LOSS OF DECAY HEAT REMOVAL

1.0 ENTRY CONDITIONS

IF the running DHR train is lost,

THEN use this procedure.

2.0 IMMEDIATE ACTIONS

NOTE
There are no immediate actions for this procedure.

Approved by MNPO [signature] for T. Wiko Date 1/12/99
(SIGNATURE ON FILE)

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3.0 FOLLOW-UP ACTIONS

ACTIONS	DETAILS
3.1 ___ Notify personnel of plant conditions.	• ___ STA • ___ Plant operators • ___ NSM (evaluate plant conditions for potential entry into the Emergency Plan)
3.2 ___ IF either of the following exist: ___ Rx vessel level is < 132 ft ___ No DHR trains are available THEN **GO TO** Step 3.5 in this procedure.	
3.3 ___ Start available DHR train.	• ___ IF A DHR Train will be started, THEN **PERFORM** Enclosure 1, Starting A Train DHR, in this procedure. • ___ IF B DHR Train will be started, THEN **PERFORM** Enclosure 2, Starting B Train DHR, in this procedure.
3.4 ___ **EXIT** this procedure.	

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ACTIONS	DETAILS

STATUS

Either of the following conditions exists:

- Rx vessel level is < 132 ft.
- No DHR trains are available.

3.5 ___ Evacuate the RB.

1 ___ Depress "RB EVACUATION" push button.

2 ___ Notify personnel over PA.

3 ___ Repeat PA announcement.

3.6 ___ IF in Modes 5 or 6, THEN establish containment closure.

- **CONCURRENTLY PERFORM** the following:

  ___ Enclosure 3, Containment Closure in Modes 5 or 6, in this procedure.

  ___ SP-346, Enclosure 1, Containment Penetrations Weekly Check During Refueling Operations.

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ACTIONS	DETAILS
3.7 ___ Verify RCS level is ≥ 130.2 ft.	
___ IF RCS level is < 130.2 ft, THEN raise RCS level.	1 Determine RCS makeup sources: ___ RCBTs ___ SF pools ___ BASTs ___ BWST 2 ___ Align an available makeup source. 3 ___ Start addition to RCS to achieve ≥ 130.2 ft.

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ACTIONS	DETAILS
3.8 ___ IF SW cooling is available, THEN ensure SW cooling to RB cooling units.	1 Ensure at least 1 Emergency SW Pump is running: ___ SWP-1A ___ SWP-1B 2 ___ IF an Emergency SW Pump is NOT available, THEN start SWP-1C 3 Ensure at least one Emergency SW RW Pump is running: ___ RWP-2A ___ RWP-2B 4 ___ IF an Emergency SW RW Pump is NOT available, THEN start RWP-1 5 Ensure CI valves to RB cooling units are closed: ___ SWV-151 ___ SWV-152 ___ SWV-355 6 Ensure SW valves to RB cooling units are open: ___ SWV-353 ___ SWV-354

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ACTIONS	DETAILS
3.9 ___ IF SW cooling is NOT available, THEN ensure CI is operating and aligned to RB cooling units.	1 ___ CI system is in operation. 2 SW valves to RB cooling units are closed: ___ SWV-353 ___ SWV-354 3 CI valves to RB cooling units are open: ___ SWV-151 ___ SWV-152 ___ SWV-355
3.10 ___ Ensure proper RB cooling unit operation.	• ___ IF ES has NOT actuated, THEN ensure both ES selected RB cooling units are running in slow speed. • ___ IF ES has actuated, THEN ensure only 1 ES selected RB cooling unit is running in slow speed.

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ACTIONS	DETAILS
3.11 ___ IF both DHR trains are NOT available, THEN isolate DHR from RCS and **GO TO** Step 3.15 in this procedure.	1 Ensure both DHPs are stopped: ___ DHP-1A ___ DHP-1B 2 Close the following valves: ___ DHV-41 ___ DHV-3 ___ DHV-4 ___ DHV-5 ___ DHV-6 3 ___ **GO TO** Step 3.15 in this procedure.
3.12 ___ WHEN RCS level is ≥ 130.2 ft, THEN start available DHR train.	• ___ IF previously running DHR train will be restarted, THEN **PERFORM** Enclosure 4, Venting DHR, in this procedure. • ___ IF A DHR Train will be started, THEN **PERFORM** Enclosure 1, Starting A Train DHR, in this procedure. • ___ IF B DHR Train will be started, THEN **PERFORM** Enclosure 2, Starting B Train DHR, in this procedure.
3.13 ___ Ensure shutdown DHR train is filled and vented as required.	• Notify PPO to **CONCURRENTLY PERFORM** Enclosure 4, Venting DHR, in this procedure.

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ACTIONS	DETAILS
3.14 ___ **EXIT** this procedure.	

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ACTIONS

3.15 ___ Ensure available cooling method and **GO TO** applicable step.

DETAILS

Cooling Method and Step	Criteria
OTSG 3.16	___ RCS filled and vented ___ PZR Htrs available ___ OTSG FW available ___ TBVs or ADVs available ___ OTSG integrity exists ___ Letdown available
Fill fuel transfer canal 3.36	___ Rx vessel head removed ___ Fuel transfer canal integrity exists
HPI 3.51	___ HPI pump with suction from BWST available ___ RCS vent path available
LPI 3.70	___ LPI pumps with suction from BWST available
CFTs 3.79	___ CFT PRESS < RCS NDT ___ CFT level exists
Flood RB sump-LPI 3.84	___ RB sump can be flooded ___ LPI pump with suction from RB sump available
Gravity feed 3.104	___ RCS vented to atmosphere ___ BWST level > Rx vessel ___ Flow path from BWST to RCS available

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ACTIONS	DETAILS

STATUS

OTSG cooling is available.

3.16 ___ Ensure level in available OTSGs is at or trending towards > 90%.

- Establish FW flow to available OTSGs:

  ___ IF EFP-1 is designated pump, THEN start EFP-1

  ___ IF EFP-2 is designated pump, THEN **PERFORM** EOP-14, Enclosure 7, EFP-2 Management, and start EFP-2

  ___ IF AFW is designated feed source, THEN **PERFORM** EOP-14, Enclosure 10, Alternate OTSG Feedwater Supply.

  ___ IF MFW is designated feed source, THEN **PERFORM** EOP-14, Enclosure 8, MFW Restoration.

  See Table 1

3.17 ___ IF TBVs are NOT available, THEN fully open ADVs for available OTSG.

3.18 ___ IF condenser vacuum exists, THEN fully open TBVs for available OTSG.

1 ___ IF MSIVs are closed, THEN **PERFORM** EOP-14, Enclosure 5, MSIV Recovery.

2 ___ Fully open TBVs.

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ACTIONS	DETAILS
3.19 ___ IF a PZR bubble does NOT exist, AND a bubble is desired, THEN begin PZR heatup.	1 ___ Turn on all PZR Htrs. 2 ___ Control PZR heatup rate < 100°F/hr. 3 ___ **CONCURRENTLY PERFORM** EOP-14, Enclosure 15, EOP Temperature Log (PZR TEMP).
3.20 ___ IF a PZR steam bubble exists, THEN use PZR Htrs to maintain adequate SCM. See Table 2	
3.21 ___ IF makeup and letdown are in service, THEN **GO TO** Step 3.25 in this procedure.	

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ACTIONS	DETAILS
3.22 ___ IF MU system is available, THEN place in service.	1 See the following to determine restraints: ___ Scheduled maintenance activities ___ Equipment Clearance Log ___ Equipment Out of Service Log 2 **CONCURRENTLY PERFORM** applicable sections of OP-402, Makeup and Purification System, to establish the following: ___ Suction flow path from MUT to suction of selected MUP ___ Recirc flow path from selected MUP to MUT ___ Selected MUP lube oil system available ___ Normal makeup flow path from selected MUP to RCS

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ACTIONS	DETAILS
3.23 ___ IF at any time, MU system alignments have been verified, THEN start selected MUP.	1 ___ Ensure selected MUP cooling water system is aligned and operating. 2 Ensure selected MUP lube oil is properly aligned: ___ Main lube oil pump in normal after start ___ Backup lube oil pump in normal after stop ___ Main and backup gear oil pumps selected to "AUTO" 3 Start selected MUP: ___ MUP-1A ___ MUP-1B ___ MUP-1C
3.24 ___ Ensure letdown flow is established and PZR level maintained.	1 ___ **CONCURRENTLY PERFORM** EOP-14, Enclosure 4, RCS Letdown Recovery. 2 ___ IF additional letdown flow is desired, THEN notify PPO to throttle open MUV-48 "Block Orifice Bypass" (119 ft AB Block Orifice Room). 3 ___ Maintain PZR level < 125 in.

Applicable carry-over steps:
3.23 IF MU system alignments have been verified, THEN start a MUP.

	ACTIONS	DETAILS
3.25 ___	IF at any time, PZR TEMP reaches T_{sat} for desired RCS PRESS, THEN establish a PZR bubble.	1 ___ Control RCS PRESS using PZR Htrs. 2 ___ Begin lowering PZR level to 100 in (80 to 120 in).
3.26 ___	IF RCP restart is NOT desired, THEN establish high PRESS Aux spray and **GO TO** Step 3.35 in this procedure.	1 ___ **CONCURRENTLY PERFORM** EOP-14, Enclosure 13, High PRESS Aux Spray Lineup. 2 ___ **GO TO** Step 3.35 in this procedure.
3.27 ___	WHEN MU system is in service, THEN ensure seal injection flows are > 3 gpm for each RCP.	
3.28 ___	Determine which RCPs will be started.	• ___ RCPs should be started in RCS loop with available OTSG. • ___ RCP-1B is preferred for maximum PZR spray capability.
3.29 ___	Establish RCS PRESS for desired RCP combination. See OP-103B, Plant Operating Curves.	

Applicable carry-over steps:
3.25 IF PZR TEMP is T_{sat} for RCS PRESS, THEN establish a PZR bubble...

ACTIONS	DETAILS
3.30 ___ Ensure RCP lift oil pump is operating for selected RCPs.	
3.31 ___ Ensure RCP start permissives are satisfied.	
3.32 ___ WHEN adequate RCP NPSH exists, THEN start 2 RCPs.	___ RCP-1A ___ RCP-1C ___ RCP-1B ___ RCP-1D

Applicable carry-over steps:
3.25 IF PZR TEMP is T_{sat} for RCS PRESS, THEN establish a PZR bubble...

ACTIONS

DETAILS

3.33 ___ Verify RCP parameters are within normal limits.

- ___ Verify RCP seal pressures are normal.
- Monitor operating RCP computer groups:

RCP	GROUP
RCP-1A	___ 78
RCP-1B	___ 79
RCP-1C	___ 80
RCP-1D	___ 81

- ___ Notify SPO to monitor RC-190-LI for RCP oil leakage (119 ft IB by East door).

RCP	UPPER CHANNEL	LOWER CHANNEL
RCP-1A	___ #1	___ #2
RCP-1B	___ #3	___ #4
RCP-1C	___ #5	___ #6
RCP-1D	___ #7	___ #8

3.34 ___ IF operating parameters are normal,
THEN stop operating RCP lift oil pumps.

3.35 ___ WHEN DHR system is available,
THEN notify TSC for additional guidance and
EXIT this procedure.

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ACTIONS | DETAILS

STATUS

- Rx vessel head is removed.
- Fuel transfer canal can be flooded.
- DH pumps are not running.

3.36 ___ IF B DHR train will be aligned for fuel transfer canal fill, THEN **GO TO** Step 3.44 in this procedure.

3.37 ___ Align A DHR train for fuel transfer canal fill.

- Close the following valves:
  - ___ DHV-39
  - ___ DHV-42
  - ___ DHV-8
- Open the following valves:
  - ___ DHV-34
  - ___ DHV-5

3.38 ___ Start gravity fill from BWST.

- Throttle DHV-110 to maintain T_{incore} < 200°F.

  See Table 3

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ACTIONS	DETAILS

CAUTION

Minimum level in BWST for DH pump operation is 4.5 ft.

3.39 ___ IF DHP-1A is available, AND increased fill rate is desired, THEN start DHP-1A and required cooling pumps.

1 ___ Select DHV-110 controller to "AUTO" and set for ≤ 1500 gpm.

2 ___ Start DCP-1A

3 ___ Start RWP-3A

4 ___ Start DHP-1A

3.40 ___ Monitor fuel transfer canal fill.

- ___ Throttle DHV-110 to maintain T_{incore} < 200°F.

  See Table 3

- ___ Monitor DHP-1A for cavitation.

3.41 ___ IF at any time, BWST level is ≤ 5 ft, THEN select BWST Htr control switch to "LOCAL".

Applicable carry-over steps:
3.41 IF BWST level is ≤ 5 ft, THEN select BWST Htr control to "LOCAL"...

	ACTIONS	DETAILS
3.42 ___	IF at any time, fuel transfer canal level is ≥ 158 ft, THEN stop fuel transfer canal fill.	1 ___ Stop DHP-1A 2 ___ Stop DCP-1A 3 ___ Stop RWP-3A 4 ___ Close DHV-5 5 ___ Close DHV-34
3.43 ___	WHEN DHR system is available, THEN notify TSC for additional guidance and **EXIT** this procedure.	

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ACTIONS	DETAILS

STATUS

- Rx vessel head is removed.
- Fuel transfer canal can be flooded.
- DH pumps are not running.
- B DHR train will be aligned for fuel transfer canal fill.

3.44 ___	Align B DHR train for fuel transfer canal fill.	1 ___ Close DHV-40 2 ___ Close DHV-43 3 ___ Close DHV-7 4 ___ Open DHV-35 5 ___ Open DHV-6
3.45 ___	Start gravity fill from BWST.	• Throttle DHV-111 to maintain T_{incore} < 200°F. See Table 3

CAUTION

Minimum level in BWST for DH pump operation is 4.5 ft.

3.46 ___	IF DHP-1B is available, AND increased fill rate is desired, THEN start DHP-1B and required cooling pumps.	1 ___ Select DHV-111 controller to "AUTO" and set for ≤ 1500 gpm. 2 ___ Start DCP-1B 3 ___ Start RWP-3B 4 ___ Start DHP-1B

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ACTIONS	DETAILS
3.47 ___ Monitor fuel transfer canal fill.	• ___ Throttle DHV-111 to maintain T_{incore} < 200°F. See Table 3 • ___ Monitor DHP-1B for cavitation.
3.48 ___ IF at any time, BWST level is ≤ 5 ft, THEN select BWST Htr control switch to "LOCAL".	
3.49 ___ IF at any time, fuel transfer canal level is ≥ 158 ft, THEN stop fuel transfer canal fill.	1 ___ Stop DHP-1B 2 ___ Stop DCP-1B 3 ___ Stop RWP-3B 4 ___ Close DHV-6 5 ___ Close DHV-35
3.50 ___ WHEN DHR system is available, THEN notify TSC for additional guidance and **EXIT** this procedure.	

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ACTIONS	DETAILS

STATUS

- HPI cooling is available.
- RCS vent path is available.

3.51 ___ Isolate the RB sump.

- Select RB sump pumps to "PULL TO LOCK":
  - ___ WDP-2A
  - ___ WDP-2B
- Close RB sump discharge valves:
  - ___ WDV-3
  - ___ WDV-4

3.52 ___ Close waste gas header isolation valves.

___ WDV-406
___ WDV-405

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ACTIONS	DETAILS
3.53 ___ Establish MU system alignment for HPI cooling.	1 Align BWST to available MUP valves: ___ MUV-73 ___ MUV-58 2 ___ Ensure MUP cooling supply is established. 3 Ensure MUP lube oil is properly aligned for available MUP: ___ Main lube oil pump running ___ Backup lube oil pump in normal after stop ___ Main and backup gear oil pumps selected to "AUTO"
3.54 ___ Energize one set of HPI valves using "HPI VALVE EMERG POWER SEL" switches.	
3.55 ___ Energize HPI recirc to sump valves.	• ___ Notify PPO to unlock and close DPDP 8A-4 "MUV-543, MUV-544" (A ES 4160V SWGR Room). • ___ Notify PPO to unlock and close DPDP 8B-8 "MUV-545, MUV-546" (B ES 4160V SWGR Room).

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	ACTIONS	DETAILS
3.56 ___	Open HPI recirc to sump valves.	___ MUV-543 ___ MUV-544 ___ MUV-545 ___ MUV-546
3.57 ___	Ensure MUP recirc to MUT valves are closed.	___ MUV-53 ___ MUV-257
3.58 ___	Isolate MUP discharge flow paths.	• Ensure the following valves are closed: ___ MUV-24 ___ MUV-23 ___ MUV-25 ___ MUV-26 ___ MUV-18 ___ MUV-27

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	ACTIONS	DETAILS
3.59 ___	IF a MUP is NOT running, THEN start available MUP.	
3.60 ___	Open HPI valve as required. [Rule 2, HPI Control]	• Throttle HPI valve to maintain T_{incore} < 200 °F. See Table 3
3.61 ___	IF at any time, RCS PRESS approaches NDT, THEN cycle PORV to maintain RCS PRESS < NDT limit. See Figure 1	
3.62 ___	Notify Chemistry to sample RB sump for boron.	

Applicable carry-over steps:
3.61 IF RCS PRESS approaches NDT, THEN cycle PORV to maintain RCS PRESS...

	ACTIONS	DETAILS
3.63 ___	IF at any time, normal DHR is available, THEN notify TSC for additional guidance and **EXIT** this procedure.	

3.64 ___	IF at any time, adequate SCM based on T_{incore} was lost, THEN notify TSC for boron precipitation guidance. See Table 2	

Applicable carry-over steps:
3.61 IF RCS PRESS approaches NDT, THEN cycle PORV to maintain RCS PRESS...
3.63 IF normal DHR is available, THEN notify TSC for additional...
3.64 IF adequate SCM based on T_{incore} was lost, THEN notify TSC...

ACTIONS	DETAILS
3.65 ___ WHEN all the following conditions exist: ___ RB flood level ≥ 2.5 ft ___ LPI pump associated with running MUP is available ___ RB sump boron ≥ that required for shut down margin THEN establish LPI from RB sump on selected train.	1 Ensure BWST recirc valve is closed on selected train: A Train: ___ DHV-8 / B Train: ___ DHV-7 2 Ensure RB sump to DHP valve is open on selected train: A Train: ___ DHV-42 / B Train: ___ DHV-43 3 Ensure BWST to DHP valve is closed on selected train: A Train: ___ DHV-34 / B Train: ___ DHV-35 4 Ensure LPI control is in "AUTO" and set for 1400 gpm on selected train: A Train: ___ DHV-110 / B Train: ___ DHV-111

Applicable carry-over steps:
3.61 IF RCS PRESS approaches NDT, THEN cycle PORV to maintain RCS PRESS...
3.63 IF normal DHR is available, THEN notify TSC for additional...
3.64 IF adequate SCM based on T_{incore} was lost, THEN notify TSC...

ACTIONS	DETAILS
3.66 ___ Start LPI pump and required cooling pumps.	1 Start pumps for selected train:

A Train	B Train
___ DCP-1A	___ DCP-1B
___ RWP-3A	___ RWP-3B
___ DHP-1A	___ DHP-1B

2 Throttle LPI flow to ≤ 1400 gpm on selected train:

A Train	B Train
___ DHV-5	___ DHV-6

3.67 ___ Adjust DC cooling on selected train.

See Table 3

A Train	B Train
___ DCV-177-MS	___ DCV-178-MS

Applicable carry-over steps:
3.61 IF RCS PRESS approaches NDT, THEN cycle PORV to maintain RCS PRESS...
3.63 IF normal DHR is available, THEN notify TSC for additional...
3.64 IF adequate SCM based on T_{incore} was lost, THEN notify TSC...

ACTIONS	DETAILS
3.68 ___ IF at any time, all the following conditions exist: ___ At least 1 LPI pump is running ___ LPI pump aligned to RB sump ___ Associated HPI pump running ___ LPI to HPI alignment is desired OR BWST level is ≤ 4.5 ft THEN align LPI to HPI suction.	1 Adjust LPI flow to ≤ 900 gpm. 2 Open LPI pump discharge to running MUP suction: A Train: ___ DHV-11 / B Train: ___ DHV-12 3 Close BWST to MUP valve: A Train: ___ MUV-73 / B Train: ___ MUV-58

3.69 ___ WHEN normal DHR is available, THEN notify TSC for additional guidance and **EXIT** this procedure.

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ACTIONS	DETAILS

STATUS

LPI cooling is available.

3.70 ___ Isolate the RB sump.

- Select RB sump pumps to "PULL TO LOCK":
  - ___ WDP-2A
  - ___ WDP-2B
- Close RB sump discharge valves:
  - ___ WDV-3
  - ___ WDV-4

3.71 ___ Close waste gas header isolation valves.

___ WDV-406
___ WDV-405

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ACTIONS	DETAILS
3.72 ___ Align LPI for cooling.	1 Close the following valves for selected train:

A Train	B Train
___ DHV-8	___ DHV-7
___ DHV-5	___ DHV-6
___ DHV-75	___ DHV-76
___ DHV-105	___ DHV-106
___ DHV-11	___ DHV-12

2 Open the following valve for selected train:

A Train	B Train
___ DHV-34	___ DHV-35

3 Ensure LPI control valve for selected train is in "AUTO" and set for 1400 gpm:

A Train	B Train
___ DHV-110	___ DHV-111

4 Open the following valve for selected train:

A Train	B Train
___ DHV-5	___ DHV-6

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ACTIONS | DETAILS

CAUTION

Minimum level in BWST for DH pump operation is 4.5 ft.

3.73 ___ Start selected LPI pump and cooling water pumps.

A Train	B Train
___ DCP-1A	___ DCP-1B
___ RWP-3A	___ RWP-3B
___ DHP-1A	___ DHP-1B

3.74 ___ Establish LPI flow.

- Throttle LPI control valve to maintain T_{incore} < 200°F:

A Train	B Train
___ DHV-110	___ DHV-111

See Table 3

3.75 ___ IF at any time, additional LPI flow is required, THEN reduce RCS PRESS.

1 ___ Ensure RCV-11 is open.

2 ___ Cycle the PORV to increase flow.

Applicable carry-over steps:
3.75 IF additional LPI flow is required, reduce RCS PRESS.

ACTIONS	DETAILS
3.76 ___ IF at any time, RB flood level is ≥ 2.5 ft, THEN transfer selected LPI pump suction to RB sump.	1 Throttle selected LPI train flow to ≤ 1400 gpm: A Train: ___ DHV-110 / B Train: ___ DHV-111 2 Open RB sump to DHP valve on selected train: A Train: ___ DHV-42 / B Train: ___ DHV-43 3 Close BWST to DHP valve on selected train: A Train: ___ DHV-34 / B Train: ___ DHV-35 4 Adjust DC cooling on selected train: A Train: ___ DCV-177-MS / B Train: ___ DCV-178-MS See Table 3
3.77 ___ IF at any time, adequate SCM based on T_{incore} was lost, THEN notify TSC for boron precipitation guidance. See Table 2	

Applicable carry-over steps:
3.75 IF additional LPI flow is required, reduce RCS PRESS.
3.76 IF RB flood level is ≥ 2.5 ft, transfer selected LPI pump suction...
3.77 IF adequate SCM based on T_{incore} was lost, THEN notify TSC...

ACTIONS	DETAILS
3.78 ___ WHEN normal DHR is available, THEN notify TSC for additional guidance and **EXIT** this procedure.	

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ACTIONS	DETAILS

STATUS

CFTs are available for core cooling.

3.79 ___ IF CFT PRESS is > RCS PRESS,
THEN establish flow from CFTs.

1 Notify PPO to unlock and close CFT isolation valve Bkrs (119 ft AB):

___ ES MCC 3AB-6B "CFV-5 A CFT Iso"

___ ES MCC 3AB-6C "CFV-6 B CFT Iso"

2 ___ Notify PPO to jog open one or both CFT isolation valves at respective breakers.

___ CFV-5

___ CFV-6

3 Adjust flow to maintain the following:

___ T_{incore} < 200°F

___ RCS PRESS < NDT curve

See Figure 1

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	ACTIONS	DETAILS
3.80 ___	IF at any time, additional CFT PRESS is desired, AND RCS PRESS is < 100 psig, THEN align nitrogen system to applicable CFT.	• Notify SPO to **PERFORM** Enclosure 6, Pressurizing Core Flood Tanks, in this procedure.
3.81 ___	IF at any time, RCS PRESS is > CFT PRESS, OR additional CFT flow is required, THEN reduce RCS PRESS.	1 ___ Ensure RCV-11 is open. 2 ___ Open the PORV.
3.82 ___	IF at any time, adequate SCM based on Tincore was lost, THEN notify TSC for boron precipitation guidance. See Table 2	
3.83 ___	WHEN normal DHR is available, THEN notify TSC for additional guidance and **EXIT** this procedure.	

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ACTIONS | DETAILS

STATUS

- RB sump can be flooded.
- LPI pump with suction from RB sump is available.

3.84 ___ Isolate the RB sump.

- Select RB sump pumps to "PULL TO LOCK":
  - ___ WDP-2A
  - ___ WDP-2B
- Close RB sump discharge valves:
  - ___ WDV-3
  - ___ WDV-4

3.85 ___ Open BWST to DHP valves on selected LPI Train.

A Train	B Train
___ DHV-34	___ DHV-35

3.86 ___ IF alternate RB sump fill path is desired (BWST through fuel transfer canal deep end to RB sump), THEN **GO TO** Step 3.94 in this procedure.

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ACTIONS	DETAILS

3.87 ___ Open RB sump to DHP valves for selected train.

A Train	B Train
___ DHV-42	___ DHV-43

3.88 ___ Close waste gas header isolation valves.

___ WDV-406
___ WDV-405

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ACTIONS	DETAILS
3.89 ___ WHEN RB flood level is ≥ 2.5 ft, THEN establish LPI from RB sump with selected train.	1 Ensure BWST recirc valve on selected train is closed:

A Train	B Train
___ DHV-8	___ DHV-7

2 Open RB sump to DHP valve on selected train:

A Train	B Train
___ DHV-42	___ DHV-43

3 Ensure BWST to DHP valve is closed on selected train:

A Train	B Train
___ DHV-34	___ DHV-35

4 Open LPI injection valve on selected train:

A Train	B Train
___ DHV-5	___ DHV-6

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ACTIONS	DETAILS
3.90 ___ Start LPI pump and required cooling water pumps.	1 Start pumps for selected train: A Train: ___ DCP-1A; ___ RWP-3A; ___ DHP-1A B Train: ___ DCP-1B; ___ RWP-3B; ___ DHP 1B 2 Throttle DHV-110 or DHV-111 to maintain the following: ___ T_{incore} < 200°F ___ Maximum DHR flow ≤ 1400 gpm See Table 3
3.91 ___ Cycle the PORV to maintain RCS PRESS ≤ NDT. See Figure 1	
3.92 ___ IF at any time, adequate SCM based on T_{incore} is lost, THEN notify TSC for boron precipitation guidance. See Table 2	
3.93 ___ WHEN normal DHR is available, THEN notify TSC for additional guidance and **EXIT** this procedure.	

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ACTIONS | DETAILS

STATUS

Alternate RB sump flood method is desired.

3.94 ___ Ensure SFP-2 is stopped.

3.95 ___ Notify PPO to **PERFORM** Enclosure 5, Valve Alignment for Fuel Transfer Canal Gravity Fill, in this procedure.

3.96 ___ WHEN Enclosure 5 is complete, THEN start fuel transfer canal gravity fill.

- Notify PPO to throttle open SFV-13 "BWST Supply Iso" for desired flow rate (119 ft AB by SFPs).

3.97 ___ WHEN RB flood level is ≥ 2.5 ft, THEN restore lineup.

- Notify PPO to close the following:
  - ___ SFV-13 "BWST Supply Iso" (119 ft AB by SFPs)
  - ___ SFV-19 "Fuel Transfer Canal AB Iso" (119 ft AB penetration area)

3.98 ___ Close waste gas header isolation valves.

___ WDV-406
___ WDV-405

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ACTIONS	DETAILS
3.99 ___ Establish LPI from RB sump with selected train.	1 Ensure BWST recirc valve on selected train is closed:

A Train	B Train
___ DHV-8	___ DHV-7

2 Open RB sump to DHP valve on selected train:

A Train	B Train
___ DHV-42	___ DHV-43

3 Ensure BWST to DHP valve is closed on selected train:

A Train	B Train
___ DHV-34	___ DHV-35

4 Open LPI injection valve on selected train:

A Train	B Train
___ DHV-5	___ DHV-6

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ACTIONS	DETAILS
3 100 ___ Start LPI pump and required cooling water pumps.	1 Start pumps for selected train: A Train: ___ DCP-1A; ___ RWP-3A; ___ DHP-1A B Train: ___ DCP-1B; ___ RWP-3B; ___ DHP-1B 2 Throttle DHV-110 or DHV-111 to maintain the following: ___ T_{incore} < 200°F ___ Maximum DHR flow ≤ 1400 gpm See Table 3
3.101 ___ Cycle the PORV to maintain RCS PRESS ≤ NDT. See Figure 1	
3.102 ___ IF at any time, adequate SCM based on T_{incore} was lost, THEN notify TSC for boron precipitation guidance. See Table 2	
3.103 ___ WHEN normal DHR is available, THEN notify TSC for additional guidance and **EXIT** this procedure.	

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ACTIONS | DETAILS

STATUS

- Gravity feed from BWST to RCS is available.
- RCS vent path is available.

3.104 ___ IF B DHR train will be aligned for gravity feed, THEN GO TO Step 3.110 in this procedure.

3.105 ___ Align A DHR train for gravity feed from BWST.

1 ___ Close DHV-39

2 ___ Close DHV-42

3 ___ Close DHV-8

4 ___ Open DHV-34

5 ___ Open DHV-5

3.106 ___ IF RCS vent path is upper OTSG hand holes, OR upper primary manway, THEN start gravity fill from BWST.

- ___ Throttle DHV-110 to maintain T_{incore} < 200°F during fill.

  See Table 3

- ___ Monitor BWST level.

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ACTIONS	DETAILS
3.107 ___ IF alternate vent paths exist, THEN start gravity fill.	• ___ Throttle DHV-110 to maintain T_{incore} < 200°F during fill. See Table 3 • ___ Monitor applicable level instrumentation during fill: ___ BWST level ___ PZR level ___ Rx vessel level ___ Hot leg level
3.108 ___ IF at any time, adequate SCM based on T_{incore} was lost, THEN notify TSC for boron precipitation guidance. See Table 2	
3.109 ___ WHEN normal DHR is available, THEN notify TSC for additional guidance and **EXIT** this procedure.	

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ACTIONS	DETAILS

STATUS

B DHR train will be aligned for gravity feed from BWST.

3.110 ___ Align B DHR train for gravity feed from BWST.

1 ___ Close DHV-40

2 ___ Close DHV-43

3 ___ Close DHV-7

4 ___ Open DHV-35

5 ___ Open DHV-6

3.111 ___ IF RCS vent path is upper OTSG hand holes, OR upper primary manway, THEN start gravity fill from BWST.

- ___ Throttle DHV-111 to maintain T_{incore} < 200°F during fill.

  See Table 3

- ___ Monitor BWST level.

3.112 ___ IF alternate vent paths exist, THEN start gravity fill.

- ___ Throttle DHV-111 to maintain T_{incore} < 200 °F.

  See Table 3

- ___ Monitor applicable level instrumentation during fill:

  ___ BWST level

  ___ PZR level

  ___ Rx vessel level

  ___ Hot leg level

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ACTIONS	DETAILS
3.113 ___ IF at any time, adequate SCM based on T_{incore} was lost, THEN notify TSC for boron precipitation guidance.	See Table 2
3.114 ___ WHEN normal DHR is available, THEN notify TSC for additional guidance and **EXIT** this procedure.	

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5.0 ENCLOSURE 1 STARTING A DHR TRAIN

ACTIONS	DETAILS
1.1 ___ Ensure DHP-1B is not running.	
1.2 ___ Position DCV-177-MS to "0" for minimum cooling.	
1.3 ___ Align DHP-1A for DHR.	• Ensure the following valves are closed: ___ DHV-34 ___ DHV-42 ___ DHV-8 ___ DHV-75 ___ DHV-105 ___ DHV-11 ___ DHV-76 ___ DHV-106 ___ DHV-40 ___ DHV-6
1.4 ___ Open DHP-1A isolation valves.	___ DHV-39 ___ DHV-5

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ACTIONS	DETAILS
1.5 ___ Align drop line for DHR operation.	1 ___ Open DHV-41 2 ___ Open DHV-3 3 ___ Open DHV-4
1.6 ___ Start A DHR train.	1 ___ Start DCP-1A 2 ___ Start RWP-3A 3 ___ Start DHP-1A 4 ___ Throttle DHV-110 to maintain approximately 3000 gpm.
1.7 ___ Stabilize RCS TEMP as desired for plant conditions.	• ___ Adjust DCV-177-MS for desired cooling. See Table 3 • ___ Monitor "Cooler Outlet" TEMP (DH-2-TI1) to determine RCS cooling.
1.8 ___ **EXIT** this enclosure.	

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4.0 ENCLOSURE 2 STARTING B DHR TRAIN

ACTIONS	DETAILS
2.1 ___ Ensure DHP-1A is not running.	
2.2 ___ Position DCV-178-MS to "0" for minimum cooling.	
2.3 ___ Align DHP-1B for DHR.	• Ensure the following valves are closed: ___ DHV-35 ___ DHV-43 ___ DHV-7 ___ DHV-76 ___ DHV-106 ___ DHV-12 ___ DHV-75 ___ DHV-105 ___ DHV-39 ___ DHV-5
2.4 ___ Open DHP-1B isolation valves.	___ DHV-40 ___ DHV-6

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ACTIONS	DETAILS
2.5 ___ Align drop line for DHR operation.	1 ___ Open DHV-41 2 ___ Open DHV-3 3 ___ Open DHV-4
2.6 ___ Start B DHR train.	1 ___ Start DCP-1B 2 ___ Start RWP-3B 3 ___ Start DHP-1B 4 ___ Throttle DHV-111 to maintain approximately 3000 gpm.
2.7 ___ Stabilize RCS TEMP as desired for plant conditions.	• ___ Adjust DCV-178-MS for desired cooling. See Table 3 • ___ Monitor "Cooler Outlet" TEMP (DH-2-TI2) to determine RCS cooling.
2.8 ___ **EXIT** this enclosure.	

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4.0 ENCLOSURE 3 CONTAINMENT CLOSURE IN MODES 5 OR 6

ACTIONS	DETAILS
3.1 ___ Ensure containment closure.	• ___ Ensure equipment hatch is closed and held in place by ≥ 16 bolts. • ___ Ensure ≥ 1 door in each air lock is closed.
3.2 ___ IF RB purge is in progress, THEN stop RB purge.	1 Notify SPO to ensure purge heaters are de-energized (Unit 480V SWGR Room): ___ 480V HEATING AUX BUS 3-3A "AHHE-16A A RB Purge Heating Coil" ___ 480V HEATING AUX BUS 3-4A "AHHE-16B B RB Purge Heating Coil" 2 Ensure all main purge valves are closed: ___ AHV-1C ___ AHV-1B ___ AHV-1D ___ AHV-1A 3 Ensure both RB purge supply fans are off: ___ AHF-6A ___ AHF-6B 4 Ensure both RB purge exhaust fans are off: ___ AHF-7A ___ AHF-7B

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ACTIONS		DETAILS
3.3	___ Determine if in progress work involves open containment penetrations.	• Review Containment Penetration log.
3.4	___ Notify Shop Supervisors to initiate containment closure requirements.	

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4.0 ENCLOSURE 4 VENTING DHR

	ACTIONS	DETAILS
4.1 ___	IF B DHR train will be filled and vented, THEN GO TO Step 4.9 in this enclosure.	
4.2 ___	Isolate A DHR train.	• Close the following valves: ___ DHV-39 ___ DHV-5
4.3 ___	Open DHV-8	

NOTE

Opening DHV-10 may cause backflow from the BWST.

4.4 ___	Notify PPO to open DHV-10 "DH Recirc Iso Bypass" (95 ft AB Triangle Room).	
4.5 ___	WHEN DHV-10 is open, THEN notify PPO to cycle DHV-19 "DHP-1A vent" (75 ft AB A DH Room) to vent DHP-1A	
4.6 ___	WHEN venting is complete THEN notify PPO to close DHV-10 "DH Recirc Iso Bypass" (95 ft AB Triangle Room).	

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ACTIONS	DETAILS

4.7 ___ Close DHV-8

4.8 ___ **EXIT** this enclosure.

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ACTIONS DETAILS

STATUS

Venting Train B DHR is desired.

4.9 ___ Isolate B DHR train.

- Close the following valves:
  - ___ DHV-40
  - ___ DHV-6

4.10 ___ Open DHV-7

NOTE

Opening DHV-10 may cause backflow from the BWST.

4.11 ___ Notify PPO to open DHV-10 "DH Recirc Iso Bypass" (95 ft AB Triangle Room).

4.12 ___ WHEN DHV-10 is open, THEN notify PPO to cycle DHV-30 "DHP-1B vent" (75 ft AB B DH Room) to vent DHP-1B

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ACTIONS	DETAILS
4.13 ___ WHEN venting is complete, THEN notify PPO to close DHV-10 "DH Recirc Iso Bypass" (95 ft AB Triangle Room).	
4.14 ___ Close DHV-7	
4.15 ___ EXIT this enclosure.	

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4.0 ENCLOSURE 5 VALVE ALIGNMENT FOR FUEL TRANSFER CANAL GRAVITY FILL

Valve	Description	Position	Initial
	AUX BUILDING		
SFV-13	BWST Supply Iso (119 ft AB by SFPs)	Closed	
SFV-180	Fuel Transfer Tube Drain (119 ft AB under stairs behind SF AH units)	Locked Closed	
SFV-181	Fuel Transfer Tube Drain (119 ft AB under stairs behind SF AH units)	Locked Closed	
SFV-20	SFP to Fuel Transfer Canal (119 ft AB by SFPs)	Closed	
SFV-88	Fuel Transfer Canal to SFP Suction (119 ft AB by SFPs)	Open	
SFV-19	Fuel Transfer Canal AB Iso (119 ft AB penetration area)	Open	
SFV-21	SFP-2 Suction Iso (119 ft AB by SFPs)	Closed	
SFV-12	SFP Suction Iso (119 ft AB by SFPs on mezzanine)	Closed	
SFV-14	SF Cask Area Iso (119 ft AB by SFPs on mezzanine)	Closed	
	REACTOR BUILDING		
SFV-18	Fuel Transfer Canal RB Iso (129 ft RB by B CFT Room)	Open	
SFV-187	RB Header Drain (119 ft RB by SFV-18)	Closed	
SFV-5	Fuel Transfer Canal Iso (119 ft RB above CFT-1B)	Open	
SFV-83	Fuel Transfer Canal Drain (95 ft RB by RB sump)	Open	
SFV-84	Fuel Transfer Canal Drain (95 ft RB by RB sump)	Open	

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4.0 ENCLOSURE 6 PRESSURIZING CORE FLOOD TANKS

ACTIONS	DETAILS
6.1 ___ Align the N_2 system to pressurize CFTs.	1 ___ Open "Low Pressure Nitrogen Header Iso" valves (119 ft TB by rollup door): ___ NGV-154 ___ NGV-156 2 ___ Close breaker ACDP 4-18 for NGHE-1 (Unit 480V SWGR Room). 3 ___ Ensure NGV-9 "High Pressure Nitrogen Header Iso" is closed (95 ft TB by FWP-1A). 4 ___ Ensure NGHE-1 "Nitrogen Heater Control Switch" is in the "ON" position (95 ft IB by EFP-2). 5 ___ Unlock and open NGV-4 "Low Pressure Nitrogen Cross-Tie Iso" (95 ft IB by EFP-2).
6.2 ___ IF pressurizing CFT-A, THEN notify Control Room to open CFV-28	
6.3 ___ IF pressurizing CFT-B, THEN notify Control Room to open CFV-27	
6.4 ___ WHEN pressurizing is complete, THEN notify Control Room to close CF isolation valves.	___ CFV-28 ___ CFV-27

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ACTIONS		DETAILS
6.5	___	Select NGHE-1 "Nitrogen Heater Control Switch" to "OFF" (95 ft IB by EFP-2).

6.6 ___ **EXIT** this enclosure.

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5.0 FIGURE 1 RCS TEMP VS PRESS (0 TO 550 PSIG)

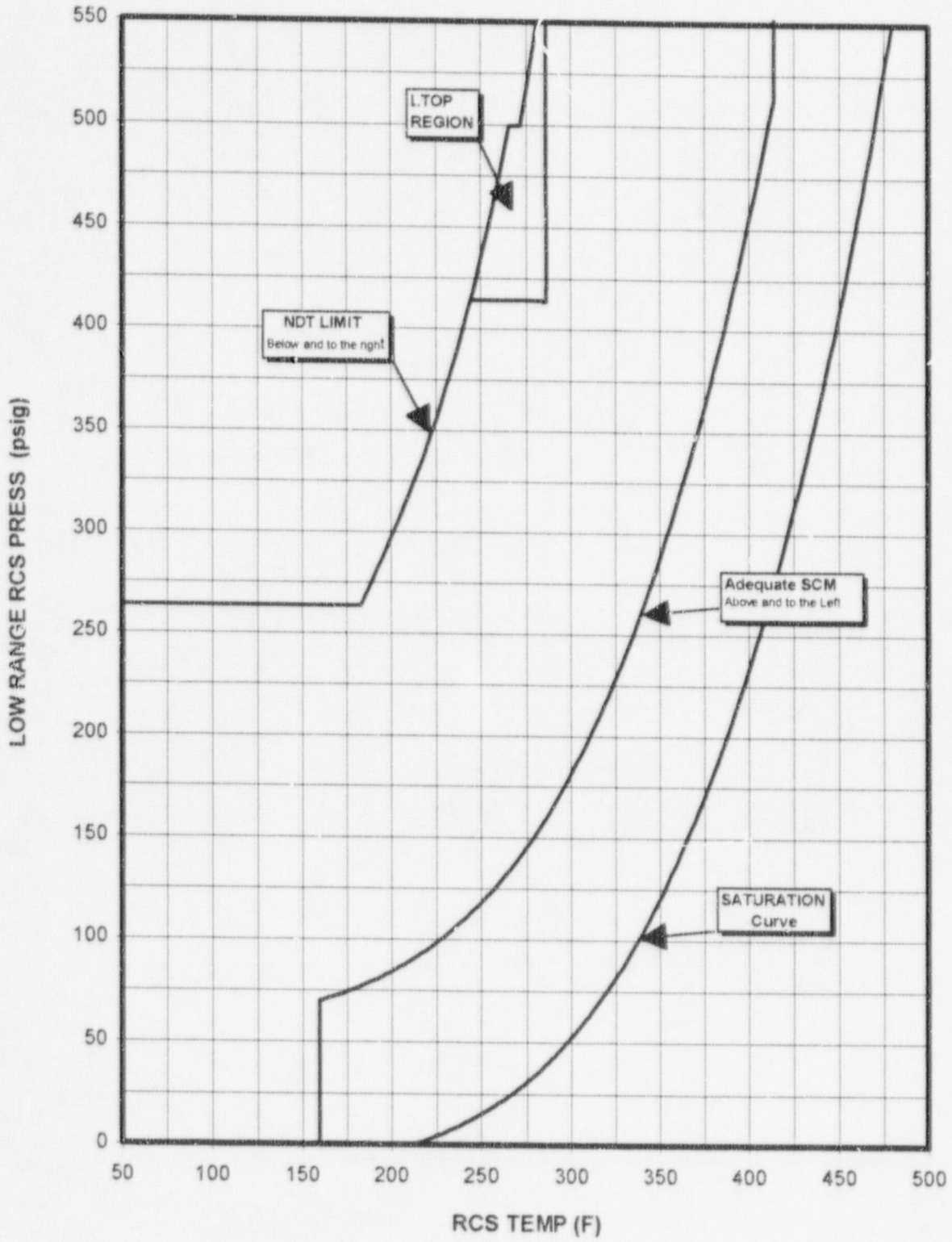

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Table 1:
Feedwater Source Limits

Parameter		Limit
MFW	Flow to the high nozzles	< 0.7 X 10^6 lbm/hr
MFW	TEMP to the high nozzles	< 150°F
AFW	Pump flow limit	< 600 gpm with CST > 5 ft

Table 2:
Adequate SCM

RCS	SCM
> 1500 psig	≥ 30°F
≤ 1500 to > 350 psig	≥ 50°F
≤ 350 psig	SPDS
≤ 160°F	N/A

Table 3:
Cooldown Rate Limits

RCP Status	RCS TEMP	Cooldown Rate
≥ 1 RCP	> 280°F	≤ 50°F/½ hr
	280 to 150°F	≤ 25°F/½ hr
No RCPs	> 150°F	≤ 25°F/½ hr
	<150°F	≤ 5°F/½ hr