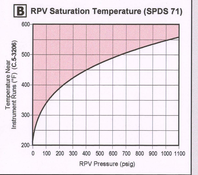
C.5-2007 FAILURE TO SCRAM

A RPV Water Level Instruments

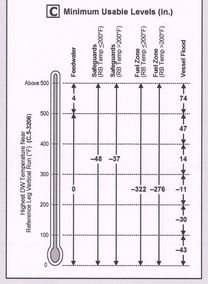
An RPV water level instrument may not be reliable if:

- Temperatures near runs for that Instrument are at or above Fig B, RPV Saturation Temperature (SPDS 71).....C.5-3206
  OR
- Level is below Fig C, Minimum Usable Levels

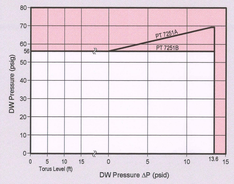
B RPV Saturation Temperature (SPDS 71)



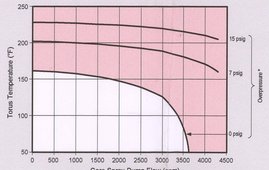
C Minimum Usable Levels (in.)



D DW Pressure Limit (SPDS 81)

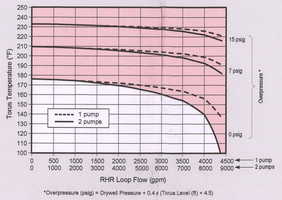


E Core Spray NPSH Limit (SPDS 73)



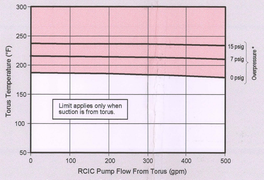
*Overpressure (psig) = Drywell Pressure + 0.4 x (Torus Level (ft) + 4.5)

F RHR NPSH Limit (SPDS 74)



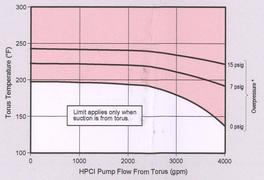
*Overpressure (psig) = Drywell Pressure + 0.4 x (Torus Level (ft) + 4.5)

G RCIC NPSH Limit (SPDS 75)



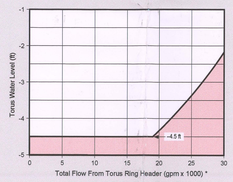
*Overpressure (psig) = Drywell Pressure + 0.4 x (Torus Level (ft) + 4.5)

H HPCI NPSH Limit (SPDS 76)



*Overpressure (psig) = Drywell Pressure + 0.4 x (Torus Level (ft) + 4.5)

I ECCS Vortex Limit (SPDS 77)



*Total Flow = RHR + Core Spray + HPCI + RCIC

START

While in this procedure:

IF	THEN
All rods inserted to at least 04 OR Reactor will stay shutdown under all conditions without boron	1. Stop injecting boron. 2. **RETURN TO RPV CONTROL:** Leave this procedure → Enter C.5-1100

Perform the following while continuing here:

- Inhibit ADS.
- IF.....any main steam line is open, THEN...defeat low-low RPV water level MSIV isolation.....C.5-3301
- Prevent Core Spray injection.....C.5-3205

LEVEL

Check Detail A for instrument limits.

5 Verify needed auto actions while continuing here:

- Isolations
- ECCS start, except Core Spray
- Diesel generator start

	IF	THEN
	RPV water level unknown	**FLOOD THE RPV:** Leave Level and Pressure → Enter C.5-2006 at ②.
EAL FU1.1	Cannot stay within Fig D, DW Pressure Limit (SPDS 81)	Stop RPV injection from outside the primary containment not needed for core cooling or to shut down the reactor.

	IF	AND	AND	AND	THEN
EAL SS2.1	Reactor power above 3.5% or unknown	RPV water level above –33 in.	----------	----------	Go to ⑦.
		RPV water level above –126 in. (TAF)	SRV open OR Drywell pressure above 1.84 psig	Torus temperature above 110°F	

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⚠ **Injecting too fast may damage the core and RPV!**

Using only preferred ATWS systems (Detail J), maintain RPV water level –149 to 48 in.

Check Detail A for instrument limits.

MSIVs close and ECCS start at –47 in.

	IF	AND	THEN
EAL SG2.1	Cannot restore and maintain level above –149 in. with Preferred ATWS Systems (Detail J)	You have not performed C.5-2002, "Emergency RPV Depressurization"	**BLOW DOWN:** Leave Level and Pressure → Enter C.5-2002.
EAL FG1.1		You have performed C.5-2002, "Emergency RPV Depressurization"	1. Use Preferred and Alternate ATWS Systems (Details J, K). 2. IF.....you still cannot restore and maintain level above –149 in., AND.... TSC has command, THEN...**FLOOD DW:** Leave all EOPs → Enter all SAMGs

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1. Prevent RPV Injection from the systems listed below until RPV water level drops to –33 in.....C.5-3205
   - Condensate/Feedwater
   - HPCI
   - LPCI
   - Alternate ATWS Injection Systems, except SBLC (Detail K)
2. Let level continue to drop until:
   - Power drops below 3.5%
     OR
   - All SRVs stay closed and DW pressure stays below 1.84 psig
     OR
   - Level reaches –126 in. (TAF)
3. Record final level: _____

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⚠ **Injecting too fast may damage the core and RPV!**

Using only preferred ATWS systems (Detail J), maintain RPV water level between –149 in. and the level you lowered it to.

Check Detail A for instrument limits.

	IF	AND	THEN
EAL SG2.1	Cannot restore and maintain level above –149 in. with Preferred ATWS Systems (Detail J)	You have not performed C.5-2002, "Emergency RPV Depressurization"	**BLOW DOWN:** Leave Level and Pressure → Enter C.5-2002.
EAL FG1.1		You have performed C.5-2002, "Emergency RPV Depressurization"	1. Use Preferred and Alternate ATWS Systems (Details J, K). 2. IF.....you still cannot restore and maintain level above –149 in., AND.... TSC has command, THEN...**FLOOD DW:** Leave all EOPs → Enter all SAMGs

WAIT until Hot Shutdown Boron Injected (SBLC tank level below 1040 gal).

IF	THEN
Power rises and keeps going up	Return to ⑦.

Restore and maintain RPV water level 9 to 48 in.

Check Detail A for instrument limits.

	IF	AND	THEN
	Cannot restore and maintain level above 9 in.	----------	Maintain level above –149 in.
EAL FG1.1	Cannot restore and maintain level above –149 in.	You have not performed C.5-2002, "Emergency RPV Depressurization"	**BLOW DOWN:** Leave Level and Pressure → Enter C.5-2002.
		You have performed C.5-2002, "Emergency RPV Depressurization"	1. Use Preferred and Alternate ATWS Systems (Details J, K). 2. IF.....you still cannot restore and maintain level above –149 in., AND.... TSC has command, THEN...**FLOOD DW:** Leave all EOPs → Enter all SAMGs

Go To ⑥

J Preferred ATWS Injection Systems

⚠ **Exceeding NPSH or Vortex Limits may damage systems (Figs E–I; SPDS 73–77).**

- Condensate/Feedwater
- CRD.....C.5-3204
- RCIC
  - ⚠ **Exceeding 180°F suction temperature may damage system.**
  - Use CST suction if available.
  - OK to defeat low pressure and high temperature isolations.....C.5-3201
- HPCI
  - ⚠ **Exceeding 180°F suction temperature may damage system.**
  - Use CST suction if available.
  - OK to defeat high torus level suction transfer and high temperature isolation.....C.5-3202
- LPCI
  - Use HXs as soon as you can.
  - OK to defeat 5 min. timer.....C.5-3207

K Alternate ATWS Injection Systems

- Core Spray
  - ⚠ **Exceeding NPSH or Vortex Limit may damage system (Figs E, I; SPDS 73, 77).**
- RHRSW A crosstie to LPCI.....C.5-3203
- Condensate Service to pressurization station.....C.5-3203
- Service Water crosstie to Condensate/Feedwater...C.5-3203
- Fire Water crosstie to LPCI.....C.5-3203
- SBLC.....C.5-3203

⑩ Return from C.5-2002

IF	THEN
RPV water level unknown	**FLOOD THE RPV:** Leave Level and Pressure → Enter C.5-2006 at ②.
Cannot stay within Fig D, DW Pressure Limit (SPDS 81)	Stop RPV injection from outside the primary containment not needed for core cooling or to shut down the reactor.

Any SRV open ? (No / Yes)

WAIT until RPV pressure is below value in Table L

L RPV Pressures

Number of Open SRVs	RPV Pressure (psig)
3 or more	266
2	406
1	826

⚠ **Injecting too fast may damage the core and RPV!**

Using only Preferred ATWS Systems (Detail J), slowly restart injecting and raise RPV water level above –149 in.

Check Detail A for instrument limits.

Can you restore level above –149 in. ? (No / Yes)

⚠ **Injecting too fast may damage the core and RPV!**

Using Preferred and Alternate ATWS Systems (Details J, K), slowly raise level above –149 in.

Check Detail A for instrument limits.

Can you restore level above –149 in. ? (No / Yes)

IF	THEN
You can restore level above –149 in.	Go to ③.

Go to ①

WAIT until TSC has command

FLOOD DW: Leave all EOPs → Enter all SAMGs (EAL FG1.1)

9 Was level lowered (at ⑦) before the blowdown ? (No / Yes)

Return to ③. (No)

Return to ③. (Yes)

Go to ③

PRESSURE

	IF	THEN
EAL FA1.1	DW pressure above 1.84 psig	Before RPV pressure drops to 320 psig, prevent LPCI injection not needed for core cooling.....C.5-3205
	Boron injection required by Power section of this procedure AND Main condenser usable as heat sink AND No steam line break indication	Open MSIVs. Use condenser as heat sink. OK to defeat low-low RPV water level MSIV isolation.....C.5-3301

Rapid SRV cycling ? (No / Yes)

Manually open enough SRVs to lower RPV pressure to 930 psig.

⑪ Stabilize RPV pressure below 1056 psig using main turbine bypass valves.

Use other methods listed below if needed.....C.5-3302

- SRVs....only if torus level is above –5.9 ft.
  - Use preferred sequence if you can.
  - If SRV pneumatics lost:
    - Place SRV D switch in AUTO.
    - Place SRV G switch in CLOSE
    - Place DIV I SRV LO-LO SET LOGIC switch in BYPASS.
- LO-LO SET....only if torus level is above –5.9 ft.
  - If SRV pneumatics lost:
    - Place SRV G switch in CLOSE
    - Place DIV II SRV LO-LO SET LOGIC switch in BYPASS.
- RCIC
  - ⚠ **Exceeding NPSH Limit, Vortex Limit, or 180°F suction temperature may damage system (Figs G, I; SPDS 75, 77).**
  - Use CST suction if available.
  - OK to defeat low pressure and high temperature isolations.....C.5-3201
- HPCI
  - ⚠ **Exceeding NPSH Limit, Vortex Limit, or 180°F suction temperature may damage system (Figs H, I; SPDS 76, 77).**
  - Use CST suction if available.
  - OK to defeat high torus level suction transfer and high temperature isolation.....C.5-3202
- SJAEs
- Gland Steam
- Recombiners
- Deaerating steam to main condenser
- Main steam line drains
- RWCU, normal mode
  - Bypass regen HXs and filter/demins as soon as you can.
  - OK to defeat isolation interlocks, including SBLC.
- RWCU, dump mode...only if no boron injected.

WAIT until: Reactor shutdown with no boron injected **OR** Cold Shutdown Boron injected (SBLC tank level below 475 gal)

IF	THEN
Reactor critical	Return to ⑪.

Depressurize the RPV.

- Maintain cooldown rate below 100°F/hr.
- If SRV pneumatics lost, minimize number of SRV cycles.

WAIT until Shutdown Cooling Interlock clears (75 psig)

Cool down to cold shutdown using Shutdown Cooling.

- Do not use RHR pumps you need for maintaining RPV water level above 9 in.
- Maintain cooldown rate below 100°F/hr.

IF	THEN
Cannot use Shutdown Cooling	Maintain RPV pressure below 75 psig (shutdown cooling interlock) using other pressure control systems.....C.5-3302

EALs SS4.1 SG2.1

POWER

Reactor critical ? (No / Yes)

Any boron injected ? (No / Yes)

ENTER SCRAM PROCEDURE: Leave Power → Enter C.4-A

EAL SA2.1 Place mode switch in SHUTDOWN.

Run back recirc.

Trip recirc pumps.

Actuate ATWS.

EAL SS2.1 Insert control rods while continuing here.....C.5-3101

IF	THEN
Power oscillating more than 25%	**INJECT BORON:** Go to ⑳.

BEFORE Torus temperature reaches 110°F (Start SBLC)

⑫ Start SBLC.

If using RWCU for pressure control, verify regen HX and filter/demin bypassed.

IF	THEN
Cannot inject boron with SBLC	Use alternate methods: CRD.....C.5-3102 RWCU....C.5-3103

D-01

MONTICELLO NUCLEAR GENERATING PLANT
EMERGENCY OPERATING PROCEDURE

Title	FAILURE TO SCRAM	
Number	C.5-2007	Revision 15