

Approval

Tom Greene

Vogtle Electric Generating Plant
NUCLEAR OPERATIONS



Procedure No.
18038-2

Revision No.
0

Date

9/15/88

Unit 2

Georgia Power

Page No.
1 of 47

ABNORMAL OPERATING PROCEDURES
OPERATION FROM REMOTE SHUTDOWN PANELS

PURPOSE

This procedure provides operator instructions in evacuating the Main Control Room, maintaining hot standby, and attaining cold shutdown from the remote shutdown panels. This procedure is applicable with or without the availability of offsite power. This procedure also addresses potential or actual component failures which may be induced by Control Room fire events.

SYMPTOMS

The Main Control Room is or is about to become inaccessible due to fire, toxic gas, or any other unforeseen reasons.

BB10070230 880929
PDR ADOCK 05000424
PNU

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDIMMEDIATE OPERATOR ACTIONS

1. Manually trip the reactor

NOTE

- Step 2 or 3 should be done prior to Control Room evacuation IF personnel safety is NOT hindered.
- 19000-C REACTOR TRIP AND SAFETY INJECTION should NOT be implemented IF the Control Room is evacuated.

SUBSEQUENT OPERATOR ACTIONS

2. If a Control Room fire, and at discretion of Unit Shift Supervisor THEN:
 - a. Shift CCP suction to RWST -
 - 1) OPEN LV-112E and/or LV-112D
 - 2) Shut LV-112B and/or LV-112C
 - b. Shut PRZR PORV block valves
 - c. Stop RCPs 1 and 4.
 - d. Isolate Main Feedwater SHUT:
 - MFIVs
 - BFIVs
 - e. Shut SG blowdown isolation valves.
 - f. Shut MSIVs and bypass valves.
 - g. Throttle total AFW to minimum - GREATER THAN 570 gpm.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

3. IF NOT a Control Room fire or at discretion of Unit Shift Supervisor, THEN
- a. Verify turbine trip.
 - b. Align VCT for AUTO makeup:
 - HS-40001A in AUTO
 - HS-40001B in AUTO-AFTER-START
 - FIC-110 pot set at 8.6.
 - LV-112A in AUTO
 - PV-131 in AUTO
 - c. Place PRZR pressure control in AUTO.
 - d. Place SG pressure control in AUTO.
 - SG ARVs in AUTO.
 - Steam Dumps in STEAM PRESSURE mode.
 - e. Throttle total AFW flow to minimum - **GREATER THAN 570 gpm.**

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDNOTE

If at any time the Control Room becomes habitable, recovery should commence at Step 65 of this procedure.

CAUTION

If Control Room is evacuated due to fire, shut down Panel A controls and instrumentation may not be reliable. Train B is preferable for Control Room fire event operation. Fire Event qualified instrumentation is marked in red.

- | | |
|--|---|
| <p>4. Send operators to the following locations to perform applicable actions of Steps 6 through 9:</p> <ul style="list-style-type: none">a. Shutdown Panel B.<ul style="list-style-type: none">● Unit Shift Supervisor● Reactor Operator● Extra Shift Personnelb. Shut down Panel A.<ul style="list-style-type: none">● BOP Operator.c. Shut down Panel C AFW Pumphouse.<ul style="list-style-type: none">● Outside Area Operator.d. TSC - ERF Terminal<ul style="list-style-type: none">● CSOS● STA <p>5. Upon exiting Control Room, isolate shutdown sound-powered phone system from the Control Room. (located outside east entrance to Unit 1 Control Room)</p> | <p>4. If insufficient personnel are available, use the following priority:</p> <ul style="list-style-type: none">a. Shut down Panel B.b. Shut down Panel A.c. Shut down Panel C AFW Pumphouse.d. TSC - ERF Terminal. |
|--|---|

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

If an SI actuation occurs, any components previously transferred to the Shutdown Panels must be manually actuated by the operator. Diesel Generator sequencing is also disabled for any load previously transferred to the Shutdown Panels. All other components should realign to the safety configuration.

6. Verify reactor is tripped.

- Reactor trip and bypass breaker - OPEN.
- Neutron flux - LOWERING.

6. Trip the reactor:

- HS-40002A - Panel A
- HS-40002B - Panel B

-OR-

Locally open Reactor Trip and Bypass Breakers.
(Control Building, Room RB-07)

-OR-

Place the Rod Drive MG sets Motor and Generator Circuit Breakers in TRIP position.

ACTION/EXPECTED RESPONSE

7. IF a Control Room fire,
THEN perform following:
- a. At Shutdown Panel A:
- ENSURE Aux. Spray Valve HV-8145 is shut,
THEN place transfer switch to LOCAL.
 - ENSURE control switches with orange dots are aligned properly, THEN place all transfer switches to LOCAL.
- b. At Shutdown Panel B:
- ENSURE control switches with orange dots are aligned properly, THEN place all transfer switches to LOCAL.
- c. THEN place all transfer switches on 2AA02-00 to LOCAL.
- d. THEN place all transfer switches on 2BA03-00 to LOCAL.

RESPONSE NOT OBTAINED

7. IF NOT a Control Room fire,
THEN place transfer switches to LOCAL when required by procedural steps.

NOTE

91000-C, EMERGENCY CLASSIFICATION AND IMPLEMENTING PROCEDURE should be implemented at this time.

8. Establish communications between all stations.
(Preferably sound powered telephones remote shutdown channel, red box)
8. All stations on same channel.

IMAGE EVALUATION
TEST TARGET (MT-3)

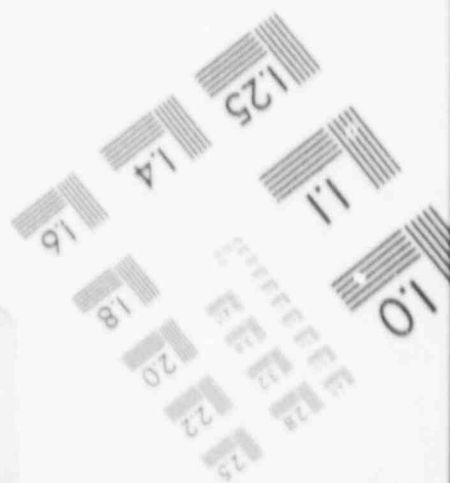
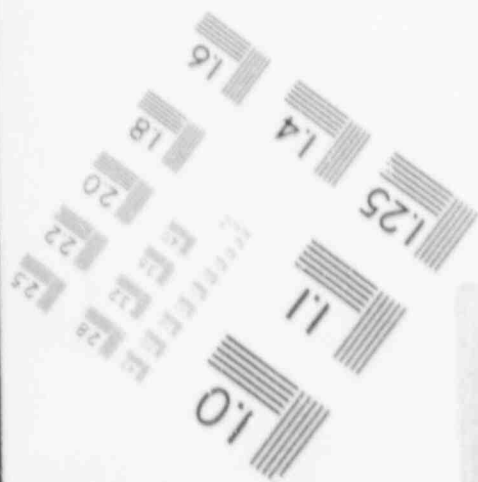
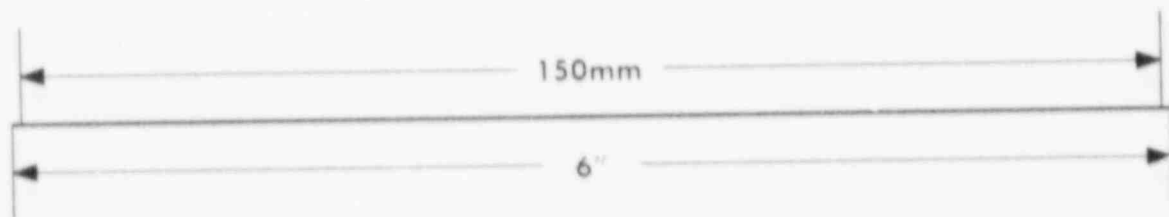
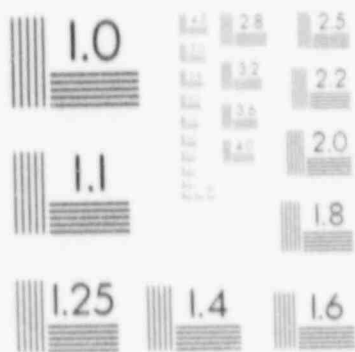
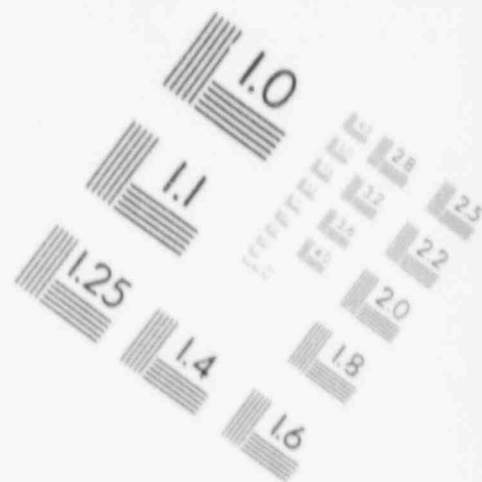
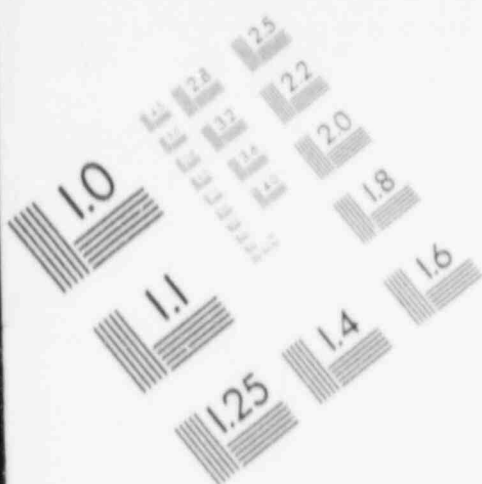


IMAGE EVALUATION
TEST TARGET (MT-3)

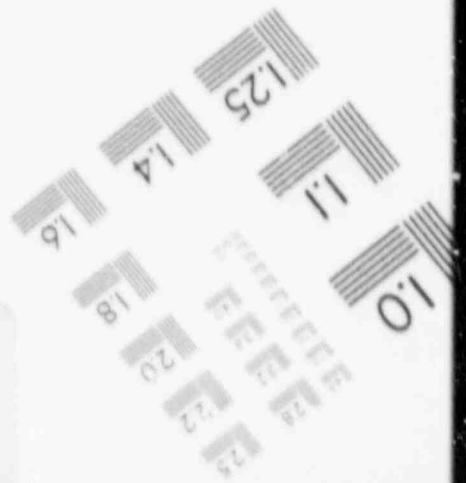
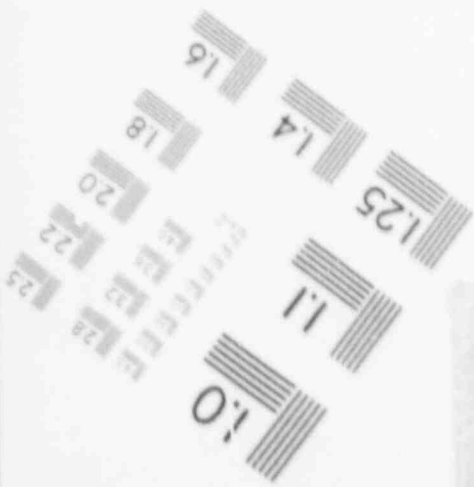
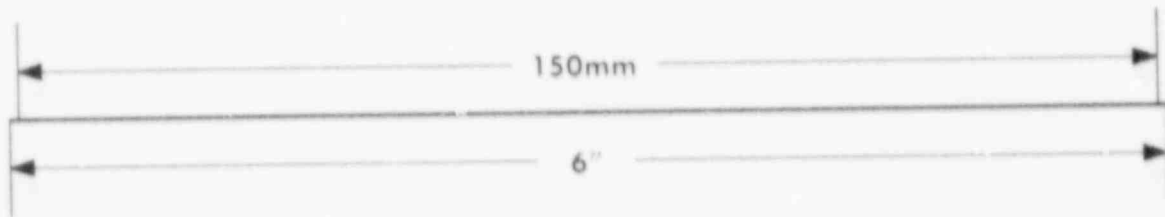
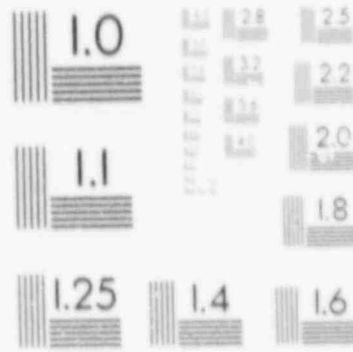
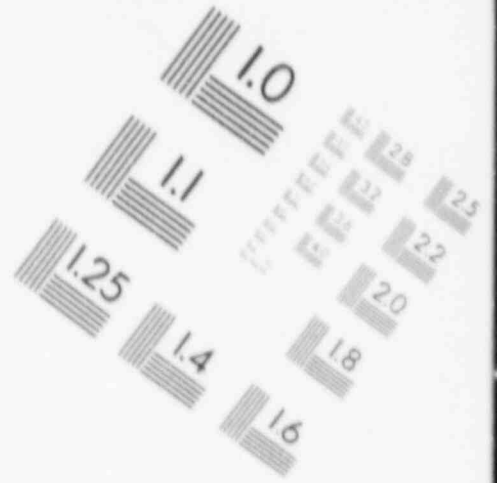
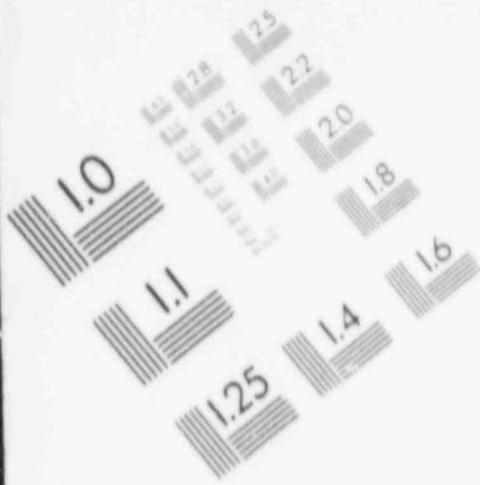
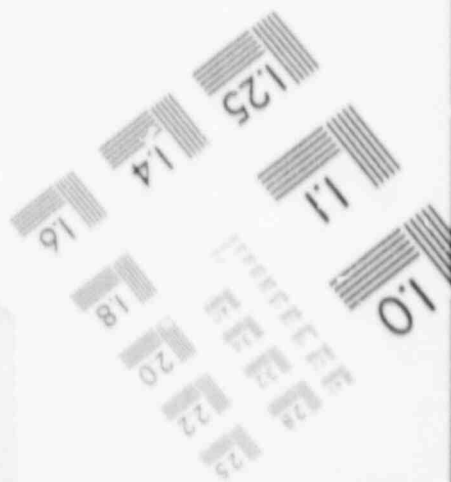
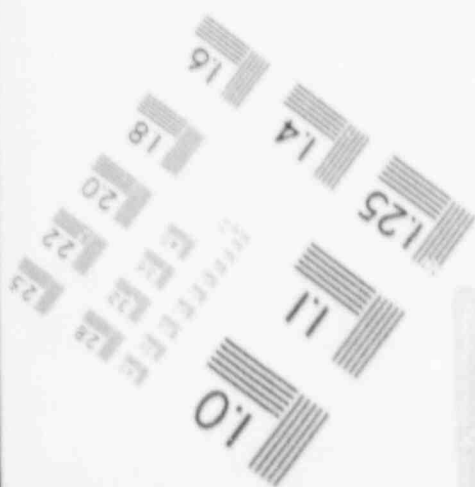
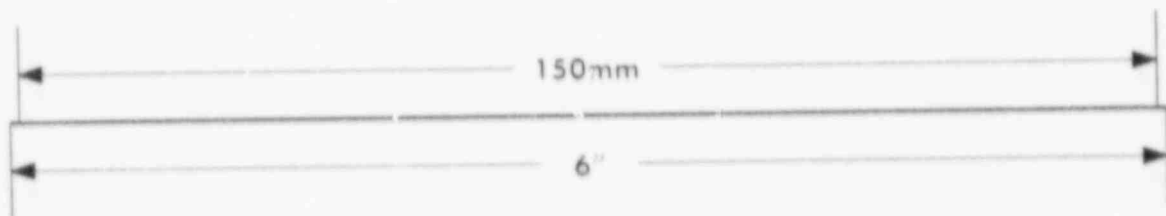
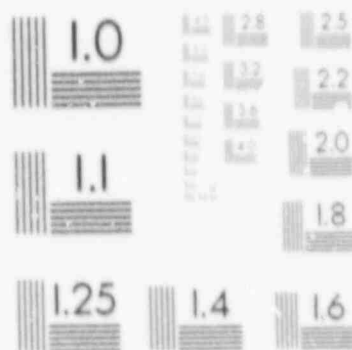
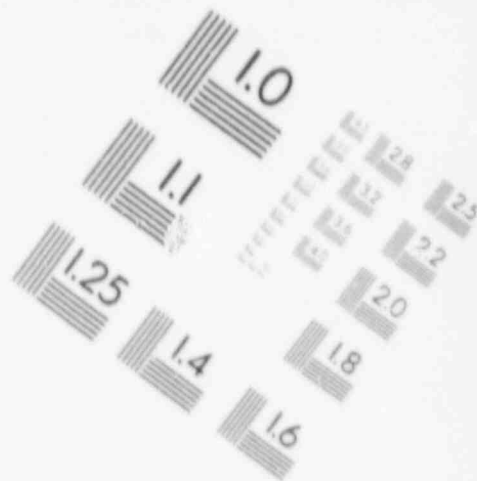
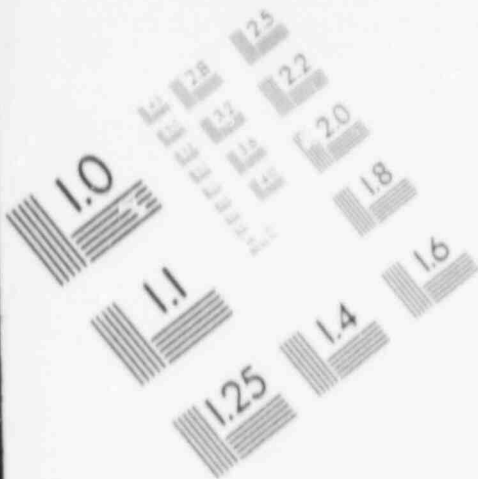


IMAGE EVALUATION
TEST TARGET (MT-3)



ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

If a loss of offsite power occurs, the NSCW pump should be started immediately after the diesel generators have restored power to the bus.

9. Locally verify AC Emergency Buses 2AA02 and 2BA03 - ENERGIZED by observing 4160 volt meter on each bus.

9. Attempt to energize any unenergized bus from preferred sources using handswitch on 2AA02-00 or 2BA03-00.

IF any Emergency Buses cannot be energized from preferred normal source, THEN start a diesel generator on that bus using Attachment B.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

Shutting SG ARVs by opening 2AY2A or 2BYC1 and shutting MSIVs and MSBVs by opening 2AD12 or 2BD12 will require secondary pressure control using Main Steam Code safeties unless initiating Attachment G to locally control SG pressure.

10. IF a Control Room fire,
THEN send operator to:

a. Trip the following
breakers in Table:

Breaker No.	Location	Significant Equipment Actions
2BD12-08	Control Bldg., RB-36	<ul style="list-style-type: none"> ● Shuts MSIVs ● Shuts MFIVs ● Shuts BFIVs
2BD12-03	Control Bldg., RB-36	<ul style="list-style-type: none"> ● Shuts MSBVs ● Isolates RMW to VCT blender
2AD12-08	Control Bldg., RB-29	<ul style="list-style-type: none"> ● Shuts MSIV ● Shuts MFIVs ● Shuts BFIV
2AD12-03	Control Bldg., RB-29	<ul style="list-style-type: none"> ● Shuts MSBVs ● Isolates RMW to VCT blender
2BYC1-10	Control Bldg., RB-18	<ul style="list-style-type: none"> ● Shuts SG ARV PV-3010
2BYC1-12	Control Bldg., RB-18	<ul style="list-style-type: none"> ● Shuts SG ARV PV-3020

b. Transfer switches on
following SWGR to LOCAL:

- 2BB06
(Control Bldg, RB-18)
- 2BB07
(Control Bldg, RB-18)
- 2AB05
(Control Bldg, RB-04)
- 2AB04
(Control Bldg, RB-04)
- 2BB16
(Control Bldg, R223)
- 2AB15
(Aux. Bldg, RD-104)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

c. Trip the following breakers in Table:

Breaker No.	Location	Significant Equipment Actions
2AY2A-17	Aux. Bldg., R149	● Shuts SG ARV PV-3000
2AY2A-18	Aux. Bldg., R149	● Shuts SG ARV PV-3030

CAUTION

Train B is the preferred pressure train.

11. Control PRZR pressure between 2220 and 2260 psig:
- Operate backup heaters on Panel A or Panel B.
 - Operate PRZR sprays on Panel A.
 - Ensure at least one PRZR PORV block valve HV-8000A on Panel A or HV-8000B on Panel B - OPEN.

11. IF pressure less than 2220 psig AND lowering THEN:
- Verify PRZR PORVs PV-455A on Panel A and PV-456A on Panel B - SHUT
- IF NOT, THEN manually shut.
- IF any valve can NOT be shut, THEN manually shut its block valve. HV-8000A on Panel A or HV-8000B on Panel B.

-OR-

Trip Breaker 4 on 2AD1M for PV-455A or Breaker 4 on 2BD1M for PV-456A. (located in Control Bldg., Room RB-29, RB-36)

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

- 2) Verify PRZR spray valves on Panel A - SHUT

IF NOT, THEN manually shut.

IF valve can NOT be shut, THEN stop RCP supplying failed valve. RCP 1 for PV-455C or RCP 4 for PV-455B on Panel A.

- 3) Energize PRZR heaters

- 4) IF PRZR pressure - LESS THAN 1870 psig or continues to lower, THEN perform the following to restore PRZR pressure between 2220 and 2260 psig and PRZR level 50% to 70%:

- a. Start additional ECCS pumps.
- b. Align CCPs to RWST suction.
- c. Shut LV-112B or LV-112C.
- d. OPEN BIT isolation valves.

IF pressure greater than 2260 psig

THEN:

- 1) De-energize PRZR heater on Panel A and Panel B.
- 2) Control pressure using normal sprays on Panel A.

IF normal PRZR spray NOT available, AND letdown is in service, THEN use auxiliary spray HV-8145 on Panel A.

IF auxiliary spray NOT available, THEN use PV-455 on Panel A or PV-456A on Panel B.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

The AFW pumps and throttle valves will NOT respond to automatic signals after control has been transferred.

12. Control SG level(s) at 50% NR (60% WR) on all SGs.
- a. On shutdown Panel A:
- Start MD-AFW Pump A
 - Throttle FV-5139 and FV-5137
 - Verify miniflow FV-5155 - OPEN.
- b. On shutdown Panel B:
- Start MD-AFW Pump B
 - Throttle FV-5134 and FV-5132
 - Verify miniflow FV-5154 - OPEN.
13. At the discretion of the Unit Shift Supervisor, locally shut air supply to SGBD solenoid rack and open air supply drain valve to shut SGBD valves. (Aux. Bldg. Penetration Room, RB-130)
- HV-7603A
 - HV-7603B
 - HV-7603C
 - HV-7603D
14. IF both MDAFW pumps are available, THEN locally stop the TDAFW pump using Attachment A.
12. Initiate Attachment A, Turbine Driven AFW pump operation from Panel C.
- Go to step 13.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

Shutting MSBV's by opening 2AD12-03 and 2BD12-03 will isolate RMW to VCT blender.

15. Verify RCS temperature.
STABLE AT OR TRENDING TO
557°F.

15. IF temperature is less than
557°F and lowering
THEN:

1) Verify SGARVs on Panel A
and Panel B are SHUT.

IF NOT, THEN manually
shut.

IF any valve can NOT be
manually shut,
THEN control RCS
temperature by initiating
Attachment G, Local
Operation of the S/G
Atmospheric Relief Valves
With a Loss of all AC
Power.

-OR-

Ensure SGARV shut by
opening its breaker:

Aux. Bldg. Room R149;

- 17 on 2AY2A for
PV-3000
- 18 on 2AY2A for
PV-3030

Control Bldg. Room RB18;

- 10 on 1BYC1 for
PV-3010
- 12 on 1BYC1 for
PV-3020

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- 2) IF cooldown continues,
THEN throttle AFW flows
to a minimum of 570 gpm
until at least one SG
level is above 5% NR
- 3) IF cooldown continues,
THEN shut MSIV's and MSBVs
by opening Breakers 8 and
3 on 1AD12 and 1BD12.
(Control Bldg. Rooms RB-29
and RB-36)

IF temperature greater than
357°F and rising
THEN control temperature
using SGARVs on Panel A or
Panel B.

-OR-

Control RCS temperature by
initiating Attachment G,
Local Operation of the S/G
Atmospheric Relief Valves
With a Loss of All AC Power.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDNOTE

If an SI actuation occurs, TSC consultation may be necessary after it is staffed.

16. IF an SI actuation occurs,
THEN perform the following

- a. Check if ECCS flow should be reduced:
- RCS subcooling -
GREATER THAN 24°F
using T-hot and RCS
pressure
 - RCS pressure - STABLE
OR RISING
 - PRZR level - GREATER
THAN 9%
 - Secondary heat sink:
Total feed flow to SGs -
GREATER THAN 570 gpm

-OR-

SG NR level - GREATER
THAN 5%

a. Do not reduce ECCS flow.

Consult TSC when it is
staffed.

Go to Step 18.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

NOTE

Train B is the preferred charging train when operating from remote shutdown panels.

- b. Reduce ECCS flow by stopping the following equipment.
- 1 CCP
 - PDP by locally (Aux. Bldg. C level Room RC-229) tripping Breaker 2NB21-08.
 - SI Pumps
 - RHR Pumps
- c. IF preferred normal power is supplying Emergency 4160V Bus, THEN stop Emergency Diesel Generators using local emergency stop pushbuttons.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- LV-112B, 112C, 112D, 112E will NOT reposition on VCT low-low level after they have been transferred to the shutdown panels.
- PRZR heaters will NOT cut off on low PRZR level after their control has been transferred to the shutdown panels.
- When operating from the shutdown panels, Train B is the preferable charging train.
- Shutting MSBVs by opening 2AD12-03 and 2BD12-03 will isolate RMW to VCT blender.

17. Control PRZR level
50% to 70%

a. Check CCP suction aligned to VCT.

- LV-112B on Panel A
OPEN
- LV-112C on Panel B
OPEN
- LV-112D on Panel A
SHUT
- LV-112E on Panel B
SHUT
- Letdown in service
(FI-132B on PSDA)

a. Align CCP Suction to RWST:

1) At Panel B

- OPEN LV-112E
- SHUT LV-112C

-OR-

2) At Panel A

- OPEN LV-112D
- SHUT LV-112B

Go to Step 17b.

b. OPEN charging isolation valves:

- HV-8105 (Panel B)
- HV-8106 (Panel A)

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

- c. IF SI actuated,
THEN at discretion of
Shift Supervisor shut
BIT isolation valves:
- HV-8801A (Panel A)
 - HV-8801B (Panel B)
- d. Start CCP B on Panel B
or CCP A on Panel A
- e. Stop PDP by locally
tripping breaker
2NB21-08 (Aux. Bldg.
Level C Room RC-229).

ACTION/EXPECTED RESPONSE

- f. Send an operator to 2-FHC-0121 (located outside PD Pump Room in Aux. Bldg. RC-110) to maintain PRZR level between 50% and 70%
- Throttle Charging using 2-FHC-0121.
 - Control seal injection by shutting 2-1208-U6-134 and throttling 2-1208-U6-136.

RESPONSE NOT OBTAINED

- f. IF instrument air not available, THEN control PRZR level using either of the following:
- 1) With CCP B running:
 - a) Verify mini-flow path
 - HV-8110 on Panel A OPEN
 - HV-8111B on Panel B OPEN
 - b) SHUT HV-8438 CCP discharge cross connect on Panel B
 - c) SHUT HV-8485B, CCP B discharge on Panel B
 - d) OPEN HV-8801B, BIT discharge on Panel B
 - e) Throttle open HV-0190B (safety grade charging) on Panel B as necessary
 - f) At Unit Shift Supervisor's discretion, throttle 2-1208-U6-151, CCP B d'sch. to seal inj. filter (located in CCP B Valve Gallery). (flows can be monitored locally on FI-0144B or FI-0145B A-level Train B Piping Penetration Rooms)

-OR-

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

2) With CCP A running

a) Verify mini-flow path

- HV-8110 on Panel A OPEN
- HV-8111A on Panel B OPEN

b) SHUT HV-8485A and HV-8106, CCP A discharge valves on Panel A.

c) OPEN HV-8105 charging isolation on Panel B

d) OPEN HV-8116, HV-0190A isolation on Panel A

e) Throttle open HV-0190A on Panel A as necessary.

f) At Unit Shift Supervisor's discretion, throttle 2-1208-U6-152, CCPs disch. to seal inj. filter (located in CCP A Valve Gallery) (flows can be monitored locally on FI-0144B or FI-0145B A-level Train B Piping Penetration Rooms).

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

- g. IF PRZR level can NOT be maintained less than 88%,
THEN open the following until PRZR level lowers less than 70%:

- Train B head vent:

- HV-8095B
- HV-8096B
- HV-0442B

- Train A head vent:

- HV-8095A
- HV-8096A
- HV-0442A

18. Locally verify at least one ACCW pump - RUNNING.

18. Stop all RCPs.

Isolate letdown by closing LV-459 and LV-460 (Panel A).

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDNOTE

RCP 4 or RCP 1 should be run preferentially to provide normal PRZR sprays.

19. Verify at least one RCP - RUNNING.

19. IF offsite power is available and at least one ACCW pump is in service,
THEN:

- a. Start the RCP Oil Lift Pump.
- b. Verify PRZR spray valves SHUT.
- c. After about 2 minutes start the selected RCP.

IF offsite power NOT available OR ACCW pump NOT in service
THEN:

Verify that the RCS is being cooled by natural circulation:

- RCS subcooling greater than 50°F.
- SG pressures stable or lowering.
- RCS hot leg temperatures stable or lowering.
- RCS cold leg temperatures at saturation for SG pressure.

Refer to Attachment F, RCS Pressure - Temperature Limits.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

20. IF a Control Room fire,
THEN prevent spurious
actions from occurring:
- Secure Containment
Sprays by racking out:
 - 2AA02-14
 - 2EA03-14
21. At the discretion of the
Unit Shift Supervisor,
locally trip SGFPTs at its
front standard.
22. At the discretion of the
Unit Shift Supervisor, shut
down the following by
depressing TRIP on their
breakers:
- Both Heater Drain Pumps
(Turb. Bldg. Level 1)
 - 2NA04 Brkr 13
 - 2NA01 Brkr 12
 - All but one Condensate
Pump (Turb. Bldg. Level
2)
 - 2NAA Brkr 6
 - 2NAA Brkr 5
 - 2NAE Brkr 4
 - All but one Circulating
Water Pump (Turb. Bldg.
level 2)
 - 2NAA Brkr 4
 - 2NAB Brkr 5
 - All River Water Makeup
Pumps not required
considering requirements
of both units. (River
Intake)
 - ANA01A Brkr 2
 - ANA01A Brkr 3
 - ANA01B Brkr 11
 - ANA01B Brkr 12

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

23. At the discretion of the Unit Shift Supervisor, isolate BTRS:

- Locally open Brkr 14 on 2ND32. (Control Bldg. Room RB-28)
- Locally open Brkr 8 on 2ND31. (Control Bldg. Room RB-28)

24. Borate the RCS to a Hot Standby Xenon Free concentration:

a. Determine required RCS shutdown margin using Attachment C.

b. Determine actual RCS shutdown margin using 14005, SHUTDOWN MARGIN CALCULATION- LESS THAN REQUIRED.

c. Start Boric Acid Transfer Pump on Panel A or Panel B.

d. Open Emergency Boration Valve:

- HV-8104 - Panel A

-OR-

- HV-8439 - Panel B

b. Go to Step 25.

d. If emergency boration path NOT available THEN shift CCP suction to RWST to borate RCS:

Open LV-112D on Panel A or LV-112E on Panel B.

NOTE

With one boric acid transfer pump running and flow through HV-8104, RCS boron concentration will increase about 8 ppm/min. Flow through HV-8439 will increase RCS boron concentration at about 2 ppm/min. Flow from RWST will increase RCS boron concentration about 1 ppm/min.

e. Terminate boration when required shutdown margin is reached or PRZR level reaches 85%.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

25. IF SI not actuated, THEN have Chemistry sample RCS and PRZR for boron - GREATER THAN REQUIRED.

25. Return to Step 24.

NOTE

If boration was stopped due to high FRZR level THEN continue boration as PRZR level lowers during cooldown.

26. Commence a cooldown to cold shutdown if any ONE of the following occur:

26. Maintain Hot Standby. Return to Step 12.

- Both CST levels lower to less than 340,000 gal (66%) as read on LI-5100 (5115).
- PRZR level can NOT be controlled less than 85%.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

27. Borate the RCS to Cold Shutdown Xenon-Free concentration:

a. Determine required RCS shutdown margin using Attachment D.

b. Determine actual RCS shutdown margin using 14005, SHUTDOWN MARGI. CALCULATION- LESS THAN REQUIRED.

c. Start Boric Acid Transfer Pump on Panel A or Panel B.

d. Open Emergency Boration Valve:

● HV-8104 - Panel A

-OR-

● HV-8439 - Panel B.

e. Terminate boration when required shutdown margin is reached or PRZR level reaches 85%.

b. Go to Step 28.

d. IF emergency boration path NOT available THEN shift CCP suction to RWST to borate RCS:

Open LV-112D on Panel A or LV-112E on Panel B.

28. IF RCP 1 or 4 running THEN slightly open one PRZR spray valve to equalize boron between RCS and PRZR.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

29. Raise PRZR level to about 70% using control established in Step 17.

30. Turn off all PRZR heaters:

a. Locally open

- 2NB08 - Brkr 12
(Control Bldg. RB-33)
- 2NB09 - Brkr 05
(Control Bldg. RB-33)

b. Turn off heaters

- HS10459B Panel A
- HS10470B Panel B

31. Open SGARVs to establish a 50°F/hr RCS cooldown rate on the SGs which are provided with AFW flow.

32. Using PRZR spray depressurize RCS by using Recommended Heat-up/Cooldown Path ±25°F curve on Attachment F.

33. Adjust AFW flow as required to maintain SG level 88% to 90% actual WR. (Refer to PTDB Tab 3.4 for indicated WR and NR temperature correlation.)

Train A

- HV-5134
- HV-5137

Train B

- HV-5134
- HV-5132

31. Locally open SGARVs to establish 50°F/hr RCS cooldown rate using Attachment G.

32. IF letdown is in service, open CVCS Auxiliary Spray HV-8145.

IF letdown is out of service, THEN use one PRZR PORV.

IF PRZR PORV's out of service, THEN use Rx Head Vents.

33. Locally operate AFW pump and throttle valves to control SG level using Attachment A.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

34. Adjust charging flow to maintain PRZR level between 50% and 70%.
35. Monitor and document cooldown using Attachments E and F at least every 30 minutes.
(Convert PRZR pressure to saturation temperature using Attachment F and calculate subcooling using Attachment E.)
36. At RCS pressure of 1970 psig:
- a. Block PRZR pressure SI:
- HS-40012B - Panel A
 - HS-40013B - Panel B
- b. Block Steamline Pressure SI:
- HS-40068B - Panel A
 - HS-40069B - Panel B

NOTE

RCP 4 or RCP 1 should be run preferably to provide normal PRZR sprays.

37. At RCS temperature of 450°F, reduce running RCPs to two:
- a. Verify RCPs 1 and 4 - RUNNING
- b. Stop RCP 2 and 3
- a. Go to step 38.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

38. Stabilize RCS pressure at 950 psig:
- a. Vent accumulators by opening the following:

Train A

- HV-8875A
- HV-8875B
- HV-8875C
- HV-8875D
- HV-0943A

- OR -

Train B

- HV-8875E
- HV-8875F
- HV-8875G
- HV-8875H
- HV-0943B

39. Continue cooldown using sprays and SGARVs:
- a. Stabilize RCS pressure at 365 psig.
- b. Stabilize RCS temperature at less than 350°F.
40. Rack out the breaker for the non-operating CCP.
- Train A, CCP 2AA02
Brkr 13
- OR -
- Train B, CCP 2BA03
Brkr 13

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

41. Rack out the breaker for both SIPs:
- Train A SIP 2AA02 Brkr 16
 - Train B SIP 2BA03 Brkr 17

NOTE

RCP 4 or RCP 1 should be run preferably to provide normal PRZR sprays.

42. Stop all but one RCP.

43. Locally ensure HV-8804A and HV-8804B are SHUT (located in RHR Hx Rooms RC-25 and RC-26)
THEN open Breaker 5 on Bus - 2ABB and 2BBB. (located in Aux. Bldg. Room R149 and R147)

43. Locally open Breaker 5 on bus - 2ABB and 2BBB, THEN locally shut HV-8804A and HV-8804B.

44. Ensure RHR vent valves HV-10465 and HV-10466 are SHUT by opening Breaker 8 on 2ND31. (located in Control Bldg. Room RB-28)

45. Verify two CCW pumps. RUNNING. (Preferably on Train B.)

45. Start two CCW pumps.

46. Verify two NSCW pumps RUNNING. (Preferably on Train B.)

46. Start two NSCW pumps.

47. Start NSCW cooling tower fan as needed to support RCS cooldown.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

48. Ensure NSCW tower valves HV-1668A on Panel A and HV-1669A on Panel B - OPEN

48. Manually open valves. (located in NSCW towers)

CAUTION

The RHR Loop 1 and Loop 4 Inlet Isolations (HV-8701A, 8701B, 8702A, 8702B) will NOT auto close on high RCS pressure after control is transferred to the shutdown panels.

NOTE

When operating from the shutdown panels, Train B is the preferable RHR train.

49. Establish one train of RHR:

49. If any preferred RHR train equipment cannot be placed in service, repeat Step 49 to place alternate train RHR in service.

If no RHR train can be placed in service, verify RCP running or maintain natural circulation as in Step 19 RNO.

Continue attempts to establish RHR and go to Step 50.

a. Place RHR Loop Inlet Isolation inverters in service by initiating 13405, 125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM:

- 2DD116 - Train B (Control Bldg. RB-31)
- 2CD115 - Train A (Control Bldg. RB-26)

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

- b. Unlock and close inverter AC output breaker:
- 2DD1I6 - Train B
 - 2CD1I5 - Train A
- c. Unlock and close RHR isolation starter input breaker.
- HV-8702A - Train B
 - HV-8701B - Train A
- d. Unlock and close RHR isolation valve breaker:
(In Control Bldg. Room RA-79):
- 2BBE-13-1 - Train B
 - 2BBE-13-2 - Train B
- (In Control Bldg. Room RB-01):
- 2ABE-15-1 - Train A
 - 2ABE-15-2 - Train A
- e. Shut RHR Heat Exchanger Outlet:
- HV-0607 - Train B
 - HV-0606 - Train A
- f. Shut RHR Heat Exchanger Bypass:
- FV-0619 - Train B
 - FV-0618 - Train A
- g. Close RHR suction from RWST:
- HV-8812B - Train B
 - HV-8812A - Train A
- h. Open RHR Hot Leg Suction:
- HV-8702A - Train B
 - HV-8702B - Train B
 - HV-8701A - Train A
 - HV-8701B - Train A
- i. Start the RHR pump on the selected train.

ACTION/EXPECTED RESPONSE

- j. Ensure RHR to Cold Leg Isolation open:
- HV-8809B - Train B
 - HV-8809A - Train A
- k. Slowly adjust RHR heat exchanger bypass to establish a flow rate of 3000 gpm, THEN place in AUTO
- FV-0619 - Train B
 - FV-0618 - Train A
- l. Slowly adjust RHR heat exchanger outlet to establish a 50°F/hr RCS cooldown rate.
- HV-607 - Train B
 - HV-606 - Train A

RESPONSE NOT OBTAINED

- j. Transfer control and open the valves.
- k. IF RHR pump flow indication is NOT established, THEN stop the applicable RHR pump and place other train in service by returning to Step 49.
- IF RHR flow rate can NOT be controlled less than 4500 gpm, THEN stop the applicable RHR pump and place other train in service by returning to Step 49.
- l. IF instrument air is NOT available THEN control cooldown rate by locally throttling RHR pump discharge:
- 2-1205-U4-020 - Train B
 - 2-1205-U4-019 - Train A (located outside RHR Hx Rooms in Aux. Bldg. Rooms RC-38 and RC-27)

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDCAUTION

Do NOT attempt to take RCS solid from the shutdown panels.

50. IF PRZR level rises to greater than 88%
THEN:

a. IF one train of RHR in service, stop the last RCP.

a. IF RHR not in service, do not stop RCP, continue with Step 50b.

b. Stop the CCP.

c. Shut letdown isolation valves:

- LV-460 - Panel A
- LV-459 - Panel A

d. Shut charging isolation valves:

- HV-8147 - Panel B
- HV-8146 - Panel A

51. IF a Control Room fire and at the discretion of the Unit Shift Supervisor, THEN prevent spurious actions.

a. Verify TV-12725 is - OPEN. (located in Control Bldg. Room RB-17)

a. Open TV-12725 by initiating 13744, ESF CHILLED WATER SYSTEM.

b. IF CBCR ESF Chiller room temperature rises to an uncomfortable level, THEN provide it temporary ventilation.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINED

52. IF PRZR level rises to greater than 88% with charging and letdown out of service, THEN open the following reactor head vent valves until level lowers to less than 88%:

Train A

- HV-8095A
- HV-8096A
- HV-0442A

-OR-

Train B

- HV-8095B
- HV-8096B
- HV-0442B

53. Maintain the following:
- RCS pressure - approximately 350 psig.
 - RCS temperature - less than 200°F.
 - Bubble in PRZR.
54. When access to the Control Room is regained, establish communications between the Shutdown Panels and Main Control Room.

ACTION/EXPECTED RESPONSERESPONSE NOT OBTAINEDNOTE

Prior to transferring switches and controls from the shutdown panel to the Main Control Room panel, switch positions should be verified and controller errors should be nulled between the control stations.

55. Transfer controls back to Main Control Room while initiating 11510, REMOTE SHUTDOWN PANEL LINEUP.
56. At the Unit Shift Supervisor's discretion, restore any previously altered equipment back to normal configuration.
57. At the Unit Shift Supervisor's discretion, initiate the appropriate procedure.

END OF PROCEDURE TEXT

ATTACHMENT A

TURBINE DRIVEN AFW PUMP OPERATION FROM SHUTDOWN PANEL C

CAUTION

The TDAFW pump steam supply valve, HV-5106, will not automatically open on a pump start signal after control has been transferred to the Shutdown Panel.

A.1 STARTING TDAFW PUMP

- A.1.1 TRANSFER control of the TDAFW pump steam supply isolation valves, HV-3009 and HV-3019 to LOCAL.
- A.1.2 ENSURE at least one steam supply isolation valve is open.
- A.1.3 TRANSFER control of the TDAFW Pump Room Outside Air Damper, HV-12010 to LOCAL.
- A.1.4 ENABLE differential pressure controller PDIC-5180B by placing transfer switch HS-5180 in LOCAL.
- A.1.5 TRANSFER control of the TDAFW Pump AFW Throttle Valves HV-5120, HV-5122, HV-5125 and HV-5127 to LOCAL.
- A.1.6 ENSURE TDAFW pump Trip/Throttle Valve PV-15129 is reset by verifying the motor operator is OPEN and the valve is latched and OPEN.
- A.1.7 ENSURE differential pressure controller PDIC-5180B is in AUTO.
- A.1.8 START the TDAFW pump by placing HS-5106C in LOCAL and opening HV-5106.
- A.1.9 VERIFY that pump speed and discharge pressure begin rising.

NOTE

Differential pressure controller PDIC-5180B will attempt to maintain a fixed differential pressure of 500-600 psid between the TDAFW pump turbine steam supply pressure and the pump discharge pressure by raising or lowering turbine speed as steam pressure varies with RCS temperature.

- A.1.10 MONITOR AFW flow to each SG using FI-5150C, FI-5151C, FI-5152C and FI-5153C.

ATTACHMENT A

TURBINE DRIVEN AFW PUMP OPERATION FROM SHUTDOWN PANEL C

A.1.11 MONITOR SG levels and adjust TDAFW pump AFW Throttle Valves as necessary to maintain SG level at 50% NR (60% WR).

A.2 STOPPING TDAFW PUMP

- A.2.1 TRANSFER control of ALL TDAFW pump and valve controls to LOCAL.
- A.2.2 PLACE the TDAFW Pump Speed Controller PD1C 5180B in MANUAL and REDUCE turbine speed to 1535 rpm.
- A.2.3 TRIP the pump by placing HS-15111B in CLOSE.
- A.2.4 CLOSE the Steam Supply Isolation Valve HV-5106B.
- A.2.5 When TDAFW pump reaches 500 rpm, fully open all TDAFW pump AFW Throttle Valves.

END OF ATTACHMENT A

ATTACHMENT BSTARTING AND PLACING DIESEL GENERATOR A(B)
ON A DEAD BUS FROM OUTSIDE THE CONTROL ROOM

- B.1. ESTABLISH communications between the diesel generator and affected 1E 4kV bus.
- At the Generator Control Panel PDG1 (3).
- B.2. RESET lockout relays A, B, C if required.
- B.3. PLACE Local/Remote Switches in LOCAL.
- HS-4516 (4517)
 - HS-9045A (B Train only, back of MCC 2BBF)
 - HS-9047A (B Train only, back of MCC 2BBF)
- B.4. IF tripped, THEN reset control power breakers on front of engine control panel.
- B.5. PLACE Unit/Parallel switch HS-4414A (4452A) in UNIT.
- B.6. ALERT personnel in the vicinity that the diesel generator is starting.
- B.7. DEPRESS Manual Start pushbutton HS-4569A (4570A).
- B.8. OBSERVE the following:
- a. Red STARTING lamp energizes.
 - b. Red SHUTDOWN SYSTEM ACTIVE lamp energizes.
 - c. Starting air is admitted to cylinders and engine begins to roll.
 - d. Red RUNNING lamp energizes when engine speed reaches 200 rpm.
 - e. Blue READY TO LOAD lamp energizes when engine speed reaches 400 rpm.
 - f. Generator field flashes and generator voltage raises to 3750-4300 volts.
- B.9. CONTROL generator voltage at 4kV using HS-4409A (4477).
- B.10. CONTROL generator frequency at 60 Hz using HS-4518A (4519A).

ATTACHMENT B

- B.11. At the 1E 4kV bus local control panels 2AA02-00 (2BA03-00).
- a. TRANSFER control to LOCAL and TRIP PREF NORM INCM BRKR 2AA02-05 (2BA03-01).
 - b. TRANSFER control to LOCAL and CLOSE DIESEL GEN BRKR 2AA02-19 (2BA03-19).
- B.12. At the Remote Shutdown Panels:
- a. START at least one Nuclear Service Water pump on the affected bus.
 - b. START AFW pumps on the affected bus.
- B.13. At the 1E 4kV bus local control panels:
- a. TRANSFER control to LOCAL and CLOSE the following Sply FDR Brkrs:
 - 2AA02-10 (2BA03-06)
 - 2AA02-20 (2BA03-04)
 - 2AA02-21 (2BA03-09)
 - 2AA02-22 (2BA03-18)
- B.14. At 480V AC MCC 2NBI(2NBO), CHECK the following:
- a. The Generator Space Heater red indicating lamp is OFF,
 - b. The Jacket Water Circulating Pump green indicating lamp is ON,
 - c. The Lube Oil Circulating Pump green indicating lamp is ON.

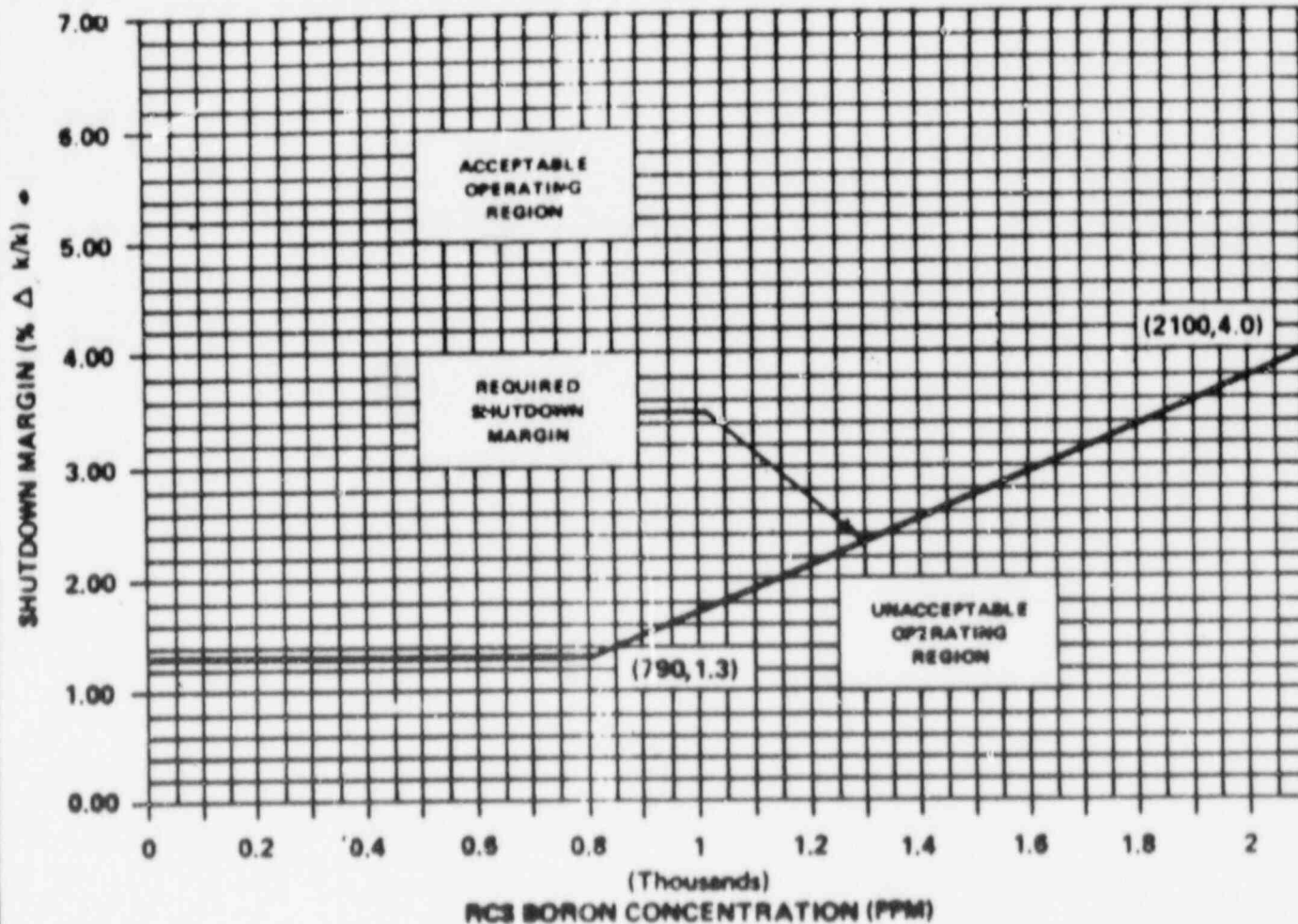
ATTACHMENT B

- B.15. CHECK the following parameters after the engine has been operating for several minutes:
- a. Engine oil pressure stabilizes between 50 and 55 psig,
 - b. Turbocharger oil pressure stabilizes between 20 and 25 psig,
 - c. Jacket water pressure stabilizes between 10 and 30 psig,
 - d. Fuel oil pressure stabilizes between 20 and 30 psig,
 - e. LO OUT and JW OUT thermocouple temperatures (Positions 19 and 21) stabilized at less than 180°F,
 - f. Generator bearing oil rings are turning freely.
- B.16. Periodically VERIFY operation of the Fuel Oil Transfer pumps. If "A" train transfer pump(s) is not operating properly and is required, 27579-C, EMERGENCY DIESEL GENERATOR FUEL OIL PUMP CONTROL CIRCUIT EMERGENCY may be used to provide guidance in bypassing Control Room circuitry.
- B.17. Return to Step 9.

END OF ATTACHMENT B

ATTACHMENT C

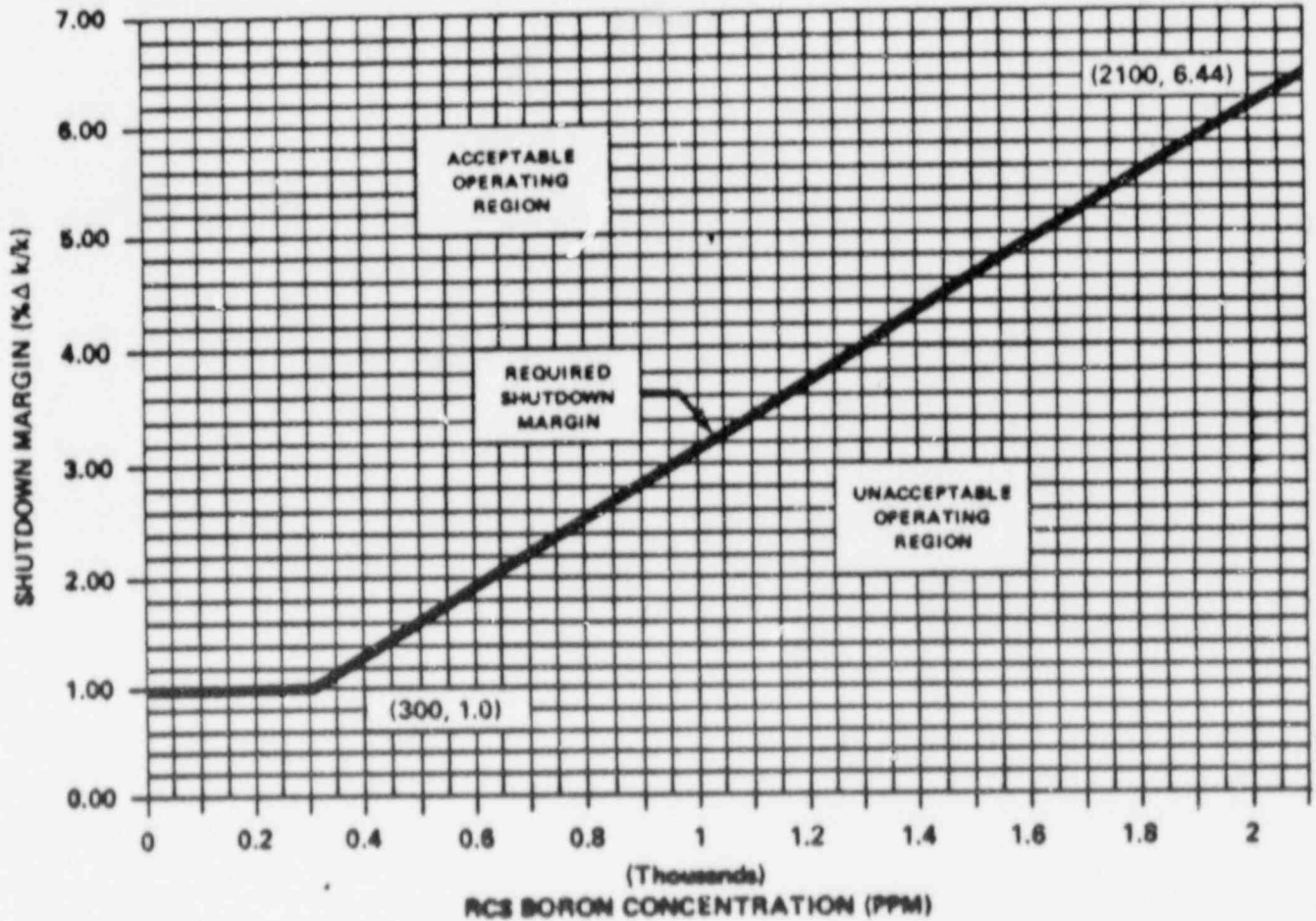
REQUIRED SHUTDOWN MARGIN FOR MODES 3 AND 4
(MODE 4 WITH AT LEAST ONE RCP RUNNING)



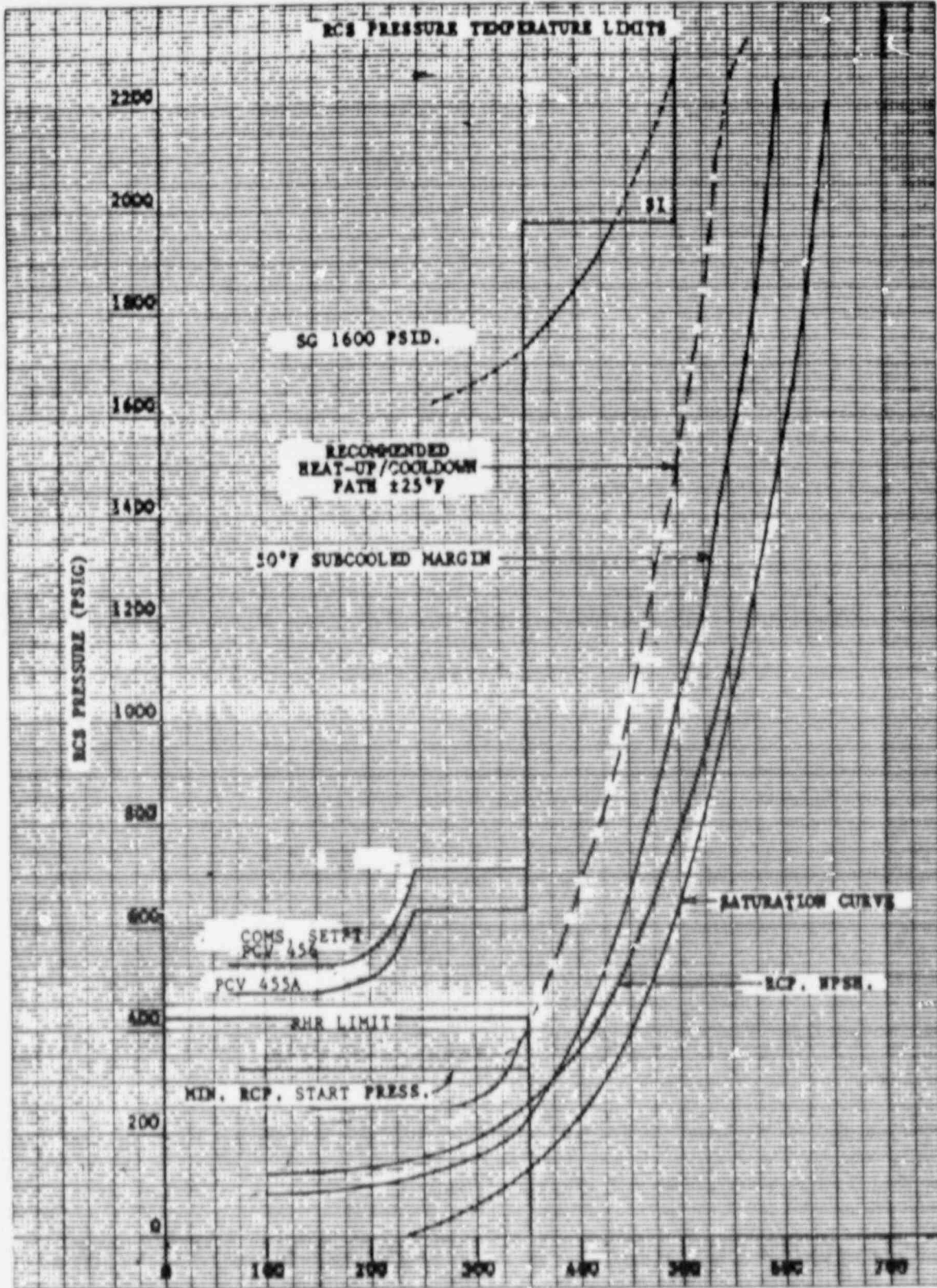
ATTACHMENT D

REQUIRED SHUTDOWN MARGIN FOR MODE 5

(MODE 4 WITH NO RCP'S RUNNING)



ATTACHMENT F



ATTACHMENT GLOCAL OPERATION OF THE STEAM GENERATOR ATMOSPHERIC
RELIEF VALVES WITH A LOSS OF ALL AC POWER

- G1. OPEN the breaker for the Hydraulic Operator Pump of the Atmospheric Relief Valve (ARV) intended to be locally operated.
- | | | |
|-----|----------|--------------------------------|
| SG1 | 2PV-3000 | 2ABB-25 (Aux. Bldg., Room 149) |
| SG2 | 2PV-3010 | 2BBB-25 (Aux. Bldg., Room 147) |
| SG3 | 2PV-3020 | 2BBB-26 (Aux. Bldg., Room 147) |
| SG4 | 2PV-3030 | 2ABB-26 (Aux. Bldg., Room 149) |
- G2. ESTABLISH COMMUNICATIONS between the Shutdown panels and the Main Steam Valve Room ARV Local Hand Pump Station.
- G3. PLACE the Local Hand Pump Station in STANDBY by performing the following steps:
- CHECK level in hydraulic fluid reservoir,
 - POSITION Selector Valve 2 to NEUTRAL (Valve handle will point directly away from the reservoir),
 - CLOSE the hand pump bleed off valve using the slotted end of the pump handle,
 - STROKE hand pump several times to check free movement,
 - CLOSE the Reservoir Inlet Valve 11A,
 - STROKE hand pump until Gauge 8 reads approximately 1000 psig,
 - OPEN the Accumulator Dump Pilot Supply valve 11B,
 - STROKE hand pump until Gauge 8 reads 1500 psig for approximately 1 minute,
- NOTE
- Maintaining this pressure may be accomplished by applying continuous force downward on the pump handle while monitoring pressure.
- OPEN the Reservoir Inlet Valve, 11A and allow the pressure on Gauge 8 to drop to 0 psig,
 - CLOSE valve 11B,
 - CLOSE valve 11A.

ATTACHMENT G

G4. When directed by the Shutdown panels, LOCALLY POSITION the ARV by performing the following applicable steps:

a. To jack valve in the OPEN direction:

- (1) Shift the Selector Valve 2 to the OPEN position (counterclockwise 45°),
- (2) STROKE the hand pump until the desired valve position (as determined by the Shutdown panels) is obtained,
- (3) SHIFT the Select Valve 2 back to the NEUTRAL position.

b. To jack valve in the CLOSE direction:

- (1) SHIFT the Selector Valve 2 to the CLOSE position (clockwise 45°),
- (2) STROKE the hand pump until the desired valve position (as determined by the Shutdown panels) is obtained,
- (3) SHIFT the Selector Valve 2 back to the NEUTRAL position.

G5. When AC power has been restored and it is desired to TRANSFER CONTROL of the ARV back to the Shutdown panels, perform the following steps:

NOTE

It may be desirable to control Reactor Coolant System temperature with one of the other ARVs while re-establishing control of the locally operated ARV to the Shutdown Panels.

a. At the ARV Local Hand Pump Station:

- (1) POSITION the Selector Valve 2 to the Neutral position,
- (2) OPEN the Reservoir Inlet Valve 11A,
- (3) OPEN the hand pump bleed-off valve using the slotted end of the pump handle.

ATTACHMENT G

- b. On the Shutdown panels, ADJUST the ARV controller 2-PIC-3000B (3010B, 3020B, 3030B) for MINIMUM FLOW,
 - c. CLOSE the breaker to supply power to the ARV hydraulic pump opened in Step K1.
 - d. ADJUST the ARV controller to maintain Reactor Coolant System temperature as required.
- G6. RETURN to Step in effect.

END OF ATTACHMENT G