FOR INFORMATION ONLY

EOP-4 PRIMARY CONTAINMENT CONTROL

ENTRY CONDITIONS

Primary containment hydrogen above 3%	Drywell temperature above 135°F	Drywell pressure above 2.7 psig	Torus temperature above 95°F	Torus water level below 13.88 ft OR above 14.0 ft

While executing this procedure:

IF	THEN
PRIMARY CONTAINMENT FLOODING IS OR HAS BEEN REQUIRED	Exit the EOPs and enter the SAOGs
DRYWELL SPRAY IS REQUIRED	Execute "Drywell Spray" concurrently with other sections of this procedure
TORUS SPRAY IS REQUIRED	Execute "Torus Spray" concurrently with other sections of this procedure

Section PC/G

Monitor and control **HYDROGEN AND OXYGEN CONCENTRATIONS**

IF	THEN
The hydrogen or oxygen monitoring system is unavailable	Sample the drywell and torus for hydrogen and oxygen (CA-01-02 or PSP-17)

- ► Monitor drywell and torus hydrogen and oxygen concentrations. Defeat isolation interlocks if necessary (EP-2)
- ► Enter EOP-4a, "Primary Containment Gas Control," and execute Section DW/G-1, DW/G-2 or DW/G-3 when directed by Drywell Gas Control
- ► Enter EOP-4a, "Primary Containment Gas Control," and execute Section T/G-1, T/G-2 or T/G-3 when directed by Torus Gas Control

Drywell Gas Control

Drywell Hydrogen Concentration	Drywell Oxygen Concentration: <5%	≥5% or cannot be determined to be below 5% — Torus Hydrogen Concentration: < 0.6%	≥ 0.6% AND < 6%	≥ 6% or cannot be determined to be below 6%
< 0.6%	No action required	No action required	DW/G-2	DW/G-3
≥ 0.6% AND < 6%	DW/G-1	DW/G-2	DW/G-2	DW/G-3
≥ 6% or cannot be determined to be below 6%	DW/G-1	DW/G-3	DW/G-3	DW/G-3

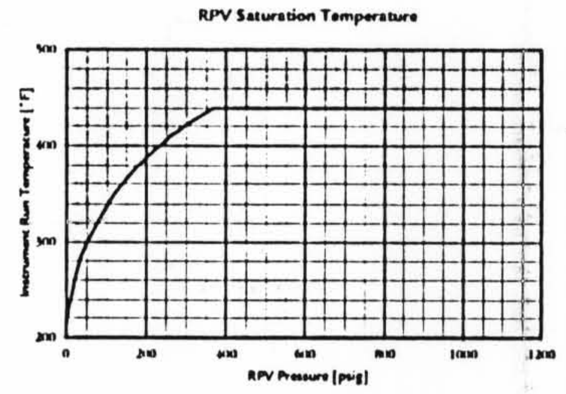
Torus Gas Control

Torus Hydrogen Concentration	Torus Oxygen Concentration: <5%	≥5% or cannot be determined to be below 5% — Drywell Hydrogen Concentration: < 0.6%	≥ 0.6% AND < 6%	≥ 6% or cannot be determined to be below 6%
< 0.6%	No action required	No action required	T/G-2	T/G-3
≥ 0.6% AND < 6%	T/G-1	T/G-2	T/G-2	T/G-3
≥ 6% or cannot be determined to be below 6%	T/G-1	T/G-3	T/G-3	T/G-3

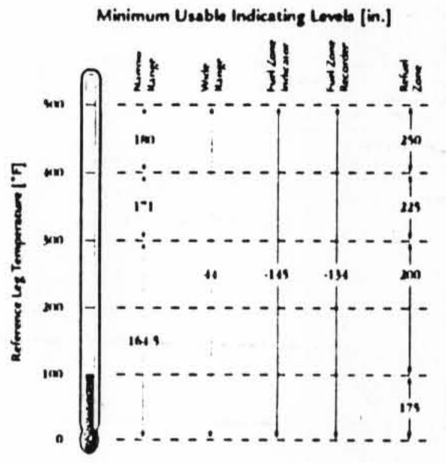
➊ An RPV water level instrument may not be used if either of the following conditions exists:

- ► An instrument run temperature is at or above the RPV Saturation Temperature.
- ► The instrument reads at or below its Minimum Usable Indicating Level

RPV Saturation Temperature



Minimum Usable Indicating Levels [in.]



Section DW/T

Monitor and Control **DRYWELL TEMPERATURE**

IF	THEN
Drywell temperature is or has been above 200°F	Isolate the cooling water supply to the drywell coolers, RWR pump and motor coolers and drywell equipment sump cooler (EP-12)

Maintain drywell temperature below 135°F using available drywell cooling. ➊

IF	THEN
Drywell temperature cannot be restored and maintained below 135°F	Operate all available drywell cooling.

BEFORE Drywell temperature reaches 309°F (Drywell spray)

DRYWELL SPRAY IS REQUIRED.

Continue efforts to restore drywell temperature below 135°F.

IF	THEN
Drywell temperature cannot be restored and maintained below 309°F	**EMERGENCY RPV DEPRESSURIZATION IS REQUIRED,** enter EOP-2, "RPV Control," and execute it concurrently with this procedure.

Drywell Spray

Are drywell sprays operating? — Yes / No

Are drywell temperature and pressure within the Drywell Spray Initiation Limit? — No: Exit "Section Drywell Spray." — Yes:

IF	THEN
Drywell sprays have been initiated	Terminate drywell sprays before drywell pressure drops below 0 psig.
Drywell or torus hydrogen concentration cannot be determined to be below 6% **AND** drywell or torus oxygen concentration cannot be determined to be below 5%	Operate drywell spray irrespective of maintaining adequate core cooling.
Primary containment water level and torus pressure can be maintained below the Primary Containment Pressure Limit	Sources external to the primary containment may be used (EP-14).

Ensure recirculation pumps and drywell cooling fans are tripped.

CAUTION: Lowering primary containment pressure will reduce the available NPSH for pumps taking suction from the torus.

Ensure drywell sprays are operating. Defeat drywell spray interlocks if necessary (EP-2)

Section PC/P

Monitor and Control **PRIMARY CONTAINMENT PRESSURE**

Maintain primary containment pressure below 2.7 psig using SBGT.

WAIT until primary containment pressure cannot be maintained below 2.7 psig

BEFORE Torus pressure reaches 15 psig (Torus spray)

TORUS SPRAY IS REQUIRED.

WAIT until torus pressure exceeds 15 psig

DRYWELL SPRAY IS REQUIRED.

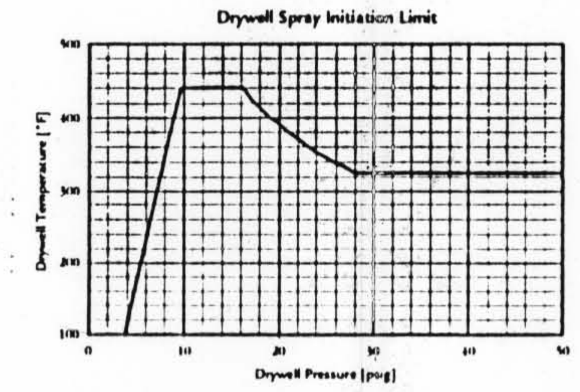
WAIT until torus pressure cannot be maintained below the Pressure Suppression Pressure.

EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.

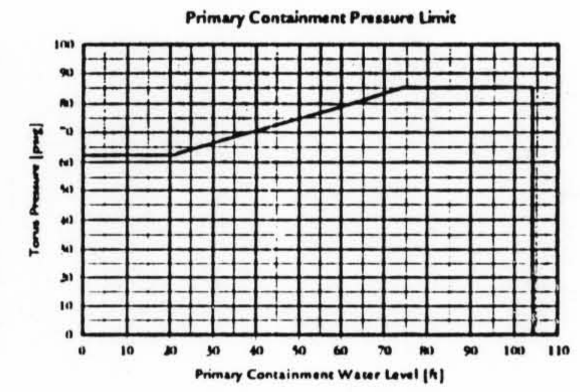
BEFORE Torus pressure reaches the Primary Containment Pressure Limit (Vent)

Irrespective of the offsite radioactivity release rate, vent the primary containment to control pressure below the Primary Containment Pressure Limit. Defeat isolation interlocks if necessary (EP-6)

Drywell Spray Initiation Limit



Primary Containment Pressure Limit



Section T/T

Monitor and Control **TORUS TEMPERATURE**

Maintain torus temperature below 95°F using available torus cooling.

IF	THEN
Torus temperature cannot be maintained below 95°F	Operate all available torus cooling ► Use only RHR pumps which do not need to be run continuously in the LPCI mode to maintain adequate core cooling
'A' and 'C' RHRSW pumps cannot supply cooling water to the 'A' RHR Heat Exchanger	Enter EP-10 and execute it concurrently with this procedure.

BEFORE Torus temperature reaches the Boron Injection Initiation Temperature (Enter EOP-2)

Enter EOP-2, "RPV Control," and execute it concurrently with this procedure.

Continue efforts to restore torus temperature below 95°F.

IF	THEN
Torus temperature and RPV pressure cannot be maintained below the Heat Capacity Temperature Limit	**EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.**

Torus Spray

Is torus water level below 26 ft? — No: Exit "Section Torus Spray." — Yes:

IF	THEN
Torus sprays have been initiated	Terminate torus sprays before torus pressure drops below 0 psig.
Drywell or torus hydrogen concentration cannot be determined to be below 6% **AND** drywell or torus oxygen concentration cannot be determined to be below 5%	Operate torus spray irrespective of maintaining adequate core cooling.
Primary containment water level and torus pressure can be maintained below the Primary Containment Pressure Limit	Sources external to the primary containment may be used (EP-14).

CAUTION: Lowering primary containment pressure will reduce the available NPSH for pumps taking suction from the torus.

Ensure torus sprays are operating. Defeat torus spray interlocks if necessary (EP-2)

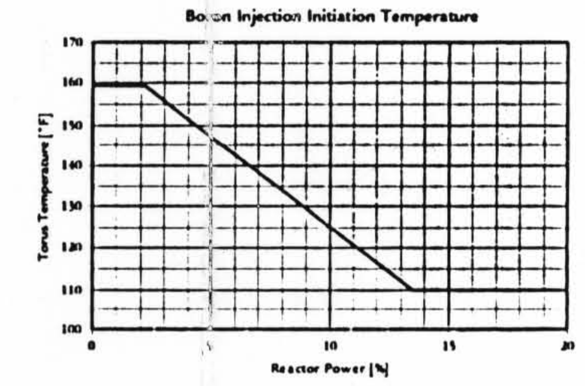
Section T/L

Monitor and Control **TORUS WATER LEVEL**

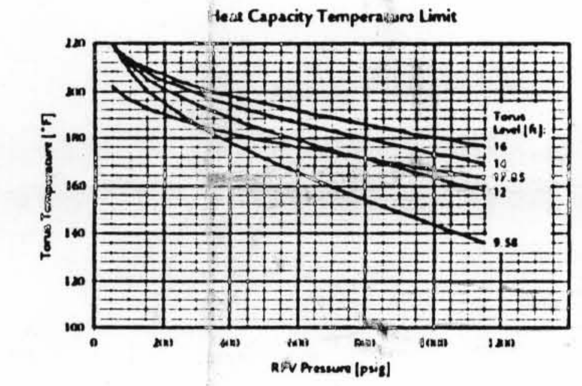
Maintain torus water level between 13.88 ft and 14.00 ft (OP-13B).

	IF	THEN
Level Low	Torus water level cannot be maintained above 10.75 ft	► Ensure the HPCI turbine is tripped ► Enter EOP-2, "RPV Control," and execute it concurrently with this procedure.
Level Low	Torus water level cannot be maintained above 9.58 ft	**EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.**
Level High	Torus water level cannot be maintained below the SRV Tail Pipe Level Limit	Enter EOP-2, "RPV Control," and execute it concurrently with this procedure.
Level High	Torus water level and RPV pressure cannot be maintained below the SRV Tail Pipe Level Limit	IF ...... the core will still be adequately cooled THEN ... terminate injection into the RPV from sources external to the primary containment, except SLC or CRD when required to shutdown the reactor.
Level High	Torus water level and RPV pressure cannot be restored and maintained below the SRV Tail Pipe Level Limit	**EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.**

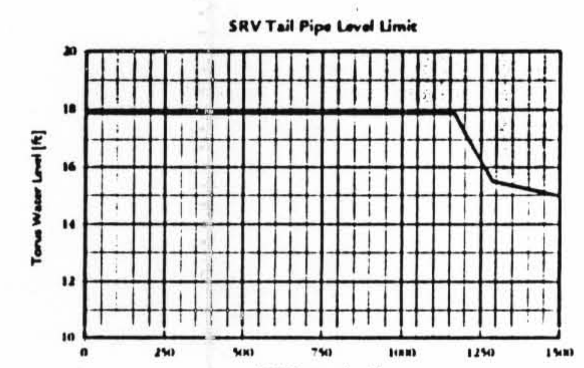
Boron Injection Initiation Temperature



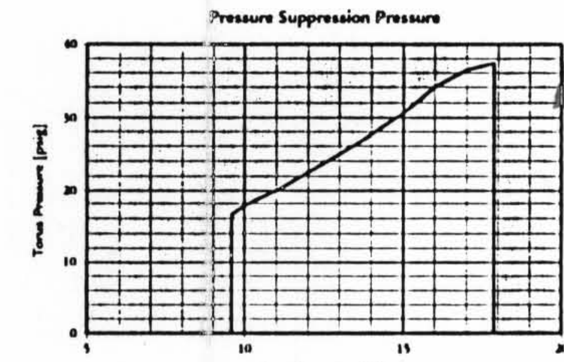
Heat Capacity Temperature Limit



SRV Tail Pipe Level Limit



Pressure Suppression Pressure



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PRIMARY CONTAINMENT CONTROL		
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