

WISCONSIN PUBLIC SERVICE CORPORATION		NO. E-0-07	REV K
KEWAUNEE NUCLEAR POWER PLANT		TITLE FIRE IN DEDICATED FIRE ZONE	
OPERATING PROCEDURE		DATE AUG 04 1998	PAGE 1 of 38
REVIEWED BY <u>O Braun</u>		APPROVED BY <u>[Signature]</u>	
NUCLEAR SAFETY RELATED	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	PORC REVIEW REQUIRED	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
		SRO APPROVAL OF TEMPORARY CHANGES REQUIRED	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

1.0 INTRODUCTION

1.1 The purpose of this procedure is to PLACE the plant in Hot Shutdown and cooldown to Cold Shutdown using Control Room and local manual operations in the event of a fire at the Dedicated Shutdown Panel or in a Dedicated Fire Zone. Normal Control Room operations are no longer effective. All dedicated equipment and offsite power will be unavailable or unreliable.

2.0 SYMPTOMS OR ENTRY CONDITIONS

- 2.1 A fire that causes the inability to monitor or control Dedicated Shutdown System equipment and instrumentation from the Control Room.
- 2.2 This procedure will be entered from E-FP-08.

3.0 AUTOMATIC ACTIONS

- 3.1 No automatic actions are assumed to occur.

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

4.0 DETAILED PROCEDURE

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CAUTION

A hydrogen fire/explosion hazard may exist at generator due to loss of seal oil system.

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NOTE: The Emergency Plan Implementing Procedures should be reviewed to evaluate if the emergency response organization should be activated.

- | | |
|--|---|
| <p>1 MANUALLY TRIP THE REACTOR</p> <p>a. Reactor Trip and Bypass Breakers - OPEN</p> <p>b. Neutron flux - DECREASING</p> | <p><u>IF</u> Reactor does <u>NOT</u> trip, OPEN breakers 13301 and 14301, Bus 33/43 Supply.</p> <p><u>IF</u> breakers 13301 and 14301 do <u>NOT</u> open, locally OPEN Reactor Trip Breakers.</p> |
| <p>2 MANUALLY TRIP THE TURBINE:</p> <p>a. Both Turbine Stop Valves - CLOSED</p> | <p>Manually RUN BACK Turbine and PLACE both EH Oil Pumps in PULLOUT.</p> <p><u>IF</u> Turbine Control Valves can <u>NOT</u> be closed, manually INITIATE Main Steam Isolation.</p> |
| <p>3 REQUEST CAS OPERATOR TO FAIL OPEN ALL SECURITY AND VITAL AREA DOORS AND INITIATE COMPENSATORY ACTIONS (Control Room Supervisor):</p> <p>a. DISTRIBUTE key rings and two way radios.</p> | |

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TITLE FIRE IN DEDICATED FIRE ZONE

EMERGENCY OPERATING PROCEDURES

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STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 4 ALIGN SERVICE WATER HEADER B
(Control Operator A):
- a. CLOSE SW-4B/CV-31085, SW Header B to Turbine Bldg Hdr, by POSITIONING Turbine Bldg SW Header Selector switch to ISOL
 - b. CLOSE SW-3B/CV-31040, Service Water Header B Isolation

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

5 ENERGIZE BUS 6 FROM DIESEL GENERATOR B (Control Operator A):

- a. POSITION Bus 6 Voltage Restoring Mode Selector switch to MAN
- b. POSITION following control switches to PULLOUT:
 - Safety Injection Pump B
 - Containment Spray Pump B
 - Residual Heat Removal Pump B
 - Auxiliary Feedwater Pump B
 - Bkr 16111, Bus 51 & 61 Tie
 - Bkr 16211, Bus 52 & 62 Tie
 - Bkr 1-602, Bus 5 & 6 Tie
 - Bkr 1-611, TAT To Bus 6
 - Bkr 1-601, RAT To Bus 6
 - Bkr 1-610, MAT To Bus 6
- c. POSITION Air Compressor B control switch to OFF

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CAUTION

IF cooling water is NOT established in 2-3 minutes after Diesel start, damage will occur.

- d. START Diesel Generator B
- d. IF Diesel Generator B can NOT be started from Control Room, REQUEST Control Operator B to locally START Diesel Generator B per A-DGM-10B.
- e. POSITION 43 switch for Bkr 1-603 to MAN
- f. POSITION Bkr 1-603 Sync switch to ON

NOTE: Control Room Bus 6 Voltage indication may be unreliable. Use Diesel Generator B Voltage for indication of Bus 6 voltage.

- g. CLOSE Bkr 1-603, DG B To Bus 6
- h. START Service Water Pump B1 by HOLDING control switch to START for 5 seconds
- h. IF Service Water Pump B1 does NOT start, START Service Water Pump B2 by HOLDING control switch to START for 5 seconds.

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 6 ESTABLISH COMPONENT COOLING FLOW TO BOTH RXCPS
(Control Operator A):
- a. VERIFY Component Cooling Pump B RUNNING
 - b. VERIFY CC-6B/MV-32122, Comp Cooling Heat Exchanger B Outlet OPEN
 - c. VERIFY SW-10B/MV-32012, Aux Bldg SW Header B Isolation OPEN
 - d. VERIFY CC-610B/CV-31128, RXCP B Thermal Barr Comp Cooling Return OPEN
 - e. POSITION CC-610A/MV-321127, RXCP A Thermal Barr CC Alternate Control switch to OPEN
- a. START Component Cooling Pump B.
 - b. OPEN CC-6B.
 - c. OPEN SW-10B.
 - d. OPEN CC-610B.

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 7 DE-ENERGIZE BUSES 1, 2, 3, 4, and 5 (Control Operator A):
- a. STOP Diesel Generator 1A.
 - b. POSITION following control switches to PULLOUT:
 - Bkr 1-101, RAT To Bus 1
 - Bkr 1-104, MAT To Bus 1
 - Bkr 1-201, RAT To Bus 2
 - Bkr 1-204, MAT To Bus 2

 - Bkr 1-307, RAT To Bus 3
 - Bkr 1-301, MAT To Bus 3
 - Bkr 1-407, RAT To Bus 4
 - Bkr 1-401, MAT To Bus 4

 - Bkr 1-509, DG A To Bus 5
 - Bkr 1-503, RAT To Bus 5
 - Bkr 1-511, MAT To Bus 5
 - Bkr 1-501, TAT To Bus 5

 - Bkr 1-510, Bus 5 & 6 Tie
- 8 PERFORM FOLLOWING LOCAL ACTIONS (Control Room Supervisor):
- a. REMOVE fuses in RR-171:
 - 1) Ckt 13 (PR-2B normal control)
 - b. REMOVE fuses in RR-174:
 - 1) Ckt 27 (SI-101A/B)
 - 2) Ckt 28 (SI-201A/B, SI-202A/B)
 - c. REMOVE fuses in RR-176:
 - 1) Ckt 12 (PR-2A)
 - 2) Ckt 39 (RC-49)

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

9 PERFORM FOLLOWING LOCAL ACTIONS
(Control Operator B):

a. Locally CLOSE:

1) MU-2A, Condensate Makeup
Control Station Inlet

2) MU-2B, Cond Emergency Makeup
Control Station Inlet

b. REMOVE fuses in SD-101:

1) Ckt 3 (RC-46)

2) Ckt 19 (CVC-15)

b. REQUEST Control Room Supervisor
to OPEN BRA-104, Ckt 6 Bkr
(SD-101)

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

10 ESTABLISH ALTERNATE INSTRUMENT AIR
(Control Operator B):

CAUTION

The following control valves are supplied with dedicated air via local air accumulators and have limited air capacity. Accumulators will NOT refill until normal instrument air is restored.

Alternate Accumulator	Valve	Minimum Design Cycles
40 gallons	LD-300 Excess Letdown Isolation LD-301 Excess Ltdn Flow Control LD-302 Excess Ltdn Divert to RCDT	10 cycles of LD-300 <u>AND</u> 10 cycles of LD-301 <u>AND</u> 10 cycles of LD-302
40 gallons	SW-30B1 SW Strn 1B1 Backwash SW-30B2 SW Strn 1B2 Backwash	7 cycles of SW-30B1 <u>AND</u> 7 cycles of SW-30B2
30 gallons	PR-2B Pressurizer PORV	5 cycles of PR-2B
18 gallons	SW-4B Turb Bldg SW Hdr Isolation	1 open/close cycle
1.8 gallons	AAC-15 Relay Room Air Supply AAC-16 Relay Room Air Exhaust	3 open cycles of AAC-15 3 open cycles of AAC-16

a. IF Air Dryer 1C is in service, locally OPEN following valves:

- SA-2B, Cmpr 1B Rcvr Outl
- SA-3, Station and IA Isol
- IA-300, 1 1/2" Alt IA
- NG-62, Air Dyr 1C N2 Bckup Isol
- N2 Bottle Valve

b. Verify Bottle Reducer set at 60 psig

a. IF Air Dryer 1A is in service, locally OPEN following valves:

- SA-2B, Cmpr 1B Rcvr Outl
- SA-100A, Air Dyr 1A Sply Vlv
- IA-300, 1 1/2" Alt IA

CONTINUED

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

10

CONTINUED

NOTE: Step 10.a. shall be completed prior to proceeding with Step 10.b.

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|---|--|
| <p>c. <u>IF</u> Air Dryer 1C is in service,
Locally CLOSE following valves:</p> <ul style="list-style-type: none"> • SA-100A, Air Dyr 1A Sply Vlv • SA-62, SA to IA Isol • SA-110, Air Dyr 1B Dyr Air Inlt • SA-101B, Air Dyr 1B Mos-Spr Inlt • SA-107A1, Air Dyr 1A Fltr 1A1 Outl • SA-107A2, Air Dyr 1A Fltr 1A2 Outl • IA-1A, 2" IA Hdr Stop • IA-5A, IA Dyr 1A Air Purge • IA-200, 3/4" IA to TSC • IA-400, 1 1/2" Dedicated IA Isol <p>d. REQUEST Control Operator A to
START Air Compressor B</p> <p>e. Locally CLOSE NG-62, Air Dyr 1C
N₂ Bckup Isol</p> <p>f. Locally CLOSE N₂ Bottle Valve</p> | <p>c. <u>IF</u> Air Dryer 1A is in service,
Locally CLOSE following valves:</p> <ul style="list-style-type: none"> • SA-3, Station and IA Isol • SA-110, Air Dyr 1B Dyr Air Inlt • SA-120, Air Dyr 1A Dyr Bypass CV Inlt • SA-170, Air Dyr 1B Dyr Cross-Connect • IA-1C, IA Sply From Air Dyr 1C • IA-1A, 2" IA Hdr Stop • IA-5A, IA Dyr 1A Air Purge • IA-200, 3/4" IA to TSC • IA-400, 1 1/2" Dedicated IA Isol |
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CONTINUED

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

10

CONTINUED

- g. IF air accumulators for valves located inside Containment become depleted, INITIATE maintenance actions to ALIGN the Alternate Instrument Air Header to Containment as follows:
- 1) In BAST Room, LOOSEN jam nut on handwheel for IA-101/CV-31309, IA to Cntmt Isol
 - 2) Locally CLOSE IA-101
 - 3) In BAST Room, OPEN IA-101-1, Ded & Alt Hdr to Cntmt Isol
 - 4) In ICS Pump area, OPEN IA-310, Alternate IA Hdr to Cntmt Isol

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 11 ESTABLISH S/G B AS HEAT SINK
(Control Operator A):
- a. INITIATE Train A and Train B
Main Steam Isolation
 - 1) CLOSE MS-1B/CV-31016, S/G B
Main Steam Isolation Valve
 - 2) CLOSE MS-1A/CV-31015, S/G A
Main Steam Isolation Valve
 - b. START Auxiliary Feedwater
Pump B
 - c. CLOSE AFW-10B/MV-32028, AFW
Train B Crossover Valve
 - d. CLOSE BT-2B/MV-32079, S/G B
Blowdown Isolation Valve B1
 - e. CLOSE BT-3A/MV-32078, S/G A
Blowdown Isolation Valve A2
 - f. OPERATE SD-3B/CV-31174, S/G B
PORV, to maintain Loop B WR
Temperature at 550°F
 - g. OPERATE AFW-2B/CV-31316, AFWP B
Flow Control, to maintain S/G B
Level 4-50% on LI-473
 - h. REQUEST Control Operator B to
locally CLOSE SD-3A/CV-31170,
S/G A PORV:
 - 1) INSERT pin to engage SD-3A
handwheel
 - 2) OPEN SD-3A Diaphragm Bypass
Valve
 - 3) CLOSE NG-235, N₂ Supply to
SD-3A
 - 4) CLOSE IA-470, IA to SD-3A
 - 5) VERIFY SD-3A, CLOSED
- 2) REQUEST Control Operator B
to locally POSITION MS-1A
Trip Lever to TRIP.
- h. Locally CLOSE SD-2A, S/G A PORV
Isolation Valve.

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

12 VERIFY RCS ISOLATED
(Control Operator A):

- a. CLOSE CVC-211/MV-32124, RXCP Seal Water Return Isolation
- b. CLOSE LD-3/CV-31104, Letdown Isolation
- c. CLOSE LD-300/CV-31236, Excess Letdown Isolation

- a. CLOSE CVC-212/MV-32115, RXCP Seal Water Return Isolation

CAUTION

RCS Pressure shall be maintained below 2200 psig, to allow use of Safety Injection Pump B for RCS Make-up.

13 ESTABLISH RCS PRESSURE CONTROL

- a. DE-ENERGIZE all Pressurizer Heaters and allow Przr Pressure to decrease to 2150 psig
- b. POSITION Przr Level Control Channel Selector switch to NORMAL 2-3
- c. OPERATE Pressurizer Heater Group B to maintain Przr Pressure 2100-2200 psig on PI-430 (white channel)

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

NOTE: SI-9B indicating lights may NOT function correctly.

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|---|---|
| <p>14 ESTABLISH RCS MAKEUP CONTROL
(Control Operator A):</p> <p>a. ALIGN Safety Injection Pump B
for RCS makeup via SI-15A:</p> <p>1) OPEN SI-4B/MV-32110. RWST
Supply To SI Pumps</p> <p>2) OPEN SI-5B/MV-32108. SI Pump
B Suction Isolation</p> <p>3) OPEN SI-208/MV-32131. SI
Recirculation To RWST</p> <p>4) OPEN SI-209/MV-32130. SI
Recirculation To RWST</p> <p>5) OPEN SI-15A/MV-32093. Safety
Injection To Reactor Vessel</p> <p>6) OPEN SI-9B/MV-32095. Safety
Injection To Reactor Vessel</p> <p>b. START Safety Injection Pump B
and run pump as necessary to
maintain Przr Level 20-50% on
LI-427 and LI-428</p> | <p>2) Locally OPEN SI-5B.</p> <p>3) Locally OPEN SI-208.</p> <p>4) Locally OPEN SI-209.</p> |
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CONTINUED

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

14

CONTINUED*****
CAUTION

Pressurizer Heater Group B shall be utilized as the primary means of RCS pressure control.

PR-2B Air Accumulator is sized to allow a total of 5 cycles of PR-2B.

c. IF Przr Level is <2% AND Przr Pressure is >2200 psig, THEN OPEN PR-2B to initiate SI Rx Vessel Flow as follows:

- 1) POSITION PR-2B/CV-31109,
Przr PORV Alternate Control
Station control switch to
OPEN
- 2) WHEN Przr Level increases to
>20%, CLOSE PR-2B by
returning control switch to
NORMAL

d. Locally CLOSE SI-8B, SI Pump 1B
X-Connect To SI Pump 1A

CONTINUED

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

14

CONTINUED

CAUTION

Do NOT operate SI Pump B more than 30 minutes on miniflow.

e. MAINTAIN Przc Level 20-50%

1) VERIFY time interval between
level adjustments is <30 min

1) STOP Safety Injection Pump B
and run pump as necessary to
maintain Przc level. GO TO
Step 4.0, DETAILED
PROCEDURE, Step 15.

a) CLOSE SI-15B/MV-32098,
Safety Injection to
Reactor Vessel

a) CYCLE SI-9B to maintain
Przc Level. GO TO
Step 4.0, DETAILED
PROCEDURE, Step 15.

b) On MCC 1-52B, OPEN SI-15B
supply breaker

c) CYCLE SI-15A to maintain
Przc Level

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- | STEP | OPERATOR ACTIONS | CONTINGENCY ACTIONS |
|------|---|--|
| 15 | <p>VERIFY NATURAL CIRCULATION
(Control Operator A):</p> <ul style="list-style-type: none">a. Loop B Hot Leg WR Temperature -
STABLE or DECREASINGb. RCS Subcooling based on Loop B
Hot Leg WR Temperature and Przr
Pressure - >50°Fc. S/G B Pressure - STABLE or
DECREASINGd. Loop B Cold Leg WR Temperature
- AT SATURATION TEMPERATURE for
S/G B Pressure | INCREASE dumping steam from S/G B
using SD-3B/CV-31174, S/G B PORV. |

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

NOTE: WHEN 12,700 gallons has been added from the RWST (approximately 5% level decrease), 1% Cold Shutdown Boron Conc should be attained.

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| <p>16 ESTABLISH COLD SHUTDOWN BORON CONCENTRATION
(Control Operator A):</p> <p>a. At MCC 1-52B, OPEN
CC-653/MV-32082, Excess Ltdn Hx
CC Return, supply breaker</p> <p>b. In North Pen Rm, VERIFY CC-653
OPEN</p> <p>c. Near Aux Bldg Mezz Fan Coil
Units, POSITION SW-1306B Manual
Override to FAIL OPEN</p> <p>d. POSITION LD-301/CV-31090,
Excess Letdown Control Selector
switch to MAN</p> <p>e. POSITION LD-302/CV-31235,
Excess Letdown To VCT/RCDT,
to RD TANK</p> <p>f. OPEN LD-300/CV-31236, Excess
Letdown Isolation</p> <p>g. ADJUST LD-301, Excess Letdown
Manual Control, as necessary to
establish required letdown flow</p> <p>h. OPERATE SI-15A as necessary to
maintain Przr Level 20-50%</p> | <p>a. Locally OPEN Bkr 15206, MCC-52B
& 52C supply bkr on Bus 1-52.</p> <p>b. Locally OPEN CC-653.</p> <p>h. OPERATE SI-9B as necessary to
maintain Przr Level 20-50%. <u>IF</u>
SI-9B is <u>NOT</u> available, use
Safety Injection Pump B.</p> |
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STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 17 VERIFY STATUS OF SUPPORT EQUIPMENT
(Control Operator A):
- a. START standby Service Water Pump B1/B2 by HOLDING control switch to START for 5 seconds
 - b. START Cntmt Fan Coil Unit C
 - c. START Cntmt Fan Coil Unit D
 - d. OPEN the following:
 - 1) SW-903C/MV-32058, Cntmt Fan Coil Unit C SW Return Isolation
 - 2) SW-903D/MV-32059, Cntmt Fan Coil Unit D SW Return Isolation
 - e. START Control Room A/C Fan B
 - f. VERIFY the following RUNNING:
 - Turbine Building Fan Coil Unit B
 - Aux Bldg Basement Fan Coil Unit B
 - Battery Room B Fan Coil Unit
 - Locally START Battery Room B Fan Coil Unit.
 - g. VERIFY Screenhouse Fan B cycles with temperature
 - h. VERIFY Diesel Generator B Room Vent Fan RUNNING
 - i. POSITION Nuclear Recorder Pen 1/2 Selector switches to S1 and S2.
 - j. REQUEST Plant Electricians determine feasibility of returning both CRDM Cooling Fans to service

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

CAUTION

IF S/G A Wide Range Level is <10%

AND

S/G A Pressure is > 1030psig, OR S/G A Pressure is < S/G B Press

THEN

DO NOT initiate AFW flow to Steam Generator A

NOTE: Cables for S/G A Level and Pressure indication are NOT protected. Indication may NOT be available.

18 ESTABLISH S/G A LEVEL CONTROL
 (Control Operator A)

IF S/G A is NOT available, GO TO
 Step 4.0, DETAILED PROCEDURE,
 Step 20.

a. OPERATE T/D AFW Pump as
 necessary to maintain S/G A
 Level 4-50%

a. IF T/D AFW Pump is NOT
 available:

- 1) Locally OPEN supply bkr for AFW-10A, AFW Pump 1A Disch X-over MV.
- 2) Locally CLOSE AFW-10A.
- 3) OPEN AFW-10B.
- 4) Locally THROTTLE AFW-10A to establish 25gpm on FI-13201, AFW to S/G 1A, in Aux Bldg Bsmt.
- 5) WHEN S/G A Level reaches 50%, CLOSE AFW-10B.
- 6) REPEAT Steps 3 and 5, as necessary to maintain S/G A Level 4-50%.

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

19 ESTABLISH S/G A PRESSURE CONTROL
(Control Operator B):

- a. ESTABLISH direct communication between SD-3A and Control Room
- b. Depressurize S/G A to match the pressure in S/G B:
 - 1) Locally OPEN SD-3A.
 - 2) WHEN pressure in S/G A is equal to S/G B, CLOSE SD-3A.
- c. WHEN S/G A Pressure is 100 psig > S/G B Pressure, REPEAT steps 19.a and 19.b.

20 MAINTAIN STABLE PLANT CONDITIONS

- | | |
|--|--------------------------|
| a. Loop B Cold Leg WR Temperature - 550°F | |
| b. Loop B Cold Leg WR Temperature and Przr Pressure - Within Limits of Figure E-0-07-1 | b. <u>GO TO</u> Step 11. |
| c. Przr Level - 20%-50% | c. <u>GO TO</u> Step 12. |
| d. S/G B Level - >4% | d. <u>GO TO</u> Step 11. |
| e. S/G A Level, <u>IF</u> available - >4% | e. <u>GO TO</u> Step 18. |

21 VERIFY COLD SHUTDOWN BORON CONCENTRATION

NOTE: WHEN 12,700 gallons has been added from the RWST (approximately 5% level decrease), 1% Cold Shutdown Boron Conc should be attained.

- | | |
|---|--------------------------|
| a. RCS Boron Sample > Cold Shutdown Boron Concentration | a. <u>GO TO</u> Step 16. |
|---|--------------------------|

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TITLE FIRE IN DEDICATED FIRE ZONE

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OPERATOR ACTIONS

CONTINGENCY ACTIONS

22 REQUEST Plant Electricians
determine feasibility of returning
both CRDM Cooling Fans to service

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 23 SUPPORT SYSTEMS PERIODIC CHECKS
(Control Operator A):
- a. VERIFY Condensate Storage Tanks Level - >4% (3000 Gal)
 - b. Locally VERIFY 1B Instrument Air Receiver Pressure (PI-11084) - >60 psig
 - c. VERIFY Service Water Header B Pressure - >60 psig
 - d. VERIFY D/G 1B Fuel Oil System and Station Batteries operating correctly
 - e. IF required to supply fresh air to the Control Room:
 - 1) OPEN ACC-1B/MD-32368, Control Room Fresh Air Inlet Damper B
 - 2) Locally OPEN ACC-5/CD-34007, Control Room Outside Air Bypass Damper
 - 3) Locally OPEN ACC-20/CD-34061, Cont Rm to Turb Bldg Steam Exclusion Dmpr
 - 4) Locally OPEN ACC-21/CD-34062, Cont Rm to Turb Bldg Steam Exclusion Dmpr

- a. PERFORM the following:

- 1) Locally OPEN DW-20, RMST Supply, to cross-connect RMU tanks to CSTs

OR

- 2) OPEN SW-601B/MV-32030, Service Water to AFW Pump B Isol. IF the T/D AFW Pump is operating, OPEN SW-502/MV-32031, Service Water to T/D AFW Pump Isol.

- b. VERIFY air system lined up per Step 10.
- d. CONSULT plant electrical and I&C personnel.

STEP	OPERATOR ACTIONS	CONTINGENCY ACTIONS
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NOTE: IF the plant can be maintained in a stable Hot shutdown condition, plant management should be consulted to determine the feasibility of restoring off-site power prior to commencing any further plant status changes.

24 RCS COOLDOWN TO COLD SHUTDOWN DESIRED

a. GO TO Step 25

a. GO TO Step 20.

CAUTION

WHEN cooling down using Loop B, do NOT cool down too rapidly; S/G A may become a heat source. IF S/G A pressure control and AFW flow are NOT established, Loop A will stagnate and only means of heat removal will be losses to ambient.

25 INITIATE RCS COOLDOWN:

a. MAINTAIN cooldown rate - <25°F/hr

b. ADJUST SD-3B to achieve required cooldown rate

c. MAINTAIN S/G B Level - 4-50%

d. MAINTAIN Loop B Cold Leg WR Temperature and Przr Pressure - Within Limits of figure E-0-07-1 or E-0-07-2

e. IF S/G A is available, MAINTAIN temperature difference between Loop A and Loop B <20°F by locally OPENING SD-3A as necessary to equalize S/G A and B pressures

e. MAINTAIN 50°F RCS Subcooling based on S/G A saturation temperature. IF S/G A Pressure indication is NOT available, REQUEST maintenance assistance to establish alternate indication.

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

26 VERIFY RCS LOOP B WR TEMPERATURE - <550° F GO TO Step 25.

CAUTION

Pressurizer Heater Group B shall be utilized as the primary means of RCS pressure control.

PR-2B Air Accumulator is sized to allow a total of 5 cycles of PR-2B.

- 27 DEPRESSURIZE RCS TO 1950 PSIG:
a. DE-ENERGIZE Pressurizer Heater Group B
b. IF faster response is required, OPEN PR-2B using Przr PORV Alternate Control Station
c. WHEN Przr Pressure is equal to 1950 psig, STOP RCS depressurization
d. ENERGIZE Pressurizer Heater Group B as necessary to maintain 1950 psig

CAUTION

IF RCS Pressure increases above 2000 psig, SI will need to be blocked again after pressure goes below 2000 psig.

28 BLOCK SI

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 29 MAINTAIN RCS CONDITIONS:
- a. Przr Pressure - 1950 psig
 - b. Przr Level - 20-50%
 - c. RCS cooldown rate - $<25^{\circ}\text{F/hr}$
 - d. Loop B Cold Leg WR Temperature and Przr Pressure - Within Limits of Figure E-0-07-1 or E-0-07-2
- 30 MONITOR RCS COOLDOWN:
- a. RCS Loop B WR Temperature - DECREASING
 - b. S/G A Pressure - STABLE or DECREASING
 - c. RCS subcooling - $>50^{\circ}\text{F}$ and INCREASING
 - 1) REFER to Table E-0-07-1
 - 2) Use Loop B Hot Leg WR Temperature

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

31 INITIATE RCS DEPRESSURIZATION:

a. VERIFY CRDM Fans - Both ON

a. Until 18 hours soak is completed, MAINTAIN RCS subcooling > 200°F and GO TO Step 31.d.

1) REFER to Table E-0-07-01

2) Use Reac Coolant LP B Hot Leg Temp Ind

b. MAINTAIN RCS subcooling - >50°F

1) REFER to Table E-0-07-1

2) Use Reac Coolant LP B Hot Leg Temp Ind

c. MAINTAIN Reac Coolant LP B Cold Leg Temp and Pzr Press - Within limits of Figure E-0-07-2

d. DE-ENERGIZE Pressurizer Heater Backup Group 1B

32 CONTINUE RCS COOLDOWN AND DEPRESSURIZATION:

a. MAINTAIN cooldown rate - <25°F/hr

b. MAINTAIN Subcooling requirements of Step 31

b. STOP depressurization and RE-ESTABLISH subcooling.

c. MAINTAIN Loop B Cold Leg WR Temperature and Przr Pressure - Within Limits of Figure E-0-07-1 or E-0-07-2

d. MAINTAIN Przr Level - 20-50%

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- | | | |
|----|---|--|
| 33 | VERIFY PRZR LEVEL - NO UNEXPECTED LARGE VARIATIONS | PRESSURIZE RCS within limits of Figure E-0-07-1 or E-0-07-2 to collapse potential voids in system and CONTINUE cooldown. |
| 34 | DETERMINE <u>IF</u> SOAK IS REQUIRED: | |
| | a. CRDM Fans - Less than both running | a. Soak <u>NOT</u> required. <u>GO TO</u> step 35. |
| | b. Reac Coolant LP B Cold Leg Temp - <390°F | b. MAINTAIN Pzr Press >1400psig <u>GO TO</u> Step 32. |
| | c. MAINTAIN following conditions for at least 18 hours: | |
| | 1) Przr Press - >1400psig | |
| | 2) Reac Coolant LP B Cold Leg Temp - Between 390°F and minimum temperature allowed per E-0-07-1 | |

STEP	OPERATOR ACTIONS	CONTINGENCY ACTIONS
------	------------------	---------------------

CAUTION

Pressurizer Heater Group B shall be utilized as primary means of RCS pressure control.

PR-2B Air Accumulator is sized to allow a total of 5 cycles of PR-2B.

NOTE: IF S/G A is NOT depressurized periodically, S/G A U-Tubes will void during depressurization. This will result in a rapidly increasing Przr Level.

- 35 DEPRESSURIZE RCS TO 950 PSIG:
- a. DE-ENERGIZE Pressurizer Heater Group B
 - b. IF faster response is required, OPEN PR-2B using Przr PORV Alternate Control Station
 - c. WHEN Przr Pressure is equal to 950 psig, STOP RCS depressurization
 - d. ENERGIZE Pressurizer Heater Group B as necessary to maintain 950 psig

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

CAUTION

Any valve manipulation requiring Containment entry will require coordination with Health Physics and approval per EP-AD-11.

36 DETERMINE IF ACCUMULATORS SHOULD BE ISOLATED:

a. Przr Pressure - <1000 psig

a. DO NOT isolate Accumulators
GO TO Step 35.

b. ISOLATE SI Accumulators A/B and ALIGN SI for <1000 psig

1) REQUEST plant electrician CLOSE the following valves from respective MCCs and LOCK OPEN supply breakers:

1) IF power is NOT available, LOCK OPEN supply breakers and locally CLOSE valves.

a) SI-20B/MV-32096, SI Accumulator 1B Disch Isol (MCC-62B)

b) SI-20A/MV-32091, SI Accumulator 1A Disch Isol (MCC-52B)

c) SI-300B/MV-32112, RHR Pump Suct Isol (MCC-62E)

STEP	OPERATOR ACTIONS	CONTINGENCY ACTIONS
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CAUTION

Pressurizer Heater Group B shall be utilized as primary means of RCS pressure control.

PR-2B Air Accumulator is sized to allow a total of 5 cycles of PR-2B.

NOTE: IF S/G A is NOT depressurized periodically, S/G A U-Tubes will void during depressurization. This will result in a rapidly increasing Przr Level.

- 37 DEPRESSURIZE RCS TO 420 PSIG:
- a. DE-ENERGIZE Pressurizer Heater Group B
 - b. IF faster response is required, OPEN PR-2B using Przr PORV Alternate Control Station
 - c. WHEN Przr Pressure is equal to 420 psig, STOP RCS depressurization
 - d. ENERGIZE Pressurizer Heater Group B as necessary to maintain 420 psig

38 DETERMINE IF RHR SYSTEM CAN BE PLACED IN SERVICE:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Loop B Hot Leg WR Temperature - <400°F b. Przr Pressure - <425 psig | <ul style="list-style-type: none"> a. <u>GO TO</u> Step 32. b. <u>GO TO</u> Step 37. |
|---|--|

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 39 PLACE RHR TRAIN B IN SERVICE:
- a. REQUEST plant electrician
INSTALL jumpers to bypass RCS
pressure interlocks, THEN CLOSE
supply breakers for the
following valves:
- 1) RHR-1B/MV-32132, Loop B Hot
Leg to RHR Pump
(MCC-62B Ext)
 - 2) RHR-2B/MV-32133, Loop B Hot
Leg to RHR Pump
(MCC-62B Ext)
- b. Locally VERIFY the following
valves CLOSED, THEN OPEN
supply breakers:
- 1) RHR-300B/MV-32135, RHR Pump
B Supply To SI Pump B
(MCC-62H)
 - 2) RHR-400B/MV-32126, RHR Pump
B Supply to ICS Pump B
(MCC-62H)
- c. Locally OPERATE
RHR-8B/CV-31115, RHR Hx 1B
Outlet CV, as follows:
- 1) CLOSE IA-31115-1
 - 2) CLOSE IA-31115-2
 - 3) BLEED OFF air pressure at
pressure regulators
 - 4) LOOSEN jam nut on valve stem
 - 5) POSITION RHR-8B to 10% OPEN

CONTINUED

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

39

CONTINUED

d. At MCC-62E, OPEN supply breaker for CC-400B/MV-32120, CC Supply to RHR Heat Exchanger 1B, THEN Locally OPEN CC-400B

e. VERIFY Component Cooling Return Flow (F-619) indicates <3650 gpm

e. Locally CLOSE CC-400A.

NOTE: Power to RHR-1B and RHR-2B indicating lights is NOT protected. IF position indication is NOT available, valve opening can be verified locally by RHR Pump B discharge pressure increasing to RCS pressure.

f. OPEN RHR-1B/MV-32132 and RHR-2B/MV-32133, RCS Loop B Supply To RHR Pumps

f. Locally OPEN RHR-1B and RHR-2B.

g. OPEN SI-302B/MV-32101, RHR Pump B Injection To Reactor Vessel

g. IF SI-302B can NOT be opened from Control Room, OPEN SI-302B supply bkr (MCC 1-62B Ext) and locally OPEN SI-302B.

h. VERIFY RHR System Boron Concentration within 100 ppm of the RCS

i. REQUEST plant electricians visually inspect RHR Pump B and RHR Pump B Pump Pit Fan Coil Unit power cables

j. START Residual Heat Removal Pump B

j. IF required, REQUEST plant electricians to INSTALL RHR Pump B power jumper.

1) VERIFY RHR Pump B Pump Pit Fan Coil Unit, ON

1) IF required, REQUEST plant electricians to INSTALL RHR Pump B Pump Pit Fan Coil Unit power jumper.

k. At MCC-62E, LOCK OPEN supply bkr for SW-1300B/MV-32010, SW From CC Hx 1B, THEN Locally OPEN SW-1300B

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 40 CONTINUE RCS COOLDOWN TO BELOW 200°F WITH RHR SYSTEM:
- a. MAINTAIN RCS cooldown rate - <25°F/hr
 - b. Locally THROTTLE RHR-8B to achieve cooldown rate
 - c. Locally OPERATE RHR-101/CV-31116, RHR Hx Bypass CV, as follows:
 - 1) Fail RHR-101 closed:
 - a) CLOSE IA-31116-2
 - b) CLOSE IA-31116-1
 - c) BLEED OFF air pressure at pressure regulator
 - 2) VERIFY RHR-110, RHR Return To RWST, CLOSED
 - 3) OPEN RHR-10B, Cross Connect Valve
 - 4) OPEN RHR-100B, Heat Exchanger Bypass Line
 - 5) LOOSEN jam nut on RHR-101 valve stem
 - 6) POSITION RHR-101 to establish 1000-2000 gpm on FI-928, RHR Pump B Flow
 - d. MAINTAIN Loop B Cold Leg WR Temperature and Przr Pressure Within Limits of Figure E-0-07-1 or E-0-07-2
 - e. MAINTAIN Przr Level - 20-50%

- b. Locally THROTTLE RHR-9B, 1B RHR Hx Outlet.

CONTINUED

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

40

CONTINUED

f. WHEN Loop B WR Temperature is <200°F, ALIGN Containment Spray System as follows:

- 1) In N and E Pen Room, LOCK CLOSED ICS-7A and ICS-7B, Cntmt Spray Pump 1A/1B to Cntmt Vessel
- 2) REQUEST plant electrician RACK OUT Containment Spray Pump A and B supply breakers

.....
CAUTION

Depressurizing RCS before entire RCS is <200°F may result in additional void formation in the RCS.
.....

41 CONTINUE COOLDOWN OF INACTIVE PORTION OF RCS:

- | | |
|---|---|
| <ol style="list-style-type: none"> a. Steam Generator U-Tubes - CONTINUE dumping steam from both Steam Generators b. Upper head region - Both CRDM Cooling Fans, ON | <ol style="list-style-type: none"> b. WAIT 30 hours after RCS temperature reaches 200°F before depressurizing RCS to <350 psig. |
|---|---|

42 DETERMINE IF RCS DEPRESSURIZATION IS PERMITTED:

- | | |
|---|--|
| <ol style="list-style-type: none"> a. Entire RCS - <200°F | <ol style="list-style-type: none"> a. DO <u>NOI</u> depressurize RCS. <u>GO TO</u> Step 40. |
|---|--|

STEP

OPERATOR ACTIONS

CONTINGENCY ACTIONS

- 43 DEPRESSURIZE RCS TO 100 PSIG:
- a. DE-ENERGIZE Pressurizer Heater Group B
 - b. OPEN PR-2B using Przr PORV Alternate Control Station to reduce RCS pressure
 - c. WHEN Przr pressure is equal to 100 psig, STOP RCS depressurization
 - d. ENERGIZE Pressurizer Heater Group B as necessary to maintain 100 psig
- 44 STABILIZE PLANT AT 180°F AND 100 PSIG

-END-

TABLE E-0-07-1
REACTOR COOLANT SYSTEM SUBCOOLING

PRESSURIZER PRESSURE PSIG	T-SAT DEG F	50 DEG SUBCOOLING DEG F	200 DEG SUBCOOLING DEG F
2300	657	607	457
2250	654	604	454
2200	650	600	450
2150	647	597	447
2100	644	594	444
2050	640	590	440
2000	637	587	437
1950	633	583	433
1900	630	580	430
1850	626	576	426
1800	622	572	422
1750	618	568	418
1700	614	564	414
1650	610	560	410
1600	606	556	406
1550	602	552	402
1500	598	548	398
1450	593	543	393
1400	588	538	388
1350	584	534	384
1300	579	529	379
1250	574	524	374
1200	569	519	369
1150	563	513	363
1100	558	508	358
1050	552	502	352
1000	546	496	346
950	540	490	340
900	534	484	334
850	527	477	327
800	520	470	320
750	513	463	313
700	505	455	305
650	497	447	297
600	489	439	289
550	480	430	280
500	470	420	270

LOOP TEMPERATURE

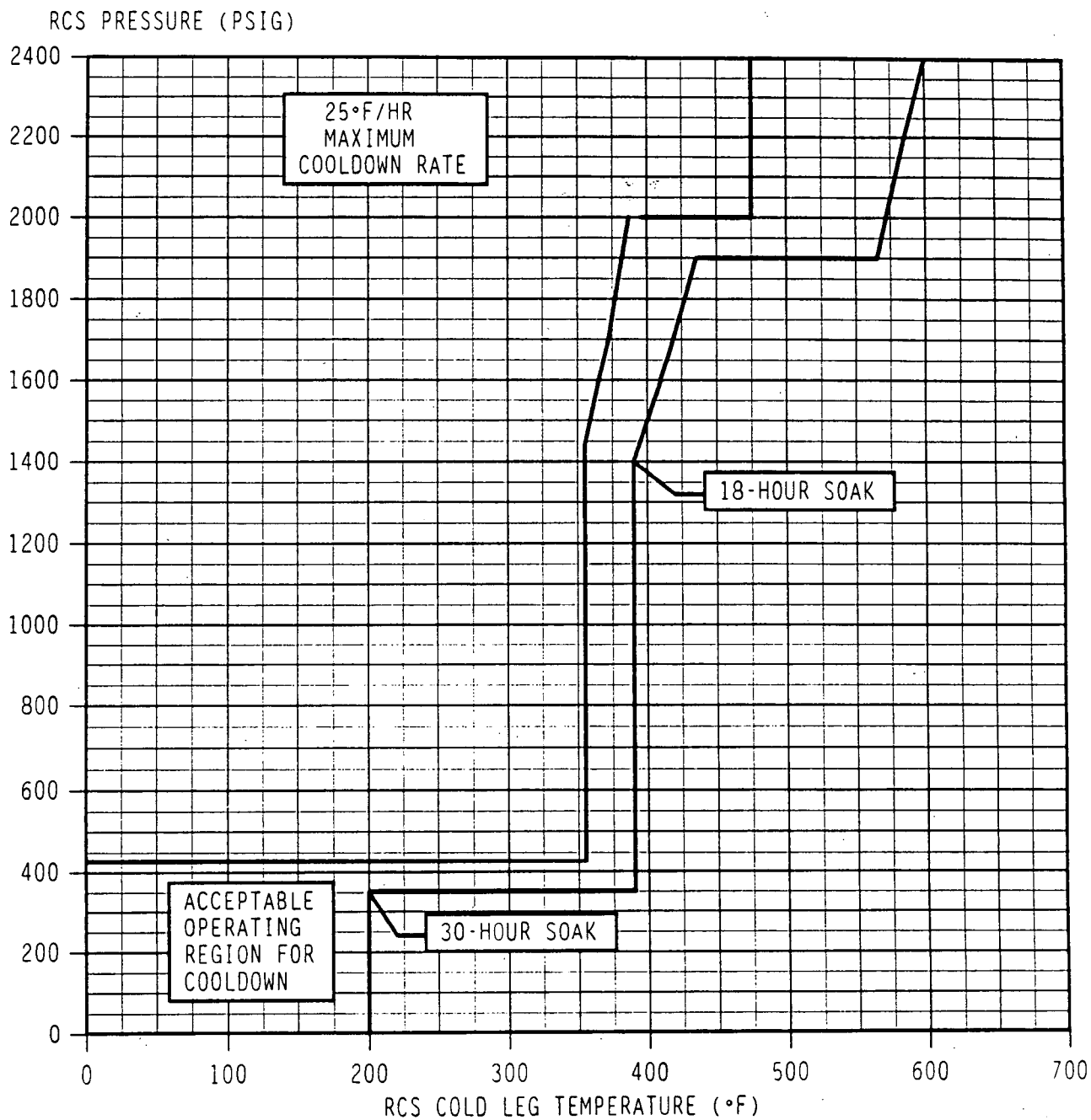


Figure E-0-07-1 Cooldown Operating Region - WITHOUT Full CRDM Cooling

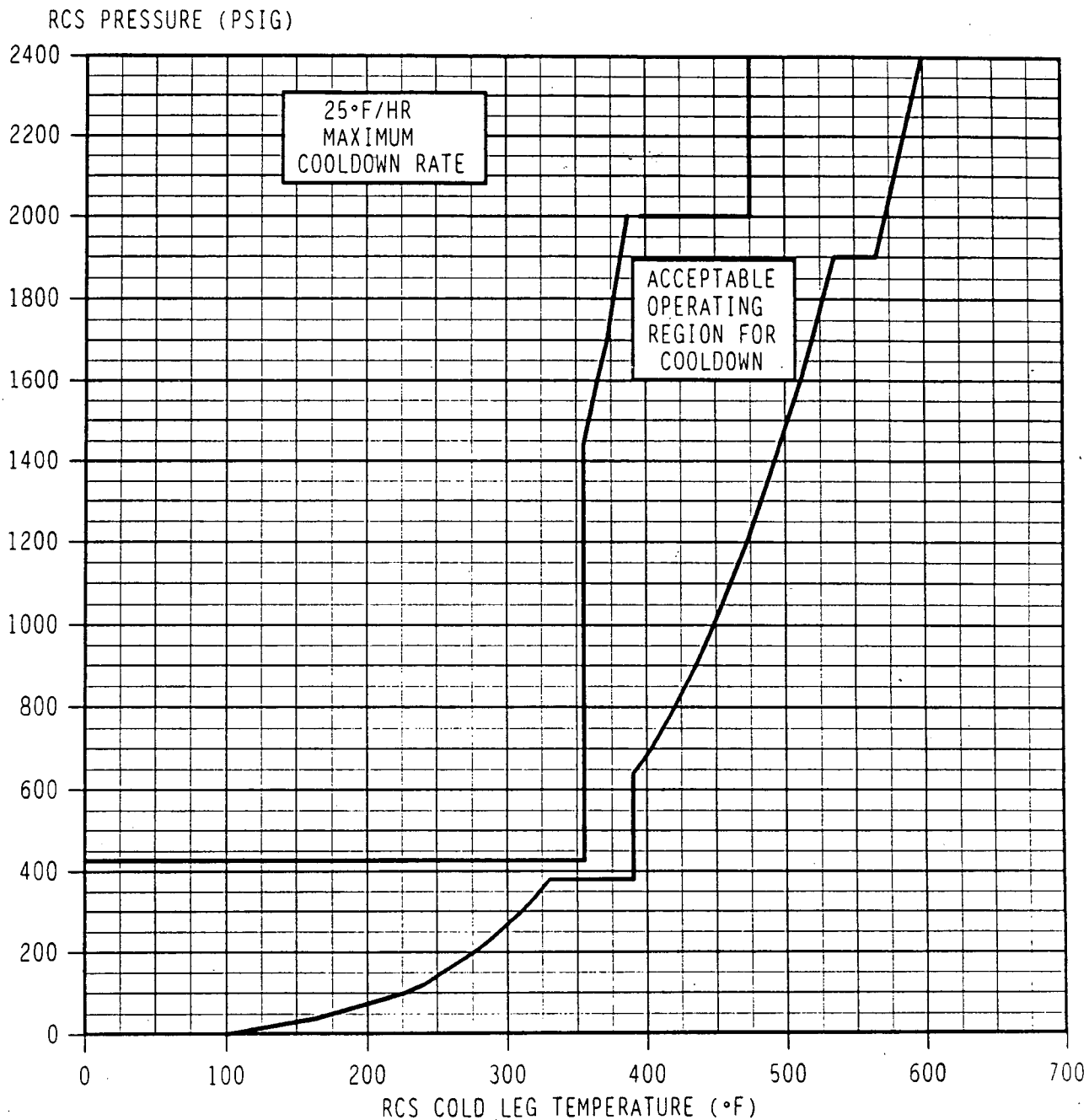


Figure E-0-07-2 Cooldown Operating Region - With Full CRDM Cooling