


EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 16 PAGE 1 of 19
----------------	--	-------------------------

ROCHESTER GAS AND ELECTRIC CORPORATION
GINNA STATION
CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

PORC REVIEW DATE 4-7-94


PLANT SUPERINTENDENT

4-7-94
EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

- A. PURPOSE - This procedure provides the necessary instructions for transferring the Safety Injection system and Containment Spray system to recirculation modes of operation.
- B. ENTRY CONDITIONS/SYMPTOMS
1. ENTRY CONDITIONS - This procedure may be entered from:
 - a. E-1, LOSS OF REACTOR OR SECONDARY COOLANT, or,
 - b. ECA-0.2, LOSS OF ALL AC POWER WITH SI REQUIRED, or,
 - c. ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, or,
 - d. FR-C.1, RESPONSE TO INADEQUATE CORE COOLING, or,
 - e. FR-C.2, RESPONSE TO DEGRADED CORE COOLING, or,
 - f. FR-C.3, RESPONSE TO SATURATED CORE COOLING, or,
 - g. FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, or,
 - h. FR-Z.1, RESPONSE TO HIGH CONTAINMENT PRESSURE, on low RWST level.
 - i. Other procedures whenever RWST level reaches the switchover setpoint (28%).

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- o INJECTION FLOW TO THE RCS SHALL BE MAINTAINED AT ALL TIMES.
- o IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.
- o CONSULT WITH RADIATION PROTECTION BEFORE DISPATCHING PERSONNEL TO AUXILIARY BUILDING.

- NOTE:
- o FOLDOUT page should be open and monitored periodically.
 - 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 Verify CNMT Sump B Level - IF RWST level is less than 28% AND GREATER THAN 113 INCHES CNMT sump B level is less than 113 inches, THEN go to ECA-1.2, LOCA OUTSIDE CONTAINMENT, Step 1.

NOTE: Steps 2 through 11 should be performed without delay. FR procedures should not be implemented prior to completion of these steps.

- 2 Reset SI

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: IF D/Gs supplying emergency AC busses, THEN non-essential loads may be shed as necessary to allow start of additional SW pumps.

3 Establish Adequate SW Flow:

- | | |
|---|---|
| <p>a. Verify at least two SW pumps - RUNNING</p> | <p>a. Start additional SW pumps as power supply permits (258 kw each). <u>IF</u> only 1 SW pump operable, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Ensure Attachment MIN SW is complete. 2) Go to Step 4. |
| <p>b. Verify AUX BLDG SW isolation valves - OPEN</p> <ul style="list-style-type: none"> • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 | <p>b. Establish SW to AUX BLDG (Refer to Attachment AUX BLDG SW).</p> |
| <p>c. Dispatch AO to verify total SW flow to CCW Hxs - GREATER THAN 5000 GPM</p> | <p>c. Perform the following:</p> <ol style="list-style-type: none"> 1) Isolate SW to screenhouse and air conditioning headers. <ul style="list-style-type: none"> • MOV-4609 and MOV-4780 • MOV-4663 and MOV-4733 2) Direct AO to locally adjust total SW flow to the CCW Hxs to between 5000 gpm and 6000 gpm (V-4619 and V-4620). 3) Direct AO to locally isolate SW return from SFP Hxs: <ul style="list-style-type: none"> • SFP Hx A (V-4622) • SFP Hx B (V-8689) 4) Verify SW portions of Attachment SD-1 are complete. |

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

4 Establish CCW flow to RHR Hxs:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Check both CCW pumps - RUNNING b. Manually open CCW valves to RHR Hxs <ul style="list-style-type: none"> • MOV-738A • MOV-738B | <ul style="list-style-type: none"> a. Start CCW pumps as power supply permits (124 kw each). b. Dispatch AO to locally open valves. |
|---|---|

CAUTION

- o CONSULT WITH RADIATION PROTECTION BEFORE DISPATCHING PERSONNEL TO AUXILIARY BUILDING.
- o THE RHR HX OUTLET VALVES (HCV-624 AND HCV-625) WILL FAIL OPEN ON LOSS OF INSTRUMENT AIR PRESSURE.

5 Check RHR Flow:

- o Both RHR pumps - RUNNING
- o RHR flow (FI-626) - LESS THAN 1500 GPM PER OPERATING PUMP

Manually adjust RHR Hx outlet valves equally to reduce flow to less than 1500 gpm per operating pump.

- RHR Hx B, HCV-624
- RHR Hx A, HCV-625

IF flow can NOT be reduced manually, THEN dispatch an AO to locally adjust RHR Hx outlet manual valves equally to reduce flow.

- RHR Hx B, V-715
- RHR Hx A, V-717

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

CAUTION

ANY PUMPS TAKING SUCTION FROM RWST SHOULD BE STOPPED UPON REACHING RWST LO-LO LEVEL ALARM.

6 Check IF Unnecessary Pumps Can Be Stopped:

- | | |
|--|--|
| a. Three SI pumps - RUNNING | a. Go to Step 6c. |
| b. Stop SI pump C and place both switches in PULL STOP | |
| c. Both CNMT spray pumps - RUNNING | c. Pull stop any idle CNMT spray pump and go to Step 6e. |
| d. Pull stop one CNMT spray pump | |
| e. Stop both RHR pumps and place in PULL STOP | |

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7	Verify RHR System Alignment:	
a.	Verify the following valves - CLOSED <ul style="list-style-type: none"> o RHR suction valves from loop A hot leg <ul style="list-style-type: none"> • MOV-700 • MOV-701 o RHR discharge valves to loop B cold leg <ul style="list-style-type: none"> • MOV-720 • MOV-721 	a. Ensure at least one suction valve and one discharge valve closed.
b.	Verify RHR pump suction crosstie valves - OPEN <ul style="list-style-type: none"> • MOV-704A • MOV-704B 	b. Manually open valves. If valves can <u>NOT</u> be opened, <u>THEN</u> dispatch AO to locally open valves.
c.	Verify the following valves - OPEN <ul style="list-style-type: none"> o RHR pump discharge to Rx vessel deluge valves <ul style="list-style-type: none"> • MOV-852A • MOV-852B o RHR suction from sump B (inside CNMT) <ul style="list-style-type: none"> • MOV-851A • MOV-851B 	c. Ensure at least one valve in each set open.
d.	Verify RCDT pump suction valves from sump B - CLOSED <ul style="list-style-type: none"> • MOV-1813A • MOV-1813B 	d. Manually close valves.

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

CAUTION

RHR FLOW INDICATED ON FI-626 SHOULD BE LIMITED TO 1500 GPM PER OPERATING PUMP TO ENSURE OPTIMUM PUMP PERFORMANCE.

8 Initiate RHR Sump Recirculation:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. Close RWST outlet valve to RHR pump suction, MOV-856 (turn on DC power key switch) b. Open both RHR suction valves from sump B (outside CNMT) <ul style="list-style-type: none"> o MOV-850A - OPEN o MOV-850B - OPEN c. Start both RHR pumps d. Verify at least one RHR pump - RUNNING | <ul style="list-style-type: none"> a. Dispatch AO to locally close valve and continue with Step 8b. b. <u>IF</u> only one valve will open, <u>THEN</u> perform the following: <ul style="list-style-type: none"> 1) Initiate only one train of RHR recirculation (Refer to Attachment RHR NPSH for further guidance). 2) Go to 8d. <u>IF</u> neither valve will open, <u>THEN</u> refer to Attachment RHR PRESS REDUCTION for further guidance. d. <u>IF</u> no RHR pump can be started, <u>THEN</u> go to ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, Step 1. |
|---|---|

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

NOTE: The TSC should be requested to establish periodic monitoring of the AUX BLDG sub-basement, as radiological conditions permit, to monitor RHR pump operation.

9 Check RWST Level - LESS THAN 15%	DO <u>NOT</u> continue with this procedure until RWST level is less than 15%.
------------------------------------	---

10 Stop All Pumps Supplied From RWST:

- | | |
|---|-------------------|
| <ul style="list-style-type: none"> a. Stop all SI pumps and place in PULL STOP b. Stop all charging pumps c. Stop operating CNMT spray pump and place in PULL STOP | |
| <ul style="list-style-type: none"> d. Check CNMT pressure - LESS THAN 28 PSIG | d. Go to Step 11. |
| <ul style="list-style-type: none"> e. Reset CNMT spray if necessary | |
| <ul style="list-style-type: none"> f. Close CNMT spray pump discharge valves <ul style="list-style-type: none"> • MOV-860A • MOV-860B • MOV-860C • MOV-860D | |

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

CAUTION
 RHR FLOW MUST BE MAINTAINED LESS THAN 1500 GPM PER OPERATING RHR PUMP AS DETERMINED BY THE TOTAL OF FI-931A, FI-931B AND FI-626 INDICATIONS.

11 Align SI And CNMT Spray For Sump Recirculation:

- | | |
|--|---|
| <p>a. Verify SI pump suction valves from BASTs - CLOSED</p> <ul style="list-style-type: none"> • MOV-826A and MOV-826B • MOV-826C and MOV-826D | <p>a. Ensure at least one valve in each flowpath closed.</p> |
| <p>b. Close and verify closed RWST outlet valves to SI and CNMT spray pumps (turn on DC power key switches)</p> <ul style="list-style-type: none"> • MOV-896A • MOV-896B | <p>b. Ensure at least one valve closed.</p> |
| <p>c. Close and verify closed SI pump RECIRC valves</p> <ul style="list-style-type: none"> • MOV-898 • MOV-897 | <p>c. Ensure at least one valve closed.</p> |
| <p>d. Verify SI pump suction valves from RWST - OPEN</p> <ul style="list-style-type: none"> • MOV-825A • MOV-825B | <p>d. Ensure at least one valve open.</p> |
| <p>e. Align RHR Hx outlet flow paths to SI and CNMT spray pump suction</p> <ul style="list-style-type: none"> o MOV-857A and MOV-857C - OPEN o MOV-857B - OPEN | <p>e. Ensure at least one flowpath aligned from RHR pump(s) to SI and CS pump suction header (Refer to Attachment RHR SYSTEM).</p> <p><u>IF</u> neither flow path can be aligned, <u>THEN</u> refer to Attachment RHR PRESS REDUCTION for further guidance.</p> |

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

CAUTION

SI PUMPS SHOULD BE STOPPED IF RCS PRESSURE IS GREATER THAN THEIR SHUTOFF HEAD PRESSURE.

NOTE: Operation of SI pump C is preferred since it delivers to both RCS loops.

12 Verify Adequate RCS Makeup Flow:

- | | |
|---|---|
| <ul style="list-style-type: none"> a. RCS pressure - LESS THAN 225 psig [425 psig adverse CNMT] | <ul style="list-style-type: none"> a. Perform the following: <ul style="list-style-type: none"> 1) Check RCS conditions: <ul style="list-style-type: none"> o RCS subcooling based on core exit T/Cs greater than Figure MIN SUBCOOLING. o PRZR level greater than 5% [30% adverse CNMT]. <u>IF</u> either condition <u>NOT</u> met, <u>THEN</u> start one SI pump. 2) Go to Step 13. |
| <ul style="list-style-type: none"> b. RHR injection flow adequate: <ul style="list-style-type: none"> o Core exit T/Cs - LESS THAN REQUIREMENTS OF FIGURE RHR INJECTION o Check RVLIS level (no RCPS) - GREATER THAN 43% [46% adverse CNMT] | <ul style="list-style-type: none"> b. Start one SI pump. |

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION
 IF A CNMT SPRAY PUMP IS STARTED, THEN CNMT PRESSURE SHOULD BE CLOSELY MONITORED. CNMT PRESSURE SHOULD NOT BE REDUCED TO LESS THAN 32 PSIG.

13 Check If CNMT Spray Is Required:

- | | |
|---|--|
| <p>a. CNMT pressure - GREATER THAN 37 PSIG</p> | <p>a. Perform the following:</p> <p>1) <u>IF</u> CNMT spray previously actuated and NaOH tank level greater than 55%, <u>THEN</u> consult TSC to determine if CNMT spray should be restarted.</p> <p>2) Go to Step 14.</p> |
| <p>b. Verify CNMT spray pump discharge valves - OPEN</p> <ul style="list-style-type: none"> • MOV-860A • MOV-860B • MOV-860C • MOV-860D | <p>b. Manually open valve(s) for selected pump.</p> <ul style="list-style-type: none"> • CS pump A, MOV-860A or MOV-860B • CS pump B, MOV-860C or MOV-860D |
| <p>c. Start selected CNMT spray pump</p> | |
| <p>d. Open NaOH tank outlet valves for running pump</p> <ul style="list-style-type: none"> • CS pump A, AOV-836A • CS pump B, AOV-836B | |
| <p>e. <u>WHEN</u> CNMT pressure decreases to 32 psig, <u>THEN</u> pull stop CNMT spray pump</p> | |

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

14 Verify Adequate Core Cooling:

- o Core exit T/Cs - STABLE OR DECREASING
- o RVLIS level (no RCPs) - STABLE OR INCREASING
- o RVLIS level (no RCPs) - GREATER THAN 43% [46% adverse CNMT]

- IF both RHR pumps running, THEN ensure two SI pumps running.
- IF only one RHR pump running, THEN perform the following:
- a. Ensure one SI pump running.
 - b. WHEN CNMT spray pumps stopped, THEN start one additional SI pump.

CAUTION

IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS).

NOTE: TDAFW pump flow control valves fail open on loss of IA.

*15 Monitor Intact S/G Levels:

- a. Narrow range level - GREATER THAN 5% [25% adverse CNMT]
- b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50%

- a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in at least one S/G.

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

16 Establish Normal Shutdown Alignment:

- | | |
|---|--|
| <p>a. Check condenser - AVAILABLE</p> <p>b. Perform the following:</p> <ul style="list-style-type: none"> o Open generator disconnects <ul style="list-style-type: none"> • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump <p>c. Verify adequate Rx head cooling:</p> <ol style="list-style-type: none"> 1) Check IA to CNMT - AVAILABLE 2) Verify at least one control rod shroud fan - RUNNING 3) Verify one Rx compartment cooling fan - RUNNING <p>d. Verify Attachment SD-1 - COMPLETE</p> | <p>a. Dispatch AO to perform Attachment SD-2.</p> <p>1) Go to Step 16d.</p> <p>2) Manually start one fan as power supply permits (45 kw)</p> <p>3) Perform the following:</p> <ul style="list-style-type: none"> o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw) |
|---|--|

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
17 Check If Emergency D/Gs Should Be Stopped:	<ul style="list-style-type: none">a. Verify AC emergency busses energized by offsite power:<ul style="list-style-type: none">o Emergency D/G output breakers - OPENo AC emergency bus voltage - GREATER THAN 420 VOLTSo AC emergency bus normal feed breakers - CLOSEDb. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP)	<ul style="list-style-type: none">a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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

18 Check If SI ACCUMs Should Be Isolated:

- | | |
|---|---|
| <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"> • ACCUM A, MOV-841 • ACCUM B, MOV-865 <p>d. Locally reopen breakers for MOV-841 and MOV-865</p> | <p>a. Continue with Step 19. <u>WHEN</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> do Steps 18b through 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> |
|---|---|

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

IF FUEL DAMAGE IS SUSPECTED, MAINTAIN S/G PRESSURE SLIGHTLY GREATER THAN RCS PRESSURE.

19 Check If Intact S/Gs Should Be Depressurized To RCS Pressure:

- a. RCS pressure - LESS THAN INTACT S/G PRESSURES
- b. Check S/G radiation - NORMAL
 - o Steamline Monitors (R-31, R-32)
 - o Direct HP to sample S/Gs for activity
- c. Dump steam to condenser from intact S/G(s) until S/G pressure less than RCS pressure

- a. Go to Step 20.
- b. Do NOT dump steam from a S/G with high radiation. Isolate feed flow to a S/G with high radiation.
- c. IF steam dump to condenser NOT available, THEN dump steam using intact S/G ARVs until S/G pressure less than RCS pressure.

20 Consult TSC to Determine If Rx Vessel Head Should Be Vented

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: This procedure should be continued while obtaining CNMT hydrogen sample in Step 21.

21 Check CNMT Hydrogen Concentration:

a. Direct HP to start CNMT hydrogen monitors as necessary

b. Hydrogen concentration - LESS THAN 0.5%

b. Consult TSC to determine if hydrogen recombiners should be placed in service.

NOTE: The TSC should be consulted before changing recirculation lineups.

22 Check Event Duration - GREATER THAN 19 HOURS AFTER EVENT INITIATION

Consult TSC to evaluate long term plant status.

23 Place CNMT Spray Pumps In PULL STOP

24 Verify Two SI Pumps - RUNNING

Manually start pumps.

25 Check Core Exit T/Cs - LESS THAN REQUIREMENTS OF FIGURE RHR INJECTION

Perform the following:

a. Manually open both PRZR PORVs and block valves.

b. Verify core exit T/Cs decreasing to less than requirements of Figure RHR INJECTION. IF NOT, THEN dump steam from intact S/Gs until core exit T/Cs less than required.

TOP:

ES-1.3

TITLE:

TRANSFER TO COLD LEG RECIRCULATION

REV: 16

PAGE 19 of 19

STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

26 Consult TSC To Evaluate Long
Term Plant Status

-END-

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 16 PAGE 1 of 1
----------------	--	------------------------

ES-1.3 APPENDIX LIST

<u>TITLE</u>	<u>PAGES</u>
1) RED PATH SUMMARY	1
2) FIGURE RHR INJECTION	1
3) FIGURE MIN SUBCOOLING	1
4) ATTACHMENT D/G STOP	1
5) ATTACHMENT SD-1	1
6) ATTACHMENT SD-2	1
7) ATTACHMENT RHR NPSH	1
8) ATTACHMENT RHR SYSTEM	1
9) ATTACHMENT AUX BLDG SW	1
10) ATTACHMENT SW LOADS IN CNMT	1
11) ATTACHMENT MIN SW	1
12) ATTACHMENT RHR PRESS REDUCTION	1
13) FOLDOUT	1

EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 16 PAGE 1 of 1
----------------	--	------------------------

RED PATH SUMMARY

- a. SUBCRITICALITY - Nuclear power greater than 5%
- b. CORE COOLING - Core exit T/Cs greater than 1200°F
-OR-
Core exit T/Cs greater than 700°F AND
RVLIS level (no RCPS) less than 43% [46%
adverse CNMT]
- c. HEAT SINK - Narrow range level in all S/Gs less than 5%
[25% adverse CNMT] AND total feedwater flow
less than 200 gpm
- d. INTEGRITY - Cold leg temperatures decrease greater than
100°F in last 60 minutes AND RCS cold leg
temperature 1 . than 285°F
- e. CONTAINMENT - CNMT pressure greater than 60 psig

FIGURE MIN SUBCOOLING

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

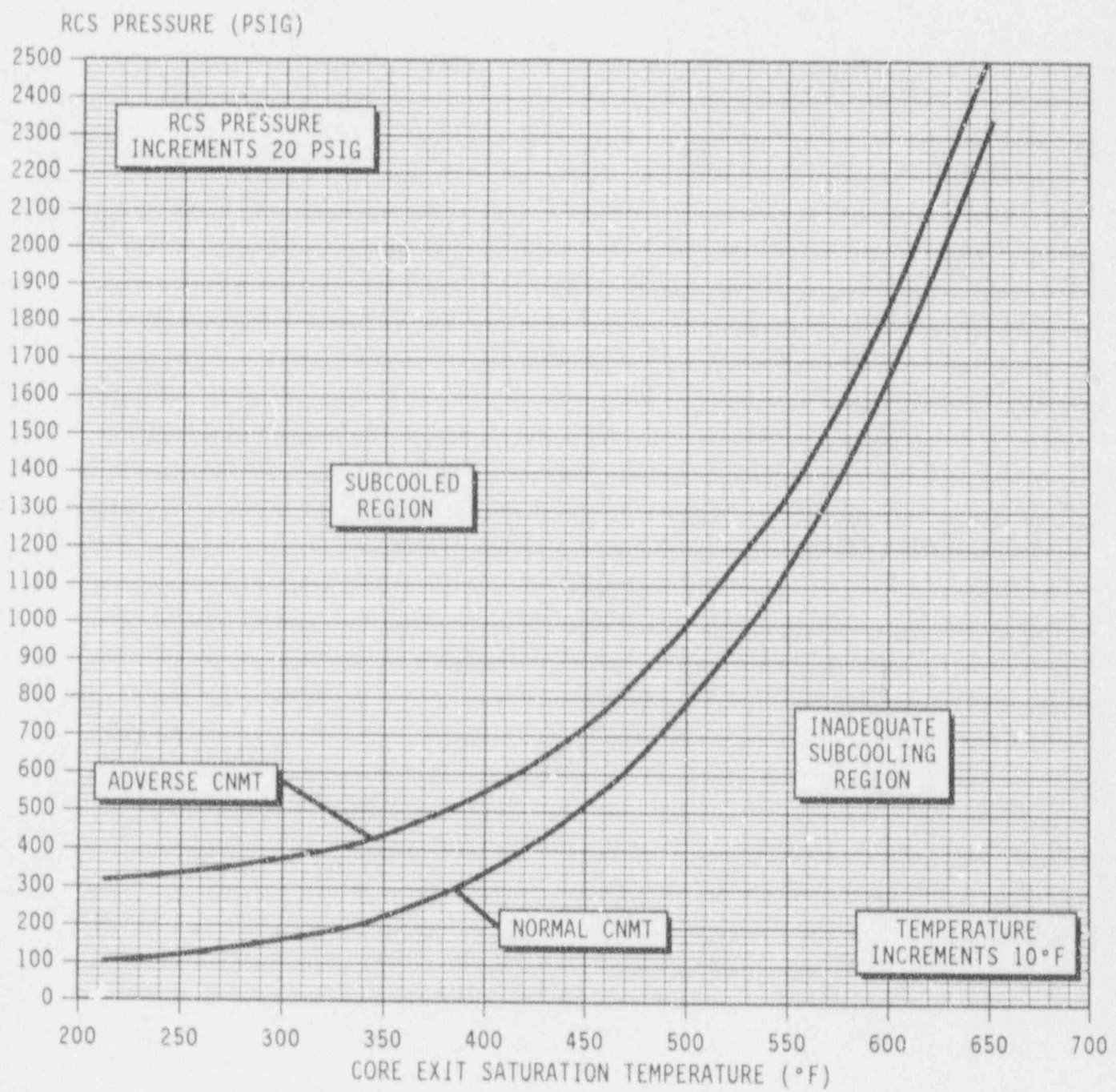
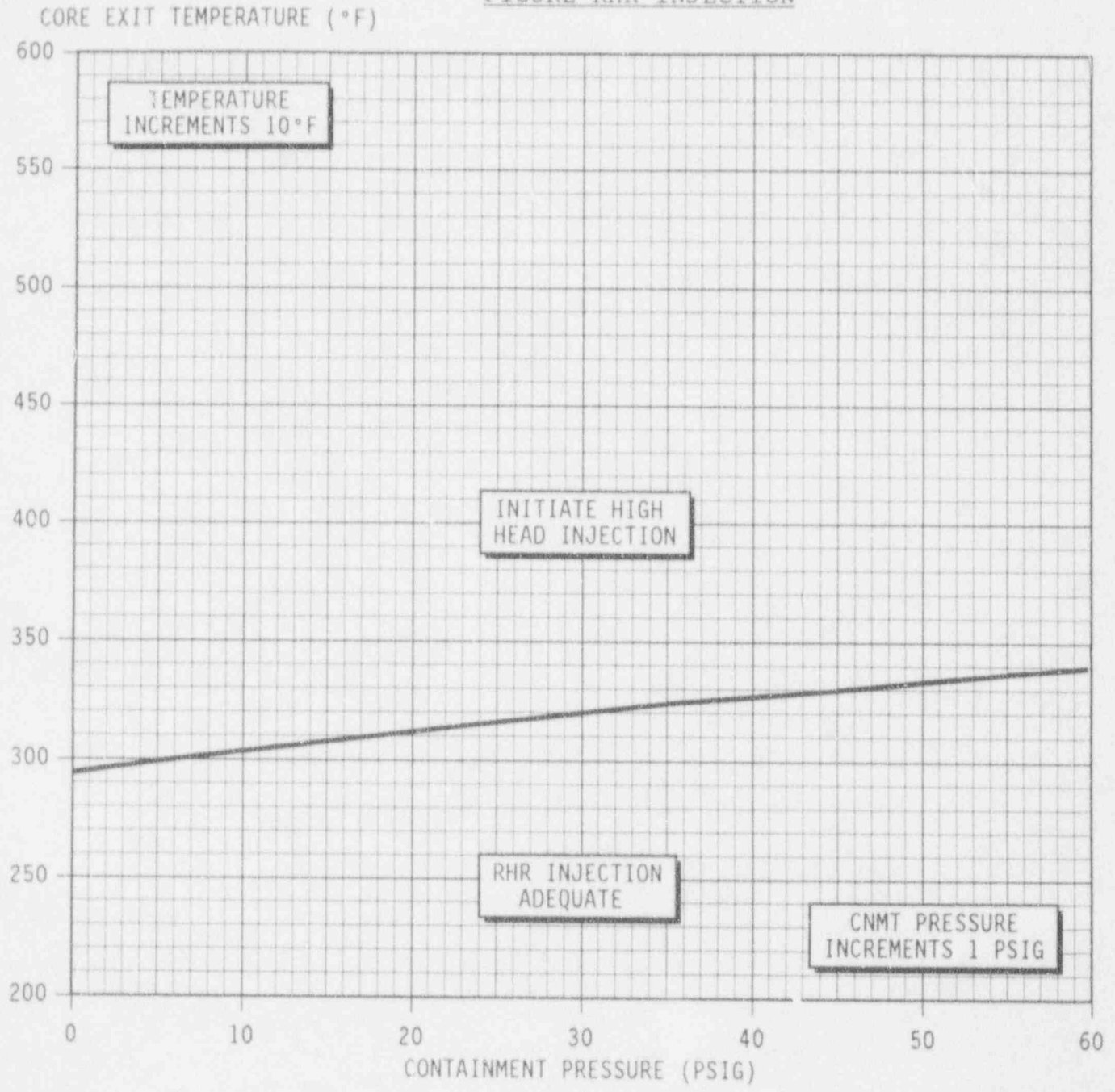


FIGURE RHR INJECTION



EOP: ES-1.3	TITLE: TRANSFER TO COLD LEG RECIRCULATION	REV: 16 PAGE 1 of 1
----------------	--	------------------------

FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN operate SI pumps manually as necessary:

o Core exit TCs - GREATER THAN REQUIREMENTS OF FIGURE RHR INJECTION

OR

o RVLIS level - LESS THAN 43% [46% adverse CNMT]

2. 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).