C4
RPV FLOODING

START

While executing this procedure:		
IF	**AND**	**THEN**
RPV water level can be determined	All control rods are not inserted to at least position 02 **AND** The reactor will not remain shutdown without boron	Exit this procedure and enter C5, Level/Power Control and RPV Control Section RP at (C) and execute them concurrently
	All control rods are inserted to at least position 02 **OR** The reactor will remain shutdown without boron	Exit this procedure and enter RPV Control Section RL at (A) and Section RP at (C) and execute them concurrently
Primary containment water level and suppression chamber pressure cannot be maintained below the Maximum Primary Containment Water Level Limit (Figure C4-1)	.....	Irrespective of whether adequate core cooling is assured, terminate injection into the Primary Containment from sources external to the Primary Containment until primary containment water level and suppression chamber pressure can be maintained below the curve (Figure C4-1)

NOTE: C2, Emergency RPV Depressurization is required (via RPV Control Section RP) when executing this procedure if less than 7 SRVs are open

Are all control rods inserted to at least position 02 ?
- No
- Yes

Will the reactor remain shutdown without boron ?
- No
- Yes

While executing the following steps:		
IF	**AND**	**THEN**
All control rods are inserted to at least position 02 **OR** The reactor will remain shutdown without boron	RPV water level cannot be determined	Continue at (K)

Terminate and prevent all injection into the RPV except from boron injection systems and CRD

Can any SRV be opened ?
- No
- Yes

WAIT until RPV pressure is below the Minimum Alternate RPV Flooding Pressure (Figure C4-2)

Can at least 4 SRVs be opened ?
- No
- Yes

Close the following valves:
- MSIVs
- Main steam line drain valves
- RCIC / RHR steam line isolation valves

CAUTION: Raising injection flow rapidly may induce a large power excursion and result in substantial core damage

Commence and slowly raise injection into the RPV with the following systems until:
- At least one SRV is open
  AND
- RPV pressure is above the Minimum Alternate RPV Flooding Pressure for the number of SRVs which can be opened (Figure C4-2)
  - Feedwater pumps
    - Defeat high RPV water level trip interlocks, if necessary (EOP-6, Att 20)
  - Condensate pumps
  - CRD (OP-30, Section H.7)

IF	THEN

No SRV is open
OR
RPV pressure cannot be raised to above the Minimum Alternate RPV Flooding Pressure (Figure C4-2)
	Commence and, irrespective of pump NPSH and vortex limits, slowly raise injection with the following systems until:
	• At least one SRV is open
	AND
	• RPV pressure is above the Minimum Alternate RPV Flooding Pressure for the number of SRVs which can be opened (Figure C4-2)
	  • HPCS (EOP-6, Att 3)
	  ☛ Defeat high RPV water level isolation interlocks, if necessary by placing E22A-S26 to TEST
	  • LPCS (EOP-6, Att 3)
	  • LPCI, with injection through the heat exchangers as soon as possible (EOP-6, Att 3)
	  • RHR Service Water crosstie (EOP-6, Att 5)
	  • Fire System (EOP-6, Att 6)
	  • ECCS Keep-Full systems (EOP-6, Att 7)
	  • Condensate Transfer (EOP-6, Att 8)

IF	THEN
No SRV is open **OR** RPV pressure cannot be raised to above the Minimum Alternate RPV Flooding Pressure (Figure C4-2)	**PRIMARY CONTAINMENT FLOODING IS REQUIRED;** Exit this procedure and enter C6, Primary Containment Flooding and RPV Control Section RP at (C) and execute them concurrently.

(O) Primary Containment Control Section SPL

Control injection to maintain RPV pressure above the Minimum Alternate RPV Flooding Pressure for the number of SRVs which can be opened (Figure C4-2), but as low as practicable

WAIT until All control rods are inserted to at least position 02 **OR** The reactor will remain shutdown without boron

(K)

Can at least 4 SRVs be opened ?
- No
- Yes

Is a HPCS or Feedwater pump available for injection ?
- No
- Yes

Close the following valves:
- MSIVs
- Main steam line drain valves
- RCIC / RHR steam line isolation valves

(L)

Commence and, irrespective of pump NPSH and vortex limits, raise injection into the RPV with the following systems until:
- At least 4 SRVs are open
  AND
- RPV pressure is not dropping and is 61 psig or more above suppression chamber pressure
  - HPCS
    - ☛ Defeat high RPV water level isolation interlocks, if necessary by placing E22A-S26 to TEST
  - Feedwater pumps
    - ☛ Defeat high RPV water level trip interlocks, if necessary (EOP-6, Att 20)
  - LPCS
  - LPCI with injection through the heat exchangers as soon as possible.
  - Condensate pumps
  - CRD (OP-30, Section H.7)
  - RHR Service Water crosstie (EOP-6, Att 5)
  - Fire system (EOP-6, Att 6)
  - ECCS Keep-Full systems (EOP-6, Att 7)
  - SLC (test tank) (EOP-6, Att 9)
  - SLC (boron tank) (OP-36A, Section H.1)
  - Condensate Transfer (EOP-6, Att 8)

Suppression chamber pressure: _____
+ 61
Target RPV pressure: = _____

Time RPV target pressure achieved: _____

IF	THEN
Less than 4 SRVs are open **OR** RPV pressure cannot be maintained at least 61 psig above suppression chamber pressure	**PRIMARY CONTAINMENT FLOODING IS REQUIRED;** Exit this procedure and enter C6, Primary Containment Flooding and RPV Control Section RP at (C) and execute them concurrently.

(O) Primary Containment Control Section SPL

Control injection to maintain at least 4 SRVs open and RPV pressure at least 61 psig above suppression chamber pressure, but as low as practicable

WAIT until RPV water level instrumentation is available **AND** Hottest drywell temperature is below 212°F **AND** RPV pressure has remained at least 61 psig above suppression chamber pressure for at least the Minimum Core Flooding Interval (Figure C4-3)

Terminate all injection into the RPV and reduce RPV water level until RPV water level indication is restored

Time termination commenced: _____
Core uncovery time (Figure C4-4): + _____
Time to reestasblish injection: = _____

IF	THEN
RPV water level indication is not restored within the Maximum Core Uncovery Time Limit (Figure C4-4) after commencing termination of injection into the RPV	Return to (L)

Exit this procedure and enter RPV Control Section RL at (A) and Section RP at (C) and execute them concurrently

FIGURE C4-1
MAX PRIMARY CONTAINMENT WATER LEVEL LIMIT

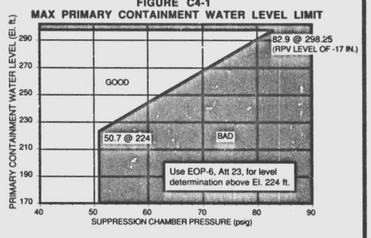


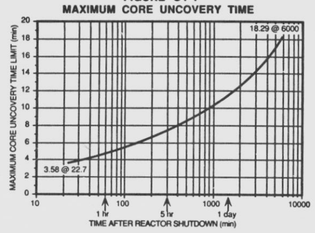
FIGURE C4-2
MINIMUM ALTERNATE RPV FLOODING PRESSURE

NUMBER OF OPEN SRVs	MINIMUM ALTERNATE RPV FLOODING PRESSURE (psig)
7 or more	135
6	160
5	195
4	247
3	334
2	508
1	1031

FIGURE C4-3
MINIMUM CORE FLOODING INTERVAL

NUMBER OF OPEN SRVs	MINIMUM CORE FLOODING INTERVAL (min)
7 or more	23
6	32
5	49
4	82

FIGURE C4-4
MAXIMUM CORE UNCOVERY TIME



NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT NUCLEAR STATION UNIT 2
EMERGENCY OPERATING PROCEDURE

FOR INFORMATION ONLY

Plant Manager, NMP2: PB Ebert Date: 1/10/91

This procedure not to be used after: December 1992 Subject to periodic review.

TITLE: **RPV FLOODING**

Procedure Number: **N2-EOP-C4** Rev: **4**

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