

Approval
A. Beckhold
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Vogtle Electric Generating Plant
NUCLEAR OPERATIONS

Unit COMMON



Georgia Power

Procedure No.
19100-C

Revision No.
4

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EMERGENCY OPERATING PROCEDURE

ECA-0.0 LOSS OF ALL AC POWER

PURPOSE

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

SYMPTOMS/ENTRY CONDITIONS

The symptoms are:

- Both emergency AC buses are de-energized.

The entry conditions are:

- 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION, Step 3.

FOR INFORMATION ONLY

9202190472 920116
PDR ADOCK 05000424
S PDR

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDIMMEDIATE OPERATOR ACTIONSNOTE

CSFSTs should be monitored for information only.
Function restoration procedures should NOT be
implemented.

- | | |
|---|---------------------------|
| 1. Verify Reactor Trip: <ul style="list-style-type: none">• Reactor trip and bypass breakers - OPEN.• Neutron flux - LOWERING. | 1. Manually trip reactor. |
| 2. Verify Turbine Trip: <ul style="list-style-type: none">• All turbine stop valves - SHUT. | 2. Manually trip turbine. |

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ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

3. Check If RCS Is Isolated:

a. PRZR PORVs - SHUT.

a. IF PRZR pressure is less than 2315 psig, THEN manually shut PORVs.

b. Letdown orifice isolation valves - SHUT.

b. Manually shut valves.

- HV-8149A
- HV-8149B
- HV-8149C

c. Letdown isolation valves - SHUT:

c. Manually shut valves.

- LV-0459
- LV-0460

d. Excess letdown isolation valves - SHUT.

d. Manually shut valves.

- HV-8153
- HV-8154

e. Reactor vessel head vent isolation valves - SHUT:

e. Manually shut valves.

- HV-8095A
- HV-8095B
- HV-8096A
- HV-8096B

f. RCS sample valves - SHUT:

f. Manually shut valves.

- HV-3548
- HV-3502
- HV-3513
- HV-3514
- HV-3507
- HV-3508

ACTION/EXPECTED RESPONSE

4. Verify AFW Flow - GREATER THAN 570 GPM.

RESPONSE NOT OBTAINED

4. Perform the following:
- a. Ensure TDAFW pump is running:
 - HV-3106 - OPEN.
 - HV-3009 - OPEN.

-OR-

HV-3019 - OPEN.
 - b. Ensure AFW throttle valves - OPEN.

SUBSEQUENT OPERATOR ACTIONSNOTE

- 91001, EMERGENCY CLASSIFICATION AND IMPLEMENTING PROCEDURE should be implemented at this time.
- If LOP sequencer has initiated, it may be necessary to reset sequencer by placing sequencer power switch to OFF before normal incoming feeder breaker can be closed.

5. Try To Restore Power To Any AC Emergency Bus:

- a. Start diesel generator.
- a. Dispatch operator to emergency start diesel generator using the emergency start break glass station at the DG panel by initiating 13145, DIESEL GENERATORS.

ACTION/EXPECTED RESPONSE

- b. Verify AC emergency bus of started DG automatically energized:
- DG output breaker - CLOSED.
- c. Check AC emergency busses - AT LEAST ONE ENERGIZED.
- d. Return to procedure and step in effect.

RESPONSE NOT OBTAINED

- b. Manually energize AC emergency bus.
- IF bus can NOT be energized,
THEN manually trip diesel generator.
- Initiate 13427, 4160V AC ELECTRICAL DISTRIBUTION SYSTEM to energize at least one AC emergency bus using any available power supply.
- Either RAT via Normal Incoming Feeder Breaker if off site power available.
 - Either diesel generator.
 - Either RAT via Emergency Incoming Feeder Breaker if offsite power available.
- c. Go to Step 6.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINLDCAUTION

- When power is restored to any AC emergency bus, necessary actions should continue starting with Scep 24.
- If an SI signal exists or if an SI signal is generated during this procedure, it should be reset to permit manual loading of equipment on an AC emergency bus.
- Two NSCW pumps should be available to automatically load on its AC emergency bus to provide diesel generator cooling.

6. * Place The Following Equipment Switches In The PULL-TO-LOCK Position:

- CCPs
- RHR pumps
- SI pumps
- Containment spray pumps
- CCW pumps
- ACCW pumps
- MDAFW pumps
- Containment fan coolers

7. Check AC Emergency Busses Status:

a. At least one AC emergency bus - ENERGIZED.

a. Dispatch operator to locally restore AC emergency busses.

WHEN one AC emergency bus is energized.

THEN go to Scep 24.

Continue with Step 8.

b. Go to Step 24.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

8. Dispatch Operator To
Locally Shut Valves To
Isolate RCP Seals:

- RCP seal injection
isolation valves
outside containment:

- HV-8103A
- HV-8103B
- HV-8103C
- HV-8103D

- RCP seal return
isolation valve
outside containment:

- HV-8100

- ACCW return isolation
valve outside
containment:

- HV-1975

9. Verify If CST Is Isolated
From Hotwell:

Dispatch operator to
verify hotwell level
valve positions:

a. COND MAKEUP LV-4415B -
SHUT.

b. COND DUMP LV-4415A -
SHUT.

a. Shut COND MAKEUP LV-4415B
INLET ISO 1305-U4-044.

b. Shut COND DUMP LV-4415A
OUTLET ISO 1305-U4-043.

10. Check SG Status:

- a. MSIVs and their bypass
valves - SHUT.
- b. MFIVs and BFIVs - SHUT.

c. Blowdown isolation
valves - SHUT.

d. SG sample isolation
valves - SHUT.

10. Manually shut valves.

IF valves can NOT be
manually shut,
THEN locally shut valves.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

A faulted or ruptured SG that is isolated should remain isolated. Steam supply to the TDAFW pump must be maintained from at least one SG.

NOTE

To preserve battery life, operate only one valve at a time.

11. Check SGs Secondary Pressure Boundaries:

- Check pressures in all SGs:

- NO SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER.
- NO SG COMPLETELY DEPRESSURIZED.

- Isolate faulted SGs:

- Shut the TDAFW throttle valves on affected SG(s).

- HV-5122 (SG 1)
- HV-5125 (SG 2)
- HV-5127 (SG 3)
- HV-5120 (SG 4)

- Shut TDAFW pump steam supply valve from affected SG:

- HV-3009 (SG 1)

-OR-

- HV-3019 (SG 2)

- Verify SG ARV shut.

IF SG ARV NOT shut,
THEN manually shut.

- Locally shut the MDAFW throttle valves on affected SG(s):

- HV-5139 (SG 1)
- HV-5132 (SG 2)
- HV-5134 (SG 3)
- HV-5137 (SG 4)

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ACTION/EXPECTED RESPONSE

12. Check If SG Tubes are Intact:
- Main steamline radiation monitors - NORMAL.
 - Condenser air ejector radiation - NORMAL.
 - SG sample radiation - NORMAL.
 - SG blowdown radiation - NORMAL.

RESPONSE NOT OBTAINED

12. Try to identify ruptured SGs.
- WHEN ruptured SGs identified,
THEN isolate ruptured SGs:
- Isolate AFW flow by shutting the TDAFW throttle valves on affected SG(s):
 - HV-5122 (SG 1)
 - HV-5125 (SG 2)
 - HV-5127 (SG 3)
 - HV-5120 (SG 4)
 - Shut TDAFW steam supply valve from affected SG:
 - HV-3009 (SG 1)

-OR-

 - HV-3019 (SG 2)
 - WHEN SG pressure is less than 1160 psig,
THEN verify SG ARV shut.
IF SG ARV NOT shut,
THEN manually shut.
 - Locally shut the MDAFW throttle valves on affected SG(s):
 - HV-5139 (SG 1)
 - HV-5132 (SG 2)
 - HV-5134 (SG 3)
 - HV-5137 (SG 4)

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

13. Check Intact SG Levels:

a. Narrow range level -
GREATER THAN 5%
[27% FOR ADVERSE
CNMT].

Control AFW flow to
maintain narrow range
level between 5%
[27% FOR ADVERSE
CNMT] and 50%.

a. Maintain maximum AFW flow
until narrow range level
GREATER THAN 5% [27% FOR
ADVERSE CNMT] in at least
one SG.

b. IF narrow range level in
any SG continues to rise
in an uncontrolled manner,
THEN isolate ruptured SG:

- Isolate AFW flow by
shutting the TDAFW
throttle valves on
affected SG(s):

- HV-5122 (SG 1)
- HV-5125 (SG 2)
- HV-5127 (SG 3)
- HV-5120 (SG 4)

- Shut TDAFW pump steam
supply valve from
affected SG:

- HV-3009 (SG 1)

-OR-

- HV-3019 (SG 2)

- WHEN SG pressure less
than 1160 psig,
THEN verify SG ARV
shut.

IF SG ARV NOT shut,
THEN manually shut.

- Locally shut the MDAFW
throttle valves on
affected SG(s):

- HV-5139 (SG 1)
- HV-5132 (SG 2)
- HV-5134 (SG 3)
- HV-5137 (SG 4)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

14. Check DC Bus Loads:

a. As time permits and at the discretion of the Unit Shift Supervisor, shed all unnecessary battery loads using Attachment A.

b. Monitor all battery voltages.

15. Check CST Level - GREATER THAN 15%.

15. Switch to alternate CST.

- Locally open HV-5113.

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ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

- To prevent injection of accumulator nitrogen into the RCS, SG pressure should not be lowered to less than 165 psig.
- SG NARROW range level should be maintained GREATER THAN 5% [27% FOR ADVERSE CNMT] in at least one intact SG. If level cannot be maintained, SG depressurization should be stopped until level is restored in at least one SG.

NOTE

- The SGs should be depressurized at a rapid rate (within the capacity of the TDAFW pump) to minimize RCS inventory loss.
- PRZR level may be lost and reactor vessel upper head voiding may occur due to depressurization of the SGs. Depressurization should not be stopped to prevent these occurrences.

16. Depressurize Intact SGs To 265 PSIG:

- a. Check SG narrow range levels - GREATER THAN 5% [27% FOR ADVERSE CNMT] in at least one SG.

a. Perform the following:

- 1) Maintain maximum TDAFW flow until narrow range level GREATER THAN 5% [27% FOR ADVERSE CNMT] in at least one SG.
- 2) WHEN narrow range level GREATER THAN 5% [27% FOR ADVERSE CNMT] in at least one SG, THEN do Steps 16b, c, d, and e.

Continue with Step 17.

- b. Dispatch operator to locally dump steam using SG ARVs.

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ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

- | | |
|---|---|
| <p>c. Check RCS cold leg temperatures - GREATER THAN 280°F [290°F FOR ADVERSE CNMT].</p> <p>d. Check SG pressure - LESS THAN 265 PSIG.</p> <p>e. Locally control SG ARVs to maintain SG pressures at 265 psig.</p> <p>17. Check Reactor Subcritical:</p> <ul style="list-style-type: none"> • Intermediate range channels - ZERO OR NEGATIVE STARTUP RATE. • Source range channels - ZERO OR NEGATIVE STARTUP RATE. | <p>c. Perform the following:</p> <ol style="list-style-type: none"> 1) Control SG ARVs to stop SG depressurization. 2) Continue with Step 17. <p>d. <u>WHEN</u> SG pressures lowered to less than 265 psig, <u>THEN</u> do Step 16e.</p> <p>Continue with Step 17.</p> <p>17. Control SG ARVs to stop SG depressurization and allow RCS to heat up.</p> |
|---|---|

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDNOTE

Depressurization of SGs will result in SI actuation. SI should be reset to permit manual loading of equipment on AC emergency bus.

18. Check SI Signal Status:

a. SI - HAS BEEN ACTUATED.

a. WHEN SI actuated,
THEN do Step 18b, 19 and 20.

Go to Step 21.

b. Reset SI.

19. Verify Containment Isolation Phase A -
• ACTUATED:CI-A MLB indicators -
CORRECT FOR SI.

19. Manually actuate Phase A.

IF valves do not shut,
THEN manually or locally shut at least one valve at each penetration.

Locally shut any open valve as time permits.

20. Verify Containment Ventilation Isolation:

Dampers and valves -
SHUT:• MLB indicators -
CORRECT FOR SI.

Manually shut dampers and valves.

IF dampers can NOT be manually shut,
THEN locally shut dampers.

21. Check Containment Radiation - LESS THAN 100 R/HR.

21. Manually shut containment isolation valves as necessary.

IF valves can NOT be manually shut,
THEN locally shut valves.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

22. Check If AC Emergency Power Is Restored:

- Check AC emergency busses - AT LEAST ONE ENERGIZED.

- Continue to control RCS conditions and monitor plant status:

1) Check status of local actions:

- AC power restoration.
- RCP seal isolation.
- DC power supply.

2) Check status of auxiliary boration system:

- BAST temperature greater than 78°F.

IF temperature less than setpoint,
THEN dispatch personnel to reduce BAST boron concentration.

3) Check status of spent fuel cooling:

- Spent fuel pool low level annunciator - NOT ACTUATED.

IF actuated,
THEN dispatch personnel to initiate makeup to the spent fuel pool using 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM.

4) Return to Step 11.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

23. Restore any DC loads shed in previous actions. Align de-energized inverters per 13431, 120V AC 1E VITAL INSTRUMENTS DISTRIBUTION SYSTEM, prior to closing DC Feeder Breakers.

24. Stabilize SG Pressures:

- Manually control SG ARVs.

- Locally control SG ARVs.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

The loads placed on the energized AC emergency bus should not exceed the capacity of the power source.

25. Verify Following Equipment Loaded On Energized AC Emergency Bus:

25. Manually or locally load equipment as necessary using the appropriate electrical procedures.

- 480V AC switchgear:

UNIT 1

<u>TRAIN A</u>	<u>TRAIN B</u>
1AB04	1BB06
1AB05	1BB07
1AB15	1BB16
1NB01	1NB10

UNIT 2

<u>TRAIN A</u>	<u>TRAIN B</u>
2AB04	2BB06
2AB05	2BB07
2AB15	2BB16
2NB01	2NB10

- Essential 480V AC loads:
 - Battery chargers.
 - Instrumentation and control.
 - Emergency lighting.
 - Communications.
 - Battery room fans.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

26. Verify NSCW Operation:

- a. Verify valve alignment -
OPEN.

- a. Manually align valves as
necessary.

TRAIN ATRAIN B

HV-1806	HV-1807
HV-1808	HV-1809
HV-1822	HV-1823
HV-1830	HV-1831

- b. Verify at least two
NSCW pumps - RUNNING.

- b. Manually start pumps.

27. Select Recovery Procedure:

- a. Check RCS subcooling
monitor indication -
GREATER THAN 24°F
[38°F FOR ADVERSE CNMT].

- a. Go to 19102-C, ECA-0.2
LOSS OF ALL AC POWER
RECOVERY WITH SI REQUIRED.

- b. Check PRZR level -
GREATER THAN 9%
[36% FOR ADVERSE CNMT].

- b. Go to 19102-C, ECA-0.2
LOSS OF ALL AC POWER
RECOVERY WITH SI REQUIRED.

- c. Check ECCS equipment -
HAS NOT ALIGNED FOR SI
INJECTION UPON AC POWER
RESTORATION.

- c. IF ECCS equipment has
aligned to injection
phase,
THEN go to 19102-C,
ECA-0.2 LOSS OF AC POWER
RECOVERY WITH SI REQUIRED.

- d. Go to 19101-C, ECA-0.1
LOSS OF ALL AC POWER
RECOVERY WITHOUT SI
REQUIRED.

END OF PROCEDURE TEXT

Sheet 1 of 6

ATTACHMENT A

DC Loads Which May Be Shed
During Loss Of All AC

<u>Breaker</u>	<u>Affected Loads</u>
<u>1AD1</u>	
1AD1-04	Miscellaneous Radiation Monitors, SSMP, SG ARVs, BOP Actuations, Sequencer
<u>1AD11</u>	
1AD11-01	4160 SWGR Control Power
1AD11-02	480 SWGR Instrument Power
1AD11-03	480 SWGR Instrument Power
1AD11-04	480 SWGR Instrument Power
1AD11-05	SG ARV
1AD11-07	SG ARV
1AD11-08	Miscellaneous Sample & CNMT Isolation Valves
1AD11-09	RX Trip SWGR
1AD11-10	HVAC Panel
1AD11-12	SSPS
1AD11-13	13.8 SWGR Control Power
1AD11-14	13.8 SWGR Control Power
1AD11-15	13.8 SWGR Control Power
1AD11-17	Accumulator N2 Isolation
1AD11-20	13.8 SWGR Control Power

ATTACHMENT A (CONT'D)

DC Loads Which May Be Shed
During Loss Of All AC

<u>Breaker</u>	<u>Affected Loads</u>
<u>1AD12</u>	
1AD12-04	RCDT Vent & Pump Discharge Valves, Letdown Isolation, Instrument Air CNMT Isolation, NSCW Tower Blowdown Isolation
1AD12-05	Accumulator Test CNMT Isolation
1AD12-07	PSDA Control Power
1AD12-08	MSIVs, FWIVs, BFIVs
1AD12-10	Isolation Devices
1AD12-14	SG Blowdown Isolation, MSIVs, NSCW Acid Pump, SI Actuation Control Power
1AD12-16	Letdown Isolation, Isolation Devices
1AD12-18	Isolation Devices

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ATTACHMENT A (CONT'D)

DC Loads Which May Be Shed
During Loss Of All ACBreakerAffected Loads1BD1

1BD1-04

Miscellaneous Radiation Monitors, SSMP, BOP
Actuations, Sequencer1BD11

1BD11-01

4160 SWGR Control Power

1BD11-02

480 SWGR Instrument Power

1BD11-03

480 SWGR Instrument Power

1BD11-04

480 SWGR Instrument Power

1BD11-07

SG ARV

1BD11-08

Miscellaneous Sample & CNMT Isolation Valves

1BD11-09

RX Trip SWGR

1BD11-10

HVAC Panel Control Power

1BD11-13

13.8 SWGR Control Power

1BD11-14

SG ARV

1BD11-15

13.8 SWGR Control Power

1BD11-17

Accumulator N2 Isolation

1BD11-19

13.8 SWGR Control Power

1BD11-20

13.8 SWGR Control Power

ATTACHMENT A (CONT'D)

DC Loads Which May Be Shed
During Loss Of All AC

<u>Breaker</u>	<u>Affected Loads</u>
<u>1BD12</u>	
1BD12-02	Boric Acid to Charging Valve from PSDB
1BD12-04	Instrument Air CNMT Isolation, NSCW Tower Blowdown Isolation
1BD12-05	SSPS
1BD12-06	ACCUMULATOR Test Isolation, SI Test Isolation, Letdown Isolation, Excess Letdown Isolation
1BD12-07	PSDB Control Power
• 1BD12-08	MSIVs, FWIVs, VFIVs, PRT Vent Isolation, PRT Primary Water Isolation
1BD12-10	Isolation Devices
1BD12-14	Isolation Devices
1BD12-16	Isolation Devices
1BD12-17	Boric Acid To Charging Valve From QMCB
1BD12-20	SG Blowdown Isolation, AFW Pump B Discharge Valves, RHR Hx Out Position Indication, DG ESF Supply Fan, MFRV, BFRV, NSCW Acid Pump Isolation

ATTACHMENT A (CONT'D)

DC Loads Which May Be Shed
During Loss Of All AC

NOTE

The "C" battery should be carefully conserved to maintain power for Train C AFW control.

BreakerAffected Loads1CD1

1CD1-08

RHR HL Suction Isolation

1CD1-09

Vital Instrumentation powered from 120V AC Panel 1CY1A:

SG 1 NR Level	LI-518
SG 2 NR Level	LI-528
SG 3 NR Level	LI-538
SG 4 NR Level	LI-548
SG 3 WR Level	LI-503*
SG 2 Pressure	PI-526A
SG 3 Pressure	PI-536A
RCS Loop 3 Tavg	TI-432*
PRZR Level	LI-461
PRZR Pressure	PI-457
RWST Level	LI-992A
Power Range NI	NI-43B

* All instrumentation listed above except SG 3 WR level and RCS Loop 3 Tavg have redundant indications powered from 1AY1A or 1BY1B. These parameters for Loop 3 can be monitored using equivalent instrumentation powered from 1AY1A or 1BY1B. SG 3 level can be obtained from NR instruments and RCS Loop 3 temperature can be obtained from WR TC and/or WR TH.

1CD11

1CD11-10

DC SWGR Space Heaters

1CD11-14

HVAC Panel

1CD11-15

Isolation Devices

1CD11-18

Isolation Devices

1CD11-21

13.8 SWGR Control Power

ATTACHMENT A (CONT'D)

DC Loads Which May Be Shed
During Loss Of All AC

NOTE

All loads on "D" battery may be shed. "D" battery may be held in reserve to maintain the capability of providing selected vital instrumentation powered from 120V AC Panel 1DY1B if "A" or "B" batteries degrade.

<u>Breaker</u>	<u>Affected Loads</u>
<u>1DD1</u>	
1DD1-04	DC SWGR Space Heaters, Isolation Devices, 13.8 SWGR Control Power
1DD1-08	RHR HL Suction Isolation
1DD1-09	Vital Instrumentation Powered From 120V AC Pnl 1DY1B:
	SG 1 NR Level LI-517
	SG 2 NR Level LI-527
	SG 3 NR Level LI-537
	SG 4 NR Level LI-547
	SG 4 WR Level LI-504*
	SG 1 Pressure PI-516A
	SG 4 Pressure PI-546A
	RCS Loop 4 Tavg TI-442*
	PRZR Pressure PI-458
	Power Range NI NI-44B
	Source Range SUR NI-31D*
	Intermediate Range SUR NI-35D*

* All instrumentation listed above except SUR, SG 4 WR level and RCS Loop 4 Tavg have redundant indications powered from 1AY1A or 1BY1B. These parameters for Loop 4 can be monitored using equivalent instrumentation powered from 1AY1A or 1BY1B. SG 4 level can be obtained from NR instruments and RCS Loop 4 temperature can be obtained from WR TC and/or WR TH. Source Range instrumentation powered from 1AY1A and 1BY1B is available.