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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5/10/92

Thomas H. Marlow
PLANT SUPERINTENDENT

5/8/92
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

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A. PURPOSE - This procedure provides actions to restore emergency coolant recirculation capability, to delay depletion of the RWST by adding makeup and reducing outflow, and to depressurize the RCS to minimize break flow.

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-1, LOSS OF REACTOR OR SECONDARY COOLANT, when cold leg recirculation capability cannot be verified.
- b. ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, when recirculation cannot be established or maintained.
- c. ECA-1.2, LOCA OUTSIDE CONTAINMENT, when a LOCA outside containment cannot be isolated.

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>o IF EMERGENCY COOLANT RECIRCULATION CAPABILITY IS RESTORED DURING THIS PROCEDURE, FURTHER RECOVERY ACTIONS SHOULD CONTINUE BY RETURNING TO PROCEDURE AND STEP IN EFFECT.</p> <p>o IF SUCTION SOURCE IS LOST TO ANY SI OR CNMT SPRAY PUMP, THE PUMP SHOULD BE STOPPED.</p> <p>*****</p> <p><u>NOTE:</u> Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.</p> | | |
| 1 | <p>Check If Emergency Coolant Recirculation Equipment Available:</p> <ul style="list-style-type: none"> o RHR pumps - OPERABLE o RHR suction valves from sump B - OPERABLE <ul style="list-style-type: none"> • MOV-850A • MOV-850B o RHR pump discharge to Rx vessel deluge valves - OPERABLE <ul style="list-style-type: none"> • MOV-852A • MOV-852B o CCW to RHR Hx - OPERABLE <ul style="list-style-type: none"> • MOV-738A • MOV-738B | <p>Manually or locally try to restore at least one train (Refer to Attachment RHR SYSTEM to identify minimum components for one train).</p> |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| 2 | Add Makeup To RWST As Necessary <ul style="list-style-type: none">o Refer to S-9J, BLENDING TO RWST-OR-o Refer to S-3.2D, TRANSFERRING WATER FROM CVCS HUT(S) TO RWST OR SFP-OR-o Refer to Attachment SFP-RWST | |

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NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).

3 Initiate RCS Cooldown To Cold Shutdown:

a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR

b. Dump steam to condenser from intact S/G(s)

b. Manually or locally dump steam from intact S/G(s):

o Use S/G ARVs

-OR-

o Open TDAFW pump steam supply valves.

-OR-

o Dispatch AO to perform the following:

1) Open S/G MSIV bypass valves.

2) Open 1A and 1B priming air ejector isolation valves.

• V-3580

• V-3581

IF no intact S/G available, THEN use faulted S/G.

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| 4 | <p>Verify CNMT RECIRC Fans Running:</p> <p>a. All fans - RUNNING</p> <p>b. Charcoal filter dampers green status lights - EXTINGUISHED</p> | <p>a. Manually start fans.</p> <p>b. Dispatch personnel with relay rack key to locally open dampers using trip relay pushbuttons in relay room racks.</p> <ul style="list-style-type: none"> • AUX RELAY RACK RA-2 for fan A • AUX RELAY RACK RA-3 for fan C |
| 5 | <p>Check RWST Level - GREATER THAN 15%</p> | <p>Go to Step 25.</p> |

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RESPONSE NOT OBTAINED

6 Determine CNMT Spray Requirements:

- a. Determine number of CNMT spray pumps required from table:

| RWST LEVEL | CNMT PRESSURE | CNMT RECIRC FANS RUNNING | CNMT SPRAY PUMPS REQUIRED |
|---------------------|-----------------------------|--------------------------|---------------------------|
| GREATER THAN 28% | GREATER THAN 60 PSIG | - | 2 |
| | BETWEEN 28 PSIG AND 60 PSIG | 0 OR 1 | 2 |
| | | 2 OR 3 | 1 |
| | | ALL | 0 |
| | LESS THAN 28 PSIG | - | 0 |
| BETWEEN 15% AND 28% | GREATER THAN 60 PSIG | - | 2 |
| | BETWEEN 28 PSIG AND 60 PSIG | 0, 1, 2, OR 3 | 1 |
| | | ALL | 0 |
| | LESS THAN 28 PSIG | - | 0 |
| LESS THAN 15% | - | - | 0 |

- b. CNMT spray pumps running - EQUAL TO MINIMUM NUMBER REQUIRED

- b. Manually operate CNMT spray pumps as necessary.

IF CNMT spray pump(s) must be stopped, THEN place switch in PULL STOP.

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| <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF OFFSITE POWER IS LOST AFTER SI RESET, SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.</p> <p>*****</p> | | |
| 7 | Reset SI If Necessary | |
| 8 | Establish One Train Of SI Flow | |
| | <p>a. SI pumps - LESS THAN THREE RUNNING</p> <p>b. RCS pressure - LESS THAN 250 psig [465 psig adverse CNMT]</p> <p>c. RHR pump - ONLY ONE RUNNING</p> | <p>a. Stop one SI pump.</p> <p>b. Stop RHR pumps and go to Step 9.</p> <p>c. <u>IF</u> two RHR pumps running, <u>THEN</u> stop one RHR pump.</p> <p><u>IF</u> no RHR pumps running, <u>THEN</u> start one RHR pump.</p> |
| 9 | Verify No Backflow From RWST To Sump: | |
| | <p>a. Any RHR suction valve from sump B - OPEN</p> <p>• MOV-850A</p> <p>• MOV-850B</p> <p>b. RWST outlet valve to RHR pump suction (MOV-856) - CLOSED</p> | <p>a. <u>IF</u> both RHR suction valves from sump B closed, <u>THEN</u> go to Step 10.</p> <p>b. Manually close valve.</p> <p><u>IF</u> valve can <u>NOT</u> be closed manually, <u>THEN</u> direct AO to locally close valve.</p> |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| 10 | Reset CI: | |
| | <ul style="list-style-type: none"> a. Depress CI reset pushbutton b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED | <ul style="list-style-type: none"> b. Perform the following: <ul style="list-style-type: none"> 1) Reset SI. 2) Depress CI reset pushbutton. |
| 11 | Verify Adequate SW Flow: | |
| | <ul style="list-style-type: none"> a. Check at least two SW pumps - RUNNING b. Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1) | <ul style="list-style-type: none"> a. Manually start SW pumps as power supply permits (258 kw each). <u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Ensure SW isolation. 2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1) 3) Go to Step 14. |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| 12 | Establish IA to CNMT: | |
| | <p>a. Verify non-safeguards busses energized from offsite power</p> <ul style="list-style-type: none"> o Bus 13 normal feed - CLOSED -OR- o Bus 15 normal feed - CLOSED <p>b. Verify SW isolation valves to turbine building - OPEN</p> <ul style="list-style-type: none"> • MOV-4613 and MOV-4670 • MOV-4614 and MOV-4664 <p>c. Verify at least two air compressors - RUNNING</p> <p>d. Check IA supply:</p> <ul style="list-style-type: none"> o Pressure - GREATER THAN 60 PSIG o Pressure - STABLE OR INCREASING <p>e. Reset both trains of XY relays for IA to CNMT AOV-5392</p> <p>f. Verify IA to CNMT AOV-5392 - OPEN</p> | <p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Verify adequate emergency D/G capacity to run air compressors (75 kw each). <u>IF NOT</u>, <u>THEN</u> evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS). 3) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. <p>b. Manually align valves.</p> <p>c. Manually start air compressors as power supply permits (75 kw each). <u>IF</u> air compressors can <u>NOT</u> be started, <u>THEN</u> dispatch AO to locally reset compressors as necessary.</p> <p>d. Perform the following:</p> <ol style="list-style-type: none"> 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR). 2) Continue with Step 14. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 12e and f. |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| 13 | <p>Establish Required Charging Line Flow:</p> <p>a. Charging pumps - ANY RUNNING</p> <p>b. Establish 20 gpm total charging flow</p> | <p>a. Perform the following:</p> <ol style="list-style-type: none"> 1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with RWST area key to locally close seal injection needle valves to affected RCP: <ul style="list-style-type: none"> • RCP A, V-300A • RCP B, V-300B 2) Ensure HCV-142 demand at 0%. 3) Start one charging pump. |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF SEAL COOLING HAD PREVIOUSLY BEEN LOST, THE AFFECTED RCP(S) SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p> | | |
| 14 | Check RCP Status: | |
| | <p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> <p>b. RCPs - AT LEAST ONE RUNNING</p> <p>c. Stop all but one RCP</p> | <p>a. Stop all RCPs and go to Step 15.</p> <p>b. Try to start an RCP:</p> <p>1) Establish conditions for starting an RCP</p> <p>o Bus 11A or 11B energized</p> <p>o Refer to Attachment RCP START</p> <p>2) Start one RCP.</p> |

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RESPONSE NOT OBTAINED

15 Check If SI Can Be Terminated:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 50°F USING FIGURE MIN SUBCOOLING

b. Check RVLIS indication:

- o Level (no RCPs) - GREATER THAN 68% [73% adverse CNMT]

-OR-

- o Fluid fraction (any RCP running) - GREATER THAN 80%

Limit RCS injection flow to that required to remove decay heat:

- o Determine required injection flow using Figure MIN RCS INJECTION
- o Stop SI pumps as necessary to establish and maintain minimum required SI flow.
- o IF required injection flow is less than 100 gpm, THEN establish required charging flow and go to Step 16.

IF required injection flow is greater than 100 gpm, THEN perform the following:

- a. Ensure one SI pump running
- b. Establish minimum charging flow for RCP seal injection.
- c. Consult TSC to determine if SI pump discharge valves should be locally throttled. (Locked valve key required.)
- d. Go to Step 18.

16 Stop SI And RHR Pumps And Place In Auto

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| 17 | Verify SI Pump Suction Aligned To RWST: | |
| | <p>a. SI pump suction valves from BASTs - CLOSED</p> <ul style="list-style-type: none"> • MOV-826A • MOV-826B • MOV-826C • MOV-826D <p>b. SI pump suction valves from RWST - OPEN</p> <ul style="list-style-type: none"> • MOV-825A • MOV-825B <p>c. Consult TSC to determine if SI flush is required (Refer to Attachment SI FLUSH)</p> | <p>a. Ensure at least one valve in each flow path closed.</p> <ul style="list-style-type: none"> • MOV-826A or MOV-826B • MOV-826C or MOV-826D <p>b. Ensure at least one valve is open.</p> |
| 18 | Verify Adequate RCS Makeup Flow: | |
| | <p>a. Check RVLIS indication:</p> <ul style="list-style-type: none"> o Level (no RCPs) - GREATER THAN 68% [73% adverse CNMT] <p>-OR-</p> <ul style="list-style-type: none"> o Fluid fraction (any RCP running) - GREATER THAN 80% <p>b. Core exit T/Cs - STABLE OR DECREASING</p> | <p>a. Increase RCS injection flow to maintain RVLIS indication as necessary.</p> <p>b. Increase RCS injection flow to maintain core exit T/Cs stable or decreasing.</p> |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| 19 | Depressurize RCS To Decrease RCS Subcooling: | |
| | <ul style="list-style-type: none"> a. Check RCS subcooling based on core exit T/Cs - GREATER THAN 20°F USING FIGURE MIN SUBCOOLING b. Use normal PRZR spray c. Depressurize RCS until either of the following conditions satisfied: <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs - LESS THAN 10°F USING FIGURE MIN SUBCOOLING | <ul style="list-style-type: none"> a. Go to Step 20. b. <u>IF</u> normal spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS. |
| | -OR- | |
| | <ul style="list-style-type: none"> o PRZR level - GREATER THAN 87% [75% adverse CNMT] | |
| | d. Stop RCS depressurization | |
| | | <p><u>IF</u> no PRZR PORV available, <u>THEN</u> use auxiliary spray valve (AOV-296).</p> |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| 20 | Check If RHR Normal Cooling Can Be Established: | |
| a. | RCS cold leg temperature - LESS THAN 350°F | a. Go to Step 21. |
| b. | RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT] | b. Go to Step 21. |
| c. | Place letdown pressure controller in MANUAL CLOSED | |
| d. | Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) | d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve. |
| e. | Verify pressure on PI-135 - LESS THAN 400 PSIG | e. Go to Step 21. |
| f. | Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM) | |
| g. | Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL | |

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21 Check If SI ACCUMs Should Be Isolated:

a. Both RCS hot leg temperatures - LESS THAN 400°F

b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves

- MOV-841, MCC C position 12F
- MOV-865, MCC D position 12C

c. Close SI ACCUM discharge valves

- MOV-841
- MOV-865

d. Locally reopen breakers for MOV-841 and MOV-865

a. Continue with Step 22. WHEN both RCS hot leg temperatures less than 400°F, THEN do Steps 21b, c and d.

c. Vent any unisolated ACCUMs:

1) Open vent valves for unisolated SI ACCUMs.

- ACCUM A, AOV-834A
- ACCUM B, AOV-834B

2) Open HCV-945.

22 Check If RCPs Must Be Stopped:

a. RCPs - ANY RUNNING

a. Go to Step 23.

b. Check the following:

b. Go to Step 23.

- o RCP #1 seal D/P - LESS THAN 220 PSID

-OR-

- o Check RCP seal leakage - LESS THAN 0.25 GPM

c. Stop affected RCP(s)

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| 23 | Check Core Exit T/Cs - GREATER THAN 200°F | Go to Step 38. |
| 24 | Check RWST Level - LESS THAN 15% | Return to Step 1. |
| 25 | Minimize RWST Outflow: a. Any SI pump(s) - RUNNING | a. <u>IF</u> charging pump suction aligned to RWST, <u>THEN</u> perform the following: 1) Verify SI pump suction aligned to RWST, MOV-825A or MOV-825B open. 2) Start one SI pump and verify flow. 3) Stop running charging pumps. 4) Go to Step 25e. |
| | b. Stop all but one SI pump | |
| | c. Check charging pump suction from RWST (AOV-112B) - OPEN | c. Go to Step 25e. |
| | d. Stop all charging pumps | |
| | e. Stop both CNMT spray pumps | |
| | f. Stop both RHR pumps | |
| 26 | Check SI pump flow - STABLE | <u>IF</u> SI flow zero or erratic, <u>THEN</u> stop running SI pump. |

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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| <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>BAST DILUTION MAY HAVE OCCURRED DURING SI PUMP SUCTION SWAPOVER FROM BASTS TO RWST. IF DILUTION IS SUSPECTED, BASTS SHOULD BE SAMPLED.</p> <p>*****</p> | | |
| 27 | Try To Add Makeup To RCS From VCT: | |
| | <p>a. Check VCT level - GREATER THAN 5%</p> <p>b. Verify charging pumps aligned to VCT</p> <p>o LCV-112C - OPEN</p> <p>o LCV-112B - CLOSED</p> <p>c. Start charging pumps as necessary to establish two pumps running</p> | <p>a. Stop charging pumps taking suction from VCT and continue with Step 28. <u>WHEN</u> VCT level greater than 5%, <u>THEN</u> do Steps 27b and c.</p> <p>b. Manually align valves as necessary.</p> |



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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|--|
| 28 | Establish Maximum VCT Makeup: | |
| a. | Check RMW control armed - RED LIGHT LIT | a. Place RMW mode switch in AUTO and place RMW control switch to START. |
| b. | Check VCT level - LESS THAN 20% | b. Continue with Step 29. <u>WHEN</u> VCT level less than 20%, <u>THEN</u> do Steps 28c, d and e. |
| c. | Check VCT makeup system - OPERATING IN AUTO | c. Perform the following: <ul style="list-style-type: none"> 1) Open makeup system valves. <ul style="list-style-type: none"> • AOV-110B • AOV-110C • AOV-111 2) Start BA transfer pumps and RMW pumps. 3) Open boric acid flow control valve (AOV-110A). |
| d. | Increase VCT makeup flow <ul style="list-style-type: none"> 1) Start both RMW pumps 2) Start both boric acid pumps 3) Adjust RMW controller (HC-111) in MANUAL to 80 gpm 4) Adjust boric acid flow controller (HC-110A) in MANUAL to 9 gpm | |
| e. | Adjust charging pump speed to stabilize VCT level | |

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| EOP: ECA-1.1 | TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION | REV: 7 PAGE 21 of 27 |
|-----------------|---|-------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|---|
| 29 | Try To Add Makeup To RCS From Alternate Source: a. Evaluate Use Of RCDT Pumps (Refer to ER-RHR.1, RCDT PUMP OPERATION FOR CORE COOLING) b. Consult TSC to determine other means of makeup | |
| 30 | Verify SI ACCUM Isolation Valves - OPEN • MOV-841 • MOV-865 | <u>IF</u> valves were closed to prevent SI ACCUM nitrogen injection, <u>THEN</u> go to Step 34. <u>IF NOT</u> , <u>THEN</u> perform the following: a. Dispatch AO to locally close breakers for SI ACCUM discharge valves • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C b. Open SI ACCUM discharge valves. |

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| EOP: ECA-1.1 | TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION | REV: 7 PAGE 22 of 27 |
|-----------------|---|-------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 31 | Depressurize All Intact S/Gs To 785 PSIG: | |
| a. | Check S/G pressures - GREATER THAN 785 PSIG | a. Go to Step 32. |
| b. | Dump steam to condenser at maximum rate | b. Manually or locally dump steam at maximum rate from intact S/G(s): <ul style="list-style-type: none"> o Use S/G ARVs -OR- o Open steam supply valves to TDAFW pump -OR- o Dispatch AO to perform the following: <ol style="list-style-type: none"> 1) Open S/G MSIV bypass valves. 2) Open priming air ejector steam isolation valves <ul style="list-style-type: none"> • V-3580 • V-3581 |
| c. | Check S/G pressures - LESS THAN 785 PSIG | c. Return to Step 31b. |
| d. | Stop S/G depressurization | |

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| ECA-1.1 | LOSS OF EMERGENCY COOLANT RECIRCULATION | PAGE 23 of 27 |

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: The intent of Step 32 is to depressurize S/Gs more slowly, but at a rate that will maintain required RVLIS level.

32 Depressurize Intact S/Gs To
200 PSIG Slowly To Inject SI
ACCUMs:

a. Dump steam to condenser as
necessary to maintain
appropriate RVLIS indication:

- o Level (no RCPs) - BETWEEN 68%
AND 73% [73% AND 76% adverse
CNMT]

-OR-

- o Fluid fraction (any RCP
running) - BETWEEN 80% AND 90%

a. Manually or locally dump steam
from intact S/G(s) to maintain
appropriate RVLIS indication:

- o Use S/G ARVs

-OR-

- o Open steam supply valves to
TDAFW pump

-OR-

- o Dispatch AO to perform the
following:

1) Open affected S/G MSIV
bypass valve.

2) Open priming air ejector
steam isolation valves

- V-3580
- V-3581

b. Check S/G pressures - LESS THAN
200 PSIG

b. Return to Step 32a.

c. Stop S/G depressurization

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| EOP: | TITLE: | REV: 7 |
| ECA-1.1 | LOSS OF EMERGENCY COOLANT RECIRCULATION | PAGE 24 of 27 |

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 33 | <p>Check If SI ACCUMs Should Be Isolated:</p> <p>a. Both RCS hot leg temperatures - LESS THAN 400°F</p> <p>b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p> | <p>a. Continue with Step 34. <u>WHEN</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> do Steps 33b, c and d.</p> <p>c. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p> |
| 34 | <p>Check If RCPs Must Be Stopped:</p> <p>a. RCPs - ANY RUNNING</p> <p>b. Check the following:</p> <ul style="list-style-type: none"> o RCP #1 seal D/P - LESS THAN 220 PSID <p>-OR-</p> <ul style="list-style-type: none"> o Check RCP seal leakage - LESS THAN 0.25 GPM <p>c. Stop affected RCP(s)</p> | <p>a. Go to Step 36.</p> <p>b. Go to Step 36.</p> |



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| EOP: | TITLE: | REV: 7 |
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 35 | Check SI Pump Flow - STABLE | <u>IF</u> SI flow zero or erratic, <u>THEN</u> stop running SI pump. |
| 36 | Depressurize All Intact S/Gs To Atmospheric Pressure: | |
| | a. Maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR | |
| | b. Dump steam to condenser | b. Manually or locally dump steam from intact S/G(s): <ul style="list-style-type: none"> o Use S/G ARVs <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Open steam supply valves to TDAFW pump <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Dispatch AO to perform the following: <ul style="list-style-type: none"> 1) Open S/G MSIV bypass valves. 2) Open priming air ejector steam isolation valves <ul style="list-style-type: none"> • V-3580 • V-3581 |

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| EOP: ECA-1.1 | TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION | REV: 7 PAGE 26 of 27 |
|-----------------|---|-------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 37 | Check If RHR Normal Cooling Can Be Established: | |
| a. | RCS cold leg temperature - LESS THAN 350°F | a. Return to Step 35. |
| b. | RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT] | b. Return to Step 35. |
| c. | Place letdown pressure controller in MANUAL CLOSED | |
| d. | Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) | d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve. |
| e. | Verify pressure on PI-135 - LESS THAN 400 PSIG | e. Return to Step 36. |
| f. | Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM) | |
| g. | Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL | |

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| EOP: ECA-1.1 | TITLE: LOSS OF EMERGENCY COOLANT RECIRCULATION | REV: 7 PAGE 27 of 27 |
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 38 | Maintain RCS Heat Removal: | |
| | a. Use RHR system if in service | |
| | b. Dump steam to condenser from intact S/Gs | b. Manually or locally dump steam from intact S/G(s): <ul style="list-style-type: none"> o Use S/G ARVs -OR- o Open steam supply valves to TDAFW pump -OR- o Dispatch AO to perform the following: <ul style="list-style-type: none"> 1) Open S/G MSIV bypass valves. 2) Open priming air ejector steam isolation valves <ul style="list-style-type: none"> • V-3580 • V-3581 <p><u>IF</u> no intact S/G available and RHR system <u>NOT</u> in service, <u>THEN</u> use faulted S/G.</p> |
| 39 | Consult TSC | |
| | | -END- |

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ECA-1.1 APPENDIX LIST

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| 1) FIGURE MIN SUBCOOLING | 1 |
| 2) FIGURE SDM | 1 |
| 3) FIGURE MIN RCS INJECTION | 1 |
| 4) ATTACHMENT RHR COOL | 2 |
| 5) ATTACHMENT SFP-RWST | 1 |
| 6) ATTACHMENT RCP START | 1 |
| 7) ATTACHMENT SD-1 | 1 |
| 8) ATTACHMENT CNMT RECIRC FANS | 1 |
| 9) ATTACHMENT RHR SYSTEM | 1 |
| 10) ATTACHMENT N2 PORVS | 1 |
| 11) ATTACHMENT SI FLUSH | 1 |

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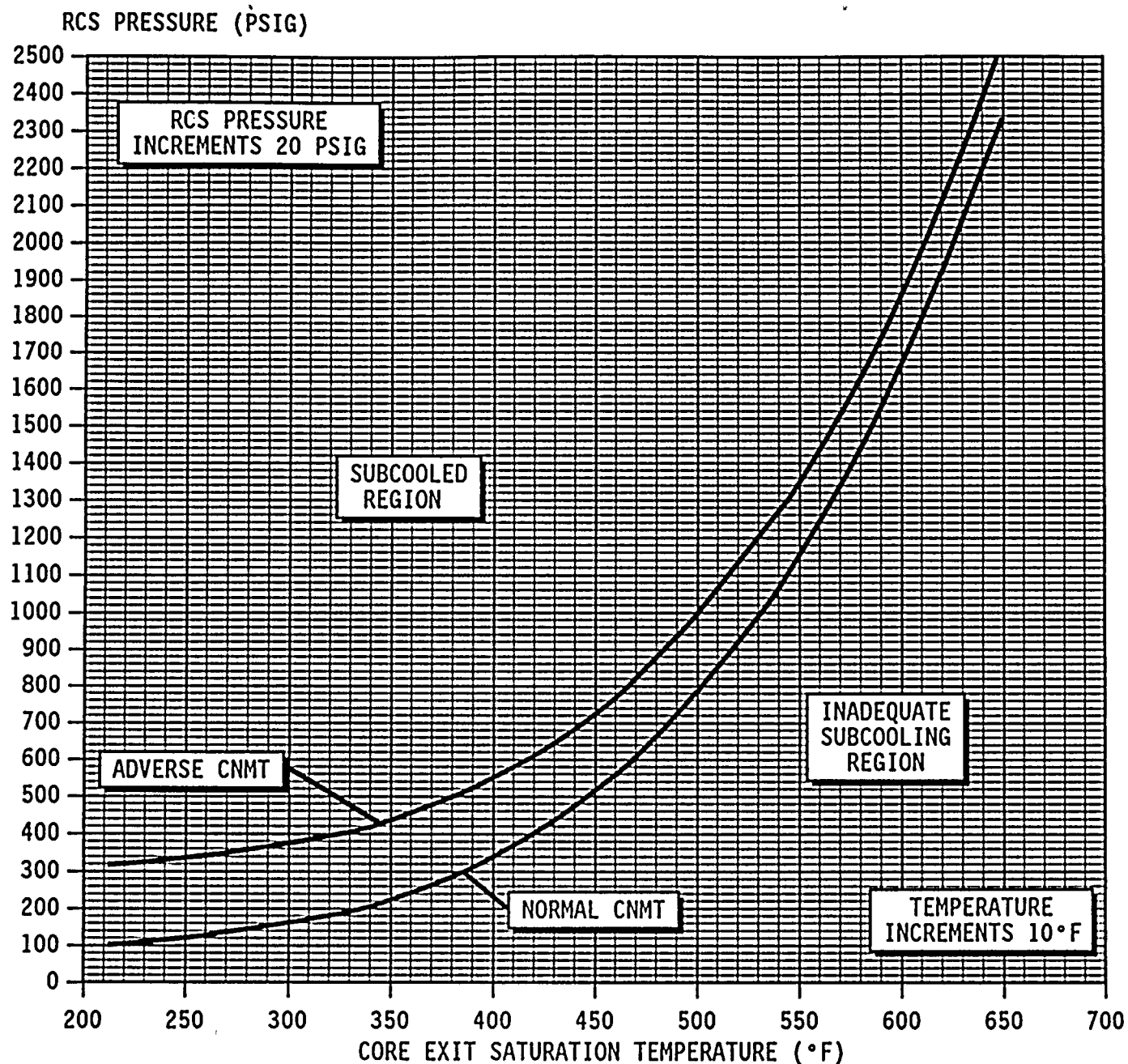
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FIGURE MIN SUBCOOLING

NOTE: Subcooling Margin = Saturation Temperature From Figure
Below [-] Core Exit T/C Indication



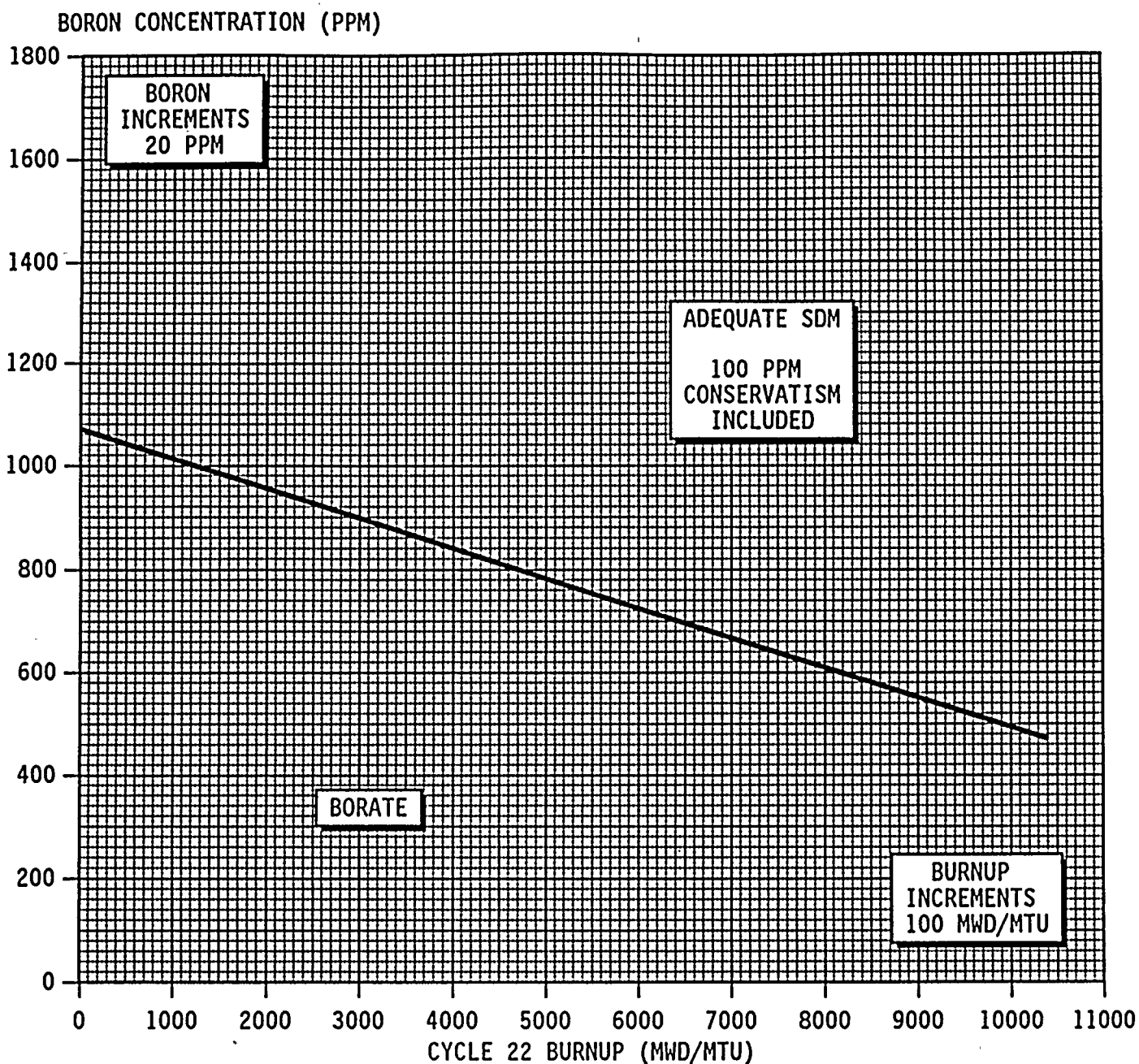
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FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

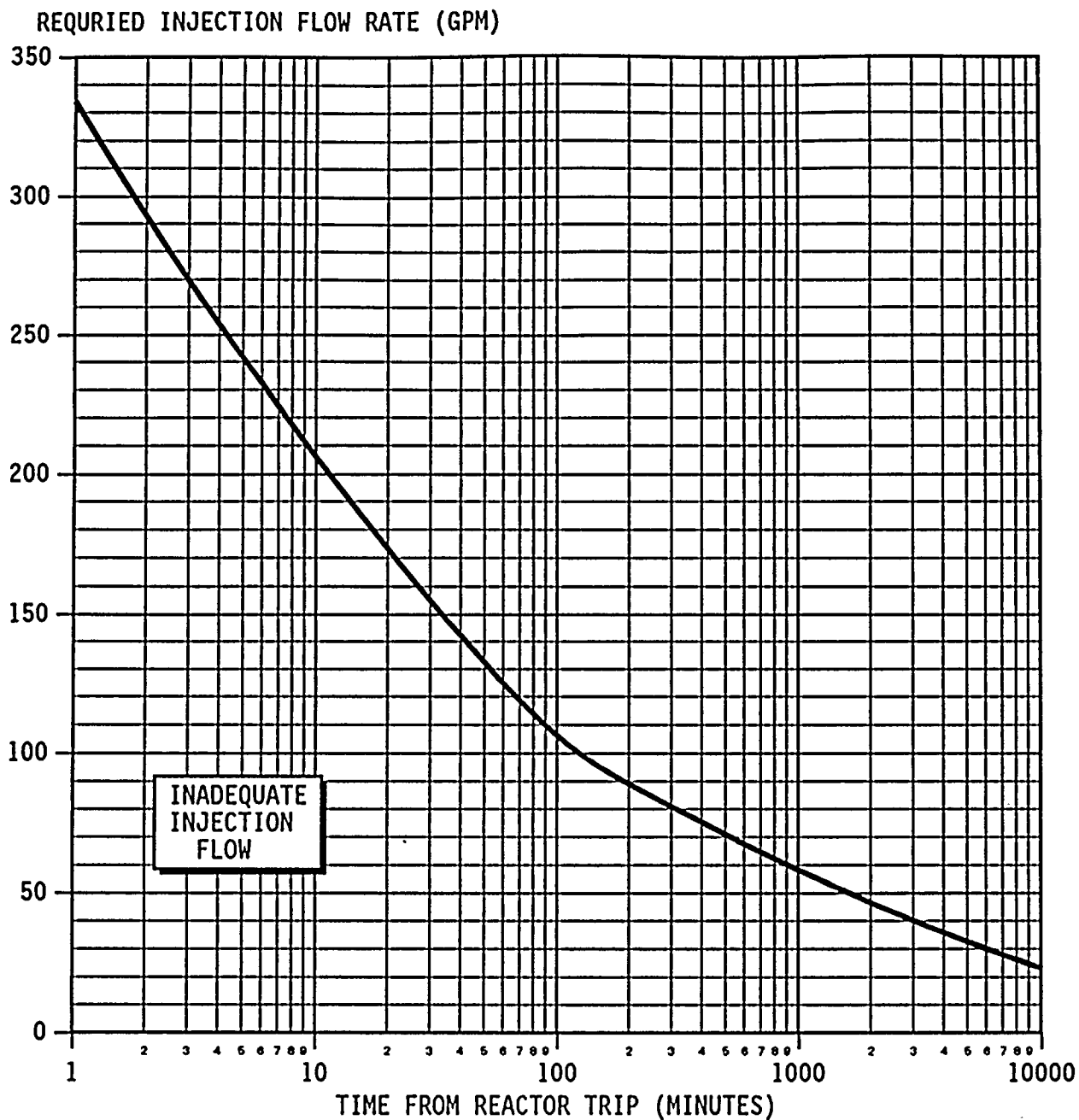
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FIGURE MIN RCS INJECTION



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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 5/1/91

Joseph A. Widay
PLANT SUPERINTENDENT

5/3/91
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

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| EOP: ECA-2.1 | TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS | REV: 6 PAGE 2 of 31 |
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- A. PURPOSE - This procedure provides actions to mitigate and minimize a loss of secondary coolant from both steam generators.
- B. ENTRY CONDITIONS/SYMPTOMS
 - 1. ENTRY CONDITIONS - This procedure is entered from:
 - a. E-2, FAULTED STEAM GENERATOR ISOLATION, when an uncontrolled depressurization of both steam generators occurs.



EOP:
ECA-2.1

TITLE:
UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM
GENERATORS

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o IF ANY S/G PRESSURE INCREASES AT ANY TIME DURING THIS PROCEDURE, THEN E-2, FAULTED STEAM GENERATOR ISOLATION, SHOULD BE PERFORMED.
- o WHEN BAST LEVEL DECREASES TO 10%, THEN SI PUMP AUTOMATIC SWITCHOVER TO RWST SHOULD BE ENSURED.
- o IF THE TDAFW PUMP IS THE ONLY AVAILABLE SOURCE OF FEED FLOW, THEN STEAM SUPPLY TO THE TDAFW PUMP MUST BE MAINTAINED FROM ONE S/G.

NOTE: o FOLDOUT page should be open AND monitored periodically.

o Conditions should be evaluated for Site Contingency Reporting (Refer to EPIP 1-0, GINNA STATION EVENT EVALUATION AND CLASSIFICATION).

o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{-05} R/hr.

1 Check Secondary Pressure Boundary:

Manually close valves one loop at a time.

- o MSIVs - CLOSED
- o MFW flow control valves - CLOSED
 - MFW regulating valves
 - MFW bypass valves
- o MFW pump discharge valves - CLOSED
- o S/G blowdown and sample valves - CLOSED
- o TDAFW pump steam supply valves - PULL STOP
- o TDAFW pump flow control valves - CLOSED
- o S/G ARVs - CLOSED
- o Dispatch A0 to locally isolate S/Gs (Refer to Attachment FAULTED S/G)

IF valves can NOT be closed, THEN dispatch A0 to locally isolate flowpaths, as necessary, one loop at a time.

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--------------------------|-----------------------|
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CAUTION

A MINIMUM FEED FLOW OF 50 GPM MUST BE MAINTAINED TO EACH S/G WITH A NARROW RANGE LEVEL LESS THAN 5% [25% ADVERSE CNMT].

2 Control Feed Flow To Minimize
RCS Cooldown:

- | | |
|--|---|
| a. Check cooldown rate in RCS cold legs - LESS THAN 100°F/HR | a. Decrease feed flow to 50 gpm to each S/G and go to Step 2c. |
| b. Check narrow range level in both S/Gs - LESS THAN 50% | b. Control feed flow to maintain narrow range level less than 50% in both S/Gs. |
| c. Check RCS hot leg temperatures - STABLE OR DECREASING | c. Control feed flow or dump steam to stabilize RCS hot leg temperatures. |

3 Check If RCPs Should Be Stopped:

- | | |
|---|------------------|
| a. RCP status - ANY RCP RUNNING | a. Go to Step 4. |
| b. SI pumps - AT LEAST TWO RUNNING | b. Go to Step 4. |
| c. RCS pressure minus maximum S/G pressure - LESS THAN 175 psig [400 psig adverse CNMT] | c. Go to Step 4. |
| d. Stop both RCPs | |

4 Check CST Level - GREATER THAN 5 FEET

Switch to alternate APW suction supply (Refer to ER-APW.1, ALTERNATE WATER SUPPLY TO APW PUMPS).

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
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CAUTION

IF ANY PRZR PORV OPENS BECAUSE OF HIGH PRZR PRESSURE, IT SHOULD BE CLOSED AFTER PRESSURE DECREASES TO LESS THAN 2335 PSIG (REFER TO STEP 5B).

5 Check PRZR PORVs And Block Valves:

a. Power to PORV block valves - AVAILABLE

a. Restore power to block valves unless block valve was closed to isolate an open PORV:

- MOV-515, MCC C position 6C
- MOV-516, MCC D position 6C

b. PORVs - CLOSED

b. IF PRZR pressure less than 2335 psig, THEN manually close PORVs.

IF any PORV can NOT be closed, THEN manually close its block valve. IF block valve can NOT be closed, THEN dispatch A0 to locally check breaker.

- MOV-515, MCC C position 6C
- MOV-516, MCC D position 6C

c. Block valves - AT LEAST ONE OPEN

c. Open one block valve unless it was closed to isolate an open PORV.

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| EOP: ECA-2.1 | TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS | REV: 6 PAGE 6 of 31 |
|-----------------|---|----------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|---|
| 6 | <p>Check Secondary Radiation Levels - NORMAL</p> <ul style="list-style-type: none"> o Steamline radiation monitor (R-31 and R-32) o Dispatch A0 to locally check steamline radiation o Request HP sample S/Gs for activity | <p>Go to E-3, STEAM GENERATOR TUBE RUPTURE, Step 1.</p> |
| <p>***** <u>CAUTION</u> *****</p> | | |
| | <ul style="list-style-type: none"> o RCS PRESS SHOULD BE MONITORED. IF RCS PRESS DECREASES TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS. o IF OFFSITE POWER IS LOST AFTER SI RESET, SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT. | |
| <p>*****</p> | | |
| 7 | Reset SI | |
| 8 | <p>Check If RHR Pumps Should Be Stopped:</p> <p>a. Check RCS Pressure:</p> <ul style="list-style-type: none"> 1) Pressure - GREATER THAN 250 psig [465 psig adverse CNMT] 2) Pressure - STABLE OR INCREASING <p>b. Stop RHR pumps and place in AUTO</p> | <ul style="list-style-type: none"> 1) Go to E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1. 2) Go to Step 9. |

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UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM
GENERATORS

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

9 Check If CNMT Spray Should Be Stopped:

- a. CNMT spray pumps - RUNNING
- b. Verify CNMT pressure - LESS THAN 4 PSIG
- c. Reset CNMT spray
- d. Check NaOH tank outlet valves - CLOSED
 - AOV-836A
 - AOV-836B
- e. Stop CNMT spray pumps and place in AUTO
- f. Close CNMT spray pump discharge valves
 - MOV-860A
 - MOV-860B
 - MOV-860C
 - MOV-860D

a. Go to Step 10.

b. Continue with Step 10. WHEN CNMT pressure less than 4 psig, THEN do Steps 9c through f.

d. Place NaOH tank outlet valve controllers to MANUAL and close valves.

- AOV-836A
- AOV-836B

10 Check RWST Level - GREATER THAN 28%

Go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.



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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 11 | <p>Check If SI ACCUMs Should Be Isolated:</p> <p>a. Both RCS hot leg temperatures - LESS THAN 400°F</p> <p>b. Dispatch A0 with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>c. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p> | <p>a. Go to Step 12.</p> <p>c. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs,</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p> |
| 12 | <p>Reset CI:</p> <p>a. Depress CI reset pushbutton</p> <p>b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED</p> | <p>b. Perform the following:</p> <p>1) Reset SI.</p> <p>2) Depress CI reset pushbutton.</p> |

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| EOP: ECA-2.1 | TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS | REV: 6 PAGE 9 of 31 |
|-----------------|---|----------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|--|
| 13 | Verify Adequate SW Flow: | |
| | a. Check at least two SW pumps - RUNNING | a. Manually start SW pumps as power supply permits (258 kw each). <u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following: 1) Ensure SW isolation. 2) Dispatch A0 to establish normal shutdown alignment (Refer to Attachment SD-1) 3) Go to Step 15. |
| | b. Dispatch A0 to establish normal shutdown alignment (Refer to Attachment SD-1) | |

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EOP:

ECA-2.1

TITLE:

UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM
GENERATORS

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

14 Establish IA to CNMT:

a. Verify non-safeguards busses energized from offsite power

o Bus 13 normal feed - CLOSED

-OR-

o Bus 15 normal feed - CLOSED

b. Verify SW isolation valves to turbine building - OPEN

- MOV-4613 and MOV-4670
- MOV-4614 and MOV-4664

c. Verify at least two air compressors - RUNNING

d. Check IA supply:

- o Pressure - GREATER THAN 60 PSIG
- o Pressure - STABLE OR INCREASING

e. Reset both trains of XY relays for IA to CNMT AOV-5392

f. Verify IA to CNMT AOV-5392 - OPEN

a. Perform the following:

1) Close non-safeguards bus tie breakers:

- Bus 13 to Bus 14 tie
- Bus 15 to Bus 16 tie

2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).

IF NOT, THEN evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).

3) WHEN bus 15 restored, THEN reset control room lighting.

b. Manually align valves.

c. Manually start air compressors as power supply permits (75 kw each). IF air compressors can NOT be started, THEN dispatch AO to locally reset compressors as necessary.

d. Perform the following:

1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).

2) Continue with Step 15. WHEN IA restored, THEN do Steps 14e and f.

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| EOP: ECA-2.1 | TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS | REV: 6 PAGE 11 of 31 |
|-----------------|---|-----------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 15 | <p>Check Normal Power Available To Charging Pumps:</p> <ul style="list-style-type: none"> o Bus 14 normal feed breaker - CLOSED o Bus 16 normal feed breaker - CLOSED | <p>Verify adequate emergency D/G capacity to run charging pumps (75 kw each).</p> <p><u>IF NOT, THEN</u> evaluate if CNMT RECIRC fans can be stopped (Refer to Attachment CNMT RECIRC FANS).</p> |

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EOP:

ECA-2.1

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UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM
GENERATORS

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

16 Check If Charging Flow Has
Been Established:

a. Charging pumps - ANY RUNNING

a. Perform the following:

- 1) IF CCW flow is lost to any RCP thermal barrier OR any RCP #1 seal outlet temperature offscale high, THEN dispatch AO with key to RWST gate to close seal injection needle valve(s) to affected RCP:

- RCP A, V-300A
- RCP B, V-300B.

- 2) Ensure HCV-142 open, demand at 0%.

b. Align charging pump suction to RWST:

b. IF LCV-112B can NOT be opened, THEN perform the following:

- o LCV-112B - OPEN
- o LCV-112C - CLOSED

- 1) Verify charging pump A NOT running and place in PULL STOP.
- 2) Dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).
- 3) WHEN V-358 open, THEN direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).

c. Start charging pumps as necessary and adjust charging flow to restore PRZR level

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| EOP: ECA-2.1 | TITLE: UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM GENERATORS | REV: 6 PAGE 13 of 31 |
|-----------------|---|-----------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|---|
| 17 | Check If SI Should Be Terminated: | |
| | <ul style="list-style-type: none"> a. Check RCS pressure: <ul style="list-style-type: none"> o Pressure - GREATER THAN 1625 psig [1825 psig adverse CNMT] o Pressure - STABLE OR INCREASING b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING c. PRZR level - GREATER THAN 5% [30% adverse CNMT] | <ul style="list-style-type: none"> a. DO <u>NOT</u> stop SI pumps. Perform the following: <ul style="list-style-type: none"> 1) Energize PRZR heaters and operate PRZR spray as necessary to stabilize RCS pressure greater than 1625 psig [1825 psig adverse CNMT] 2) Return to Step 2. b. DO <u>NOT</u> stop SI pumps. Return to Step 2. c. Do <u>NOT</u> stop SI pumps. Perform the following: <ul style="list-style-type: none"> 1) <u>IF</u> normal PRZR spray available, <u>THEN</u> try to stabilize RCS pressure with PRZR spray. 2) Return to Step 17a. |
| 18 | Stop SI and RHR Pumps And Place In Auto | |

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EOP:

ECA-2.1

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UNCONTROLLED DEPRESSURIZATION OF BOTH STEAM
GENERATORS

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19 Verify SI Flow Not Required:

a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING

b. PRZR level - GREATER THAN 5% [30% adverse CNMT]

a. Manually operate SI pumps as necessary and return to Step 2.

b. Control charging flow to maintain PRZR level.

IF PRZR level can NOT be maintained, THEN manually operate SI pumps as necessary and return to Step 2.

CAUTION

ALIGNING SI PUMP SUCTION TO RWST BEFORE ISOLATING BAST MAY RESULT IN BACKFLOW FROM RWST TO BASTS.

20 Verify SI Pump Suction Aligned To RWST:

a. SI pump suction valves from BASTs - CLOSED

- MOV-826A
- MOV-826B
- MOV-826C
- MOV-826D

a. Manually close at least one valve in each flow path.

- MOV-826A or MOV-826B
- MOV-826C or MOV-826D

IF either flowpath can NOT be manually isolated, THEN dispatch A0 to isolate flowpath locally.

b. SI pump suction valves from RWST - OPEN

- MOV-825A
- MOV-825B

b. Ensure at least one valve is open.

c. Consult TSC to determine if SI flush is required (Refer to Attachment SI FLUSH)

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|---|
| 21 | Check RCS Hot Leg Temperatures - STABLE OR DECREASING | Control feed flow or dump steam to stabilize RCS hot leg temperatures. |
| 22 | Check Narrow Range Level In Both S/Gs - LESS THAN 50% | Control feed flow to maintain narrow range level less than 50% in both S/Gs. |
| 23 | Verify Adequate SW Flow To CCW Hx: | |
| | a. Verify at least two SW pumps - RUNNING | a. Manually start pumps as power supply permits (258 kw per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> go to Step 30. |
| | b. Verify AUX BLDG SW isolation valves - OPEN • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 | b. Establish SW to AUX BLDG (Refer to Attachment AUX BLDG SW). |
| | c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED | c. Dispatch A0 to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow. |

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|-----------------|---|-------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|--|--|
| 24 | Check If Normal CVCS Operation Can Be Established | |
| a. | Verify IA restored: <ul style="list-style-type: none"> o IA to CNMT (AOV-5392) - OPEN o IA pressure - GREATER THAN 60 PSIG | a. Continue with Step 30. <u>WHEN</u> IA restored, <u>THEN</u> do Steps 24 through 29. |
| b. | Verify instrument bus D - ENERGIZED | b. Energize MCC B. <u>IF</u> MCC B <u>NOT</u> available, <u>THEN</u> perform the following: <ol style="list-style-type: none"> 1) Verify MCC A energized. 2) Place instrument bus D on maintenance supply. |
| c. | CCW pumps - ANY RUNNING | c. Perform the following: <ol style="list-style-type: none"> 1) <u>IF</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> isolate CCW to thermal barrier of affected RCP(s). <ul style="list-style-type: none"> • RCP A, MOV-749A and MOV-759A • RCP B, MOV-749B and MOV-759B 2) Manually start one CCW pump. |
| d. | Charging pump - ANY RUNNING | d. Continue with Step 30. <u>WHEN</u> any charging pump running, <u>THEN</u> do Steps 25 through 29. |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

25 Check If Seal Return Flow
Should Be Established:

a. Verify RCP #1 seal outlet
temperature - LESS THAN 235°F

b. Verify RCP seal outlet valves -
OPEN

- AOV-270A
- AOV-270B

c. Reset both trains of XY relays
for RCP seal return isolation
valve MOV-313.

d. Open RCP seal return isolation
valve MOV-313

e. Verify RCP #1 seal leakoff flow
- LESS THAN 5.5 GPM

f. Verify RCP #1 seal leakoff flow
- GREATER THAN 0.25 GPM

26 Verify PRZR Level - GREATER
THAN 13% [40% adverse CNMT]

a. Go to Step 28.

b. Manually open valves as
necessary.

d. Perform the following:

- 1) Place MOV-313 switch to OPEN.
- 2) Dispatch AO with key to RWST
gate to locally open MOV-313.

e. IF any RCP seal leakoff flow
greater than 5.5 gpm THEN:

o Close the affected RCP seal
discharge valve

- RCP A, AOV-270A
- RCP B, AOV-270B

o Trip the affected RCP

IF both RCP seal discharge
valves are shut, THEN go to
Step 27.

f. Refer to AP-RCP.1, RCP SEAL
MALFUNCTION.

Continue with Step 28. WHEN PRZR
level increases to greater than 13%
[40% adverse CNMT], THEN do Step 27.

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EOP:

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

27 Establish Normal Letdown:

- a. Verify charging line flow to
REGEN Hx - GREATER THAN 20 GPM
- b. Place the following switches to
CLOSE:
 - Letdown orifice valves
(AOV-200A, AOV-200B, and
AOV-202)
 - AOV-371, letdown isolation
valve
 - AOV-427, loop B cold leg to
REGEN Hx
- c. Place letdown controllers in
MANUAL at 25% open
 - TCV-130
 - PCV-135
- d. Reset both trains of XY relays
for AOV-371 and AOV-427
- e. Open AOV-371 and AOV-427
- f. Open letdown orifice valves as
necessary
- g. Place TCV-130 in AUTO at 105°F
- h. Place PCV-135 in AUTO at 250 psig
- i. Adjust charging pump speed and
HCV-142 as necessary

IF RCP seal return has been
established, THEN establish excess
letdown as follows:

- o Place excess letdown divert
valve, AOV-312, to NORMAL.
- o Ensure CCW from excess letdown
open, (AOV-745).
- o Open excess letdown isolation
valve AOV-310.
- o Slowly open HCV-123 to maintain
excess letdown temperature less
than 195°F and pressure less
than 100 psig.
- o Adjust charging pump speed as
necessary.

IF RCP seal return NOT established,
THEN consult TSC to determine if
excess letdown should be placed in
service.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

28 Check VCT Makeup System:

a. BAST levels - ANY GREATER THAN 5%

a. Go to Step 29.

b. Check Annunciator B-23, BORIC
ACID TANK LO LO LEVEL -
EXTINGUISHED

b. Perform the following:

1) Adjust boric acid flow
control valve to required
flow from table.

| BAST LEVEL | BORIC ACID FLOW (GPM) |
|---------------|--------------------------|
| <10% | 4.5 |
| 10-15% | 6.7 |
| 15-20% | 8.9 |
| >20% | 10.0 |

2) Go to Step 28d.

c. Adjust boric acid flow control
valve in AUTO to 4.5 gpm

d. Verify the following:

d. Adjust controls as necessary.

1) RMW mode selector switch in
AUTO2) RMW control armed - RED LIGHT
LIT

e. Check VCT level:

e. Manually increase VCT makeup
flow as follows:

o Level - GREATER THAN 20%

-OR-

o Level - STABLE OR INCREASING

1) Ensure BA transfer pumps and
RMW pumps running. IF NOT,
THEN reset MCC C and MCC D UV
lockouts as necessary.2) Place RMW flow control valve
HCV-111 in MANUAL and
increase RMW flow.3) Increase boric acid flow as
necessary.

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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|--|
| 29 | <p>Check Charging Pump Suction Aligned To VCT:</p> <p>a. VCT level - GREATER THAN 20%</p> <p>b. Verify charging pumps aligned to VCT:</p> <ul style="list-style-type: none"> o LCV-112C - OPEN o LCV-112B - CLOSED <p><u>NOTE:</u> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>o When using PRZR PORV, select one with an operable block valve.</p> | <p>a. <u>IF</u> VCT level can <u>NOT</u> be maintained greater than 5%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> 1) Ensure charging pump suction aligned to RWST <ul style="list-style-type: none"> o LCV-112B open o LCV-112C closed 2) Continue with Step 30. <u>WHEN</u> VCT level greater than 40%, <u>THEN</u> do Step 29b. <p>b. Manually align valves as necessary.</p> |
| 30 | <p>Energize Heaters And Operate Normal Spray As Necessary To Maintain RCS Pressure Stable</p> | <p><u>IF</u> normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> use auxiliary spray valve (AOV-296).</p> <p><u>IF</u> PRZR spray <u>NOT</u> available, <u>THEN</u> use one PRZR PORV.</p> <p><u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> |



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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|---|
| 31 | <p>Check RCP Cooling:</p> <p>a. Check CCW to RCPs:</p> <ul style="list-style-type: none"> o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED <p>b. Check RCP seal injection:</p> <ul style="list-style-type: none"> o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o RCP seal injection flow to each RCP - GREATER THAN 6 GPM | <p>Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).</p> |



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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

32 Verify All AC Busses -
ENERGIZED BY OFFSITE POWER

- o Normal feed breakers to all 480 volt busses - CLOSED
- o 480 bus voltage - GREATER THAN 420 VOLTS
- o Emergency D/G output breakers - OPEN

Perform the following:

- a. IF any AC emergency bus normal feed breaker open, THEN ensure associated D/G breaker closed.
- b. Perform the following, as necessary:
 - 1) Close non-safeguards bus tie breakers:
 - Bus 13 to Bus 14 tie
 - Bus 15 to Bus 16 tie
 - 2) Place the following pumps in PULL STOP:
 - EH pumps
 - Turning gear oil pump
 - HP seal oil backup pump
 - 3) Restore power to MCCs.
 - A from Bus 13
 - B from Bus 15
 - E from Bus 15
 - F from Bus 15
 - 4) WHEN bus 15 restored, THEN reset control room lighting.
 - 5) Refer to Attachment SI/UV for other equipment lost with loss of offsite power.
- c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).



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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|--|
| <p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p> | | |
| 33 | Check RCP Status - AT LEAST ONE RUNNING | <p>Try to start one RCP:</p> <ul style="list-style-type: none"> a. Establish conditions for starting an RCP. <ul style="list-style-type: none"> o Bus 11A or 11B energized o Refer to Attachment RCP START. b. Start one RCP. <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation can <u>NOT</u> be verified, <u>THEN</u> increase feed flow or dumping steam.</p> |

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|-----------------|---|-----------------------------|

| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|--|
| <p><u>NOTE:</u> Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.</p> | | |
| 34 | Check If Source Range Detectors Should Be Energized: | |
| a. | Source range channels - DEENERGIZED | a. Go to Step 34e. |
| b. | Check intermediate range flux - EITHER CHANNEL LESS THAN 10^{-10} AMPS | b. Perform the following: <ol style="list-style-type: none"> 1) <u>IF</u> neither intermediate range channel is decreasing <u>THEN</u> initiate boration. 2) Continue with Step 35. <u>WHEN</u> flux is LESS THAN 10^{-10} amps on any operable channel, <u>THEN</u> do Steps 34c, d and e. |
| c. | Check the following: <ul style="list-style-type: none"> o Both intermediate range channels - LESS THAN 10^{-10} AMPS <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o Greater than 20 minutes since reactor trip | c. Continue with step 35. <u>WHEN</u> either condition met, <u>THEN</u> do Steps 34d and e. |
| d. | Verify source range detectors - ENERGIZED | d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2). <p><u>IF</u> source ranges can <u>NOT</u> be restored, <u>THEN</u> refer to ER-NIS.1, SR MALFUNCTION and go to Step 35.</p> |
| e. | Transfer Rk-45 recorder to one source range and one intermediate range channel. | |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

35 Check If Emergency D/Gs
Should Be Stopped:

a. Verify AC emergency busses
energized by offsite power:

- o Emergency D/G output breakers
- OPEN
- o AC emergency bus voltage -
GREATER THAN 420 VOLTS
- o AC emergency bus normal feed
breakers - CLOSED

b. Stop any unloaded emergency D/G
and place in standby (Refer to
Attachment D/G STOP)

a. Try to restore offsite power
(Refer to ER-ELEC.1, RESTORATION
OF OFFSITE POWER).

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

36 Establish Normal Shutdown
Alignment:

a. Check condenser - AVAILABLE

a. Dispatch AO to perform
Attachment SD-2.

b. Perform the following:

o Open generator disconnects

- 1G13A71
- 9X13A73

o Place voltage regulator to OFF

o Open turbine drain valves

o Rotate reheater steam supply
controller cam to close valveso Place reheater dump valve
switches to HANDo Stop all but one condensate
pump

c. Verify adequate Rx head cooling:

1) Check IA to CNMT - AVAILABLE

1) Go to Step 37.

2) Verify at least one control
rod shroud fan - RUNNING2) Manually start one fan as
power supply permits (45 kw)3) Verify one Rx compartment
cooling fan - RUNNING

3) Perform the following:

o Dispatch AO to reset UV
relays at MCC C and MCC D.o Manually start one fan as
power supply permits
(23 kw)

d. Verify Attachment SD-1 - COMPLETE

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|-----------------|---|-----------------------------|
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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|------|---|---|
| 37 | Maintain Plant Conditions - STABLE o RCS pressure o PRZR level o RCS temperatures | Control plant systems as necessary to maintain conditions stable. |
| 38 | Verify SI Flow Not Required: a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING b. PRZR level - GREATER THAN 5% [30% adverse CNMT] | a. Manually operate SI pumps as necessary. Return to Step 2. b. Control charging flow to maintain PRZR level. <u>IF</u> PRZR level can <u>NOT</u> be maintained, <u>THEN</u> manually operate SI pumps as necessary. Return to Step 2. |

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EOP:

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

39 Check If SI ACCUMs Should Be Isolated:

a. Check the following:

- o RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING

- o PRZR level - GREATER THAN 5% [30% adverse CNMT]

b. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves

- MOV-841, MCC C position 12F
- MOV-865, MCC D position 12C

c. Close SI ACCUM discharge valves

- MOV-841
- MOV-865

d. Locally reopen breakers for MOV-841 and MOV-865

a. Go to Step 40.

c. Vent any unisolated ACCUMs:

1) Open vent valves for unisolated SI ACCUMs.

- ACCUM A, AOV-834A
- ACCUM B, AOV-834B

2) Open HCV-945.

40 Check RCS Hot Leg Temperatures - LESS THAN 350°F

Control feed flow and dump steam to establish RCS cooldown rate less than 100°F/hr in RCS cold legs.



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| STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|---|
| <p><u>NOTE:</u></p> <ul style="list-style-type: none"> o If auxiliary spray is in use, spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves. o When using PRZR PORV, select one with operable block valve. | | |
| 41 | Check RCS Pressure - LESS THAN 400 PSIG [300 PSIG adverse CNMT] | <p>Use normal PRZR spray.</p> <p><u>IF</u> normal spray <u>NOT</u> available and letdown is in service, <u>THEN</u> use auxiliary spray.</p> <p><u>IF NOT</u>, <u>THEN</u> use one PRZR PORV.</p> <p><u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> |

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

42 Check If RHR Normal Cooling
Can Be Established:

a. RCS cold leg temperature - LESS
THAN 350°F

a. Return to Step 38.

b. RCS pressure - LESS THAN
400 psig [300 psig adverse CNMT]

b. Return to Step 41.

c. Place letdown pressure
controller (PCV-135) in MANUAL
CLOSED

d. Check following valves - OPEN

d. Perform the following:

- AOV-371, letdown isolation
valve
- AOV-427, loop B cold leg to
REGEN Hx
- At least one letdown orifice
valve (AOV-200A, AOV-200B, or
AOV-202)

1) Reset both trains of XY
relays for AOV-371 and
AOV-427.

2) Open AOV-371 and AOV-427.

3) Open one letdown orifice
valve.

e. Verify pressure on PI-135 - LESS
THAN 400 PSIG

e. Return to Step 41.

f. Place RCS overpressure
protection system in service
(Refer to 0-7, ALIGNMENT AND
OPERATION OF THE REACTOR VESSEL
OVERPRESSURE PROTECTION SYSTEM)

f. IF RCS overpressure protection
system can NOT be placed in
service, THEN notify TSC of
potential Tech Spec violation if
RHR system is placed in service.

g. Establish RHR normal cooling
(Refer to Attachment RHR COOL)

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

43 Continue RCS Cooldown To Cold
Shutdown:

a. Maintain cooldown rate in RCS
cold legs - LESS THAN 100°F/HR

b. Check narrow range level in both
S/Gs - LESS THAN 50%

b. Control feed flow to maintain
narrow range level less than 50%
in both S/Gs.

44 Check Core Exit T/Cs - LESS
THAN 200°F

Return to Step 43.

45 Evaluate Long Term Plant
Status:

a. Maintain cold shutdown conditions

b. Consult TSC

-END-

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ECA-2.1 APPENDIX LIST

| <u>TITLE</u> | <u>PAGES</u> |
|--------------------------------|--------------|
| 1) RED PATH SUMMARY | 1 |
| 2) FIGURE MIN SUBCOOLING | 1 |
| 3) ATTACHMENT FAULTED S/G | 1 |
| 4) ATTACHMENT CNMT RECIRC FANS | 1 |
| 5) ATTACHMENT NC | 1 |
| 6) ATTACHMENT RCP START | 1 |
| 7) ATTACHMENT N2 PORVS | 1 |
| 8) ATTACHMENT SEAL COOLING | 2 |
| 9) ATTACHMENT SI/UV | 1 |
| 10) ATTACHMENT D/G STOP | 1 |
| 11) ATTACHMENT SD-1 | 1 |
| 12) ATTACHMENT SD-2 | 1 |
| 13) ATTACHMENT RHR COOL | 2 |
| 14) ATTACHMENT AUX BLDG SW | 1 |
| 15) ATTACHMENT SI FLUSH | 1 |
| 16) FOLDOUT | 1 |

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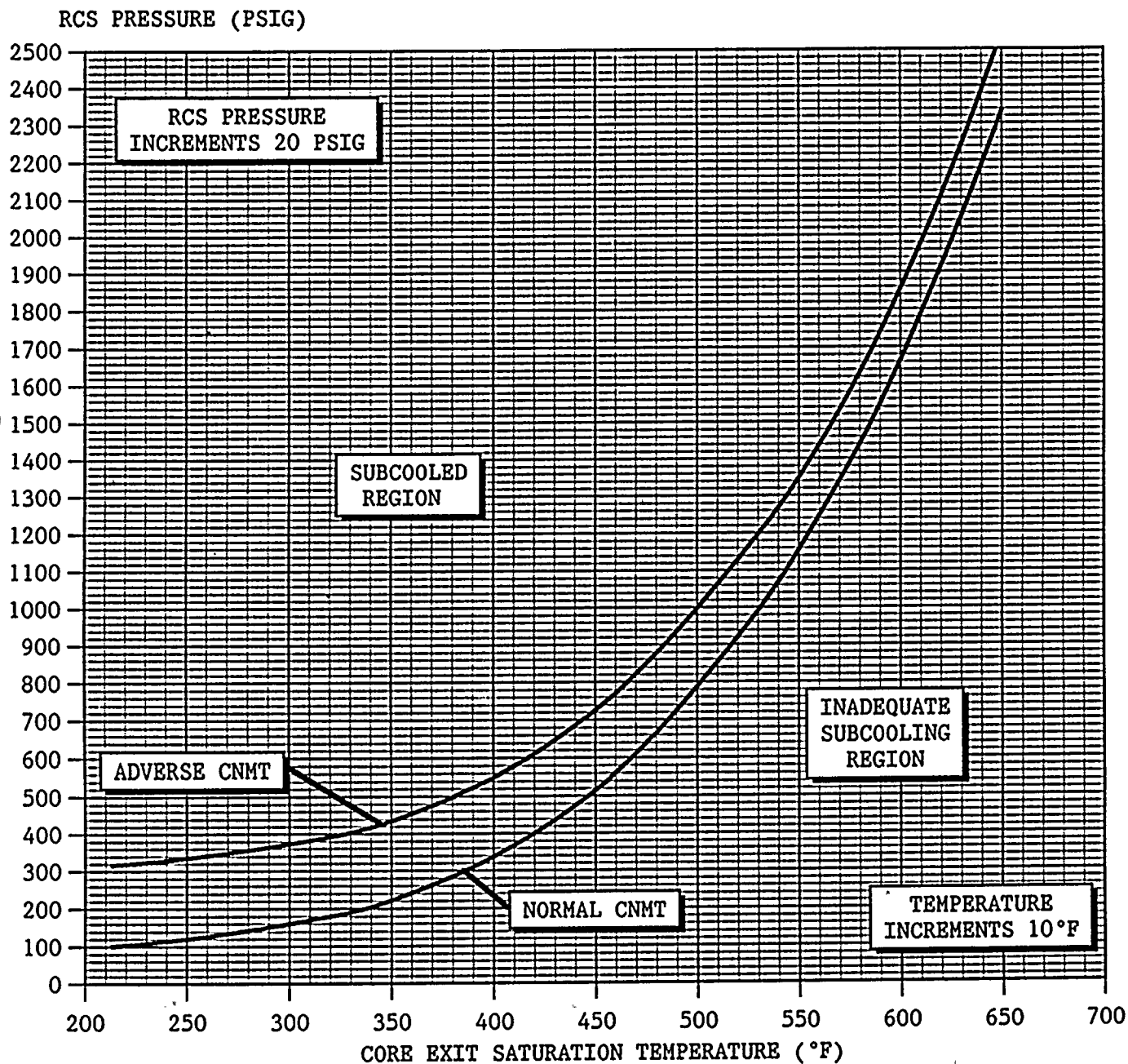
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FIGURE MIN SUBCOOLING

NOTE: Subcooling Margin = Saturation Temperature From Figure
Below [-] Core Exit T/C Indication



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FOLDOUT PAGE

1. SI REINITIATION CRITERIA

Manually operate SI pumps as necessary if EITHER condition listed below occurs:

- o RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIGURE MIN SUBCOOLING
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% ADVERSE CNMT]

2. E-2 TRANSITION CRITERIA

IF any S/G pressure increases at any time, THEN go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.

3. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

4. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

5. SI PUMP AUTO SWITCHOVER CRITERION

WHEN BAST level decreases to 10%, THEN ensure SI pump automatic switchover to RWST.

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