 Throttle FCV 3306 manually.
5.3.3.3.2 Observe individual header flow instruments to maintain $\geq$ 3000 GPM
1A1 - FI3322
1B2 - FI3342
1A2 - FI3312
1B1 - FI3332

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5.0 Instructions (cont'd)

5.3 Subsequent Action (cont'd)

5.3.4 If shutdown cooling capability is lost and the RCS level has dropped below the hot leg suction and/or the RCS has heated up excessively, reestablish shutdown cooling as follows:

5.3.4.1 Open the associated warmup valve for the LPSI pump to be started (I-MV-03-1A or I-MV-03-1B) (CRAC) R/4

5.3.4.2 Crack open the LPSI pump suction valve and insure the appropriate RWT outlet valve is open.

5.3.4.3 Throttle the LPSI header valves HCV3615, 3625, 3635, and 3645.

5.3.4.4 Start the LPSI pump. If the pump cavitates severely, open the suction valve further or secure the pump as necessary.

NOTE: Several start attempts (with several minutes between starts) may be required.

5.3.4.5 When the pump is running satisfactorily, slowly close the LPSI suction valve and insure suction from the hot leg is adequate. Slowly close the warmup valve and open the LPSI header valves as desired.

NOTE: Rx vessel level should be monitored closely during this evolution.

6.0 References:

6.1 CE Emergency Procedure Guideline F-EP-13.

6.2 FSAR Section 6 and Section 9.

7.0 Records Required:

7.1 Normal log entry.

DOCUMENT REVISION DISTRIBUTION SHEET - OFF NORMAL & EMERGENCY OPER. PROCEDUR

DOCUMENT TITLE FLCEA off-Normal Operation And Re-Alignment

DOCUMENT FILE NUMBER 0110030

DOCUMENT REVISION NUMBER 6

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*Note: New distribution per instructions. Effective 9-12-79. C.P Russo

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PALNT UNIT NO. 1
OFF-NORMAL OPERATING PROCEDURE NO. 0110030
REVISION 6

1.0 Title:

FLCEA OFF-NORMAL OPERATION AND REALIGNMENT

2.0 Approval:

Reviewed by Plant Nuclear Safety Committee June 25 19 75
Approved by J. H. Barrow Plant Manager July 9 19 75

Rev. 3 Reviewed by FRG October 28 1977
Approved by J. H. Barrow for Plant Manager Oct. 31 1977

Revision 6 reviewed by FRG Nov. 5, 1981
Approved by C. M. Wethy Plant Manager Nov. 12 1981

3.0 Purpose and Discussion:

3.1 Purpose:

To provide instructions for operator action during abnormal operation and realignment of CEA's.

3.2 Discussion:

During normal operation all full length CEA's shall be operable with each CEA of a given group positioned within 7.5 inches of all other CEA's in its group. In the case of a misaligned CEA existing, this procedure implemented to ensure:

1. Acceptable power distribution limits are maintained.
2. Minimum shutdown margin is maintained.
3. Potential effects of a CEA ejection accident are limited to acceptable levels.

For small misalignments, a one hour time limit is provided to restore CEA alignment due to small effects on peaking factors, linear heat rate, and shutdown margin. For large misalignments, however, distortion of core power distribution, resulting in degradation in radial peaking factors would not be detected by the RPS, so a reduction in thermal power prior to attempting realignment is necessary.

For an immovable or untrippable CEA, or a large misalignment of two or more CEA's requires prompt shutdown of the reactor due to possible loss of mechanical functional capability of the CEA's or loss of shutdown margin.

1

OFF-NORMAL OPERATING PROCEDURE NO. 0110030
REVISION 6
FLCEA OFF-NORMAL OPERATION AND REALIGNMENT

4.0 Symptoms:

4.1 Upon observation from metrascope, digital position indicators or data processor, one or more CEA's are misaligned, dropped, stuck, or untrippable;

4.2 CEA position deviation alarm;

4.3 CEA motion inhibit alarm;

4.4 NI channel deviation alarm;

4.5 Dropped CEA alarm;

4.6 AWP alarm;

4.7 PDIL alarm;

4.8 Group out of sequence alarm;

4.9 Short term, steady state insertion alarm.

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5.0 Instructions:

5.1 REGULATING GROUP OUT OF SEQUENCE, OR MISALIGNMENT OF ±4 INCHES BUT LESS THAN ±7.5 INCHES.

5.1.1 Immediate automatic action

5.1.1.1 CEA motion inhibit on reg. group out of sequence.

5.1.2 Immediate operator action

5.1.2.1 Place CEDS control panel on off.

5.1.2.2 Determine if any mismatch exists between reactor power and turbine power. If a mismatch exists, adjust turbine power to equal reactor power.

5.1.3 Subsequent operator action:

5.1.3.1 Determine from symptoms and CEA position indications the cause of the inoperability or if the CEA is operable but misaligned, in accordance with Appendix "B".

5.1.3.2 Insure automatic functions have initiated.

5.1.3.3 Determine shutdown margin within one hour after detection of an inoperable CEA to be greater than 3.3% Δk/k. (Tech Specs 3/4 1-1)

5.1.3.4 If excessive friction or mechanical interference prevents movement of the CEA, or the CEA is untrippable, borate the worth of the effected CEA(s) above the minimum shutdown margin of 3.3% Δk/k. See OP #0030125, Turbine Shutdown Full Load to Zero Load (Tech Specs 3/4 1-20).

5.1.3.5 If one CEA is inoperable due to other reasons than stated in Section 5.1.3.4, operation in modes 1 and 2 may continue for up to 7 days per occurrence with a total accumulated time of ≤14 days per calendar year (Tech Specs 3/4 1-20).

5.1.3.6 If CEA is functioning properly realign the rod with its group in accordance with Appendix "A".

OFF-NORMAL OPERATING PROCEDURE NO. 0110030, Rev. 6
FLCEA OFF-NORMAL OPERATION AND REALIGNMENT

5.0 Instructions (cont.):

5.2 WITH ONE OR MORE CEA'S MISALIGNED BY MORE THAN ±7.5 INCHES BUT LESS THAN 15.

5.2.1 Immediate automatic action

5.2.1.1 CEA motion inhibit

5.2.2 Immediate operator action

5.2.2.1 Place CEDS control panel on off

5.2.2.2 Determine if any mismatch exists between reactor power and turbine power. If a mismatch exists, adjust turbine power to equal reactor power.

5.2.3 Subsequent operator action:

5.2.3.1 Determine from symptoms and CEA position indications the cause of the inoperability or if the CEA is operable but misaligned, in accordance with Appendix "B".

5.2.3.2 Insure automatic functions have initiated.

5.2.3.3 Determine shutdown margin within one hour after detection of an inoperable CEA to be greater than 3.3% Δk/k (Tech Specs 3/4 1-1).

5.2.3.4 If excessive friction or mechanical interference prevents movement of the CEA, or the CEA is untrippable, borate the worth of the effected CEA(s) above the minimum shutdown margin of 3.3% Δk/k and be in hot standby in six hours. See OP#0020125, Turbine Shutdown Full Load To Zero Load (Tech Specs 3/4 1-20).

5.2.3.5 If one or more CEA(s) are inoperable due to other reasons than stated in Section 5.2.3.4 declare inoperable within one hour and if above 70% thermal power, borate to not greater than 70% thermal power within one hour and realign remainder of operable CEA's in group within 7.5 inches of inoperable CEA's, without violating CEA sequence and insertion limits, within one hour. Operating time in MODES 1 and 2 may continue for up to 7 days per occurrence with a total accumulated time of ≤14 days per calendar year (Tech Specs 3/4 1-21).

OFF-NORMAL OPERATING PROCEDURE NO. 0110030, Rev. 6
FLCEA OFF-NORMAL OPERATION AND REALIGNMENT

5.0 Instructions (cont.):

5.2 (cont.)

5.2.3.6 If CEA's are functioning properly, realign CEA(s) within one hour, in accordance with Appendix "A". (Tech Specs 3/4 1-20).

CAUTION: If CEA(s) become misaligned by 15 inches or more, but does not drop while performing the above instruction, proceed to instruction 5.3.2.2. If CEA(s) drop while performing the above instruction, proceed to instruction 5.4.

5.0 Instructions (cont.):

5.3 WITH ONE CEA MISALIGNED BY 15 INCHES OR MORE BUT NOT A DROPPED ROD.

5.3.1 Immediate automatic action

5.3.1.1 CEA motion inhibit.

5.3.2 Immediate operator action

5.3.2.1 Place CEDS control panel on off.

5.3.2.2 Determine if any mismatch exists between reactor power and turbine power. If a mismatch exists, adjust turbine power to equal reactor power.

5.3.3 Subsequent actions

5.3.3.1 Determine from symptoms and CEA position indications the cause of the inoperability or if the CEA is operable but misaligned, in accordance with Appendix "B".

5.3.3.2 Insure automatic functions have initiated.

5.3.3.3 Determine shutdown margin within one hour after detection of an inoperable CEA to be greater than 3.3% Δk/k. (Tech Specs 3/4 1-1).

5.3.3.4 If excessive friction or mechanical interference prevents movememnt of the CEA, or the CEA is untrippable, borate the worth of the effected CEA(s) above the minimum shutdown margin of 3.3% Δk/k and be in hot standby in six hours. See OP#0030125, Turbine Shutdown Full Load To Zero Load (Tech Specs 3/4 1-20).

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5.0 Instructions (cont.):

5.3 (cont.):

5.3.3.5 If one CEA is inoperable due to other reasons than stated in Section 5.3.3.4 and if above 70% thermal power, borate to not greater than 70% thermal power within one hour. The controlled boration should be done in a manner which will insure that the reactor power is reduced to a level of less than or equal to 70% within 10 to 30 minutes.

Declare the CEA inoperable, and realign the remainder of operable CEA's in group within 7.5 inches of inoperable CEA without violating CEA sequence and insertion limits within one hour. After declaring the CEA inoperable, POWER OPERATION may continue for up to 7 days per occurrence with a total accumulated time of ≤14 days per calendar year.

With more than one full length CEA inoperable or misaligned from any other CEA in its group by 15 inches (indicated position) or more, be in HOT STANDBY within 6 hours. (Tech Specs 3/4 1-21 and 3/4 1-22).

5.3.3.6 If CEA is functioning properly and if above 70% thermal power, borate to not greater than 70% thermal power within one hour. The controlled boration should be done in a manner which will insure that the reactor power is reduced to a level of less than or equal to 70% within 10 to 30 minutes.

Realign CEA within one hour after reducing thermal power as required in accordance with Appendix "A". (Tech Specs 3/4 1-21).

1

OFF-NORMAL OPERATING PROCEDURE NO. 0110030, Rev. 6
FLCEA OFF-NORMAL OPERATION AND REALIGNMENT

5.0 Instructions (cont.):

5.4 DROPPED ROD

Dropping of a CEA during power operation is considered to occur in one of two circumstances:

1. Reactor operating at a power level of 70% or less of the maximum allowable THERMAL POWER for the existing reactor coolant pump combination.

2. Reactor operating at a power level of greater than 70% of the maximum allowable THERMAL POWER for the existing reactor coolant pump combination.

5.4.1 DROPPED ROD CASE 1

5.4.1.1 Immediate automatic action

5.4.1.1.1 CEA motion inhibit

5.4.1.2 Immediate operator action

5.4.1.2.1 Immediately reduce turbine load to match the reactor power and to return the plant conditions to within LCO's.

5.4.1.3 Subsequent operator action:

5.4.1.3.1 Determine from symptoms and CEA position indications the cause of the inoperability or if the CEA is operable but misaligned, in accordance with Appendix "B". During the determination of the cause of the dropped CEA the reactor power shall not be increased above the value present at the time the dropped CEA occurred. (Tech Spec 3/4 1-21) (CE letter F-SF-917).

5.4.1.3.2 Insure automatic functions have initiated.

5.4.1.3.3 Determine shutdown margin within one hour after detection of an inoperable CEA to be greater than 3.3% $\Delta k/k$ (Tech Specs 3/4 1-1).

5.0 Instructions (cont.):

5.4 (cont.):

5.4.1.3.4 If excessive friction or mechanical interference prevents movement of the CEA, or the CEA is untrippable, borate the worth of the effected CEA(s) above the minimum shutdown margin of 3.3% Δk/k and be in hot standby in six hours. See OP#0030125, Turbine Shutdown Full Load To Zero Load (Tech Specs 3/4 1-20).

5.4.1.3.5 If one CEA is inoperable due to other reasons than stated in Section 5.4.1.3.4, declare the CEA inoperable. After declaring the CEA inoperable, POWER OPERATION may continue for up to 7 days per occurrence with a total accumulated time of ≤14 days per calendar year provided the remainder of the CEAs in the group with the inoperable CEA are aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1-2 of the Tech Specs. The THERMAL POWER level shall be restricted pursuant to Specification 3/4 1-28 3.1.3.6 during subsequent operation. (Tech Specs 3/4 1-21) (Tech Specs 3/4 1-28).

5.4.1.4 With more than one full length CEA inoperable or misaligned from any other CEA in its group by 15 inches (indicated position) or more, be in HOT STANDBY within 6 hours (Tech Specs 3/4 1-22).

5.4.1.5 RECOVERY:
Upon ascertaining and correcting the cause for the dropped CEA, recovery of the CEA may be made.

The CEA should be recovered by a slow, smooth withdrawal using small increments of movement. Preferably, the movement increments should be three steps or less. The period of time for recovering the CEA should be at least 10 minutes. Appropriate changes in reactor coolant system boron concentration should be made during the withdrawal of the CEA.

5.0 Instructions (cont.):

5.4 (cont.):

5.4.1.5 RECOVERY (cont.)

Reactor power should be maintained for the remainder of the recovery procedure at or below the level which resulted after matching the turbine load to the post drop steady state reactor power if at all possible.

Following the return of the CEA to its group, operation should be maintained at the existing power level for at least one hour in order to allow assessment of resultant power distributions and/or azimuthal tilts.* Upon ascertaining that a normal power distribution is present and that the plant conditions are normal, power may then be raised to the desired operating power.

*Notify Reactor Engineering Supervisor

NOTE: It may be necessary to operate at this reduced power level for as long as 24 to 36 hours in order to reduce the azimuthal oscillation and the resulting values of F_r^T, T_q, F_{XY}, and ASI resulting from a dropped CEA.

OFF-NORMAL OPERATING PROCEDURE NO. 0010030, Rev. 6
FLCEA OFF-NORMAL OPERATION AND REALIGNMENT

5.0 Instructions (cont.):

5.4

5.4.2 DROPPED ROD CASE II

5.4.2.1 Immediate automatic action

5.4.2.1.1 CEA motion inhibit

5.4.2.2. Immediate operator action

5.4.2.2.1 In accordance with the present Technical Specifications, the operator shall immediately begin to reduce power and, within one hour, be less than 70% of the maximum allowable THERMAL POWER level using boration if negative reactivity is required. It is intended that this boration shall be a controlled boration and not an emergency boration. The controlled boration should be done in a manner which will insure that the reactor power is reduced to a level of less than or equal to 70% within 10 to 30 minutes after the CEA is dropped. (CE letter and Tech Specs 3/4 1-21).

5.4.2.3 Subsequent operator action

5.4.2.3.1 Determine from symptoms and CEA position indications the cause of the inoperability or if the CEA is operable but misaligned in accordance with Appendix "B". During the determination of the cause of the dropped CEA the reactor power shall not be increased above the value present at the time the dropped CEA occurred.

OFF-NORMAL OPERATING PROCEDURE NO. 0010030, Rev. 6
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5.0 Instructions (cont.):

5.4 (cont.)

5.4.2.3.2 Insure automatic functions have initiated.

5.4.2.3.3 Determine shutdown margin within one hour after detection of an inoperable CEA to be greater than 3.3% Δk/k. (Tech Specs 3/4 1-1).

5.4.2.3.4 If excessive friction or mechanical interference prevents movement of the CEA, or the CEA is untrippable, borate the worth of the effected CEA(s) above the minimum shutdown margin of 3.3% Δk/k and be in hot standby in six hours. See OP#0030125, Turbine Shutdown Full Load to Zero Load (Tech Specs 3/4 1-20).

5.4.2.3.5 If one CEA is inoperable due to other reasons than stated in Section 5.4.2.3.4, declare the CEA inoperable. After declaring the CEA inoperable, POWER OPERATION may continue for up to 7 days per occurrence with a total accumulated time of ≤14 days per calendar year provided the remainder of the CEAs in the group with the inoperable CEA are aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1-2 of Tech Specs 3/4 1-28 the THERMAL POWER level shall be restricted pursuant to Specifications 3.1.3.6 during subsequent operation. (Tech Specs 3/4 1-21) (Tech Specs 3/4 1-28).

OFF-NORMAL OPERATING PROCEDURE NO. 0010030, Rev. 6
FLCEA OFF-NORMAL OPERATION AND REALIGNMENT

5.0 Instructions (Cont.):

5.4 (cont.)

5.4.2.4 With more than one full length CEA inoperable or misaligned from any other CEA in its group by 15 inches (indicated position) or more, be in HOT STANDBY within 6 hours (Tech Specs 3/4 1-28).

5.4.2.5 RECOVERY
Upon ascertaining and correcting the cause for the dropped CEA, recovery of the CEA may be made.

The CEA should be recovered by a slow, smooth withdrawal using small increments of movement. Preferably, the movement increments should be three steps or less. The period of time for recovering the CEA should be at least 10 minutes. Appropriate changes in reactor coolant system boron concentration should be made during the withdrawal of the CEA.

Reactor power should be maintained for the remainder of the recovery procedure at or below the level which resulted after matching the turbine load to the post drop steady state reactor power if at all possible.

Following the return of the CEA to its group, operation should be maintained at the existing power level for at least one hour in order to allow assessment of resultant power distributions and/or azimuthal tilts.* Upon ascertaining that a normal power distribution is present and that the plant conditions are normal, power may then be raised to the desired operating power.

NOTE: It may be necessary to operate at this reduced power level for as long as 24 to 36 hours in order to reduce the azimuthal oscillation and the resulting values of F_r^T, F_q, F_{XY}^T, and AST resulting from a dropped CEA.

* Notify Reactor Engineering Supervisor

6.0 References:

6.1 Combustion Engineering NSSS lecture series.

6.2 Standard Technical Specifications, Section 3/4.1.3.

6.3 FSAR, St. Lucie Plant Unit No. 1, Chapter 15, Accident Analysis, Section 15.2.3.

6.4 C.E. Letter F-SF-917 6/22/76

7.0 Records Required:

7.1 Normal Log entries.

APPENDIX A - CEA REALIGNMENT

1.0 Limits and Precautions:

1.1 Regulating CEAs should be withdrawn in sequence and overlap between groups shall not exceed 40 percent.

1.2 Do not exceed a sustained SUR of 1.4 DPM (alarm 1.3 DPM). /R6

1.3 Criticality shall be anticipated any time CEAs are being withdrawn.

1.4 If deviation between CEAs in any group approaches 3 inches stop group withdrawal and realign CEAs.

1.5 Individual CEA positions within the group shall be determined at least once per 12 hours except when the rod position deviation circuit is out of service, then verify CEA positions at least once every four hours. (Tech Specs 3/4 1-22)

1.6 CEAs shall be limited in physical insertion as shown by the insertion limit curves.

2.0 Instructions:

2.1 Alignment of a CEA which is below its group, prior to criticality:

_____ 2.1.1 Utilizing manual sequential control insert the misaligned group a minimum of 4 inches.

_____ 2.1.2 Utilizing manual individual control, withdraw the low CEA to the group position.

_____ 2.1.3 Monitor the position of all CEAs in the group for proper alignment.

2.2 Alignment of a CEA which is above its group, prior to criticality:

____ 2.2.1 Utilize manual individual control and insert the high CEA to to the group position.

____ 2.2.2 Monitor the position of all CEAs in the group for proper alignment.

2.3 Alignment of an above or below CEA with the reactor critical:

____ 2.3.1 Utilize manual individual control to return the misaligned CEA to the group position.

____ 2.3.2 If necessary, alternate between manual individual control of the misaligned CEA and manual sequential control of its associated group to maintain the desired reactor power level.

APPENDIX A - CEA REALIGNMENT (cont.)

2.0 Instructions: (cont.)

2.3 (cont.)

_____2.3. Monitor the position of all CEAs in the group for proper alignment.

_____2.3. Utilize manual group control as required to readjust the group positions for proper automatic sequencing.

OFF-NORMAL OPERATING PROCEDURE NO. 0110030, REV. 6
FLCEA OFF-NORMAL OPERATION AND REALIGNMENT

APPENDIX B - DROPPED CEA INVESTIGATION

1.0 Ascertain the cause of the dropped rod by selecting manual individual on the mode selection push buttons, selecting the individual rod on the individual CEA selection push buttons, selecting the motion inhibit push button under the group the rod is in, selecting the group the rod is in on the group selection push buttons, and while holding down the motion inhibit push button under the group selection push buttons, insert and withdraw the rod. Reactor power shall not be increased above the value present at the time the dropped rod occurred.

If the rod moves smoothly and all indications appear normal, re-align the rod per the dropped rod procedure.

2.0 Guidelines for Investigating Dropped CEDM'S
(Taken from CE Letter F-SF-0935)

Dropped CEDM's have occurred from:

(1) Shorted SCR's in the CPP Power Switch Module

(2) Loss of 12 Volts Control Power in the CPP Timer Module

(3) Loss of 15 Volt Power Supply

(4) Failure of the Interval Timer

Symptoms

(1) Shorted SCR's

(a) Line fuse(s) blown in Power Supply Circuit

(b) Circuit breaker closed lamp out. Applicable dependent on which line fuse(s) blow.

(2) Loss of 12 Volts

(a) Indicator lamp on CPP Timer Module dim or out.

(3) Loss of 15 Volt Power Supply

(a) No output or reduced output to CPP Timer Module. Indication lamp on CPP Timer Module dim or out.

APPENDIX B - DROPPED CEA INVESTIGATION (cont.)

2.0 (cont.)

Trouble Shooting

Call Digital Specialist in.

(1) Check line fuses. If blown, have Digital Specialist check SCR's for shorts, opens. DO NOT replace fuses or reclose circuit breaker and re-energize before checking for failed SCR's.

(2) Check fuses in 15 volt d-c Power Supply Transformer input. If blown determine cause before replacing. Check output.

21/27

DOCUMENT REVISION DISTRIBUTION SHEET - OFF NORMAL & EMERGENCY OPER. PROCEDUR

DOCUMENT TITLE Pressurizer Pressure + Level - Off-Normal Operatio

DOCUMENT FILE NUMBER 0120035

DOCUMENT REVISION NUMBER 5

DOCUMENT DISTRIBUTED ON 11-12-81
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PROCESSED BY: Hand DATE 11-12-81

*Note: New distribution per instructions. Effective 9-12-79.

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT NO. 1
OFF-NORMAL OPERATING PROCEDURE 0120035
REVISION 5

1.0 Title:

PRESSURIZER PRESSURE & LEVEL - OFF-NORMAL OPERATION

2.0 Approval:

Reviewed by Plant Nuclear Safety Committee Oct 30 1974

Approved by J. H. Barrow For Plant Manager Jan 3 1974

Revision 5 reviewed by FRG Nov. 5 1981.

Approved by [signature] Plant Manager Nov. 12 1981.

3.0 Purpose:

To provide instructions for operator action in the event of malfunction of pressurizer pressure and level control systems, or pressure transient caused by inadvertant operation of auxiliary spray valves.

4.0 Symptoms:

4.1 Pressurizer High-Low Pressure Alarm, Channels X or Y

4.2 Pressurizer High-Low Level Alarm, Channels X or Y

4.3 Pressurizer Low-Low Level Alarm, Channels X or Y

4.4 Pressurizer Proportional Heaters Low Level Trip - Control Switch Isolated Alarm

4.5 Pressurizer Backup Heaters Low Level Trip - Control Switch Isolated Alarm.

4.6 Safety or Relief Valve(s) open alarm.

OFF-NORMAL OPERATING PROCEDURE 0120035, REV. 5
PRESSURIZER PRESSURE & LEVEL OFF-NORMAL OPERATION

5.0 Instructions:

5.1 Immediate Automatic Actions

5.1.1 Abnormal Pressurizer Pressure Condition

5.1.1.1 SIAS initiates at 1600 PSIA in the pressurizer

5.1.1.2 TM/LP reactor trip initiates at 1887 PSIA minimum pressure.

5.1.1.3 Low pressure alarm actuates at 2100 PSIA

5.1.1.4 Backup heaters energize at <2200 PSIA and and denergize at >2220 PSIA.

5.1.1.5 Spray valves cycle from full closed at 50 PSI above setpoint, to full open 75 PSI above setpoint.

5.1.1.6 Proportional heaters cycle from minimum output at 25 PSI above setpoint, to maximum output at 25 PSI below setpoint.

5.1.1.7 High pressure alarm actuates at 2340 PSIA.

5.1.1.8 High pressure reactor trip initiates and power operated reliefs open at 2400 PSIA.

5.1.1.9 Pressurizer safety valves open at 2500 PSIA.

5.1.2 Abnormal Pressurizer Level Condition

5.1.2.1 All pressurizer heaters denergize at 26.9% indicated level.

5.1.2.2 Low level alarm actuates and all charging pumps receive backup signal to start at 5.0% below RRS setpoint.

5.1.2.3 Second backup charging pump receives signal to start 4.2% below selected setpoint.

5.1.2.4 First backup charging pump receives signal to start 2.5% below selected setpoint.

OFF-NORMAL OPERATING PROCEDURE 0120035, REV. 5
PRESSURIZER PRESSURE & LEVEL OFF-NORMAL OPERATION

5.0 Instructions (cont.):

5.1 (cont.) 5.1.2.5 Second backup charging pump receives signal to stop at 1.9% below selected setpoint.

5.1.2.6 Minimum letdown of 29 gpm and first backup charging pump receives signal to stop at 1.1% below selected setpoint.

5.1.2.7 All backup heaters energize and all but one charging pump receives signal to stop at 3.6% above RRS setpoint.

5.1.2.8 Maximum letdown is 128 gpm at 9.2% above selected setpoint. /R5

5.1.2.9 High level alarm actuates at 10% above RRS setpoint.

5.2 Immediate Operator Actions:

5.2.1 Abnormal Pressurizer Pressure Condition

5.2.1.1 Insure pressurizer spray, proportional and backup heaters are operating properly in automatic, if not, shift spray valve controller to manual, energize or denergize heaters whichever is applicable.

5.2.1.2 Insure power operated reliefs closed, if open, isolate by closing V1403, V1405, power operated relief isolation valves. Refer to OP #0120036, pressurizer relief/safety valve-off normal operation.

5.2.1.3 Insure SE-02-03, SE-02-04 auxiliary spray valves closed if open, attempt to close using key switch. If still open, stop all charging pumps, isolate letdown. Refer to OP #0210030, charging and letdown off normal operation.

5.2.1.4 Insure pressure anomally is not caused by large rate of change of T_{ave}.

5.2.2 Abnormal Pressurizer Level Condition

5.2.2.1 Insure selected RRS channel is operating properly, if not, shift to operable channel.

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OFF-NORMAL OPERATING PROCEDURE 0120035, REV. 5
PRESSURIZER PRESSURE & LEVEL OFF-NORMAL OPERATION

5.0 Instructions (cont.):

5.2 (cont.)

5.2.2.2 Insure backup charging pumps start, letdown decreasing, or backup charging pumps off, letdown increasing, whichever is applicable.

5.2.2.3 Insure level anomally is not caused by large rate of change in T_{ave}.

5.3 Subsequent Operator Actions:

5.3.1 Check that pressurizer safeties are not leaking or have actuated by downstream header temperature indication and quench tank indications.

5.3.2 Insure AOV-2515, AOV-2516, letdown isolation valves open.

5.3.3 Insure SE-02-01, SE-02-02, charging isolation valves open.

5.3.4 Insure LCV-2110P, LVC-2110Q, pressurizer level control valves are operating properly.

5.3.5 Insure PCV-2201P, PCV-2201Q Letdown pressure control valves are operating properly.

5.3.6 Place second backup charging pump control switch in auto if three charging pumps are necessary.

5.3.7 Insure letdown valve limiter bypass switch and pressurizer level bypass control switch are in the normal positions.

5.3.8 Compare letdown flow, charging flow, charging pump header pressure and VCT levels for indications of leaks or lifting relief valves in the CVCS system. Refer to OP #0210030, charging and letdown-off normal operation.

5.3.9 Insure that power operated relief valve V-1402 and V-1404 hand switches are in proper mode for existing plant conditions.

Note: (1) SW in "Norm Range"
RCS Pressure $\geq$ 435 psia
RCS Tcold $\geq$ 279°F

(2) SW in "Low Range"
RCS Pressure $\leq$ 415 psia
RCS Tcold $\leq$ 275° F

5.3.10 If pressurizer level decrease cannot be immediately explained, refer to OP #0120031, Excessive Reactor Coolant System Leakage.

OFF-NORMAL OPERATING PROCEDURE 0120035, REV. 5
PRESSURIZER PRESSURE & LEVEL OFF-NORMAL OPERATION

6.0 References:

6.1 FSAR, Section 7.7, Control Systems

6.2 CE P&ID 19367-210-100

6.3 CE Set Point Guidelines

7.0 Records Required

7.1 Normal log entries

7.2 If pressure transient was caused by inadvertant auxiliary spray valve actuation, document transient per OP # _____, Component Cyclic and Transient Limits Records.

DOCUMENT REVISION DISTRIBUTION SHEET - OFF NORMAL & EMERGENCY OPER. PROCEDURE

DOCUMENT TITLE Blackout Operation

DOCUMENT FILE NUMBER 0030140

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*Note: New distribution per instructions. Effective 9-12-79.

[signatures] F. D. Groot

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT #1
EMERGENCY OPERATING PROCEDURE NO. 0030140
REVISION 22

1.0 Title:

BLACKOUT OPERATION

2.0 Approval:

Reviewed by Plant Nuclear Safety Committee [illegible] 1979
Approved by [illegible] Plant Manager [illegible] 1979

Revision 22 reviewed by [illegible] 11-5 1981.
Approved by [illegible] Plant Manager 11-10 1981.

3.0 Purpose or Discussion:

3.1 This procedure provides the action to be taken in the event of a complete loss of off site electrical power concurrent with a turbine trip.

3.2 Discussion

3.2.1 A loss of power to the 4160 V buses, results in a loss of power to all 480 V load centers and motor control centers and to all instrumentation not fed directly or indirectly from the station battery. A reactor trip will occur from a low reactor coolant flow rate signal due to the loss of power to the 6900 V buses supplying the reactor coolant pumps and will be accompanied by a turbine trip and generator lockout.

3.2.2 Steam dump to atmosphere must be used to remove reactor decay heat. Initially, steam generator safety valves may actuate to augment the steam flow and to help control steam generator pressure immediately after the trip.

3.2.3 On site power will be supplied by Emergency Generators.

3.3 A rapid reduction in steam generator water levels will occur due to the reduction of the steam generator void fraction on the secondary side and also because steam flow will continue after normal feedwater flow stops. Auxiliary feedwater flow will automatically initiate 3 minutes after the first steam generator level reaches 34% (2/4 logic).

3.4 Core decay heat removal is accomplished by natural circulation in the reactor coolant loops.

3.5 Core damage is not expected as a result of a loss of power condition as the steam generators are maintained as a heat sink and no loss of water occurs from the pressurizer.

EMERGENCY OPERATING PROCEDURE NO. 0030140, REV 22
BLACKOUT OPERATION

3.0 Purpose or Discussion: (cont)

3.6 If operating under blackout conditions and an engineered safety features actuation signal occurs, any non emergency loads that are running will be automatically tripped and the required emergency loads will be automatically started.

4.0 Symptoms:

4.1 Alarms associated with the loss of operating plant components.

4.2 Loss of normal control room lighting and DC lighting energized.

4.3 Reactor and turbine trip.

4.4 Emergency diesel generators start.

4.5 Reactor coolant pump trip and steam generator feed pump trip.

EMERGENCY OPERATING PROCEDURE NO. 0030140, REV 22
BLACKOUT OPERATION

1

5.0 Instructions:

5.1 Immediate auto action

5.1.1 Reactor and turbine trip, generator lockout

5.1.2 Generator breakers open.

5.1.3 Incoming feeder breakers open to 4160 V and 6900 V buses.

5.1.4 Tie breakers between Normal 4160 buses (1A2 and 1B2) and the emergency 4160 V buses (1A3 and 1B3) open.

5.1.5 Ties between essential and non-essential sections of emergency 480 V MCC's open.

5.1.6 Breakers open for the following non-safety related loads which are normally fed from emergency buses.

NOTE: These loads can be manually reconnected to the emergency buses as needed.

5.1.6.1 Pressurizer heater transformers 1A and 1B.
5.1.6.2 Fire pump 1A and 1B.
5.1.6.3 CEA Drive M.G. 1A & 1B.
5.1.6.4 Fuel Handling 480 V MCC 1A8, 1B8/
5.1.6.5 Reactor cavity sump pump 1A
5.1.6.6 Reactor building elevator
5.1.6.7 Electrical equipment room hoist
5.1.6.8 120/208 power panel 121 transformer
5.1.6.9 Lighting panel transformers 110, 112, 114, 117, 125, 126
5.1.6.10 Incoming feeder from 1A2 & 1B2 4160V buses
5.1.6.11 RCP oil lift pumps (8 pumps only - A pumps running)
5.1.6.12 Airborne radioactivity removal fans HVE-1&2
5.1.6.13 Pressurizer relief isol valves 1403 & 1405 /R22
5.1.6.14 CVCS heat tracing transformer 1A & 1B
5.1.6.15 480V Lighting panel 2A, 2B & 2C
5.1.6.16 Waste management heat tracing transformers 2A & 2B
5.1.6.17 Air conditioner HVA-4, ACC-4.
5.1.6.18 Power panel 120
5.1.6.19 Lighting panels 113, 116, 109, 115, 130
5.1.6.20 Refueling equipment
5.1.6.21 Refueling water to charging pumps V-2504
5.1.6.22 Boric Acid batching tank heaters
5.1.6.23 Fire siren

EMERGENCY OPERATING PROCEDURE NO. 0030140, REV 22
BLACKOUT OPERATION

1

5.0 Instructions: (cont)

5.1 (cont)

5.1.7 All loads on emergency buses are tripped except the following:

5.1.7.1 Boric Acid makeup pumps
5.1.7.2 Charging pumps
5.1.7.3 Emergency lighting
5.1.7.4 Class I power panels
5.1.7.5 RCP oil lift pumps (A pumps only - B pumps off)
5.1.7.6 Diesel fuel transfer pump.

5.1.8 Diesel generators A & B start and energize 4160 V emergency buses 1A3, 1B3, and 1AB and loads listed in step 5.1.7.

5.1.9 Subsequent loads are started at 3 second intervals. See Table 1, Emergency Diesel Generator Loading Sequence.

5.1.10 Auxiliary Feedwater auto start sequence initiates when the first steam generator level decreases to 34%.

NOTE: Pump start and flow initiation is delayed for 3 minutes. Pumps may be started by the operator AT ANY TIME.

5.2 Immediate Operator Actions

5.2.1 Trip turbine and reactor manually.

5.2.2 Check all full length CEA's are fully inserted and reactor trip breakers are open.

5.2.3 Check turbine valves are closed.

5.2.4 Check generator field and 240 KV breakers are open.

5.2.5 Place reheater control system in manual, close TCV's.

5.2.6 Check that diesel generators have started and are feeding only emergency buses.

5.2.7 Open start-up transformer breakers.

5.2.8 Reduce T_{avg} to reference set point by manual operation of the steam dump valves to atmosphere.

5.2.9 Isolate steam generator blowdown.

EMERGENCY OPERATING PROCEDURE NO. 0030140, REV. 22
BLACKOUT OPERATION

1

5.0 Instruction: (Cont'd)

5.2 Immediate Operation Action (Cont'd)

5.2.10 Start steam driven aux. feed pump and establish flow to S.G.'s. If aux. feed pumps have started due to the auto start feature, the motor driven pumps may be secured 30 seconds after they start, if desired.

5.2.11 If any of the automatic actions listed in 5.2.2 thru 5.2.9 do not occur automatically, then manually initiate that action.

5.3 Subsequent Action

5.3.1 Ensure adequate natural circulation flow by ensuring that hot and cold leg temperatures, pressurizer pressure and level stabilize within minutes. The core ΔT should be less than $\sim 44^{\circ}F$ (ΔT for full power).

5.3.1.1 If the above conditions are not established:

5.3.1.1.1 Check RCS temperature and pressure to ensure that the RCS is subcooled.

5.3.1.1.2 Ensure auxiliary feed flow to the steam generators has been initiated and the steam dumps to atmosphere are in operation.

5.3.1.2 Return at least one RCP in each loop to operation as soon as offsite power is available

5.3.2 Start equipment in Table 1 if required.

EMERGENCY OPERATING PROCEDURE NO. 0030140,
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1

5.0 Instruction: (Cont'd)

5.3 (cont'd)

5.3.3 If one diesel fails to start, attempt a manual start.

5.3.3.1 If manual start attempt is unsuccessful, an operator should be sent to the diesel local control station to inspect status of local alarm panel.

5.3.3.2 If no alarms are present on the local alarm panel, an inspection of the overspeed trip lever should be made to insure it has not tripped.

5.3.3.3 If the overspeed trip levers are latched, the normal isolate switches on the local control panel should be placed in the isolate position and a local start attempt should be made.

5.3.3.4 Refer to Operating Procedure 2200020, 2200050 Emergency Diesel Standby Line up and Periodic Test.

5.3.4 Locally open condenser vacuum breakers MV10-1A and MV10-1B. Locally close MSR main steam block valves MV08-4, MV08-6, MV08-8, and MV08-10.

5.3.5 Check MSR warm-up valves MV08-5, MV08-7, MV-9, and MV08-11 to be closed or close manually.

5.3.6 Send an operator to align and start emergency cooling water to the instrument air compressor, then reset local handswitch and manually start the instrument air compressor.

CAUTION: Do not overload the diesel generators when starting additional equipment. (3500 KW max. continuous rating).

5.3.7 When diesel generator power is available energize equipment as may be required for plant safety and to achieve an orderly shutdown within the diesel generator load limitations by:

5.3.7.1 Verify one set of cavity and support cooling fans operating. If not, start one set.

5.3.7.2 Locking out automatic starting equipment that is not in service.

5.3.7.3 Manually opening all breakers on any non-vital bus or motor control center that is to be re-energized.

EMERGENCY OPERATING PROCEDURE NO. 0030140,
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BLACKOUT OPERATION

1

5.0 Instructions: (Cont)

5.3 (Cont)

5.3.7 (Cont)

5.3.7.4 Resetting lockout relays for each required bus to allow closing of feeder breakers.

5.3.8 Energize 4160 V buses 1A2, 1B2, 480 V load centers 1A1, 1B1 and 480 MCC's 1A1, 1B1, 1A4, 1B4, and 1C as follows:

	ACTION	LOCATION	
5.3.8.1	Strip non-vital 4.16 KV busses (All should be opened automatically)	1A2	1B2
5.3.8.2	Insert sync plug, close 4.16 KV non-vital breaker and hold control switch closed while closing 4.16 KV vital breaker.	1A2-20109 1A3-20209	1B2-20309 1B3-20411
5.3.8.3	Strip non-vital load center	1A1	1B1
5.3.8.4	Close 4.16KV feed breaker to non-vital load centers	1A2-20110	1B2-20310
5.3.8.5	Strip 480V MCC	1A1 1A4 1C	1B1 1B4
5.3.8.6	Close 480V load center feed breaker to MCC 1A1 & 1B1	1A1-40115	1B1-40411
5.3.8.7	Close 480V load center feed breaker to MCC 1A4 & 1B4	1A1-40113	1B1-40413
5.3.8.8	Close 480V load center feed breaker to MCC 1C	1A1-40119	1B1-40410

5.3.9 At MCC 1C, close breakers for turning gear, bearing oil pump, air side seal oil pump and hydrogen seal oil pump.

5.3.10 Place turbine plant cooling water pump in operation.

5.3.11 Align turbine cooling water system to the instrument air compressor back to normal alignment.

5.3.11.1 Open all Ckt's on PP-104 except Ckt's 21 & 23.

5.3.11.2 Close Breaker 40851 on MCC 1A1

5.3.11.3 Open all Ckt's on PP-146 except Ckt 1.

EMERGENCY OPERATING PROCEDURE NO. 0030140,
REVISION 22
BLACKOUT OPERATION

1

5.0 Instructions: (Cont)

5.3.11.3.1 Open all Ckt's on PP-150 except Ckt's 7,9 and 11.

NOTE: PP-146 is located on the wall of the new cold lab just west of MCC 1B1. PP-150 is located in the new cold lab closet.

5.3.11.4 Close Breaker 41634 on MCC 1B1.

5.3.12 Place turbine drain valve switch in the open position.

5.3.13 Start bearing oil pump before turbing bearing oil pressure reaches 12 psig. decreasing. Pump starts automatically at 12 psig decreasing turbine bearing oil pressure. NOTE: If bearing oil pump fails to start, the emergency DC oil pump will start at 10 psig decreasing bearing oil pressure. Operator should start pump before 10 psig is reached. Stop the DC oil pump if it is running in addition to the bearing oil pump.

5.3.14 Remove the following components from service:

5.3.14.1 Steam jet air ejectors
5.3.14.2 Priming ejector
5.3.14.3 Auxiliary priming ejector
5.3.14.4 Auxiliary steam to R.A.B.
5.3.14.5 Gland seal system

5.3.15 Start CEDM cooling fans A & B.

5.3.16 Start reactor support cooling fans A & B.

CAUTION: Consider equipment starting requirements. Alternate operation of equipment may be required to avoid overloading the diesel generators. (3500 KW Max. continuous rating).

5.3.17 Manually close breakers for pressurizer heater buses on 4150 V buses 1A3 and 1B3.

EMERGENCY OPERATING PROCEDURE NO. 0030140, REV 22
BLACKOUT OPERATION

1

5.0 Instructions: (cont)

5.3 (cont)

5.3.18 Check that the bearing oil lift pump starts automatically when turbine speed decreases to approximately 600 rpm.

5.3.19 Start turbine lube oil vapor extractor and generator oil vapor extractor.

5.3.20 Check that the turning gear engages and starts automatically when turbine speed decreases to zero rpm, or manually engage it.

5.3.21 Reduce the flow of cooling water to maintain the temperature of the oil leaving the turbine lube oil and the air side and hydrogen side oil coolers between 95 - 100°F.

5.3.22 Isolate cooling water supply to the generator hydrogen coolers.

5.3.23 If additional condensate storage tank water is required and sufficient power is available from the diesel generators, place the water treatment plant in service.

5.3.24 Place the spent fuel pit cooling pump in operation as necessary.

NOTE: With spent fuel elements from 3-1/3 cores present, the spent fuel pit can safely withstand 5 hours without cooling before reaching the boiling point.

5.3.25 Periodically check fuel oil levels in the diesel generator day tanks to confirm proper operation of the fuel oil transfer system and to ensure uninterrupted diesel generator operation.

5.3.26 Sample and analyze the reactor coolant to determine if fuel element clad failure has occurred.

5.3.27 Determine expected duration of power outage. If unable to do so or if outage is to be prolonged, borate RCS to cold shutdown concentration.

5.3.28 If the outage will exceed 4 hours and the RWT is available, proceed to cold shutdown conditions utilizing thermal circulation, atmospheric steam dump and feedwater addition. Place shutdown cooling in service when appropriate temperatures and pressures are reached. Proceed to step 5.3.32.

1

5.0 Instructions: (cont)

5.3 (cont)

5.3.28 (cont)

NOTE: Do not begin plant cooldown until cold shutdown boron concentration is verified.

5.3.29 If the outage will exceed 4 hours and the RWT is not available, the Safety Injection tanks should be used for makeup to the RCS, if other sources are not available.

5.3.30 Make the following preparations:

5.3.30.1 Close either or both non-essential tie breakers for MCC 1A5 and MCC 1B5
1A5 - 41230
1B5 - 42027
This will provide power to the containment instrument air compressors.

5.3.30.2 If running of containment instrument air compressors is not desirable, insure that a turbine building instrument air compressor is running and containment instrument air pressure is normal.

5.3.30.3 Open the 480 V AC breakers for MOV-2501 and MOV-2504.
MOV-2501 - 42021
MOV-2504 - 42017

5.3.30.4 Open and lock the following valves:

V-07009	SIT test line return to RWT penetration #41
V-3463	SIT test line return to RWT penetration #41
V-03920	SIT test line tie to VCT inlet

5.3.30.5 Borate the RCS to cold shutdown boron concentration.

CAUTION: Insure that one BAMT tank remains in service to use as a source of borated water while in mode 5.

EMERGENCY OPERATING PROCEDURE NO. 0030140, REV 22
BLACKOUT OPERATION

1

5.0 Instructions: (cont)

5.3 (cont)

5.3.31 Proceed to cold shutdown conditions utilizing thermal circulation, atmospheric steam dump and feedwater addition.

5.3.31.1 When makeup to VCT is necessary, select a S.I.T. to use as makeup source. Open the appropriate tanks, fill and drain valve.
1A1 - AOV-3621
1A2 - AOV-3611
1B1 - AOV-3631
1B2 - AOV-3641

5.3.31.2 Close the appropriate fill and drain valve when VCT is restored to normal level.

CAUTION: Use one SIT tank at a time. Insure RCS is 1750 psia before the second SIT tank is used.

5.3.31.3 Place shutdown cooling in service when appropriate temperatures and pressures are reached.

5.3.32 If pressurizer cooldown cannot be accomplished in a timely manner from the addition of cooler liquid (Aux. Spray) from the charging pump via the pressurizer spray line, proceed with the alternate positive means of depressurization as follows:

5.3.32.1 Place the switches for the power operated relief valves V1402 and V1404 in the override position.

5.3.32.2 Initiate a high pressurizer pressure trip signal on two RPS channel trip units.

5.3.32.3 Place the switch for either power operated relief valve (V1402 or V1404) in the normal range position and vent the pressurizer to the quench tank. Return the switch to override to close valve.

5.3.32.4 Control the rate of cooldown and depressurization by selective operation of the power operated relief valves in this mode until cooldown via the Auxiliary Spray valves can be initiated.

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BLACKOUT OPERATION

1

5.0 Instructions: (cont)

5.3 (cont)

5.3.33 When normal AC power is available:

5.3.33.1 Restore bus sections to their normal supplies.

5.3.33.2 Place the diesel generator system in standby lineup as per OP 2200020.

5.3.33.3 Restore all plant systems to normal.

1

6.0 References:

6.1 FSAR, Section 15

6.2 FSAR, Section 8

6.3 Operating Procedure #0030130, Shutdown Resulting From Reactor/Turbine Trip

6.4 Operating Procedure #0210020, Charging and Letdown

6.5 Operating Procedure #0330020, Turbine Cooling Water Operation

6.6 Operating Procedure #0250031, Boron Concentration Control, Off-Normal

6.7 Operating Procedure #1010040, Loss of Instrument Air

6.8 Operating Procedure #1540020, Water Plant Startup and Shutdown

6.9 Operating Procedure #2200020, Emergency Diesels - Standby Lineup

6.10 Operating Procedure #0700022, Aux. Feedwater System Operation

7.0 Records/Notification:

7.1 Normal Log Entries.

7.2 Notify Duty Call Supervisor.

TABLE I

EMERGENCY DIESEL GENERATOR LOADING SEQUENCE

Service	Qty	Nominal Load - Ea	Loss of Coolant Accident and Loss of Off-Site Power: Running Load - Kw	Timing* Starting	Running	Loss of Off-Site Power: Running Load - Kw
HPSI pump	1	400 HP	330	From 0.2 Sec	- Cont	-
Boric acid makeup pump	1	25 HP	22	From 0	Sec - 4 hrs 1st	22
Charging pump	1	100 HP	80	From 0	Sec - 4 hrs Block	80
Motor operated valves	Lot	60 HP	40	From 0	Sec - 1 min	-
Emergency lighting	Lot	50 KW	50	From 0	Sec - Cont	50
Class I power panels	4	45KVA	40	From 0	Sec - Cont	40
Fuel Transfer Pump	1	5 HP	5	From 0	Sec - Cont	5
LPSI pump	1	400 HP	330	From 3	Sec - 90 min 2nd	330
Containmnet fan coolers	2	150 HP	245	From 3	Sec - Cont Block	167
Component coolant pump	1	450 HP	376	From 6	Sec - Cont	376
Shield bld vent fan	1	60 HP	54	From 6	Sec - Cont 3rd	-
Shield Bld Vent Sys Elec Htr	1	30KW	30	From 6	Sec - Cont Block	-
D-G Bldg Exh. Fan	1	1HP	1	From 6	Sec - Cont	1
Intake cooling pump	1	600 HP	492	From 9	Sec - Cont 4th Block	492
Containment spray pump	1	500 HP	400	From 12	Sec - Cont 5th Block	-
Auxiliary feedwater pump	1	350 HP	305	From 15	Sec - 4 hrs 6th Block	305
Boric acid heating	1 Lot	51.75 KW	51.75	From 18	Sec - 4 hrs	51.75
Auxiliary bld supply fan	1	60 HP	54	From 18	Sec - Cont	54
ECCS Area exhaust system	1	50 HP	44	From 18	Sec - Cont 7th	44
Control Room AC Outdoor Unit	1	50 HP	44	From 18	Sec - Cont Block	44
Control room AC Indoor Unit	1	7.5 HP	8	From 18	Sec - Cont	8
Control room booster fan	1	3 HP	3	From 18	Sec - Cont	3
Reactor Support CLG Fan	1	40 HP	37	From 18	Sec - Cont	37
Reactor Cavity CLG Fan	1	20 HP	19	From 18	Sec - Cont	19
Battery Charger	1	68 KVA	68	From 30	Sec - Cont 8th	68
Plant Security Inverter	1	20 KVA	20	From 30	Sec - Cont Block	20
UPS Inverter	1	15 KVA	15	From 30	Sec - Cont	15
Fire Pump	1	250 HP	**	From 35	Sec - **	198
		Totals:	3163.75 kw (maximum, 18 Sec - 30 min)			2429.75 kw

* Counting from the time the D-G breaker closes

** Auto-start feature on fire pump is defeated if SIAS is present.

INTER-OFFICE MEMO

TO NRC IE-HQ FROM QC Vault LOCATION

SUBJECT Revised Procedure Indef DATE 10-30 19 81

Attached is a set of current indefs for St. Lucie Unit #1 & 2 "For Information Only" procedure supplied to you by Document Control on a regular basis. Please keep them updated as new procedures/revisions are issued.

COPIES TO SIGNED R Hand

TO DATE 19 IN REPLY TO ABOVE MEMO

Courtesy wins Friends FOR FLORIDA...AND YOU!

FORM 229 REV. 3/65

FROM

(WRITE AND SIGN ON BACK IF MORE SPACE IS REQUIRED)

Oct. 30, 1981

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OFF-NORMAL/EMERGENCY OPERATING PROCEDURES INDEX

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0030131	16	PLANT ANNUNCIATOR SUMMARY
0030140	21	BLACKOUT OPERATION
0030141	7	CONTROL ROOM INACCESSIBILITY
0030142	5	RCS COOLDOWN DURING BLACKOUT
0110030	5	FLCEA OFF-NORMAL OPERATION AND RE-ALIGNMENT
0120031	6	EXCESSIVE REACTOR COOLANT SYSTEM LEAKAGE
0120032	2	EXCESSIVE REACTOR COOLANT SYSTEM ACTIVITY
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OFF-NORMAL/EMERGENCY OPERATING PROCEDURES INDEX

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