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BWR OWNER'S GROUP GENERIC

EMERGENCY PROCEDURE GUIDELINES

Revision 3J

BWR 1 through 6

November 10, 1983

INTRODUCTION

Based on the various BWR system designs, the following generic symptomatic emergency procedure guidelines have been developed:

- RPV Control Guideline
- Primary Containment Control Guideline
- Secondary Containment Control Guideline
- Radioactivity Release Control Guideline

The RPV Control Guideline maintains adequate core cooling, shuts down the reactor, and cools down the RPV to cold shutdown conditions. This guideline is entered whenever low RPV water level, high RPV pressure, high drywell pressure, or a condition which requires MSIV isolation has occurred, or whenever a condition which requires reactor scram exists and reactor power is above the APRM downscale trip or cannot be determined.

The Primary Containment Control Guideline maintains primary containment integrity and protects equipment in the primary containment. This guideline is entered whenever suppression pool temperature, drywell temperature, containment temperature, drywell pressure, suppression pool water level, or primary containment hydrogen concentration is above its high operating limit or suppression pool water level is below its low operating limit.

The Secondary Containment Control Guideline protects equipment in the secondary containment, limits radioactivity release to the secondary containment, and either maintains secondary containment integrity or limits radioactivity release from the secondary containment. This guideline is entered whenever a secondary containment temperature, radiation level, or water level is above its maximum normal operating value or secondary containment differential pressure reaches zero.

The Radioactivity Release Control Guideline limits radioactivity release into areas outside the primary and secondary containments. This guideline is entered whenever offsite radioactivity release rate is above that which requires an Alert.

Figure 1, Operator Actions Flowchart, illustrates all operator actions within the emergency procedure guidelines. Each action block states briefly the operator action and its purpose. The blocks are generally correlated from top (high RPV pressure) to bottom (RPV cold shutdown conditions) with a vertical RPV pressure/temperature scale to show continuity of the linked operator actions. Each block is further identified by a numbered symbol (e.g., ▽1) which is keyed to the guideline steps.

Table I is a list of abbreviations used in the guidelines.

Brackets [ ] enclose plant unique setpoints, design limits, pump shutoff pressures, etc., and parentheses ( ) within brackets indicate the source for the bracketed variable. Illustrated in these guidelines are variables for a typical BWR/4 or BWR/6 as appropriate.

At various points throughout these guidelines, precautions are noted by the symbol [#] . The number within the box refers to a numbered "Caution" contained in the Operator Precautions section. These "Cautions" are brief and succinct red flags for the operator. Where the basis for the "Caution" or a step is not completely evident from the text, a full discussion of the basis is contained in Appendix A. Other system details which pertain to the guidelines are also included in this appendix.

The emergency procedure guidelines are generic to GE-BWR 1 through 6 designs in that they address all major systems which may be used to respond to an emergency. Because no specific plant includes all of the systems in these guidelines, the guidelines are applied to individual plants by deleting statements which are not applicable or by substituting equivalent systems where appropriate. For example, plants with no low pressure injection system will delete statements referring to LPCI, and plants with Low Pressure Core Flooding will substitute LPCF for LPCI.

At various points within these guidelines, limits are specified beyond which certain actions are required. While conservative, these limits are derived from engineering analyses utilizing best-estimate (as opposed to licensing) models. Consequently, these limits are not as conservative as the limits specified in a plant's Technical Specifications. This is not to imply that operation beyond the Technical Specifications is recommended in an emergency. Rather, such operation may be required under certain degraded conditions in order to safely mitigate the consequences of those degraded conditions. The limits specified in the guidelines establish the boundaries within which continued safe operation of the plant can be assured. Therefore, conformance with the guidelines does not ensure strict conformance with a plant's Technical Specifications or other licensing bases.

The entry conditions for these emergency procedure guidelines are symptomatic of both emergencies and events which may degrade into emergencies. The guidelines specify actions appropriate for both. Therefore, entry into procedures developed from these guidelines is not conclusive that an emergency has occurred.

TABLE I

ABBREVIATIONS

ADS	-	Automatic Depressurization System
APRM	-	Average Power Range Monitor
CRD	-	Control Rod Drive
ECCS	-	Emergency Core Cooling System
HCU	-	Hydraulic Control Unit
HPCI	-	High Pressure Coolant Injection
HPCS	-	High Pressure Core Spray
HVAC	-	Heating, Ventilating and Air Conditioning
IC	-	Isolation Condenser
LCO	-	Limiting Condition for Operation
LOCA	-	Loss of Coolant Accident
LPCI	-	Low Pressure Coolant Injection
LPCS	-	Low Pressure Core Spray
MSIV	-	Main Steamline Isolation Valves
NDTT	-	Nil-Ductility Transition Temperature
NPSH	-	Net Positive Suction Head
RCIC	-	Reactor Core Isolation Cooling
RHR	-	Residual Heat Removal
RPS	-	Reactor Protection System
RPV	-	Reactor Pressure Vessel
RSCS	-	Rod Sequence Control System
RWCU	-	Reactor Water Cleanup
SBGT	-	Standby Gas Treatment
SLC	-	Standby Liquid Control
SORV	-	Stuck Open Relief Valve
SPMS	-	Suppression Pool Makeup System
SRV	-	Safety Relief Valve

OPERATOR PRECAUTIONS

GENERAL

This section lists "Cautions" which are generally applicable at all times.

CAUTION #1

Monitor the general state of the plant. If an entry condition for a [procedure developed from the Emergency Procedure Guidelines] occurs, enter that procedure. When it is determined that an emergency no longer exists, enter [normal operating procedure].

CAUTION #2

Monitor RPV water level and pressure and primary containment temperatures and pressure from multiple indications.

CAUTION #3

If a safety function initiates automatically, assume a true initiating event has occurred unless otherwise confirmed by at least two independent indications.

CAUTION #4

Whenever RHR is in the LPCI mode, inject through the heat exchangers as soon as possible.

CAUTION #5

Suppression pool temperature is determined by [procedure for determining bulk suppression pool water temperature]. Drywell temperature is determined by [procedure for determining drywell atmosphere average temperature]. Containment temperature is determined by [procedure for determining Mark III containment atmosphere average temperature].

CAUTION #6

Whenever [temperature near the instrument reference leg vertical runs] exceeds the temperature in the table and the instrument reads below the indicated level in the table, the actual RPV water level may be anywhere below the elevation of the lower instrument tap.

Temperature[*]	Indicated Level	Instrument	
any	617 in.	Shutdown Range Level	(500 to 900 in.)
107°F	-107 in.	Wide Range Level	(-150 to +60 in.)
310°F	19 in.	Narrow Range Level	(0 to +60 in.)
545°F	168 in.	Fuel Zone Level	(200 to 500 in.)

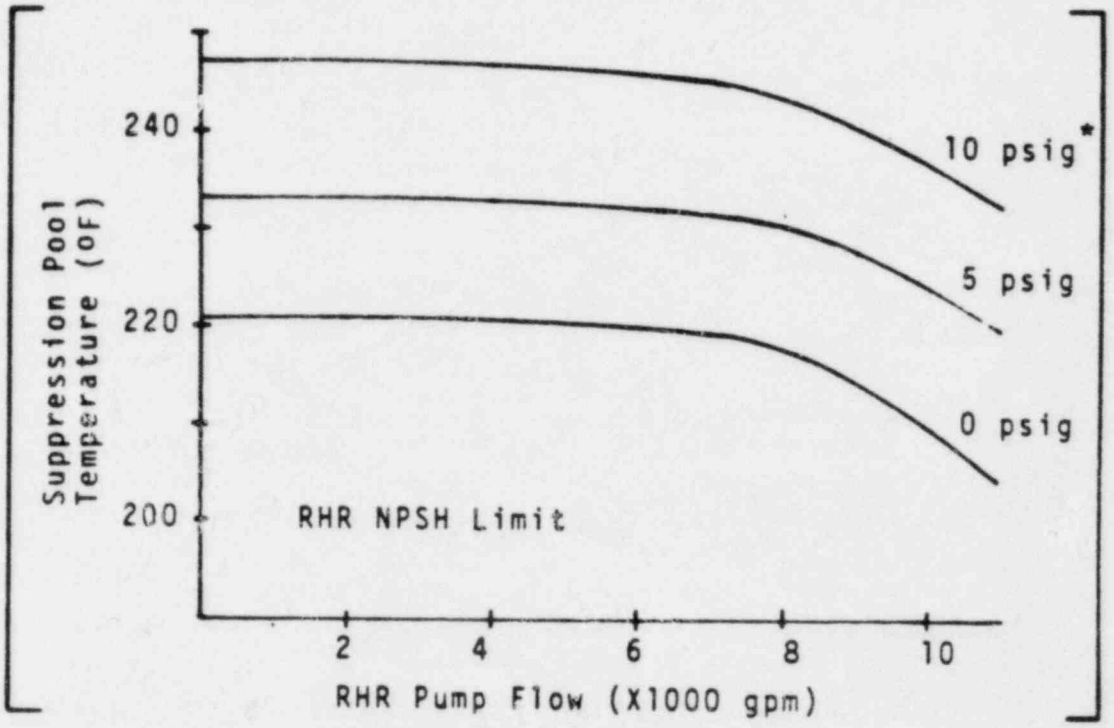
[*List in order of increasing temperature.]

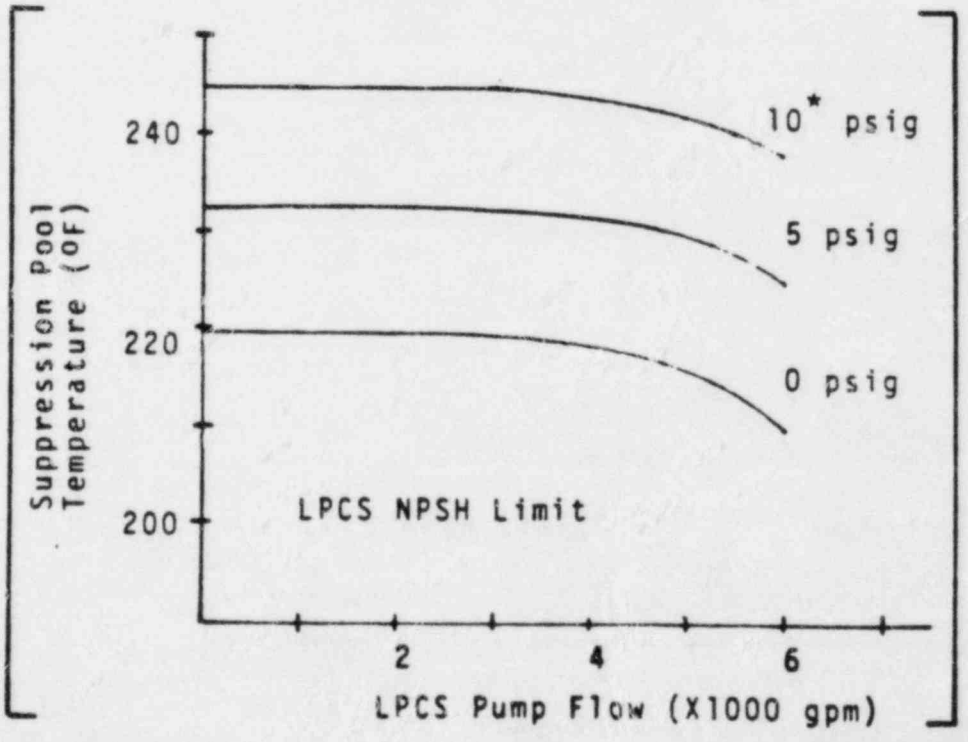
CAUTION #7

[Heated reference leg instrument] indicated levels are not reliable during rapid RPV depressurization below 500 psig. For these conditions, utilize [cold reference leg instruments] to monitor RPV water level.

CAUTION #8

Observe NPSH requirements for pumps taking suction from the suppression pool.





*Suppression chamber pressure
Suppression pool at normal water level

CAUTION #9

If signals of high suppression pool water level [12 ft. 7 in. (high level suction interlock)] or low condensate storage tank water level [0 in. (low level suction interlock)] occur, confirm automatic transfer of or manually transfer HPCI, HPCS, and RCIC suction from the condensate storage tank to the suppression pool.

SPECIFIC

This section lists "Cautions" which are applicable at one or more specific points within the guidelines. Where a "Caution" is applicable, it is identified with the symbol [#] .

CAUTION #10

Do not secure or place an ECCS in MANUAL mode unless, by at least two independent indications, (1) misoperation in AUTOMATIC mode is confirmed, or (2) adequate core cooling is assured. If an ECCS is placed in MANUAL mode, it will not initiate automatically. Make frequent checks of the initiating or controlling parameter. When manual operation is no longer required, restore the system to AUTOMATIC/STANDBY mode if possible.

CAUTION #11

If a high drywell pressure ECCS initiation signal [2.0 psig (drywell pressure which initiates ECCS)] occurs or exists while depressurizing, prevent injection from those LPCS and LPCI pumps not required to assure adequate core cooling prior to reaching their maximum injection pressures. When the high drywell pressure ECCS initiation signal clears, restore LPCS and LPCI to AUTOMATIC/STANDBY mode.

CAUTION #12

Do not throttle HPCI or RCIC systems below [2200 rpm (minimum turbine speed limit per turbine vendor manual)].

CAUTION #13

Cooldown rates above [100°F/hr (RPV cooldown rate LCO)] may be required to accomplish this step.

CAUTION #14

Do not depressurize the RPV below [100 psig (HPCI or RCIC low pressure isolation setpoint, whichever is higher)] unless motor driven pumps sufficient to maintain RPV water level are running and available for injection.

CAUTION #15

Open SRVs in the following sequence if possible: [SRV opening sequence].

CAUTION #16

Bypassing low RPV water level [ventilation system and] MSIV isolation interlocks may be required to accomplish this step.

CAUTION #17

Cooldown rates above [100°F/hr (RPV cooldown rate LCO)] may be required to conserve RPV water inventory, protect primary containment integrity, or limit radioactive release to the environment.

CAUTION #18

If continuous LPCI operation of any RHR pump is required to assure adequate core cooling, do not divert that pump from the LPCI mode.

CAUTION #19

Confirm automatic trip or manually trip SLC pumps at [0% (low level trip)] in the SLC tank.

CAUTION #20

Defeating RSCS interlocks may be required to accomplish this step.

CAUTION #21

Elevated suppression chamber pressure may trip the RCIC turbine on high exhaust pressure.

CAUTION #22

Defeating isolation interlocks may be required to accomplish this step.

CAUTION #23

Do not initiate drywell sprays if suppression pool water level is above [17 ft. 2 in. (elevation of bottom of Mark I internal suppression chamber to drywell vacuum breakers less vacuum breaker opening pressure in feet of water)].

CAUTION #24

Bypassing high drywell pressure and low RPV water level secondary containment HVAC isolation interlocks may be required to accomplish this step.

CAUTION #25

A rapid increase in injection into the RPV may induce a large power excursion and result in substantial core damage.

CAUTION #26

Large reactor power oscillations may be observed while executing this step.

RPV CONTROL GUIDELINE

PURPOSE

The purpose of this guideline is to:

- Maintain adequate core cooling,
- Shut down the reactor, and
- Cool down the RPV to cold shutdown conditions ([100°F < RPV water temperature < 212°F (cold shutdown conditions)]).

ENTRY CONDITIONS

The entry conditions for this guideline are any of the following:

- RPV water level below [+ 12 in. (low level scram setpoint)]
- RPV pressure above [1045 psig (high RPV pressure scram setpoint)]
- Drywell pressure above [2.0 psig (high drywell pressure scram setpoint)]
- A condition which requires MSIV isolation
- A condition which requires reactor scram, and reactor power above [3% (APRM downscale trip)] or cannot be determined

OPERATOR ACTIONS

RC-1 If reactor scram has not been initiated, initiate reactor scram.

Irrespective of the entry condition, execute [Steps RC/L, RC/P, and RC/Q] concurrently.

RC/L Monitor and control RPV water level.

RC/L-1 Confirm initiation of any of the following:

- Isolation
- ECCS
- [Emergency diesel generator]

Initiate any of these which should have initiated but did not.

If while executing the following step:

- Boron Injection is required, enter [procedure developed from CONTINGENCY #7].
- RPV water level cannot be determined, RPV FLOODING IS REQUIRED; enter [procedure developed from CONTINGENCY #6].
- RPV Flooding is required, enter [procedure developed from CONTINGENCY #6].

RC/L-2 Restore and maintain RPV water level between [+ 12 in. (low level scram setpoint)] and [+58 in. (high level trip setpoint)] with one or more of the following systems: #9 #10 #11

- Condensate/feedwater system [1110 - 0 psig (RPV pressure range for system operation)]
- CRD system [1110 - 0 psig (RPV pressure range for system operation)]
- RCIC system [1110 - 50 psig (RPV pressure range for system operation)] #12

- HPCI system [1110 - 100 psig (RPV pressure range for system operation)]

- HPCS system [1110 - 0 psig (RPV pressure range for system operation)]

- LPCS system [425 - 0 psig (RPV pressure range for system operation)]

- LPCI system [250 - 0 psig (RPV pressure range for system operation)]

If RPV water level cannot be restored and maintained above [+12 in. (low level scram setpoint)], maintain RPV water level above [-164 in. (top of active fuel)].

If RPV water level can be maintained above [-164 in. (top of active fuel)] and the ADS timer has initiated, prevent automatic RPV depressurization by resetting the ADS timer.

If RPV water level cannot be maintained above [-164 in. (top of active fuel)], enter [procedure developed from CONTINGENCY #1].

If Alternate Shutdown Cooling is required, enter [procedure developed from CONTINGENCY #5].

RC/L-3 When [procedure for cooldown to cold shutdown conditions] is entered from [Step RC/P-5] in this procedure, proceed to cold shutdown in accordance with [procedure for cooldown to cold shutdown conditions].

RC/P Monitor and control RPV pressure.

If while executing the following steps:

- Emergency RPV Depressurization is anticipated and Boron Injection is not required, rapidly depressurize the RPV with the main turbine bypass valves. #13

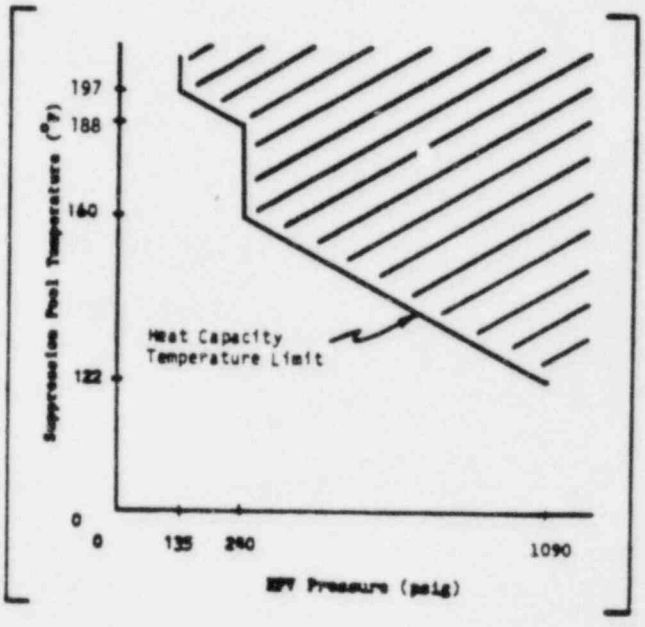
- Emergency RPV Depressurization or RPV Flooding is required and less than [7 (number of SRVs dedicated to ADS)] SRVs are open, enter [procedure developed from CONTINGENCY #2].

- RPV Flooding is required and at least [7 (number of SRVs dedicated to ADS)] SRVs are open, enter [procedure developed from CONTINGENCY #6].

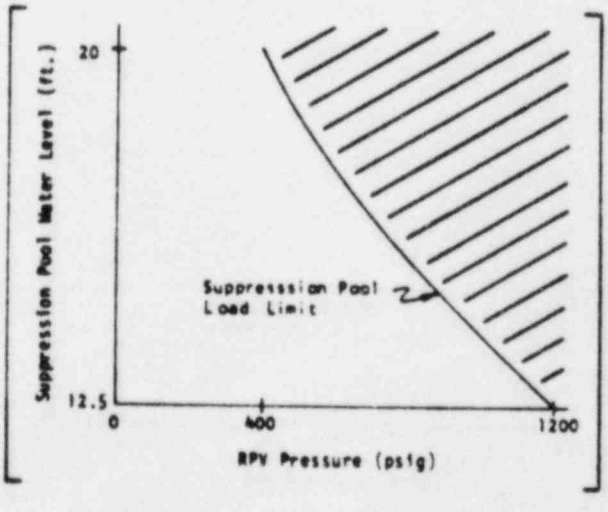
RC/P-1 If any SRV is cycling, initiate IC and manually open SRVs until RPV pressure drops to [935 psig (RPV pressure at which all turbine bypass valves are fully open)].

If while executing the following steps:

- Suppression pool temperature cannot be maintained below the Heat Capacity Temperature Limit, maintain RPV pressure below the Limit. #8 #13 #14



- Suppression pool water level cannot be maintained below the Suppression Pool Load Limit, maintain RPV pressure below the Limit. #13 #14



- Steam Cooling is required, enter [procedure developed from CONTINGENCY #3].

If while executing the following steps:

- Boron Injection is required, and
- The main condenser is available, and
- There has been no indication of gross fuel failure or steam line break,

open MSIVs to re-establish the main condenser as a heat sink. #16

RC/P-2 Control RPV pressure below [1090 psig (lowest SRV lifting pressure)] with the main turbine bypass valves. #14

RPV pressure control may be augmented by one or more of the following systems:

- IC
- SRVs only when suppression pool water level is above [4 ft. 9 in. (elevation of top of SRV discharge device)]. If the continuous SRV pneumatic supply is or becomes unavailable, place the control switch for each SRV in the [CLOSE] position. #15
- HPCI #12
- RCIC
- [Other steam driven equipment]

- RWCU (recirculation mode) if no boron has been injected into the RPV.
- Main steam line drains
- RWCU (blowdown mode) if no boron has been injected into the RPV. Refer to [sampling procedures] prior to initiating blowdown.

If while executing the following steps the reactor is not shutdown, return to [Step RC/P-2].

RC/P-3 When either:

- All control rods are inserted beyond position [06 (maximum subcritical banked withdrawal position)], or
- [280 pounds (Cold Shutdown Boron Weight)] of boron have been injected into the RPV, or
- The reactor is shutdown and no boron has been injected into the RPV,

depressurize the RPV and maintain cooldown rate below [100°F/hr (RPV cooldown rate LCO)]. #14, #17

If one or more SRVs are being used to depressurize the RPV and the continuous SRV pneumatic supply is or becomes unavailable, depressurize with sustained SRV opening.

RC/P-4 When the RHR shutdown cooling interlocks clear, initiate the shutdown cooling mode of RHR. #18

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If the RHR shutdown cooling mode cannot be established and further cooldown is required, continue to cool down using one or more of the systems used for depressurization.

> If RPV cooldown is required but cannot be accomplished and all control rods are inserted beyond position [06 (maximum subcritical banked withdrawal position)], ALTERNATE SHUTDOWN COOLING IS REQUIRED; enter [procedure developed from CONTINGENCY #5].

RC/P-5 Proceed to cold shutdown in accordance with [procedure for cooldown to cold shutdown conditions].

RC/Q Monitor and control reactor power.

> If while executing the following steps:
>
> - All control rods are inserted beyond position [06 (maximum subcritical banked withdrawal position)], terminate boron injection and enter [scram procedure].
>
> - The reactor is shutdown and no boron has been injected into the RPV, enter [scram procedure].

RC/Q-1 [Confirm or place the reactor mode switch in SHUTDOWN.]

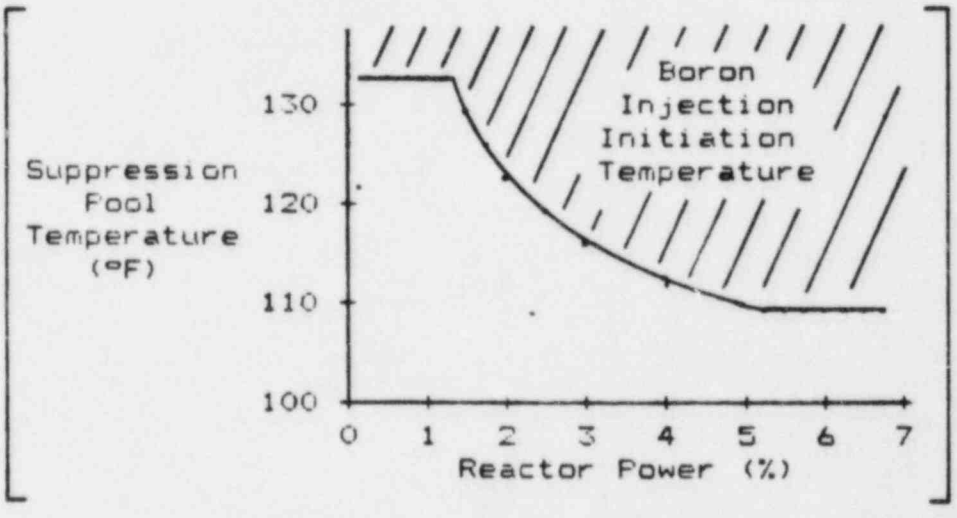
RC/Q-2 If the main turbine-generator is on-line [and the MSIVs are open], confirm or initiate recirculation flow runback to minimum.

RC/Q-3 If reactor power is above [3% (APRM downscale trip)] or cannot be determined, trip the recirculation pumps.

Execute [Steps RC/Q-4 and RC/Q-5] concurrently.

#19

RC/Q-4 If the reactor cannot be shutdown before suppression pool temperature reaches [the Boron Injection Initiation Temperature], BORON INJECTION IS REQUIRED; inject boron into the RPV with SLC and prevent automatic initiation of ADS.



If boron cannot be injected with SLC, inject boron into the RPV by one or more of the following alternate methods:

- CRD
- HPCS
- RWCU
- Feedwater
- HPCI
- RCIC
- Hydro pump

RC/Q-4.1 If boron is not being injected into the RPV by RWCU, confirm automatic isolation of or manually isolate RWCU.

RC/Q-4.2 Continue to inject boron until [280 pounds (Cold Shutdown Boron Weight)] of boron have been injected into the RPV.

RC/Q-4.3 Enter [scram procedure].

RC/Q-5 Insert control rods as follows:

RC/Q-5.1 If any scram valve is not open:

- [Remove:
  H11-P609 C71-F18A,E,C,G
  H11-P611 C71-F18B,F,D,H
  (fuses which de-energize RPS scram solenoids)].

- Close [C11-F095 (scram air header supply valve)] and open [C11-F008 (scram air header vent valve)].

When control rods are not moving inward:

- [Replace:
  H11-P609 C71-F18A,E,C,G
  H11-P611 C71-F18B,F,D,H
  (fuses which de-energize RPS scram solenoids)].

- Close [C11-F008 (scram air header vent valve)] and open [C11-F095 (scram air header supply valve)].

RC/Q-5.2 Reset the reactor scram.

If the reactor scram cannot be reset:

1. Start all CRD pumps.

   If no CRD pump can be started, continue in this procedure at [Step RC/Q-5.6.1].

2. Close [C11-F034 (HCU accumulator charging water header valve)].

3. Rapidly insert control rods manually until the reactor scram can be reset. #20

4. Reset the reactor scram.

5. Open [C11-F034 (HCU accumulator charging water header valve)].

RC/Q-5.3 If the scram discharge volume vent and drain valves are open, initiate a manual reactor scram.

1. If control rods moved inward, return to [Step RC/Q-5.2].

2. Reset the reactor scram.

   If the reactor scram cannot be reset, continue in this procedure at [Step RC/Q-5.5.1].

3. Open the scram discharge volume vent and drain valves.

RC/Q-5.4 Individually open the scram test switches for control rods not inserted beyond position [06 (maximum subcritical banked withdrawal position)].

When a control rod is not moving inward, close its scram test switch.

RC/Q-5.5 Reset the reactor scram.

If the reactor scram cannot be reset:

1. Start all CRD pumps.

   If no CRD pump can be started, continue in this procedure at [Step RC/Q-5.6.1].

2. Close [C11-F034 (HCU accumulator charging water header valve)].

RC/Q-5.6 Rapidly insert control rods manually until all control rods are inserted beyond position [06 (maximum subcritical banked withdrawal position)]. #20

If any control rod cannot be inserted beyond position [06 (maximum subcritical banked withdrawal position)]:

1. Individually direct the effluent from [C11-F102 (CRD withdraw line vent valve)] to a contained radwaste drain and open [C11-F102 (CRD withdraw line vent valve)] for each control rod not inserted beyond position [06 (maximum subcritical banked withdrawal position)].

2. When a control rod is not moving inward, close its [C11-F102 (CRD withdraw line vent valve)].

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PRIMARY CONTAINMENT CONTROL GUIDELINE

PURPOSE

The purpose of this guideline is to:

- Maintain primary containment integrity, and
- Protect equipment in the primary containment.

ENTRY CONDITIONS

The entry conditions for this guideline are any of the following:

- Suppression pool temperature above [95°F (most limiting suppression pool temperature LCO)]
- Drywell temperature above [135°F (drywell temperature LCO or maximum normal operating temperature, whichever is higher)]
- Containment temperature above [90°F (containment temperature LCO)]
- Drywell pressure above [2.0 psig (high drywell pressure scram setpoint)]
- Suppression pool water level above [12 ft. 6 in. (maximum suppression pool water level LCO)]
- Suppression pool water level below [12 ft. 2 in. (minimum suppression pool water level LCO)]
- Primary containment hydrogen concentration above [2% (high hydrogen alarm setpoint)]

OPERATOR ACTIONS

Irrespective of the entry condition, execute [Steps SP/T, DW/T, CN/T, PC/P, SP/L, and PC/H] concurrently.

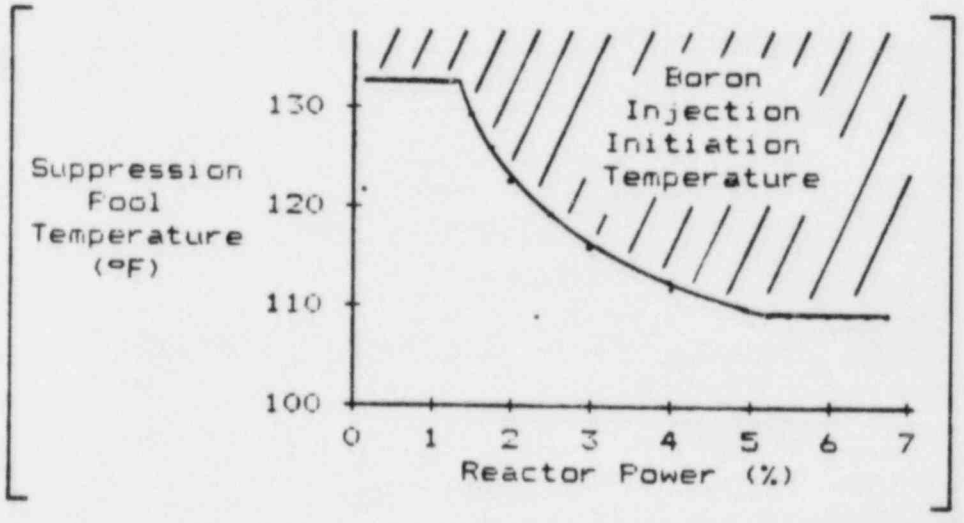
SP/T Monitor and control suppression pool temperature.

SP/T-1 Close all SORVs.

If any SORV cannot be closed [within 2 minutes (optional plant-specific time interval)], scram the reactor.

SP/T-2 When suppression pool temperature exceeds [95°F (most limiting suppression pool temperature LCO)], operate available suppression pool cooling. #18

SP/T-3 Before suppression pool temperature reaches [the Boron Injection Initiation Temperature], scram the reactor.



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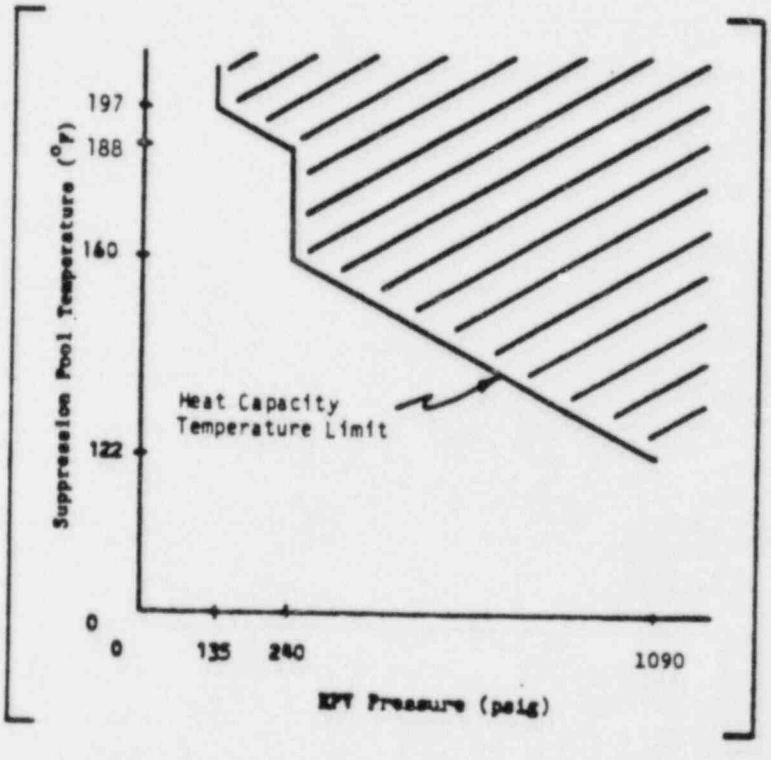
SP/T-4 If suppression pool temperature cannot be maintained below the Heat Capacity Temperature Limit, maintain RPV pressure below the Limit; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

#8
#13
#14



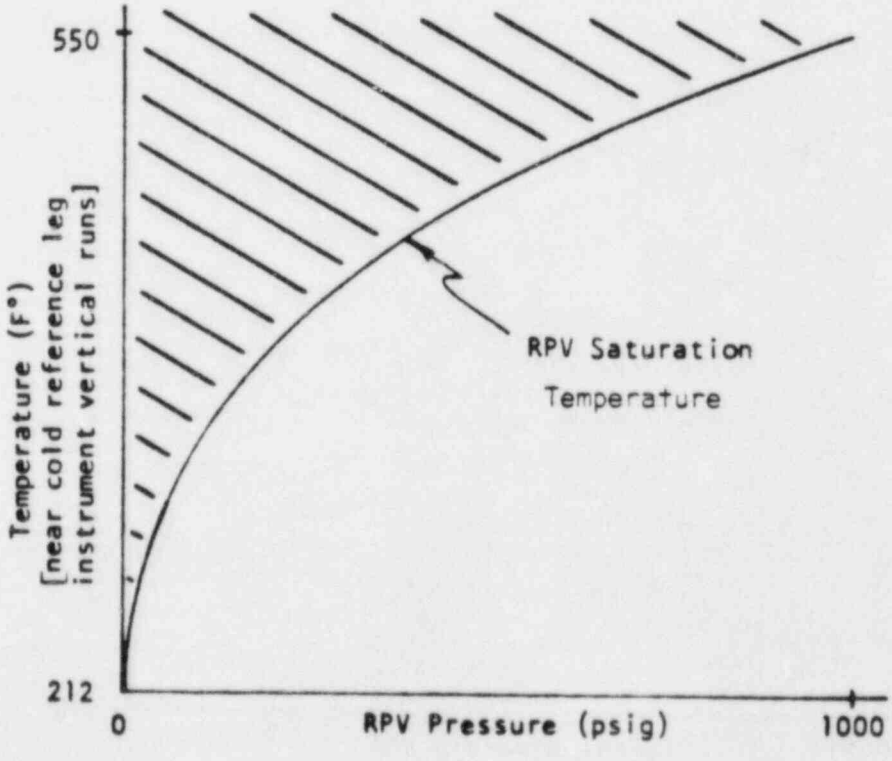
If suppression pool temperature and RPV pressure cannot be restored and maintained below the Heat Capacity Temperature Limit, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.

DW/T Monitor and control drywell temperature.

DW/T-1 When drywell temperature exceeds [135°F (drywell temperature LCO or maximum normal operating temperature, whichever is higher)], operate available drywell cooling. #6

Execute [Steps DW/T-2 and DW/T-3] concurrently.

DW/T-2 If drywell temperature [near the cold reference leg instrument vertical runs] reaches the RPV Saturation Temperature, RPV FLOODING IS REQUIRED; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.



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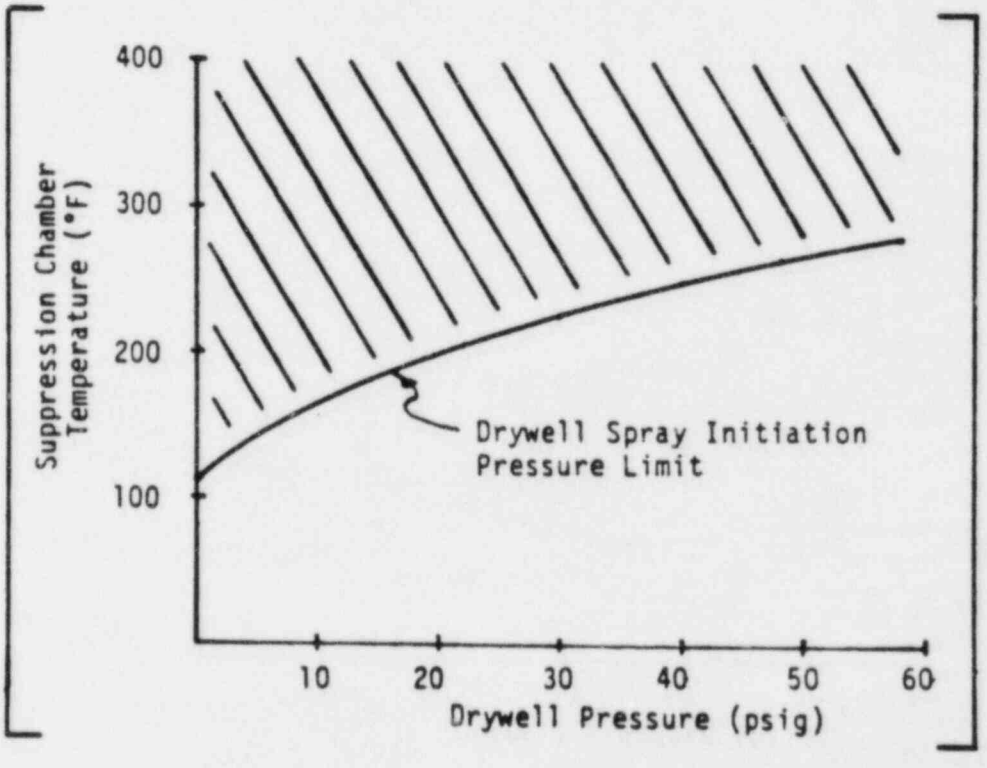
DW/T-3 Before drywell temperature reaches [340°F (maximum temperature at which ADS qualified or drywell design temperature, whichever is lower)] but only if [suppression chamber temperature and drywell pressure are below the Drywell Spray Initiation Pressure Limit], [shut down recirculation pumps and drywell cooling fans and] initiate drywell sprays [restricting flow rate to less than 720 gpm (Maximum Drywell Spray Flow Rate Limit)].

#18



If drywell temperature cannot be maintained below [340°F (maximum temperature at which ADS qualified or drywell design temperature, whichever is lower)], EMERGENCY RPV DEPRESSURIZATION IS REQUIRED; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

CN/T Monitor and control containment temperature.

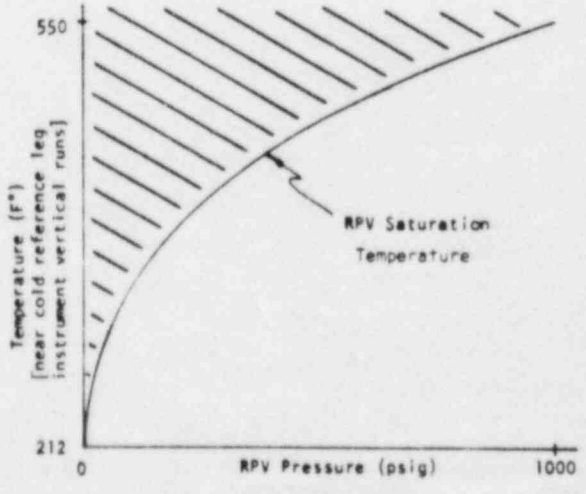
CN/T-1 When containment temperature exceeds [90°F (containment temperature LCO)], operate available containment cooling. #6

If while executing the following steps suppression pool sprays have been initiated, when suppression chamber pressure drops below 0 psig, terminate suppression pool sprays.

CN/T-2 Before containment temperature reaches [185°F (containment design temperature)] but only if [suppression chamber pressure is above 1.7 psig (Mark III Containment Spray Initiation Pressure Limit)], initiate suppression pool sprays. #18

CN/T-3 If containment temperature cannot be maintained below [185°F (containment design temperature)], EMERGENCY RPV DEPRESSURIZATION IS REQUIRED; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

CN/T-4 If containment temperature [near the cold reference leg instrument vertical runs] reaches the RPV Saturation Temperature, RPV FLOODING IS REQUIRED.



PC/P Monitor and control primary containment pressure.

PC/P-1 Operate [the following systems, as required:

- Containment pressure control systems. Use containment pressure control system operating procedure.]

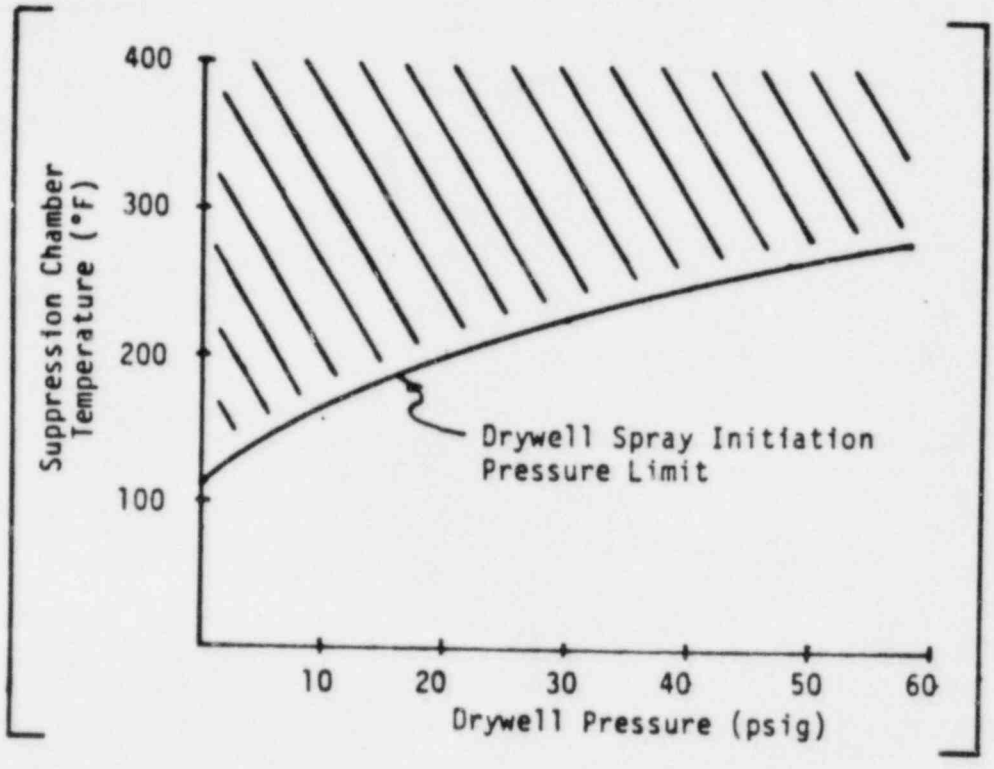
[•] SBGT [and drywell purge], only when the temperature in the space being evacuated is below [212°F (Maximum Noncondensible Evacuation Temperature)]. Use [SBGT and drywell purge operating procedures]. #21

If while executing the following steps suppression pool sprays have been initiated, when suppression chamber pressure drops below 0 psig, terminate suppression pool sprays.

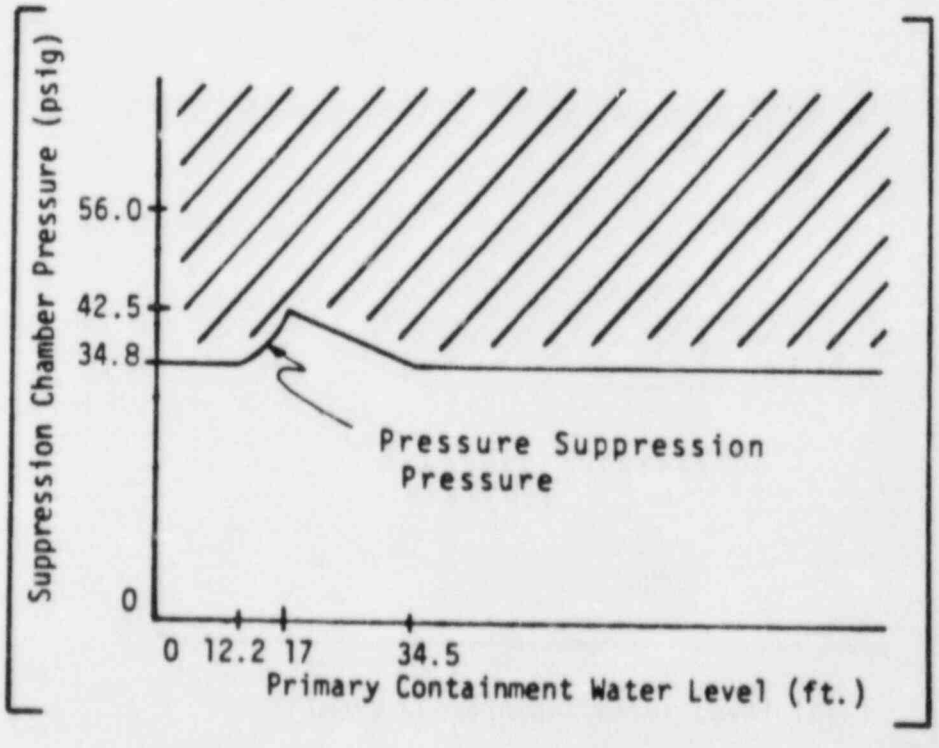
PC/P-2 Before suppression chamber pressure reaches [the Pressure Suppression Pressure] [17.4 psig (Suppression Chamber Spray Initiation Pressure)], but only if [suppression chamber pressure is above 1.7 psig (Mark III Containment Spray Initiation Pressure Limit)] [suppression pool water level is below 24 ft. 6 in. (elevation of suppression pool spray nozzles)], initiate suppression pool sprays. #8, #18

PC/P-3 If suppression chamber pressure exceeds [17.4 psig (Suppression Chamber Spray Initiation Pressure)] but only if [suppression chamber temperature and drywell pressure are below the Drywell Spray Initiation Pressure Limit], [shut down recirculation pumps and drywell cooling fans and] initiate drywell sprays [restricting flow rate to less than 720 gpm (Maximum Drywell Spray Flow Rate Limit)]. #18

DRAFT

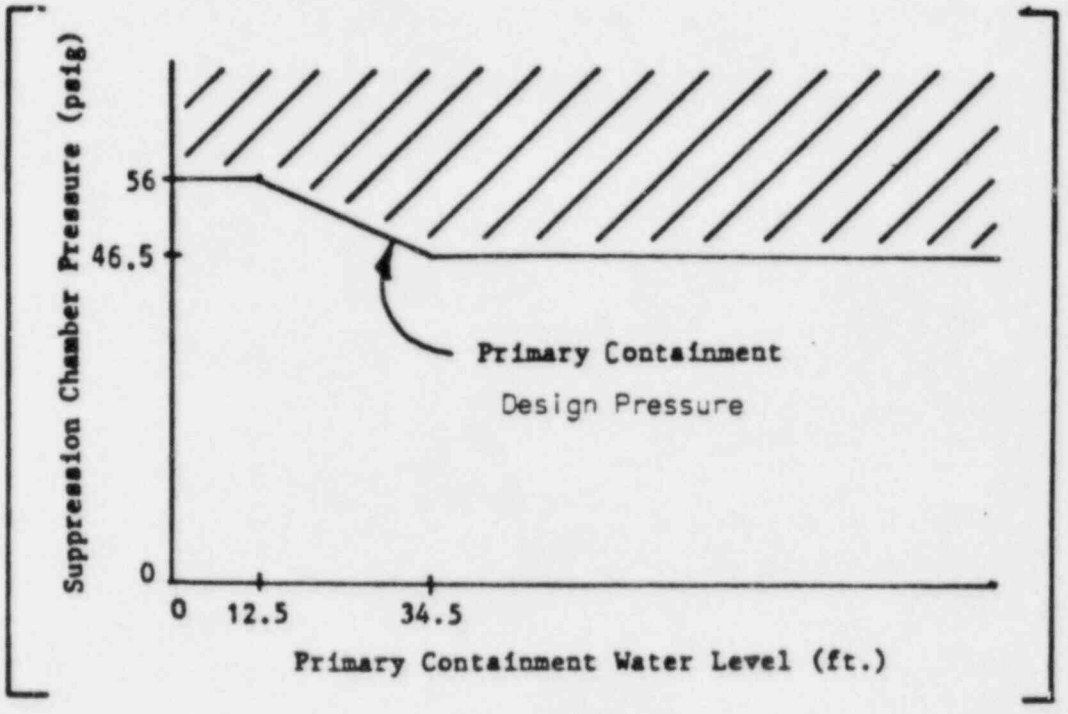


PC/P-4 If suppression chamber pressure cannot be maintained below [the Pressure Suppression Pressure], EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.

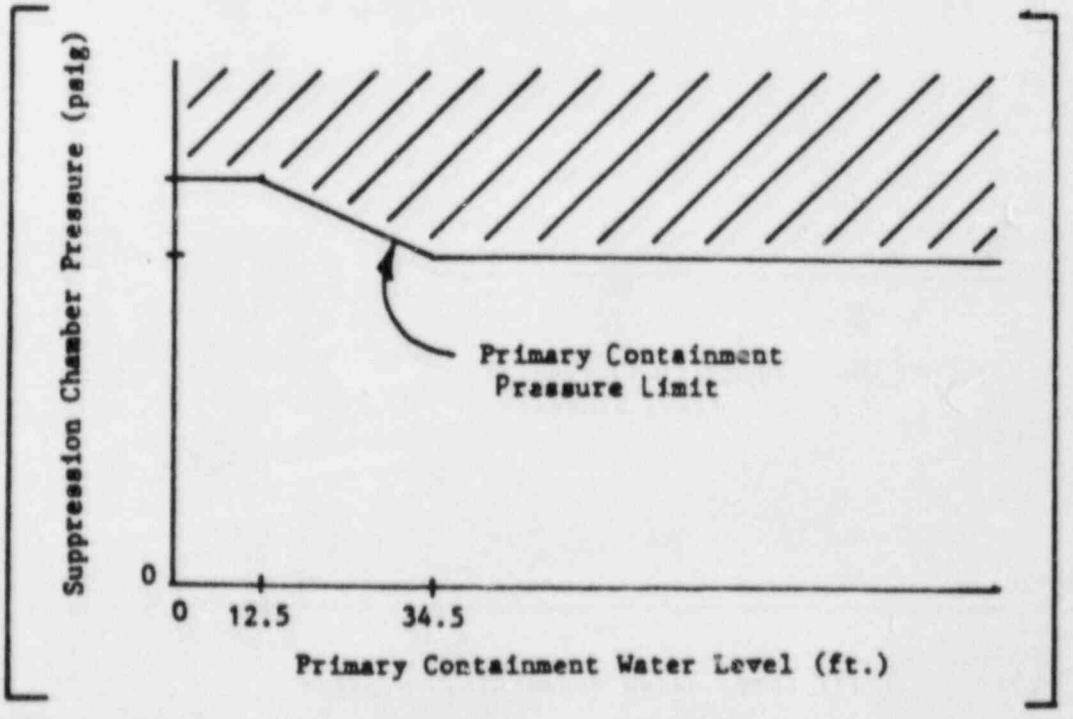


DRAFT

PC/P-5 If suppression chamber pressure cannot be maintained below [the Primary Containment Design Pressure], RPV FLOODING IS REQUIRED.



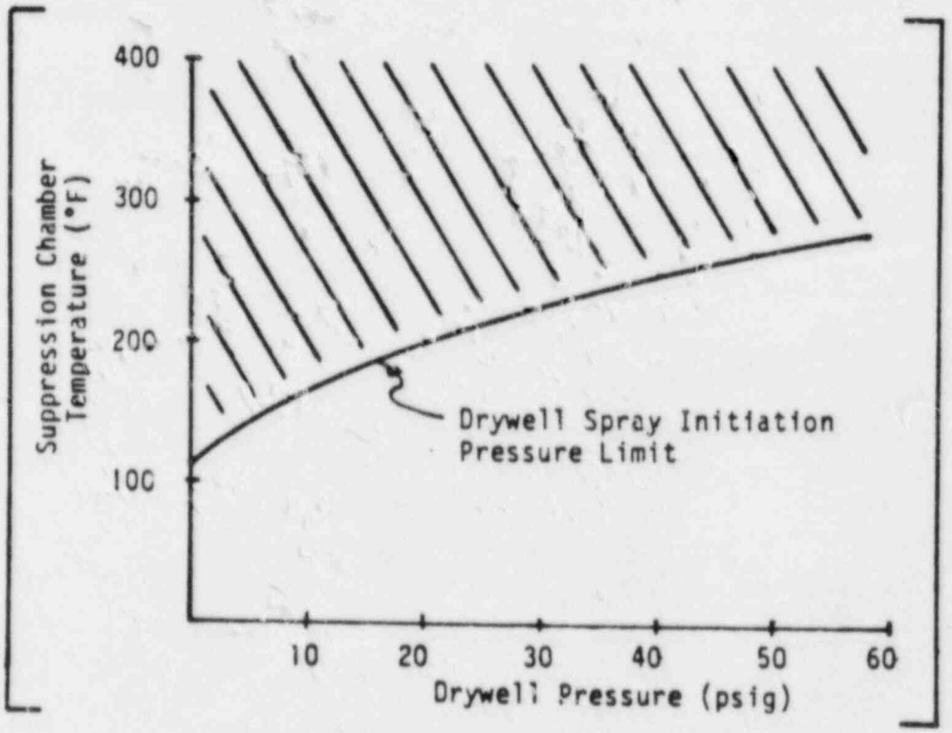
PC/P-6 If suppression chamber pressure cannot be maintained below the Primary Containment Pressure Limit, then irrespective of whether adequate core cooling is assured:



DRAFT

- [If suppression pool water level is below 24 ft. 6 in. (elevation of suppression pool spray nozzles),] initiate suppression pool sprays.

- If [suppression chamber temperature and drywell pressure are below the Drywell Spray Initiation Pressure Limit], [shut down recirculation pumps and drywell cooling fans and] initiate drywell sprays [restricting flow rate to less than 720 gpm (Maximum Drywell Spray Flow Rate Limit)].



PC/P-7 If suppression chamber pressure exceeds the Primary Containment Pressure Limit, vent the primary containment in accordance with [procedure for containment venting] to reduce and maintain pressure below the Primary Containment Pressure Limit.

#22

DRAFT

SP/L Monitor and control suppression pool water level.

SP/L-1 Maintain suppression pool water level between [12 ft. 6 in. (maximum suppression pool water level LCO)] and [12 ft. 2 in. (minimum suppression pool water level LCO)]. Refer to [sampling procedure] prior to discharging water. [Suppression pool makeup may be augmented by SPMS]. #8, #9

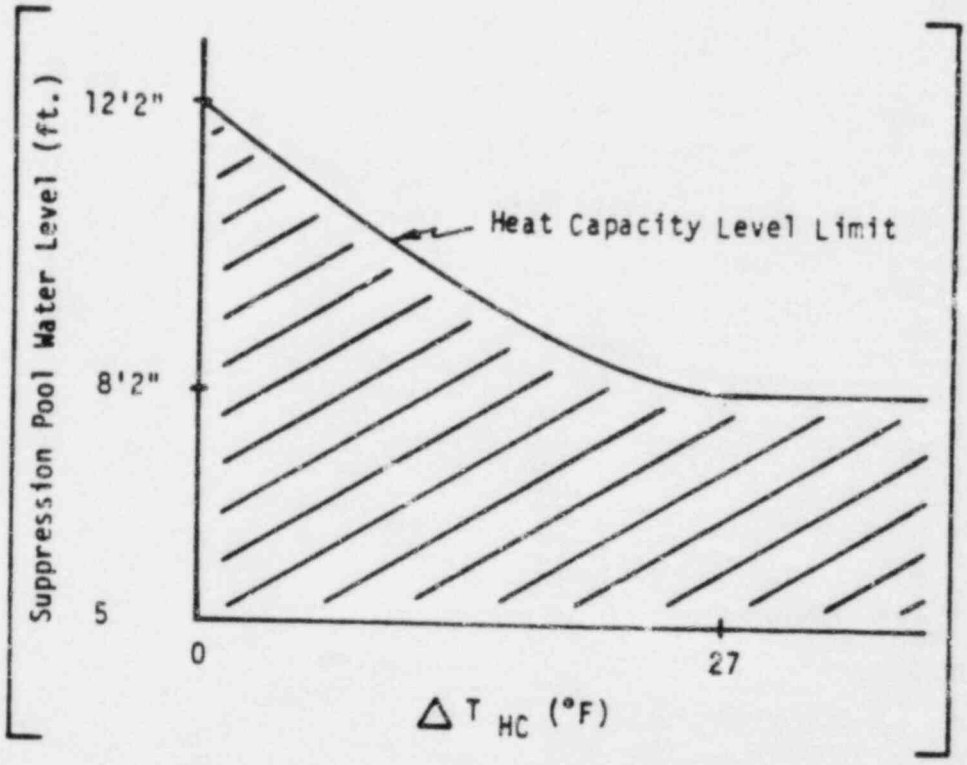
If SPMS has been initiated, maintain suppression pool water level between [23 ft. 9 in. (SPMS initiation setpoint plus suppression pool water level increase which results from SPMS operation)] and [19 ft. 11 in. (minimum suppression pool water level LCO)].

If suppression pool water level cannot be maintained above [12 ft. 2 in. (minimum suppression pool water level LCO)] execute [Step SP/L-2].

If suppression pool water level cannot be maintained below [12 ft. 6 in. (maximum suppression pool water level LCO)] ([23 ft. 9 in. (SPMS initiation setpoint plus suppression pool water level increase which results from SPMS operation)] if SPMS has been initiated), execute [Step SP/L-3].

SP/L-2 SUPPRESSION POOL WATER LEVEL BELOW [12 ft. 2 in. (minimum suppression pool water level LCO)]

Maintain suppression pool water level above the Heat Capacity Level Limit.



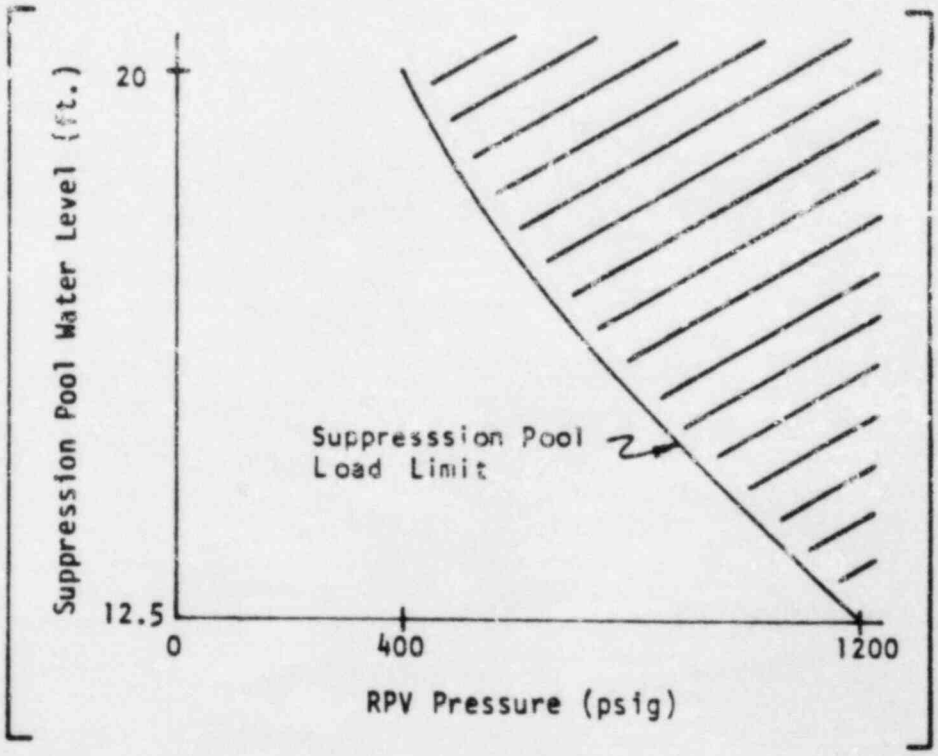
Where ΔT_{HC} = Heat Capacity Temperature Limit minus suppression pool temperature

If suppression pool water level cannot be maintained above the Heat Capacity Level Limit, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

SP/L-3 SUPPRESSION POOL WATER LEVEL ABOVE [12 ft. 6 in. (maximum suppression pool water level LCO)] ([23 ft. 9 in. (SPMS initiation setpoint plus suppression pool water level increase which results from SPMS operation)] if SPMS has been initiated)

Execute [Steps SP/L-3.1 and SP/L-3.2] concurrently.

SP/L-3.1 Maintain suppression pool water level below the Suppression Pool Load Limit.



If suppression pool water level cannot be maintained below the Suppression Pool Load Limit, maintain RPV pressure below the Limit.

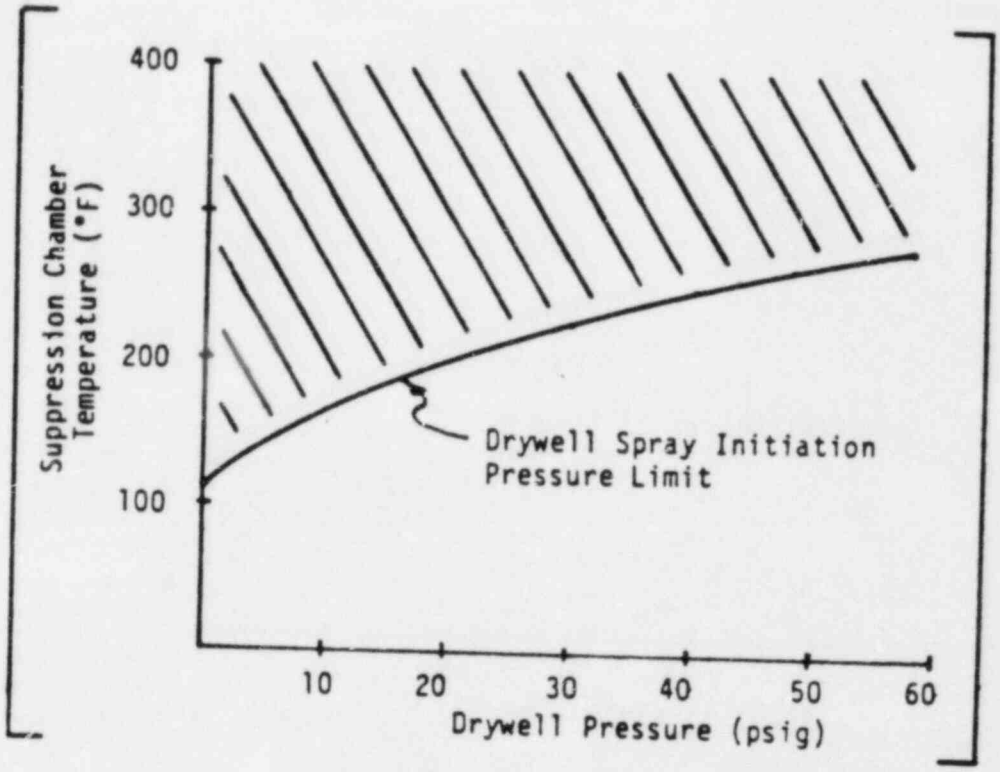
#13
#14

If suppression pool water level and RPV pressure cannot be maintained below the Suppression Pool Load Limit but only if adequate core cooling is assured, terminate injection into the RPV from sources external to the primary containment except from boron injection systems and CRD.

If suppression pool water level and RPV pressure cannot be restored and maintained below the Suppression Pool Load Limit, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

SP/L-3.2 Before suppression pool water level reaches [17 ft. 2 in. (Maximum Primary Containment Water Level Limit or elevation of bottom of Mark I internal suppression chamber to drywell vacuum breakers less vacuum breaker opening pressure in feet of water, whichever is lower)] but only if adequate core cooling is assured, terminate injection into the RPV from sources external to the primary containment except from boron injection systems and CRD.

1. When suppression pool water level reaches [17 ft. 2 in. (elevation of bottom of Mark I internal suppression chamber to drywell vacuum breakers less vacuum breaker opening pressure in feet of water)] but only if [suppression chamber temperature and drywell pressure are below the Drywell Spray Initiation Pressure Limit], [shut down recirculation pumps and drywell cooling fans and] initiate drywell sprays [restricting flow rate to less than 720 gpm (Maximum Drywell Spray Flow Rate Limit)]. #18

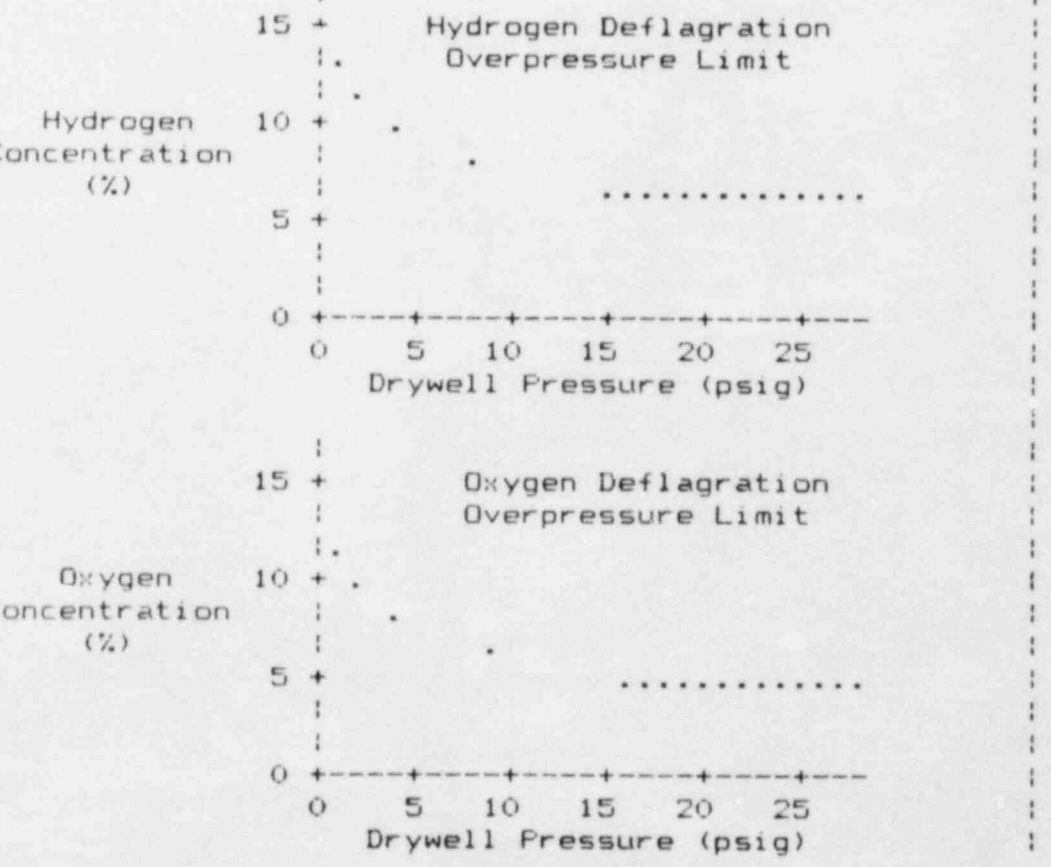


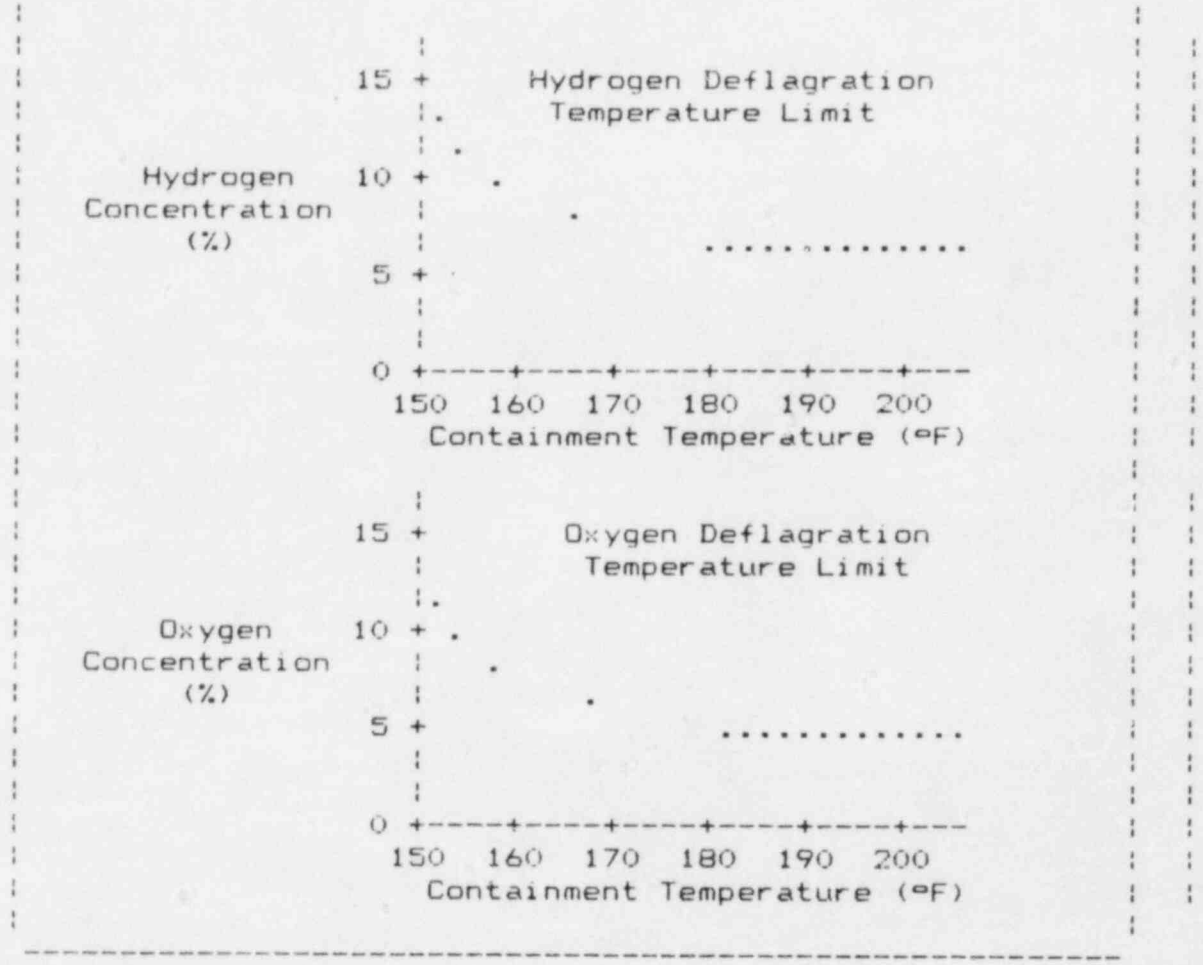
2. If suppression pool water level exceeds [17 ft. 2 in. (elevation of bottom of Mark I internal suppression chamber to drywell vacuum breakers less vacuum breaker opening pressure in feet of water)], continue to operate drywell sprays [below 720 gpm (Maximum Drywell Spray Flow Rate Limit)]. #23

3. When primary containment water level reaches [104 ft. (Maximum Primary Contrainment Water Level Limit)], terminate injection into the RPV from sources external to the primary containment irrespective of whether adequate core cooling is assured.

PC/H Monitor and control hydrogen and oxygen concentrations.

If while executing the following steps, drywell or suppression chamber hydrogen concentration cannot be determined to be below the [respective] Hydrogen Deflagration Overpressure Limit and the Hydrogen Deflagration Temperature Limit and drywell or suppression chamber oxygen concentration cannot be determined to be below the [respective] Oxygen Deflagration Overpressure Limit and the Oxygen Deflagration Temperature Limit, secure and prevent operation of hydrogen mixing systems, recombiners, and ignitors until drywell and suppression chamber hydrogen concentrations can be determined to be below the [respective] Hydrogen Deflagration Overpressure Limit[s] and the Hydrogen Deflagration Temperature Limit or drywell and suppression chamber oxygen concentrations can be determined to be below the [respective] Oxygen Deflagration Overpressure Limit[s] and the Oxygen Deflagration Temperature Limit.





Execute Steps PC/H-1 and PC/H-2 concurrently.

PC/H-1 When RPV water level cannot be determined to be above [-164 in. (top of active fuel)] but only if drywell and suppression chamber hydrogen concentrations are below the [respective] Hydrogen Deflagration Overpressure Limit[s] and the Hydrogen Deflagration Temperature Limit or drywell and suppression chamber oxygen concentrations are below the [respective] Oxygen Deflagration Overpressure Limit[s] and the Oxygen Deflagration Temperature Limit, operate hydrogen ignitors.

PC/H-2 When hydrogen concentration in the drywell or suppression chamber reaches [0.5% (minimum detectable hydrogen concentration)], but only if the site radioactivity release rate is expected to remain below the site release rate LCO, vent and purge the primary containment to restore and maintain the drywell and suppression chamber hydrogen concentrations below [0.5% (minimum detectable hydrogen concentration)] as follows: ----- ¦ #22 ¦ -----

If while executing the following steps the site radioactivity release rate reaches the site release rate LCO, isolate the primary containment vent and purge.

PC/H-2.1 Refer to [sampling procedure].

PC/H-2.2 If suppression pool water level is below [26 ft. 9 in. (elevation of the bottom of the suppression chamber vent)], vent the suppression chamber.

If suppression pool water level is at or above [26 ft. 9 in. (elevation of the bottom of the suppression chamber vent)] or if the suppression chamber cannot be vented, vent the drywell [to atmosphere].

PC/H-2.3 If the suppression chamber or drywell can be vented [to atmosphere], initiate and maximize the [nitrogen] [containment and] drywell purge flow.

Execute Steps PC/H-3 and PC/H-4 concurrently.

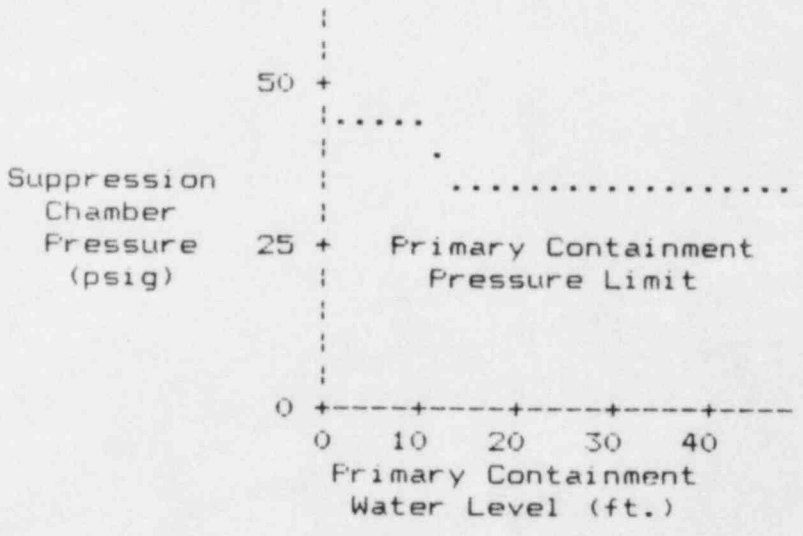
PC/H-3 Monitor and control hydrogen and oxygen concentrations in the drywell.

PC/H-3.1 When drywell hydrogen concentration reaches [1% (minimum hydrogen concentration for recombiner operation or minimum detectable hydrogen concentration, whichever is higher)]:

1. If drywell hydrogen concentration is below [6% (maximum hydrogen concentration for recombiner operation or the lowest hydrogen concentration which can support a deflagration, whichever is lower)] or drywell oxygen concentration is below [5% (maximum oxygen concentration for recombiner operation or the lowest oxygen concentration which can support a deflagration, whichever is lower)], place hydrogen recombiners in service taking suction directly on the drywell.

2. If drywell and suppression chamber hydrogen concentrations are below the [respective] Hydrogen Deflagration Overpressure Limit[s] and the Hydrogen Deflagration Temperature Limit or drywell and suppression chamber oxygen concentrations are below the [respective] Oxygen Deflagration Overpressure Limit[s] and the Oxygen Deflagration Temperature Limit, operate hydrogen ignitors.

PC/H-3.2 When drywell hydrogen concentration reaches [4% (lowest hydrogen concentration which can support an upward flame propagation)] but only if [RPV pressure is below the Primary Containment Pressure Limit and either] drywell and suppression chamber hydrogen concentrations are below the [respective] Hydrogen Deflagration Overpressure Limit[s] and the Hydrogen Deflagration Temperature Limit or drywell and suppression chamber oxygen concentrations are below the [respective] Oxygen Deflagration Overpressure Limit[s] and the Oxygen Deflagration Temperature Limit, operate the drywell hydrogen mixing system.



PC/H-3.3 When drywell hydrogen concentration reaches [6% (maximum hydrogen concentration for recombiner operation or the lowest hydrogen concentration which can support a deflagration, whichever is lower)] and drywell oxygen concentration reaches [5% (maximum oxygen concentration for recombiner operation or the lowest oxygen concentration which can support a deflagration, whichever is lower)], secure any hydrogen recombiner taking suction on the drywell.

,pa

PC/H-3.4 [When drywell hydrogen concentration reaches 6% (lowest hydrogen concentration which can support a deflagration) and drywell oxygen concentration reaches 5% (lowest oxygen concentration which can support a deflagration),] EMERGENCY RPV DEPRESSURIZATION IS REQUIRED; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

PC/H-3.5 Continue in this procedure at [Step PC/H-5].

PC/H-4 Monitor and control hydrogen and oxygen concentrations in the suppression chamber.

PC/H-4.1 When suppression chamber hydrogen concentration reaches [1% (minimum hydrogen concentration for recombiner operation or minimum detectable hydrogen concentration, whichever is higher)]:

1. If suppression chamber hydrogen concentration is below [6% (maximum hydrogen concentration for recombiner operation or the lowest hydrogen concentration which can support a deflagration, whichever is lower)] or suppression chamber oxygen concentration is below [5% (maximum oxygen concentration for recombiner operation or the lowest oxygen concentration which can support a deflagration, whichever is lower)], place hydrogen recombiners in service taking suction directly from the suppression chamber.

   If no hydrogen recombiner can be placed in service taking suction directly from the suppression chamber but only if the drywell hydrogen concentration is below [6% (maximum hydrogen concentration for recombiner operation or the lowest hydrogen concentration which can support a deflagration, whichever is lower)] or drywell oxygen concentration is below [5% (maximum oxygen concentration for recombiner operation or the lowest oxygen concentration which can support a deflagration, whichever is lower)], place hydrogen recombiners in service taking suction indirectly from the suppression chamber by way of the drywell.

2. If drywell and suppression chamber hydrogen concentrations are below the [respective] Hydrogen Deflagration Overpressure Limit[s] and the Hydrogen Deflagration Temperature Limit or drywell and suppression chamber oxygen concentrations are below the [respective] Oxygen Deflagration Overpressure Limit[s] and the Oxygen Deflagration Temperature Limit, operate hydrogen ignitors.

PC/H-4.2 When suppression chamber hydrogen concentration reaches [6% (maximum hydrogen concentration for recombiner operation or the lowest hydrogen concentration which can support a deflagration, whichever is lower)] and suppression chamber oxygen concentration reaches [5% (maximum oxygen concentration for recombiner operation or the lowest oxygen concentration which can support a deflagration, whichever is lower)], secure any hydrogen recombiner taking suction directly on the suppression chamber.

PC/H-5 When hydrogen concentration in either the drywell or the suppression chamber reaches [6% (lowest hydrogen concentration which can support a deflagration)][8% (maximum hydrogen concentration expected when ignitors are functioning properly)] and the drywell or suppression chamber oxygen concentration is above [5% (maximum oxygen concentration for recombiner operation or the lowest oxygen concentration which can support a deflagration, whichever is lower)] but only if the offsite radioactivity release rate is expected to remain below the offsite release rate which requires an Alert, vent and purge the primary containment to restore and maintain the drywell and suppression chamber hydrogen concentrations below [6% (maximum hydrogen concentration for recombiner operation or the lowest hydrogen concentration which can support a deflagration, whichever is lower)] [or the drywell and suppression chamber oxygen concentrations below 5% (maximum oxygen concentration for recombiner operation or the lowest oxygen concentration which can support a deflagration, whichever is lower)] as follows:

If while executing the following steps the offsite radioactivity release rate reaches the offsite release rate which requires an Alert, isolate the primary containment vent and purge.

PC/H-5.1 Refer to [sampling procedure].

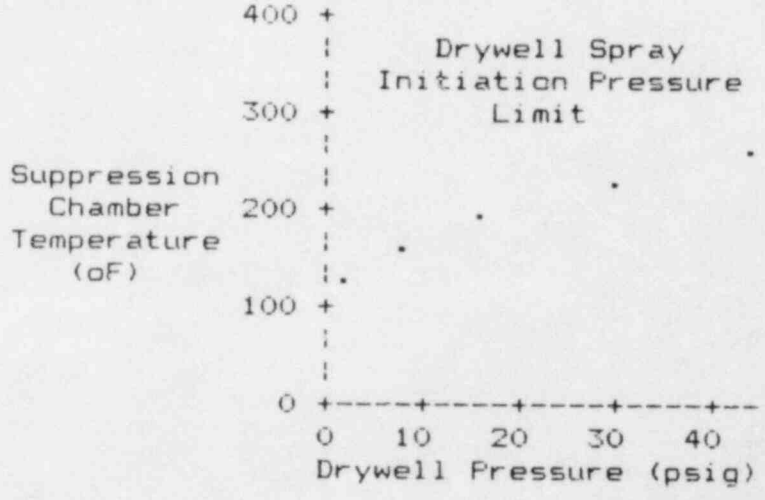
PC/H-5.2 If suppression pool water level is below [24 ft. 6 in. (elevation of suppression pool spray nozzles)], initiate [Mk I/II] suppression pool sprays. | ----- | #18 | -----

PC/H-5.3 If suppression pool water level is below [26 ft. 9 in. (elevation of the bottom of the suppression chamber vent)], vent the suppression chamber.

If suppression pool water level is at or above [26 ft. 9 in. (elevation of the bottom of the suppression chamber vent)] or if the suppression chamber cannot be vented, vent the drywell.

PC/H-5.4 If the suppression chamber or drywell can be vented [to atmosphere], initiate and maximize the [nitrogen] [containment and] drywell purge flow.

PC/H-5.5 If [suppression chamber temperature and drywell pressure are below the Drywell Spray Initiation Pressure Limit], [shut down recirculation pumps and drywell cooling fans and] initiate drywell sprays [restricting flow rate to less than 720 gpm (Maximum Drywell Spray Flow Rate Limit)].



PC/H-6 When the drywell or suppression chamber hydrogen concentration reaches the [respective] Hydrogen Deflagration Overpressure Limit or the Hydrogen Deflagration Temperature Limit and the drywell or suppression chamber oxygen concentration reaches the [respective] Oxygen Deflagration Overpressure Limit or the Oxygen Deflagration Temperature Limit, secure hydrogen mixing systems and ignitors and, irrespective of the offsite radioactivity release rate, vent and purge the primary containment to restore and maintain the drywell and suppression chamber hydrogen concentrations below the [respective] Hydrogen Deflagration Overpressure Limit[s] and the Hydrogen Deflagration Temperature Limit [or the drywell] and suppression chamber oxygen concentrations below the [respective] Oxygen Deflagration Overpressure Limit[s] and the Oxygen Deflagration Temperature Limit] as follows:

PC/H-6.1 If [suppression chamber pressure is above 1.7 psig (Mark III Containment Spray Initiation Pressure Limit)] [suppression pool water level is below 24 ft. 6 in. (elevation of suppression pool spray nozzles)], initiate suppression pool sprays. #18

PC/H-6.2 If suppression pool water level is below [26 ft. 9 in. (elevation of the bottom of the suppression chamber vent)], vent the suppression chamber.

If suppression pool water level is at or above [26 ft. 9 in. (elevation of the bottom of the suppression chamber vent)] or if the suppression chamber cannot be vented, vent the drywell.

PC/H-6.3 If the suppression chamber or drywell can be vented [to atmosphere], initiate and maximize the [nitrogen] [containment and] drywell purge flow.

PC/H-6.4 If [suppression chamber temperature and drywell pressure are below the Drywell Spray Initiation Pressure Limit], [shut down recirculation pumps and drywell cooling fans and] initiate drywell sprays [restricting flow rate to less than 720 gpm (Maximum Drywell Spray Flow Rate Limit)].

PC/H-7 If the drywell or suppression chamber hydrogen concentration cannot be restored and maintained below the [respective] Hydrogen Deflagration Overpressure Limit and the Hydrogen Deflagration Temperature Limit and the drywell or suppression chamber oxygen concentration cannot be restored and maintained below the [respective] Oxygen Deflagration Overpressure Limit and the Oxygen Deflagration Temperature Limit, then irrespective of whether adequate core cooling is assured:

PC/H-7.1 If [suppression chamber pressure is above 1.7 psig (Mark III Containment Spray Initiation Pressure Limit)] [suppression pool water level is below 24 ft. 6 in. (elevation of suppression pool spray nozzles)], initiate suppression pool sprays.

PC/H-7.2 If [suppression chamber temperature and drywell pressure are below the Drywell Spray Initiation Pressure Limit], [shut down recirculation pumps and drywell cooling fans and] initiate drywell sprays [restricting flow rate to less thar 720 gpm (Maximum Drywell Spray Flow Rate Limit)].

SECONDARY CONTAINMENT CONTROL GUIDELINE

PURPOSE

The purpose of this guideline is to:

- Protect equipment in the secondary containment,
- Limit radioactivity release to the secondary containment, and either:
- Maintain secondary containment integrity, or
- Limit radioactivity release from the secondary containment.

ENTRY CONDITIONS

The entry conditions for this guideline are any of the following secondary containment conditions:

- Differential pressure at or above 0 in. of water
- An area temperature above the maximum normal operating temperature
- A HVAC cooler differential temperature above the maximum normal operating differential temperature
- A HVAC exhaust radiation level above the maximum normal operating radiation level
- An area radiation level above the maximum normal operating radiation level
- A floor drain sump water level above the maximum normal operating water level
- An area water level above the maximum normal operating water level

OPERATOR ACTIONS

If while executing the following steps secondary containment HVAC exhaust radiation level exceeds [20 mr/hr (secondary containment HVAC isolation setpoint)]:

- Confirm or manually initiate isolation of secondary containment HVAC, and
- Confirm initiation of or manually initiate SBGT [only when the space being evacuated is below 212°F].

If while executing the following steps:

- Secondary containment HVAC isolates, and
- Secondary containment HVAC exhaust radiation level is below [20 mr/hr (secondary containment HVAC isolation setpoint)],

restart secondary containment HVAC. #24

Irrespective of the entry condition, execute [Steps SC/T, SC/R, and SC/L] concurrently.

SC/T Monitor and control secondary containment temperatures.

SC/T-1 Operate available area coolers.

DRAFT

SC/T-2 If secondary containment HVAC exhaust radiation level is below [20 mr/hr (secondary containment HVAC isolation setpoint)], operate available secondary containment HVAC.

SC/T-3 If any area temperature exceeds its maximum normal operating temperature, isolate all systems that are discharging into the area except systems required to shut down the reactor, assure adequate core cooling, or suppress a working fire.

SC/T-4 If a primary system is discharging into an area, then before any area temperature reaches its maximum safe operating temperature, enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

SC/T-5 If a primary system is discharging into an area and an area temperature exceeds its maximum safe operating temperature in more than one area, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.

SC/R Monitor and control secondary containment radiation levels.

SC/R-1 If any area radiation level exceeds its maximum normal operating radiation level, isolate all systems that are discharging into the area except systems required to shut down the reactor, assure adequate core cooling, or suppress a working fire.

SC/R-2 If a primary system is discharging into an area, then before any area radiation level reaches its maximum safe operating radiation level, enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

SC/R-3 If a primary system is discharging into an area and an area radiation level exceeds its maximum safe operating radiation level in more than one area, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.

SC/L Monitor and control secondary containment water levels.

SC/L-1 If any floor drain sump or area water level is above its maximum normal operating water level, operate available sump pumps to restore and maintain it below its maximum normal operating water level.

If any floor drain sump or area water level cannot be restored and maintained below its maximum normal operating water level, isolate all systems that are discharging water into the sump or area except systems required to shut down the reactor, assure adequate core cooling, or suppress a working fire.

SC/L-2 If a primary system is discharging into an area, then before any floor drain sump or area water level reaches its maximum safe operating water level, enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

SC/L-3 If a primary system is discharging into an area and a floor drain sump or area water level exceeds its maximum safe operating water level in more than one area, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.

TABLE 1

OPERATING VALUES OF SECONDARY CONTAINMENT PARAMETERS

Secondary Containment Parameter/Location	Alarm	Maximum Normal[1] Operating Value	Maximum Safe[1] Operating Value
• Differential pressure	(in. water)	(in. water)	(in. water)
- Reactor Building/outside air	0		
- Refuel Floor/outside air	0		
• Area temperature	(°F)	(°F)	(°F)
- RWCU "A" pump room 158'	130		
- RWCU "B" pump room 158'	130		
- RWCU Hx room 158' at Hx.	130		
- RWCU Hx room 158' disch-H.W.	130		
- RWCU phase sep. room 158'	130		
- RWCU holding pump room 185	130		
- NE Diagonal	175		
- SE Diagonal	175		
- HPCI room, area A	175		
- HPCI room, area B	175		
- HPCI room, area C	175		
- Torus room, westwall	200		
- Torus room, eastwall	200		
- Torus room, northwall	200		
- Torus room, southwall	200		
- Main steam tunnel	160		
- SE, Reactor 130 elev., area A	200		
- SE, Reactor 130 elev., area B	200		
- NW Diagonal, area A	200		
- NW Diagonal, area B	200		
- NW Diagonal, area C	200		

[1] Typical values not available.

TABLE 1

OPERATING VALUES OF SECONDARY CONTAINMENT PARAMETERS (Continued)

Secondary Containment Parameter/Location	Alarm	Maximum Normal[1] Operating Value	Maximum Safe[1] Operating Value
• HVAC cooler differential temperature	(°F)	(°F)	(°F)
- RWCU "A" Pump Room	75		
- RWCU "B" Pump Room	75		
- RWCU Hx Room 158' at Hxs	75		
- RWCU Hx Room 158' disch. to Hotwell	75		
- RWCU phase separator room 158'	75		
- RWCU holding pump room 185'	75		
- NE diagonal	50		
- SE diagonal	50		
- HPCI Room, Cooler A	40		
- HPCI Room, Cooler B	40		
- NW Diagonal, Cooler A	40		
- NW Diagonal, Cooler B	40		
- NW Diagonal, Cooler C	40		
- Torus Room, NW	40		
- Torus Room, West	40		
- Torus Room, NW	40		
- Torus Room, West	40		
- Torus Room NW	40		
- Torus Room West	40		
- Torus Room, NW	40		
- Torus Room, West	40		
- Main Steam Tunnel, Cooler A	70		
- Main Steam Tunnel, Cooler B	70		

[1] Typical values not available.

TABLE 1

OPERATING VALUES OF SECONDARY CONTAINMENT PARAMETERS (Continued)

Secondary Containment Parameter/Location	Alarm	Maximum Normal[1] Operating Value	Maximum Safe[1] Operating Value
• HVAC exhaust radiation level above	(mr/hr)	(mr/hr)	(mr/hr)
- Reactor Building	20		
- Refuel Floor	20		
• Area radiation level	(mr/hr)	(mr/hr)	(mr/hr)
- 158' Southeast Area	15		
- 158' Northeast Area	15		
- 158' Northwest Area	15		
- 130' Northeast Work Area	15		
- 130' Southeast Work Area	15		
- Decontamination Pump & Equipment Room	20		
- South CRD Hydraulic Units	15		
- Spent Fuel Pool Passageway	15		
- 185' Operating Floor	15		
- 185' Sample Panel Area	15		
- CRD Repair Area	20		
- 185' RWCU Control Panel Area	15		
- RCIC Equipment Area	20		
- CRD Pump Room SW	20		
- RHR & Core Spray Room Northeast	20		
- RHR & Core Spray Room Southeast	20		
- Fuel Pool Demin Panel Area	20		

[1] Typical values not available.

TABLE 1

OPERATING VALUES OF SECONDARY CONTAINMENT PARAMETERS (Continued)

Secondary Containment Parameter/Location	Alarm	Maximum Normal[1] Operating Value	Maximum Safe[1] Operating Value
• Floor drain sump water level	(in.)	(in.)	(in.)
- Sump A (S.E. Diagonal)	47		
- Sump B (S.W. Diagonal)	52		
• Area water level	(in.)	(in.)	(in.)
- CRD Compartment	7		
- RCIC Compartment	7		
- RB NE Corner RM	7		
- RB SE Corner RM	7		
- HPCI Compartment	7		
- Torus Compartment NW	7		
- Torus Compartment NE	7		
- Torus Compartment SE	7		
- Torus Compartment SW	7		

[1] Typical values not available.

RADIOACTIVITY RELEASE CONTROL GUIDELINE

PURPOSE

The purpose of this guideline is to limit radioactivity release into areas outside the primary and secondary containments.

ENTRY CONDITIONS

The entry condition for this guideline is:

- Offsite radioactivity release rate above the offsite release rate which requires an Alert.

OPERATOR ACTIONS

RR-1 Isolate all primary systems that are discharging into areas outside the primary and secondary containments except systems required to assure adequate core cooling or shut down the reactor.

RR-2 If offsite radioactivity release rate approaches or exceeds the offsite release rate which requires a General Emergency and a primary system is discharging into an area outside the primary and secondary containments, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

CONTINGENCY #1
LEVEL RESTORATION

If while executing the following steps:

- Boron Injection is required, enter [procedure developed from CONTINGENCY #7].
- RPV water level cannot be determined, RPV FLOODING IS REQUIRED; enter [procedure developed from CONTINGENCY #6].
- RPV Flooding is required, enter [procedure developed from CONTINGENCY #6].

C1-1 Initiate IC.

C1-2 Line up for injection and start pumps in 2 or more of the following injection subsystems:

- Condensate
- HPCS
- LPCI-A
- LPCI-B
- LPCI-C
- LPCS-A
- LPCS-B

If less than 2 of the injection subsystems can be lined up, commence lining up as many of the following alternate injection subsystems as possible:

- RHR service water crosstie
- Fire system
- Interconnections with other units
- ECCS keep-full systems
- SLC (test tank)
- SLC (boron tank)

C1-3 Monitor RPV pressure and water level. Continue in this procedure at the step indicated in the following table.

RPV PRESSURE REGION

RPV LEVEL	HIGH [425 psig][1]	INTERMEDIATE	LOW [100 psig][2]
INCREASING	C1-4	C1-5	C1-6
DECREASING	C1-7		C1-8

[1](RPV pressure at which LPCS shutoff head is reached)

[2](HPCI or RCIC low pressure isolation setpoint, whichever is higher)

If while executing the following steps:

- The RPV water level trend reverses or RPV pressure changes region, return to [Step C1-3].
- RPV water level drops below [-146 in. (ADS initiation setpoint)], prevent automatic initiation of ADS.

C1-4 RPV WATER LEVEL INCREASING, RPV PRESSURE HIGH

Enter [procedure developed from the RPV Control Guideline] at [Step RC/L].

C1-5 RPV WATER LEVEL INCREASING, RPV PRESSURE INTERMEDIATE

If HPCI and RCIC are not available and RPV pressure is increasing, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED. When RPV pressure is decreasing, enter [procedure developed from the RPV Control Guideline] at [Step RC/L].

If HPCI and RCIC are not available and RPV pressure is not increasing, enter [procedure developed from the RPV Control Guideline] at [Step RC/L].

Otherwise, when RPV water level reaches [+12 in. (low level scram setpoint)], enter [procedure developed from the RPV Control Guideline] at [Step RC/L].

C1-6 RPV WATER LEVEL INCREASING, RPV PRESSURE LOW

If RPV pressure is increasing, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED. When RPV pressure is decreasing, enter [procedure developed from the RPV Control Guideline] at [Step RC/L].

Otherwise, enter [procedure developed from the RPV Control Guideline] at [Step RC/L].

C1-7 RPV WATER LEVEL DECREASING, RPV PRESSURE HIGH OR INTERMEDIATE

If HPCI or RCIC is not operating, restart whichever is not operating.

If no injection subsystem is lined up for injection with at least one pump running, start pumps in alternate injection subsystems which are lined up for injection.

When RPV water level drops to [-164 in. (top of active fuel)]:

- If no system, injection subsystem or alternate injection subsystem is lined up with at least one pump running, STEAM COOLING IS REQUIRED. When any system, injection subsystem or alternate injection subsystem is lined up with at least one pump running, return to [Step C1-3].

- Otherwise, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED. When RPV water level is increasing or RPV pressure drops below [100 psig (HPCI or RCIC low pressure isolation setpoint, whichever is higher)], return to [Step C1-3].

C1-8 RPV WATER LEVEL DECREASING, RPV PRESSURE LOW

[If no HPCS or LPCS subsystem is operating,] start pumps in alternate injection subsystems which are lined up for injection.

If RPV pressure is increasing, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.

When RPV water level drops to [-164 in. (top of active fuel)], enter [procedure developed from CONTINGENCY #4].

C1-3 MONITOR RPV PRESSURE AND WATER LEVEL. CONTINUE IN THIS PROCEDURE AT THE STEP INDICATED IN THE FOLLOWING TABLE:

RPV WATER LEVEL	RPV PRESSURE REGION: HIGH (>425 PSIG (*))	RPV PRESSURE REGION: INTERMEDIATE (425 PSIG (*) to 100 PSIG (+))	RPV PRESSURE REGION: LOW (<100 PSIG (+))
INCREASING	C1-4 ENTER (PROCEDURE DEVELOPED FROM THE RPV CONTROL GUIDELINE) AT (STEP RC/L).	C1-5 IF HPCI AND RCIC ARE NOT AVAILABLE AND RPV PRESSURE IS INCREASING, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED. WHEN RPV PRESSURE IS DECREASING, ENTER (PROCEDURE DEVELOPED FROM THE RPV CONTROL GUIDELINE) AT (STEP RC/L). IF HPCI AND RCIC ARE NOT AVAILABLE AND RPV PRESSURE IS NOT INCREASING, ENTER (PROCEDURE DEVELOPED FROM THE RPV CONTROL GUIDELINE) AT (STEP RC/L). OTHERWISE, WHEN RPV WATER LEVEL REACHED (+12 IN. (LOW LEVEL SCRAM SETPOINT)), ENTER (PROCEDURE DEVELOPED FROM THE RPV CONTROL GUIDELINE) AT (STEP RC/L).	C1-6 IF RPV PRESSURE IS INCREASING, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED. WHEN RPV PRESSURE IS DECREASING, ENTER (PROCEDURE DEVELOPED FROM THE RPV CONTROL GUIDELINE) AT (STEP RC/L). OTHERWISE, ENTER (PROCEDURE DEVELOPED FROM THE RPV CONTROL GUIDELINE) AT (STEP RC/L).
DECREASING	C1-7 IF HPCI OR RCIC IS NOT OPERATING, RESTART WHICHEVER IS NOT OPERATING. IF NO INJECTION SUBSYSTEM IS LINED UP FOR INJECTION WITH AT LEAST ONE PUMP RUNNING, START PUMPS IN ALTERNATE INJECTION SUBSYSTEMS WHICH ARE LINED UP FOR INJECTION. WHEN RPV WATER LEVEL DROPS TO (-164 IN. (TOP OF ACTIVE FUEL)): ● IF NO SYSTEM, INJECTION SUBSYSTEM OR ALTERNATE INJECTION SUBSYSTEM IS LINED UP WITH AT LEAST ONE PUMP RUNNING, STEAM COOLING IS REQUIRED. WHEN ANY SYSTEM, INJECTION SUBSYSTEM OR ALTERNATE INJECTION SUBSYSTEM IS LINED UP WITH AT LEAST ONE PUMP RUNNING, RETURN TO STEP C1-3. ● OTHERWISE, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED, WHEN RPV WATER LEVEL IS INCREASING OR RPV PRESSURE DROPS BELOW (100 PSIG (HPCI OR RCIC LOW PRESSURE ISOLATION SETPOINT, WHICHEVER IS HIGHER)), RETURN TO STEP C1-3.		C1-8 (IF NO HPCS OR LPCS SUBSYSTEM IS OPERATING,) START PUMPS IN ALTERNATE INJECTION SUBSYSTEMS WHICH ARE LINED UP FOR INJECTION. IF RPV PRESSURE IS INCREASING, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED. WHEN RPV WATER LEVEL DROPS TO (-164 IN. (TOP OF ACTIVE FUEL)) ENTER (PROCEDURE DEVELOPED FROM CONTINGENCY #4).

IF WHILE EXECUTING THE FOLLOWING STEPS THE RPV WATER LEVEL TREND REVERSES OR RPV PRESSURE CHANGES REGION, RETURN TO (STEP C1-3).

*RPV PRESSURE AT WHICH LPCS SHUTOFF HEAD IS REACHED. +HPCI OR RCIC LOW PRESSURE ISOLATION SETPOINT, WHICHEVER IS HIGHER.

ALTERNATE FORMAT FOR STEPS C1-3 THROUGH C1-8

CONTINGENCY #2

EMERGENCY RPV DEPRESSURIZATION

C2-1 When either: #13, #14

- Boron Injection is required and all injection into the RPV except from boron injection systems and CRD has been terminated and prevented, or

- Boron Injection is not required,

C2-1.1 Initiate IC.

C2-1.2 If suppression pool water level is above [4 ft. 9 in. (elevation of top of SRV discharge device)]:

- Open all ADS valves.
- If any ADS valve cannot be opened, open other SRVs until [7 (number of SRVs dedicated to ADS)] valves are open.

C2-1.3 If less than [3 (Minimum Number of SRVs Required for Emergency Depressurization)] SRVs are open [and RPV pressure is at least 50 psig (Minimum SRV Re-opening Pressure) above suppression chamber pressure], rapidly depressurize the RPV using one or more of the following systems (use in order which will minimize radioactive release to the environment): #22

- Main condenser
- RHR (steam condensing mode)
- [Other steam driven equipment]
- Main steam line drains
- HPCI steam line
- RCIC steam line
- Head vent
- IC tube side vent

If RPV Flooding is required, enter [procedure developed from CONTINGENCY #6].

C2-2 Enter [procedure developed from the RPV Control Guideline] at [Step RC/P-3].

CONTINGENCY #3

STEAM COOLING

C3-1 Confirm initiation of IC.

If while executing the following steps Emergency RPV Depressurization is required or any system, injection subsystem, or alternate injection subsystem is lined up for injection with at least one pump running, enter [procedure developed from CONTINGENCY #2].

If IC cannot be initiated:

When RPV water level drops to [-272 in. (Minimum Zero-Injection RPV Water Level)] or if RPV water level cannot be determined, open one SRV.

When RPV pressure drops below [700 psig (Minimum Single SRV Steam Cooling Pressure)], enter [procedure developed from CONTINGENCY #2].

CONTINGENCY #4

CORE COOLING WITHOUT LEVEL RESTORATION

C4-1 Open all ADS valves. [#13]

If any ADS valve cannot be opened, open other SRVs until [7 (number of SRVs dedicated to ADS)] valves are open.

C4-2 Operate HPCS and LPCS subsystems with suction from the suppression pool.

When at least one core spray subsystem is operating with suction from the suppression pool and RPV pressure is below [310 psig (RPV pressure for rated LPCS or HPCS flow, whichever pressure is lower)], terminate injection into the RPV from sources external to the primary containment.

C4-3 When RPV water level is restored to [-164 in. (top of active fuel)], enter [procedure developed from the RPV Control Guideline] at [Step RC/L].

CONTINGENCY #5

ALTERNATE SHUTDOWN COOLING

C5-1 Initiate suppression pool cooling.

C5-2 Close the [RPV head vents,] MSIVs, main steam line drain valves, and HPCI and RCIC isolation valves.

C5-3 Place the control switch for [one (Minimum Number of SRVs Required for Alternate Shutdown Cooling)] SRV[s] in the OPEN position.

C5-4 Slowly raise RPV water level to establish a flow path through the open SRV back to the suppression pool.

C5-5 Start one LPCS or LPCI pump with suction from the suppression pool.

C5-6 Slowly increase LPCS or LPCI injection into the RPV to the maximum.

C5-6.1 If RPV pressure does not stabilize at least [94 psig (Minimum Alternate Shutdown Cooling RPV Pressure)] above suppression chamber pressure, start another LPCS or LPCI pump.

C5-6.2 If RPV pressure does not stabilize below [172 psig (Maximum Alternate Shutdown Cooling RPV Pressure)], open another SRV.

C5-6.3 If the cooldown rate exceeds [100°F/hr (maximum RPV cooldown rate LCO)], reduce LPCS or LPCI injection into the RPV until the cooldown rate decreases below [100°F/hr (maximum RPV cooldown rate LCO)] [or RPV pressure decreases to within 50 psig (Minimum SRV Re-opening Pressure) of suppression chamber pressure, whichever occurs first].

C5-7 Control suppression pool temperature to maintain RPV water temperature above [70°F (RPV NDTT or head tensioning limit, whichever is higher)].

C5-8 Proceed to cold shutdown in accordance with [procedure for cooldown to cold shutdown conditions].

CONTINGENCY #6
RPV FLOODING

C6-1 If at least [3 Minimum Number of SRVs Required for Emergency Depressurization)] SRVs can be opened or if HPCS or motor driven feedwater pumps are available for injection, close the MSIVs, main steam line drain valves, IC, HPCI, RCIC and RHR steam condensing isolation valves.

C6-2 If any control rod is not inserted beyond position [06 (maximum subcritical banked withrawal position)]:

C6-2.1 Terminate and prevent all injection into the RPV except from boron injection systems and CRD until RPV pressure is below the Minimum Alternate RPV Flooding Pressure.

Number of open SRVs	Minimum Alternate RPV Flooding Pressure (psig)
[7 or more	110]
[6	135]
[5	165]
[4	210]
[3	280]
[2	430]
[1	870]

If less than [1 (minimum number of SRVs for which the Minimum Alternate RPV Flooding Pressure is below the lowest SRV lifting pressure)] SRV[s] can be opened, continue in this procedure.

If while executing the following step, RPV water level can be determined and RPV FLooding is not required, enter [procedure developed from CONTINGENCY #7] and [procedure developed from the RPV Control Guideline] at [Step RC/P-4] and execute these procedures concurrently.

C6-2.2 Commence and slowly increase injection into the RPV with the following systems until at least [1 (minimum number of SRVs for which the Minimum Alternate RPV Flooding Pressure is below the lowest SRV lifting pressure)] SRV[s] are open and RPV pressure is above the Minimum Alternate RPV Flooding Pressure: #25

- o Motor driven feedwater pumps
- o Condensate pumps
- o CRD
- [o LPCI]

If at least [1 (minimum number of SRVs for which the Minimum Alternate RPV Flooding Pressure is below the lowest SRV lifting pressure)] SRV[s] are not open or RPV pressure cannot be increased to above the Minimum Alternate RPV Flooding Pressure, commence and slowly increase injection into the RPV with the following systems until at least [1 (minimum number of SRVs for which the Minimum Alternate RPV FLooding Pressure is below the lowest SRV lifting pressure)] SRV[s] are open and RPV pressure is above the Minimum Alternate RPV Flooding Pressure:

- o HPCS
- o LPCS
- [o RHR service water crosstie]
- [o Fire System]
- [o Interconnections with other units]
- [o ECCS keep-full systems]

C6-2.3 Maintain at least [1 (minimum number of SRVs for which the Minimum Alternate RPV Flooding Pressure is below the lowest SRV lifting pressure)] SRV[s] open and RPV pressure above the Minimum Alternate RPV Flooding Pressure but as low as practicable by throttling injection.

C6-2.4 When:

- All control rods are inserted beyond position [06 (maximum subcritical banked withdrawal position)], or
- The reactor is shutdown and no boron has been injected into the RPV,

continue in this procedure.

C6-3 If RPV water level cannot be determined:

C6-3.1 Commence and increase injection into the RPV with the following systems until at least [3 (Minimum Number of SRVs Required for Emergency Depressurization)] SRVs are open and RPV pressure is not decreasing and is [77 psig (Minimum RPV Flooding Pressure)] or more above suppression chamber pressure:

- o HPCS
- o Motor driven feedwater pumps
- o LPCS
- o LPCI
- o Condensate pumps
- o CRD
- [o RHR service water crosstie]
- [o Fire System]
- [o Interconnections with other units]
- [o ECCS keep-full systems]
- [o SLC (test tank)]
- [o SLC (boron tank)]

C6-3.2 Maintain at least [3 (Minimum Number of SRVs Required for Emergency Depressurization)] SRVs open and RPV pressure at least [77 psig (Minimum RPV Flooding Pressure)] above suppression chamber pressure but as low as practicable by throttling injection.

C6-4 If RPV water level can be determined, commence and increase injection into the RPV with the following systems until RPV water level is increasing:

- o HPCS
- o Motor driven feedwater pumps
- o LPCS
- o LPCI
- o Condensate pumps
- o CRD
- [o RHR service water crosstie]
- [o Fire System]
- [o Interconnections with other units]
- [o ECCS keep-full systems]
- [o SLC (test tank)]
- [o SLC (boron tank)]

C6-5 If RPV water level cannot be determined:

C6-5.1 Continue injecting water into the RPV until [temperature near the cold reference leg instrument vertical runs] is below 212°F and RPV water level instrumentation is available.

If while executing the following steps, RPV water level can be determined, continue in this procedure at [Step C6-6].

C6-5.2 If it can be determined that the RPV is filled or if RPV pressure is at least [77 psig (Minimum RPV Flooding Pressure)] above suppression chamber pressure, terminate all injection into the RPV and reduce RPV water level.

C6-5.3 If RPV water level indication is not restored within the Maximum Core Uncovery Time Limit after commencing termination of injection into the RPV, return to [Step C6-3].

C6-6 When suppression chamber pressure can be maintained below the Primary Containment Design Pressure, enter [procedure developed from the RPV Control Guideline] at [Steps RC/L and RC/P-4] and execute these steps concurrently.

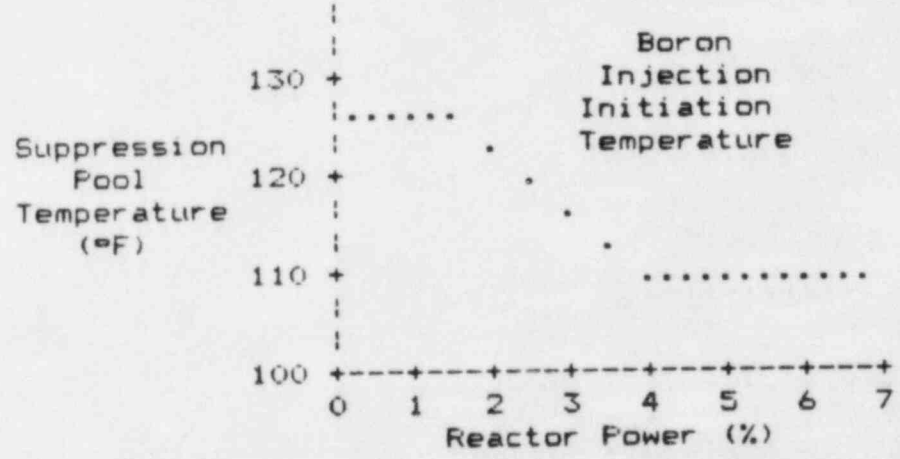
CONTINGENCY #7
LEVEL/POWER CONTROL

If while executing the following steps:

- RPV water level cannot be determined, RPV FLOODING IS REQUIRED; enter [procedure developed from CONTINGENCY #6].
- RPV Flooding is required, enter [procedure developed from CONtTINGENCY #6].

C7-1 If:

- Reactor power is above [3% (APRM downscale trip)] or cannot be determined, and
- Suppression pool temperature is above [the Boron Injection Initiation Temperature], and



- Either an SRV is open or opens or drywell pressure is above [2.0 psig (high drywell pressure scram setpoint)],

lower RPV water level by terminating and preventing all injection into the RPV except from boron injection systems and CRD until either: #26

- Reactor power drops below [3% (APRM downscale trip)], or
- RPV water level reaches [-164 in. (Flow Stagnation Water Level)], or
- All SRVs remain closed and drywell pressure remains below [2.0 psig (high drywell pressure scram setpoint)].

If while executing the following steps Emergency RPV Depressurization is required, continue in this procedure at [Step C7-2.1].

If while executing the following step:

- Reactor power is above [3% (APRM downscale trip)] or cannot be determined, and
- RPV water level is above [-164 in. (Flow Stagnation Water Level)], and
- Suppression pool temperature is above [the Boron Injection Initiation Temperature], and
- Either an SRV is open or opens or drywell pressure is above [2.0 psig (high drywell pressure scram setpoint)],

return to [Step C7-1].

C7-2 Maintain RPV water level either: | #9, #10, #11, #25 |

- o If RPV water level was deliberately lowered in [Step C7-1], at the level to which it was lowered, or
- o If RPV water level was not deliberately lowered in [Step C7-1], between [+12 in. (low level scram setpoint)] and [+58 in. (high level trip setpoint)],

with the following systems:

- o Condensate/feedwater system [1110 - 0 psig (RPV pressure range for system operation)]
- o CRD system [1110 - 0 psig (RPV pressure range for system operation)]
- o RCIC system [1110 - 50 psig (RPV pressure range for system operation)] | #12 |
- [o HPCI system [1110 - 100 psig (RPV pressure range for system operation)]]
- [o LPCI system [250 - 0 psig (RPV pressure range for system operation)]]

If RPV water level cannot be so maintained, maintain RPV water level above [-164 in. (top of active fuel)].

If RPV water level cannot be maintained above [-164 in. (top of active fuel)], EMERGENCY RPV DEPRESSURIZATION IS REQUIRED:

C7-2.1 Terminate and prevent all injection into the RPV except from boron injection systems and CRD until RPV pressure is below the Minimum Alternate RPV Flooding Pressure.

Number of open SRVs	Minimum Alternate RPV Flooding Pressure (psig)
[7 or more	110]
[6	135]
[5	165]
[4	210]
[3	280]
[2	430]
[1	870]

If less than [1 (minimum number of SRVs for which the Minimum Alternate RPV Flooding Pressure is below the lowest SRV lifting pressure)] SRV[s] can be opened, continue in this procedure.

C7-2.2 Commence and slowly increase injection into the RPV with the following systems to restore and maintain RPV water level above [-164 in. (top of active fuel)]: #25

- o Condensate/feedwater system
- o CRD
- o RCIC
- [o HPCI]
- [o LPCI]

If RPV water level cannot be restored and maintained above [-164 in. (top of active fuel)], commence and slowly increase injection into the RPV with the following systems tc restore and maintain RPV water level above [-164 in. (top of active fuel)]:

- o HPCS
- o LPCS
- [o RHR service water crosstie]
- [o Fire System]
- [o Interconnections with other units]
- [o ECCS keep-full systems]

If while executing the following step reactor power commences and continues to increase, return to [Step C7-1].

C7-3 When [204 pounds (Hot Shutdown Boron Weight)] of boron have been injected or all control rods are inserted beyond position [06 (maximum subcritical banked withdrawal position)], restore and maintain RPV water level between [+12 in. (low level scram setpoint)] and [+58 in. (high level trip setpoint)].

If RPV water level cannot be restored and maintained above [+12 in. (low level scram setpoint)], maintain RPV water level above [-164 in. (top of active fuel)].

If RPV water level cannot be maintained above [-164 in. (top of active fuel)], EMERGENCY RPV DEPRESSURIZATION IS REQUIRED; return to [Step C7-2.1].

If Alternate Shutdown Cooling is required, enter [procedure developed from CONTINGENCY #5].

C7-4 When [procedure for cooldown to cold shutdown conditions] is entered from [procedure developed from the RPV Control Guideline] at [Step RC/P-5], proceed to cold shutdown in accordance with [procedure for cooldown to cold shutdown conditions].