

Approval
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Vogtle Electric Generating Plant
NUCLEAR OPERATIONS
Unit COMMON
Georgia Power

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19101-C
Revision No.
8
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EMERGENCY OPERATING PROCEDURE

05-42-90

ECA-0.1 LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED

PURPOSE

This procedure provides actions to use normal operational systems to stabilize plant conditions following restoration of AC emergency power.

ENTRY CONDITIONS

- 19100-C, ECA-0.0 LOSS OF ALL AC POWER, Step 27.

FOR INFORMATION ONLY

9202190554 920116
PDR ADOCK 05000424
S PDR

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINEDNOTE

CSFSTs should be monitored for information only. FRPs should not be implemented prior to completion of Step 9.

1. Check RCP Seal Isolation Status:

- a. RCP seal injection isolation valves outside containment - SHUT:

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

- b. ACCW return isolation valve outside containment - SHUT:

- HV-1975

- a. IF valves open, OR position NOT known, THEN check CCP status:

- 1) IF pump running, THEN go to Step 2.
- 2) IF pump NOT running, THEN manually shut valves before starting CCP.

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

- b. IF valve open, OR position NOT known, THEN check ACCW pump status:

- 1) IF pump running, THEN go to Step 2.
- 2) IF pump NOT running, THEN manually shut valve.

IF valve can NOT be manually shut, THEN manually shut ACCW return isolation valve inside containment:

- HV-1974

ACTIONS/EXPECTED RESPONSE

2. Check Containment Phase A -
NOT ACTUATED.

RESPONSE NOT OBTAINED

2. Perform the following:

- a. Reset containment
isolation Phase A.
- b. Establish instrument air
to containment:

IF instrument air pressure
normal,
THEN open containment
isolation valve HV-9378
and go to Step 3.

IF instrument air pressure
NOT normal,
THEN perform the
following:

- 1) Start one air
compressor by
initiating 13710,
SERVICE AIR SYSTEM.
- 2) WHEN instrument air
pressure is normal,
THEN open containment
isolation valve HV-9378
and go to Step 3.

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

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

NOTE

ACCW Return Isolation Valve HV-1975 or HV-1974 should remain shut until RCP seal temperature is less than 220°F.

3. Verify Valve Alignment and Manually Load The Following Equipment On The Energized AC Emergency Bus:
- a. Check NSCW System alignment and start two NSCW pumps.
 - a. Align NSCW System for normal operation by initiating 13150, NUCLEAR SERVICE COOLING WATER SYSTEM.
 - b. Check ACCW System alignment and start one ACCW pump.
 - b. Align ACCW System for normal operation by initiating 13716, AUXILIARY COMPONENT COOLING WATER SYSTEM.

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

Without instrument air available CCP suction should remain aligned to RWST.

c. Check CVCS valve alignment and start one CCP:

1) Check valve alignment:

- CCP suction valves from VCT - OPEN:
 - LV-0112B
 - LV-0112C
- VCT makeup control system - SET FOR GREATER THAN RCS BORON CONCENTRATION AND AUTOMATIC CONTROL.
- Charging line isolation valves - SHUT:
 - HV-8105
 - HV-8106
- CCP normal miniflow isolation valves - OPEN.

2) Start One CCP.

d. Start containment fan coolers as necessary.

1) Manually align valves as necessary.

IF VCT NOT available, THEN establish suction from RWST:

- Open CCP suction valves from RWST:
 - LV-0112D
 - LV-0112E
- Shut CCP suction valves from VCT:
 - LV-0112B
 - LV-0112C

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINEDNOTE

Without instrument air available charging should be established using Attachment A.

4. Establish Charging Flow:
- a. Set HC-0182 to maximum seal flow (HV-0182 - SHUT).
 - b. Open charging line isolation valves:
 - HV-8105
 - HV-8106
 - c. Establish charging flow using control valves FV-0121 and HV-0182.
5. Check ECCS Flow Not Required:
- a. RCS subcooling monitor - GREATER THAN 24°F [38°F FOR ADVERSE CNMT].
 - b. PRZR level - GREATER THAN 9% [36% FOR ADVERSE CNMT].
- a. Go to 19102-C, ECA-0.2 LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED.
- b. Control charging flow to maintain PRZR level.
- IF PRZR level can NOT be maintained, THEN go to 19102-C, ECA-0.2 LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED.
6. Check PRZR level - GREATER THAN 19% [50% FOR ADVERSE CNMT].
6. Control charging flow as necessary.

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

- Alternate water sources for AFW pumps will be necessary if CST level lowers to less than 15%.
- If SG narrow range level lowers to LESS THAN 5% [27% FOR ADVERSE CNMT] and AFW flow is less than 570 gpm, the MDAFW pumps should be manually loaded on the AC Emergency Bus to supply water to the SGs.

NOTE

If MDAFW pump operation is not required, pump switches should be maintained in PULL-TO-LOCK to prevent automatic start.

7. Check Intact SG Levels:

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

- a. Maintain AFW flow greater than 570 gpm until narrow range level GREATER THAN 5% [27% FOR ADVERSE CNMT] in at least one SG.

IF AFW flow NOT greater than 570 gpm,
THEN establish AFW flow from the MDAFW pumps by initiating 13610, AUXILIARY FEEDWATER SYSTEM.

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

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINED

8. Establish SG Pressure Control:
 - a. Set each SG ARV controller to maintain existing SG pressure.
 - b. Place each SG ARV controller in automatic mode.
 - c. Locally return SG ARVs to remote control.

9. Place Following Pump Switches In AUTO:
 - SI pumps.
 - RHR pumps.
 - CS pumps.

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

- RCP thermal barrier cooling should be established slowly to minimize potential steam flashing of the ACCW System.
- RCP seal injection should be established slowly to minimize RCP thermal stresses and potential seal failures.
- As a part of subsequent recovery actions, RCPs should not be started prior to a status evaluation.

NOTE

FRPs may now be implemented as necessary.

10. Establish RCP Seal Cooling:

- | | |
|---|---|
| <p>a. Check RCP seal No. 1 temperature - LESS THAN 220°F.</p> <p>b. Open seal injection supply valves on affected RCP.</p> <p>c. Control seal injection flow using FV-0121 and HV-0182.</p> <p>d. Open ACCW Return Isolation Valve(s):</p> <ul style="list-style-type: none"> ● HV-1975 ● HV-1974 | <p>a. Restore seal injection flow using Attachment B.</p> <p>c. <u>IF</u> charging was established using Attachment A, <u>THEN</u> maintain 8 to 13 gpm seal injection flow by using appropriate section of Attachment A.</p> |
|---|---|

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINED

11. Check If RCP Seal Return Flow Should Be Established:

a. RCS pressure - GREATER THAN 100 PSIG.

b. Establish flow:

1) Open RCP seal return header isolation valves:

- o HV-8100
- o HV-8112

2) Verify seal return from each RCP - NORMAL FOR RCP SEAL NUMBER 1 DIFFERENTIAL PRESSURE.

a. Go to Step 12.

2) Open RCP seal leakoff valves as necessary:

- HV-8141A (RCP 1)
- HV-8141B (RCP 2)
- HV-8141C (RCP 3)
- HV-8141D (RCP 4)

NOTE

Without instrument air available letdown should be established using Attachment C.

12. Check If Letdown Can Be Established:

a. Check PRZR level - GREATER THAN 19% [50% FOR ADVERSE CNMT].

b. Establish letdown by initiating 13006, CHEMICAL AND VOLUME CONTROL SYSTEM STARTUP AND NORMAL OPERATION.

a. Control charging as necessary. WHEN PRZR level GREATER THAN 19% [50% FOR ADVERSE CNMT] THEN do Step 12b.

Continue with Step 13.

b. Establish excess letdown by initiating 13008, CHEMICAL AND VOLUME CONTROL SYSTEM EXCESS LETDOWN.

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINED

13. Control Charging And Letdown Flow To Maintain PRZR Level Between 19% [50% FOR ADVERSE CNMT] And 50%.

14. Establish PRZR Pressure Control:

a. Check letdown - IN SERVICE.

a. Use PRZR heaters and one PRZR PORV to maintain RCS pressure.

Go to Step 15.

b. Use PRZR heaters and auxiliary spray to maintain RCS pressure.

CAUTION

On natural circulation, RTD bypass temperatures and associated interlocks will be inaccurate.

15. Verify Natural Circulation:

15. Raise rate of dumping steam from intact SGs until natural circulation is verified.

- RCS subcooling monitor - GREATER THAN 24°F [38°F FOR ADVERSE CNMT].
- SG pressures - STABLE OR LOWERING.
- RCS hot leg temperatures - STABLE OR LOWERING.
- Core exit TCs - STABLE OR LOWERING.
- RCS cold leg temperatures - AT SATURATION TEMPERATURE FOR SG PRESSURE.

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINED

16. Check If Source Range Detectors Should Be Energized:

a. Check intermediate range flux - LESS THAN 10^{-10} AMPS.

b. Verify source range detectors - ENERGIZED.

c. Transfer nuclear recorder to source range scale.

a. WHEN flux less than 10^{-10} amps, THEN do Step 16b and c.

Continue with Step 17.

b. Manually energize source range detectors.

NOTE

Without RCPs in service, boric acid will not mix uniformly in the RCS.

17. Verify Adequate Shutdown Margin:

a. Open sample isolation valves as necessary.

b. Direct Chemistry to sample RCS for boron concentration.

c. Shutdown margin - ADEQUATE.

c. Borate as necessary to a xenon free, cold shutdown concentration by initiating 13009, CVCS REACTOR MAKEUP CONTROL SYSTEM.

18. Maintain Plant Conditions - STABLE:

- RCS pressure.
- PRZR level.
- RCS temperatures.
- Intact SG levels.

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINED

- | | |
|---|---|
| <p>19. Check ECCS Flow Not Required:</p> <p>a. RCS subcooling monitor - GREATER THAN 24°F [38°F FOR ADVERSE CNMT].</p> <p>b. PRZR level - GREATER THAN 9% [36% FOR ADVERSE CNMT].</p> | <p>a. Go to 19102-C, ECA-0.2 LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED.</p> <p>b. Control charging flow to maintain PRZR level.</p> <p><u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> go to 19102-C, ECA-0.2 LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED.</p> |
| <p>20. Try To Restore Offsite Power To All AC Busses By Initiating Appropriate Electrical Procedures.</p> | <p>20. Maintain plant conditions stable using AC emergency power.</p> |
| <p>21. Start Essential Chilled Water Pumps By Initiating 13744, ESSENTIAL CHILLED WATER SYSTEM.</p> | |

ACTIONS/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

- Two hot starts of an RCP are allowed if the pump coasts to a stop between starts. (Approximately 2 minutes.)
- Subsequent hot starts are allowed if the pump has been running for 20 minutes or idle for 45 minutes.
- Start only one RCP at a time.

22. Determine If Natural Circulation Cooldown Not Required:

a. Start at least one RCP using Attachment D.

a. Go to 19002-C, ES-0.2
NATURAL CIRCULATION
COOLDOWN.

b. Consult TSC and go to appropriate procedure.

END OF PROCEDURE TEXT

ATTACHMENT AESTABLISHING CHARGING WITHOUT INSTRUMENT AIR

A. Establish Charging With Train A Emergency Bus Energized:

1. Verify Train A CCP - RUNNING.
2. Verify Train A charging isolation valves - CPEN:
 - HV-8116
 - HV-0190A
 - HV-8105 (locally verify if Train B De-energized)

3. Shut the following charging isolation valves:

- HV-8485A
- HV-8106

4. Maintain desired charging flow using HV-0190A.

5. Open charging to seal injection manual isolation:

UNIT 1UNIT 2

1-1208-U6-152

2-1208-U6-152

6. Return to Step 5 of this procedure.

NOTE

Use the following section of this attachment to control seal injection after seal cooling is established.

7. Maintain 8 to 13 gpm seal injection flow by throttling:

UNIT 1UNIT 2

1-1208-U6-152

2-1208-U6-152

8. Maintain desired charging flow using HV-0190A.

ATTACHMENT A (Cont'd.)

- B. Establish Charging With Train B Emergency Bus Energized:
1. Verify Train B CCP - RUNNING.
 2. Verify Train B charging isolation valve HV-0190B - OPEN.
 3. Verify Train B BIT outlet isolation valve HV-8801B - OPEN.
 4. Shut the following charging isolation valves:
 - HV-8438
 - HV-8485B
 5. Maintain desired charging flow using HV-0190B.
 6. Open charging to seal injection manual isolation:

<u>UNIT 1</u>	<u>UNIT 2</u>
1-1208-U6-151	2-1208-U6-151
 7. Return to Step 5 of this procedure.

NOTE

Use the following section of this attachment to control seal injection after seal cooling is established.

8. Maintain 8 to 13 gpm seal injection flow by throttling:

<u>UNIT 1</u>	<u>UNIT 2</u>
1-1208-U6-151	2-1208-U6-151
9. Maintain desired charging flow using HV-0190B.

END OF ATTACHMENT A

ATTACHMENT B

RECOVERY OF RCP SEAL INJECTION

1. Check RCP No. 1 seal temperature.
 IF less than 220°F,
THEN open CVCS SEALS RCP SEAL INJ SUPPLY CNMT ISO valve and ACCW supply to the affected RCP. Return to Step 10 of this procedure.

 IF greater than 220°F,
THEN proceed to Step 2 of this Attachment.
2. Verify seal injection supply temperature - LESS THAN 135°F.
 Verify ACCW supply temperature - LESS THAN 105°F.
3. Dispatch operator to shut CVCS SEALS RCP SEAL INJ NEEDLE VLVS TO #1 SEAL for affected RCP.
 - 1208-U4-414(RCP 1)
 - 1208-U4-415(RCP 2)
 - 1208-U4-416(RCP 3)
 - 1208-U4-417(RCP 4)
4. Verify CVCS SEALS RCP SEAL INJ NEEDLE VLVS of Step 3 of this Attachment is shut.
5. Open CVCS SEALS RCP SEAL INJ SUPPLY CNMT ISO valve for affected RCP.
6. Slowly open CVCS SEALS RCP SEAL INJ NEEDLE VLVS TO #1 SEAL to establish a 1°F per minute cooldown rate.
7. WHEN RCP No. 1 seal temperature is less than 220°F,
THEN restore ACCW supply to the affected RCP.
8. IF normal charging has been established,
THEN Control charging and seal injection using FV-0121 and HV-0182 or Attachment A as appropriate.
9. Verify RCP seal parameters:
 - Seal injection supply temperature - LESS THAN 135°F.
 - RCP No. 1 seal temperature - LESS THAN 220°F.
 - ACCW supply temperature - LESS THAN 105°F.
 IF RCP seal parameters can NOT be verified,
THEN secure the affected RCP.
10. Return to Step 11 of this procedure.

ATTACHMENT CESTABLISH SAFETY GRADE LETDOWNCAUTION

The PRT may rupture while performing safety grade letdown.

1. Open Reactor Vessel Head Vent isolation valves:
 - HV-8095A
 - HV-8096A
 - HV-8095B
 - HV-8096B

2. Open Reactor Vessel Head Vent flow control valves to obtain desired letdown flow:
 - HV-0442A
 - HV-0442B

END OF ATTACHMENT C

ATTACHMENT DSTARTING A REACTOR COOLANT PUMP

1. Establish Initial Conditions:
 - a. 13.8KV power available to RCP.
 - b. Steam bubble in PRZR.
 - c. #1 Seal dP greater than or equal to 200 psid.
 - d. Seal injection flow 8 to 13 gpm.
 - e. Seal leakoff flow greater than or equal to 0.2 gpm.
2. Check the following alarms clear or establish conditions to clear those alarms for the RCP to be started:
 - a. RCP LOWER OIL RSVR HI/LO LEVEL.
 - b. RCP UPPER RSVR HI/LO LEVEL.
 - c. VOLUME CONTROL TANK OUTLET TEMP HI.
 - d. VCT HI/LO PRESS.
 - e. RCP STNDPIPE LO LEVEL.
 - f. RCP STNDPIPE HI LEVEL.
 - g. RCP MTR OVERLOAD.
 - h. RCP NO 2 SEAL LKOFF HI FLOW.
 - i. ACCW RCP CLR OUTLET HI TEMP.
 - j. ACCW RCP CLR LO FLOW.
 - k. ACCW RCP THERM BARRIER HX HI FLOW.
 - l. ACCW RCP THERM BARRIER HI PRESS.
3. Verify all RCP ACCW thermal barrier isolation valves open.
4. Start the associated RCP oil lift pump.
5. After two minutes of lift pump operation, start the RCP.

ATTACHMENT D (Cont'd.)

6. After approximately one minute check the following alarms clear:
 - a. RCP LOW FLOW.
 - b. RCP SHAFT VIBRATION.
 - c. RCP FRAME VIBRATION.
 - d. Those alarms in Step 2.
7. After one minute of RCP operation, stop the oil lift pump.

END OF ATTACHMENT D