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MFN-117-80

June 30, 1980

U.S. Nuclear Regulatory Commission
Division of Licensing
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attention: Darrell G. Eisenhut, Director

Gentlemen:

SUBJECT: NUREG-0578 REQUIREMENT 2.1.9 IMPLEMENTATION BY BWR OWNERS GROUP

Reference: R. H. Buchholz to D. F. Ross, same subject MFN-074-80, dated March 31, 1980

On behalf of the BWR Owners' Group, this letter transmits for your review in prepublication form the BWR Emergency Procedure Guidelines Rev. 0 which were committed in the reference letter. The Emergency Procedure Guidelines were developed jointly by General Electric and a subcommittee of the BWR Owners Group. The subcommittee had representation by each GE BWR product line and containment design type. The guidelines were written to apply to all BWR/1 through 5 units in the United States, and they have been reviewed in depth by personnel of all US utilities owning BWR/1 through 5 units.

Also committed in the reference letter were 1) descriptions of how the analyses of NEDO-24708 and subsequent submittals, and the Emergency Procedure Guidelines, apply to all FSAR Chapter 15 events, and 2) a reliability analysis of the BWR performance during inventory threatening events. These will be transmitted to you under separate covers.

Very truly yours,

RHBuchholz

R. H. Buchholz, Manager
BWR Systems Licensing
Nuclear Safety & Licensing Operation

RHB:rf:rm/679

cc: L. S. Gifford
P. W. Marriott
BWR Owners' Group

NONE 5.1.16
see LIST

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EMERGENCY PROCEDURE GUIDELINES

Revision 0

BWR 1 THROUGH 5

June 30, 1980

INTRODUCTION

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

- Level Control Guideline
- Shutdown Guideline
- Containment Control Guideline

The Level Control Guideline restores and stabilizes RPV water level. This guideline is entered after low RPV water level, high drywell pressure, or an isolation has occurred.

The Shutdown Guideline maintains RPV water level while depressurizing the RPV to cold shutdown conditions. This guideline is entered from the Level Control Guideline after the RPV water level has been stabilized.

The Containment Control Guideline controls primary containment temperatures, pressure, and level whenever suppression pool temperature, drywell temperature, drywell pressure, or suppression pool water level is above its normal operating limit. This guideline is executed concurrently with the guideline from which it is entered.

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 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.

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. In those cases where the basis for the "Caution" 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 the 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 substitu 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
CRD	-	Control Rod Drive
ECCS	-	Emergency Core Cooling System
HPCI	-	High Pressure Coolant Injection
HPCS	-	High Pressure Core Spray
IC	-	Isolation Condenser
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
RPV	-	Reactor Pressure Vessel
RWCU	-	Reactor Water Cleanup
SBGT	-	Standby Gas Treatment
SLC	-	Standby Liquid Control
SORV	-	Stuck Open Relief Valve
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 either [procedure developed from the Level Control Guideline] or [procedure developed from the Containment Control Guideline] 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

Do not 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 #5

Do not secure an ECCS unless there are at least two independent indications that adequate core cooling is assured.

CAUTION #6

Do not use the RHR steam condensing mode unless (1) the suppression pool temperature can be maintained below [120°F (limit for depressurization)] and (2) more than one RHR loop is available.

CAUTION #7

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

CAUTION #8

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].

CAUTION #9

Whenever drywell temperature exceeds the temperature in the table, the actual RPV water level may be anywhere below the elevation of the lower instrument tap when the instrument reads below the indicated level in the table.

Drywell Temperature*	Indicated Level	Instrument
[any]	[614 in.]	[Shutdown Range Level (500 to 900 in.)]
[98°F]	[-107 in.]	[Wide Range Level (-150 to +60 in.)]
[314°F]	[19 in.]	[Narrow Range Level (0 to +60 in.)]
[380°F]	[264 in.]	[Fuel Zone Level (200 to 500 in.)]

*[List in order of increasing drywell temperature].

CAUTION #10

[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 #11

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.

CAUTION #12

If suppression pool temperature exceeds [95°F (normal operating limit)], drywell temperature exceeds [135°F (normal operating limit)], drywell pressure exceeds [2.0 psig (drywell pressure which initiates ECCS)], or suppression pool water level exceeds [12 ft. 6 in. (normal operating limit)], enter [procedure developed from the Containment Control Guideline] and execute it concurrently with the procedure from which it was entered.

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 #13

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 #14

Do not throttle HPCI or RCIC systems below [2200 rpm (minimum turbine speed which yields acceptable continuous operation per turbine vendor manual)].

CAUTION #15

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

CAUTION #16

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

CAUTION #17

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

2. If the continuous SRV pneumatic supply is or becomes unavailable, depressurize with sustained SRV opening.

CAUTION #18

Do not divert RHR pumps from the LPCI mode unless adequate core cooling is assured.

CAUTION #19

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

CAUTION #20

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

CAUTION #21

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

CAUTION #22

Do not operate recirculation pumps or [drywell cooling fans] when spraying the drywell.

LEVEL CONTROL GUIDELINE

LC-1 PURPOSE

The purpose of this guideline is to restore and stabilize RPV water level.

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

- RPV water level below [+ 12 in. (low level scram setpoint)], or
- drywell pressure above [2.0 psig (high drywell pressure scram setpoint)], or
- an isolation which requires or initiates reactor scram.

LC-2 OPERATOR ACTIONS

LC-2.1 Confirm initiation of any of the following:

- Reactor scram
- Isolation
- ECCS
- [Emergency diesel generator]

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

LC-2.2 Enter [scram procedure] and execute it concurrently with this procedure.

LC-2.3 [Confirm or place the reactor mode switch in REFUEL].

LC-2.4 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:

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

If RPV water level cannot be determined, enter [procedure developed from CONTINGENCY #2].

LC-2.5 If SRVs are cycling, initiate IC or manually open one SRV and reduce RPV pressure to below [940 psig (150 psig below the minimum SRV setpoint)].

LC-2.6 When the RPV water level has stabilized, enter [procedure developed from the Shutdown Guideline].

SHUTDOWN GUIDELINE

SD-1 PURPOSE

The purpose of this guideline is to depressurize and cool down the RPV to cold shutdown conditions ([100°F < RPV water temperature < 212°F]) while maintaining RPV water level within a satisfactory range.

This guideline is entered from the Level Control Guideline after the RPV water level has been stabilized.

SD-2 OPERATOR ACTIONS

SD-2.1 Maintain RPV water level between [- 164 in. (top of active fuel)] and [+58 in. (high level trip setpoint)] with one or more of the following systems:

#11, #13

- 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, #14

- 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 maintained above [-164 in. (top of active fuel)], enter [procedure developed from CONTINGENCY #1].

If RPV water level cannot be determined, enter [procedure developed from CONTINGENCY #2].

SD-2.2 If SRVs are cycling, initiate IC or manually open one SRV and reduce RPV pressure to below [940 psig (150 psig below the minimum SRV setpoint)].

SD-2.3 Depressurize the RPV and maintain cooldown rate below [100°F/hr (maximum RPV cooldown rate)] with one or more of the following systems:

#15, #16

Main Condenser Available

Main turbine bypass valves.

Pressure reduction may be augmented by:

- IC
- HPCI — #12, #14
- RCIC
- RHR (steam condensing mode) — #6
- Other steam driven equipment.
- RWCU (recirculation mode)
- Main steam line drains
- RWCU (blowdown mode). Refer to [sampling procedures] prior to initiating blowdown.

Main Condenser Not Available

- IC
- HPCI — #12, #14
- RCIC
- RHR (steam condensing mode) — #6
- RWCU (recirculation mode)

Pressure reduction may be augmented by:

- SRVs — #17
- RWGU (blowdown mode). Refer to [sampling procedures] prior to initiating blowdown.

SD-2.4 When the RHR shutdown cooling interlocks clear, initiate the shutdown cooling mode of RHR.

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, enter [procedure developed from CONTINGENCY #5].

SD-2.5 Proceed to cold shutdown in accordance with [procedure for cooldown to cold shutdown conditions].

CONTAINMENT CONTROL GUIDELINE

CC-1 PURPOSE

The purpose of this guideline is to control primary containment temperatures, pressure, and level. The Containment Control Guideline is executed concurrently with the guideline from which it is entered.

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

- o Suppression pool temperature above [95°F (normal operating limit)]
- o Drywell temperature above [135°F (normal operating limit)]
- o Drywell pressure above [2.0 psig (drywell pressure which initiates ECCS)].
- o Suppression pool water level above [12 ft. 6 in. (normal operating limit)].

CC-2 OPERATOR ACTIONS

Irrespective of the entry condition, enter this procedure at [Steps CC-2.1, CC-2.2, CC-2.3, and CC-2.4] and execute these steps concurrently with one another.

CC-2.1 Monitor and control suppression pool temperature.

CC-2.1.1 Close any SORV.

If an SORV cannot be closed [within 2 minutes], scram the reactor.

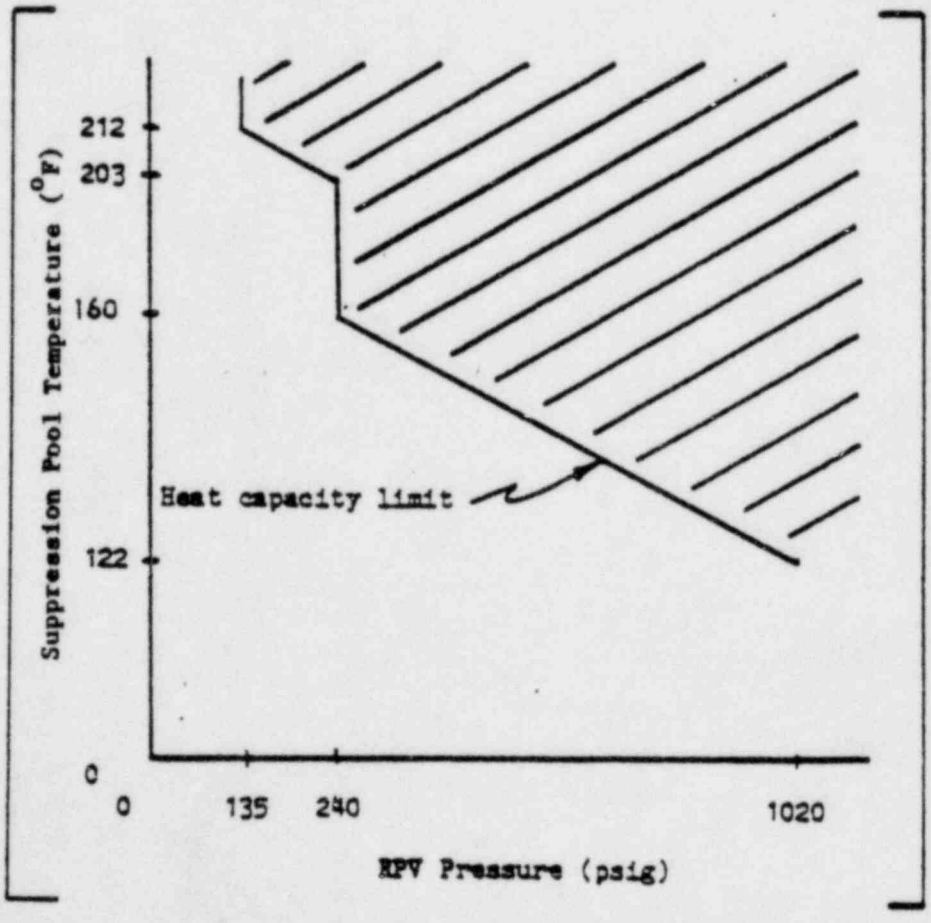
CC-2.1.2 Operate available suppression pool cooling when pool temperature exceeds [95°F (normal operating limit)].

#18

CC-2.1.3 If suppression pool temperature reaches [110°F (limit for scram)], scram the reactor.

CC-2.1.4 If suppression pool temperature cannot be maintained below the heat capacity limit, maintain RPV pressure below the limit.

#16, #19, #20



If suppression pool temperature and RPV pressure cannot be restored or maintained below the heat capacity limit, enter [procedure developed from CONTINGENCY #2].

CC-2.2 Monitor and control drywell temperature.

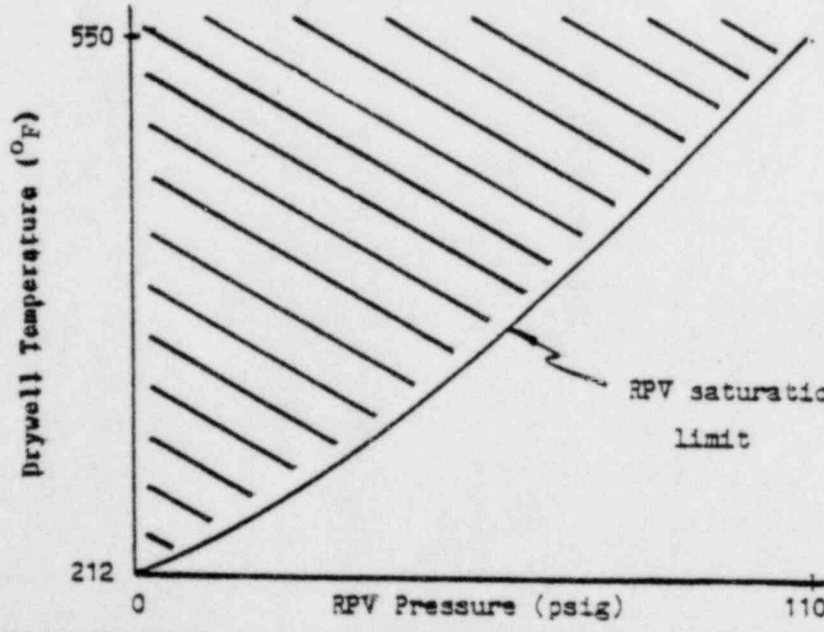
CC-2.2.1 Operate available drywell cooling when drywell temperature exceeds [135°F (normal operating limit)].

#9

CC-2.2.2 Initiate drywell sprays before drywell temperature reaches [340°F (drywell design temperature)].

#18, #22

If drywell temperature [near the cold reference leg instrument vertical runs] reaches the RPV saturation limit, enter [procedure developed from CONTINGENCY #2].

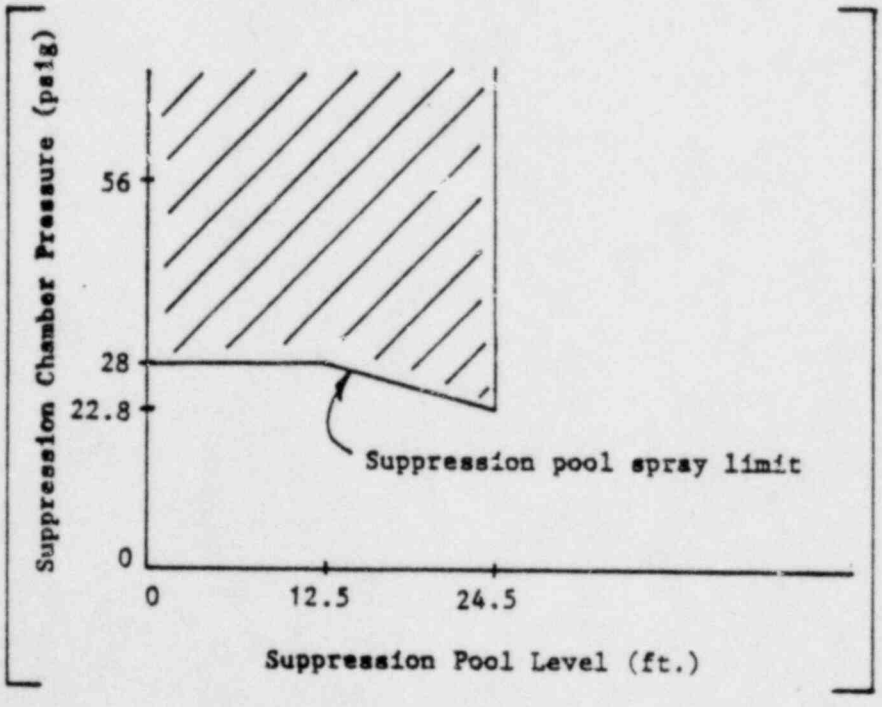


If drywell temperature cannot be maintained below [340°F (maximum temperature at which ADS qualified)], enter [procedure developed from CONTINGENCY #2].

CC-2.3 Monitor and control primary containment pressure with the following systems, as required:

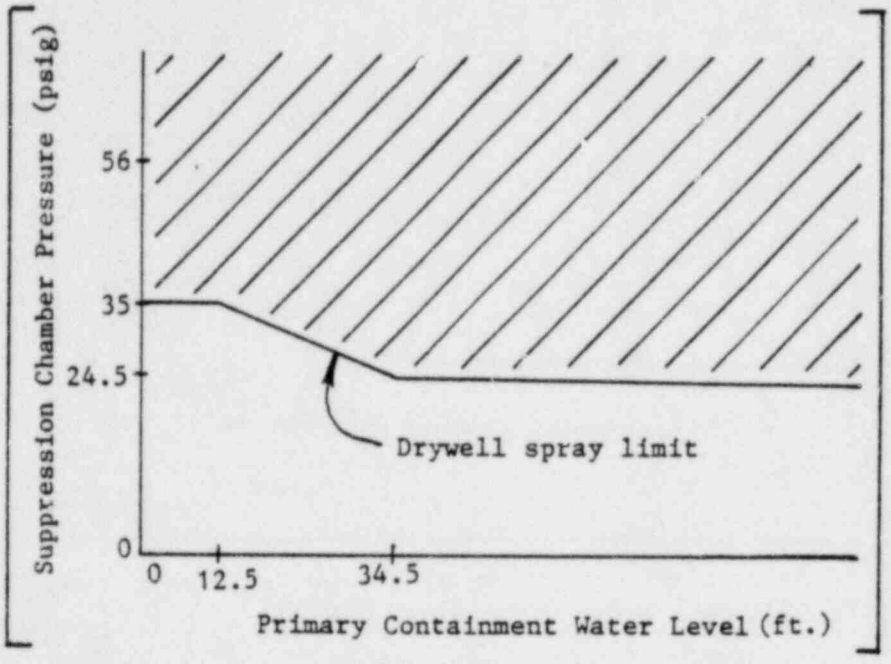
- SBGT, only when drywell temperature is below 212°F. Use [SBGT operating procedure]. #21

- Suppression pool sprays. Initiate suppression pool sprays before suppression chamber pressure reaches [the suppression pool spray limit]. #18



- Drywell sprays. Initiate drywell sprays before suppression chamber pressure reaches [the drywell spray limit].

#2



If suppression chamber pressure cannot be maintained below the drywell spray limit, enter [procedure developed from CONTINGENCY #2].

CC-2.4 Monitor and control suppression pool water level.

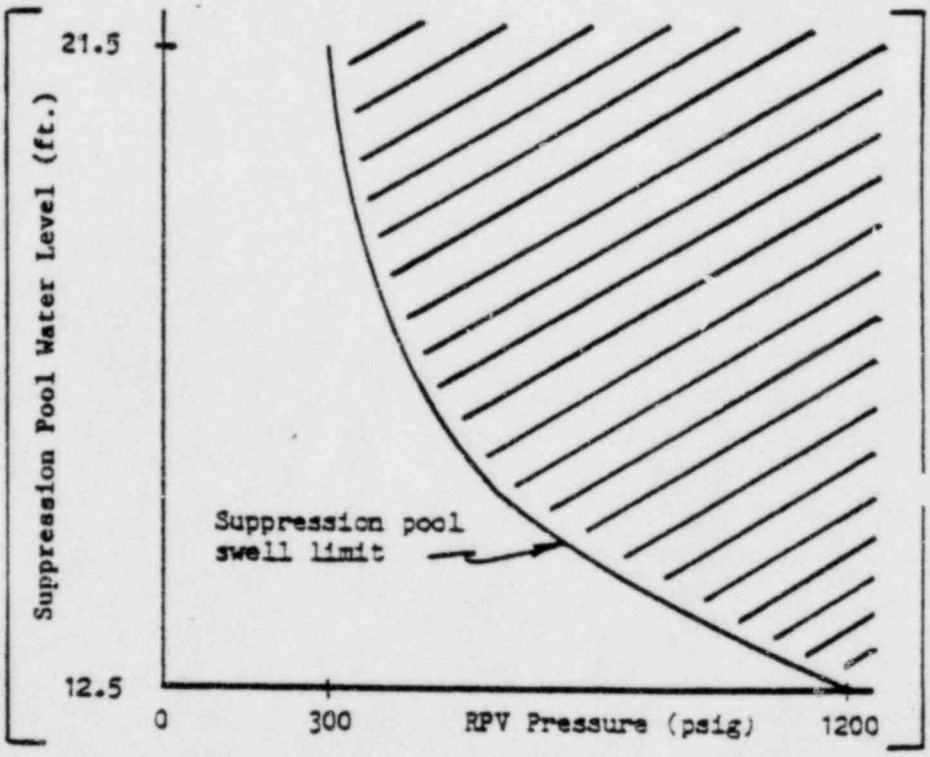
CC-2.4.1 Maintain suppression pool water level between [12 ft. 6 in. and 12 ft. 2 in. (normal operating limits)]. Refer to [sampling procedure] prior to discharging water.

#11, #20

CC-2.4.2 If the suppression pool water level is above [12 ft. 6 in. (normal operating limit)] and adequate core cooling is assured, injection into the RPV from sources external to the primary containment should be terminated.

CC-2.4.3 If suppression pool water level cannot be maintained below the suppression pool swell limit, maintain RPV pressure below the limit.

#16,#19,#20



If suppression pool water level and RPV pressure cannot be restored or maintained below the suppression pool swell limit, enter [procedure developed from CONTINGENCY #2].

CC-2.4.4 Before suppression pool water level reaches [(17 ft. 2 in. (elevation of bottom of Mark I internal suppression pool to drywell vacuum breakers less vacuum breaker opening pressure in feet of water)], initiate drywell sprays and operate continuously while suppression pool water level is above [17 ft. 2 in. (elevation of bottom of Mark I internal suppression pool to drywell vacuum breakers less vacuum breaker opening pressure in feet of water)].

CC-2.4.5 When primary containment water level reaches [104 ft. (maximum safe primary containment water level at 0 psig or highest containment vent elevation, whichever is lower)], terminate injection into the RPV from sources external to the primary containment.

CONTINGENCY #1

LEVEL RESTORATION

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](LPCS shutoff head)

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

If at any time RPV water level cannot be determined, enter [procedure developed from CONTINGENCY #2].

If at any time the RPV pressure or water level trend reverses or RPV pressure changes region, return to [Step C1-3].

C1-4 Enter [procedure developed from the Level Control Guideline] at [Step LC-2.4].

C1-5 If HPCI and RCIC are not available and RPV pressure is increasing, enter [procedure developed from CONTINGENCY #2].

If HPCI and RCIC are not available and RPV pressure is not increasing, enter [procedure developed from the Level Control Guideline] at [Step LC-2.4].

Otherwise, when RPV water level reaches [+12 in. (low level scram setpoint)] enter [procedure developed from the Level Control Guideline] at [Step LC-2.4].

C1-6 If RPV pressure is increasing, enter [procedure developed from CONTINGENCY #2].

Otherwise, enter [procedure developed from the Level Control Guideline] at [Step LC-2.4].

C1-7 If HPCI and RCIC are not operating, restart HPCI and RCIC.

If CRD is not operating but at least 2 injection subsystems are lined up for injection with pumps running, enter [procedure developed from CONTINGENCY #2].

C1-7.1 If CRD is not operating and 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.

C1-7.2 When RPV water level drops to [-164 in. (top of active fuel)]:

If CRD is not operating and no injection or alternate injection subsystem is lined up with at least one pump running, enter [procedure developed from CONTINGENCY #3].

Otherwise, enter [procedure developed from CONTINGENCY #2].

C1-8 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.

If RPV pressure is increasing, enter [procedure developed from CONTINGENCY #2].

Otherwise, 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 PRESSURE REGION

RPV WATER LEVEL	HIGH [425 PSIG (*)]	INTERMEDIATE	LOW [100 PSIG (+)]
INCREASING	C1-4 ENTER [PROCEDURE DEVELOPED FROM THE LEVEL CONTROL GUIDELINE] AT [STEP LC-2.4].	C1-5 IF HPCI & RCIC ARE NOT AVAILABLE & RPV PRESSURE IS INCREASING, ENTER [PROCEDURE DEVELOPED FROM CONTINGENCY #2]. IF HPCI & RCIC ARE NOT AVAILABLE & RPV PRESSURE IS NOT INCREASING, ENTER [PROCEDURE DEVELOPED FROM THE LEVEL CONTROL GUIDELINE] AT [STEP LC-2.4]. OTHERWISE, WHEN RPV WATER LEVEL REACHES [+12 IN. (LOW LEVEL SCRAM SETPOINT)] ENTER [PROCEDURE DEVELOPED FROM THE LEVEL CONTROL GUIDELINE] AT [STEP LC-2.4].	C1-6 IF RPV PRESSURE IS INCREASING, ENTER [PROCEDURE DEVELOPED FROM CONTINGENCY #2]. OTHERWISE, ENTER [PROCEDURE DEVELOPED FROM THE LEVEL CONTROL GUIDELINE] AT [STEP LC-2.4].
DECREASING	C1-7 IF HPCI AND RCIC ARE NOT OPERATING, RESTART HPCI AND RCIC. IF CRD IS NOT OPERATING BUT AT LEAST 2 INJECTION SUBSYSTEMS ARE LINED UP FOR INJECTION WITH PUMPS RUNNING, ENTER [PROCEDURE DEVELOPED FROM CONTINGENCY #2]. C1-7.1 IF CRD IS NOT OPERATING AND 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. C1-7.2 WHEN RPV WATER LEVEL DROPS TO [-164 IN. (TOP OF ACTIVE FUEL)]: IF CRD IS NOT OPERATING AND NO INJECTION OR ALTERNATE INJECTION SUBSYSTEM IS LINED UP WITH AT LEAST ONE PUMP RUNNING, ENTER [PROCEDURE DEVELOPED FROM CONTINGENCY #3]. OTHERWISE, ENTER [PROCEDURE DEVELOPED FROM CONTINGENCY #2].	C1-8 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. IF RPV PRESSURE IS INCREASING, ENTER [PROCEDURE DEVELOPED FROM CONTINGENCY #2]. OTHERWISE, WHEN RPV WATER LEVEL DROPS TO [-164 IN. (TOP OF ACTIVE FUEL)] ENTER [PROCEDURE DEVELOPED FROM CONTINGENCY #4].

IF AT ANY TIME RPV WATER LEVEL CANNOT BE DETERMINED, ENTER [PROCEDURE DEVELOPED FROM CONTINGENCY #2].

IF AT ANY TIME THE RPV PRESSURE OR WATER LEVEL TREND REVERSES OR RPV PRESSURE CHANGES REGION, RETURN TO [STEP C1-3].

*LPCS SHUT OFF HEAD

+HPCI OR RCIC LOW PRESSURE ISOLATION SETPOINT, WHICHEVER IS HIGHER

ALTERNATE FORMAT FOR STEPS C1-3 THROUGH C1-8

CONTINGENCY #2

RAPID RPV DEPRESSURIZATION

C2-1 Initiate IC.

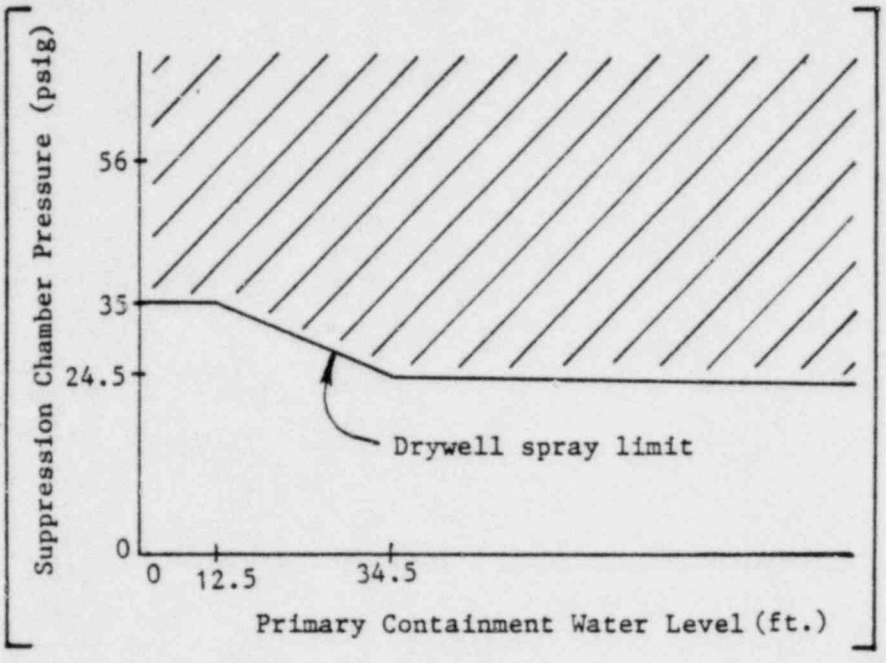
C2-2 Open all ADS valves. | #16,#19,#20 |

C2-2.1 If not all ADS valves can be opened, open other SRVs until [7 (number of SRVs dedicated to ADS)] valves are open.

C2-2.2 If less than [3 (minimum number of SRVs required for rapid depressurization)] SRVs can be opened, rapidly depressurize the RPV using one or more of the following systems (use in order which will minimize radioactive release to the environment):

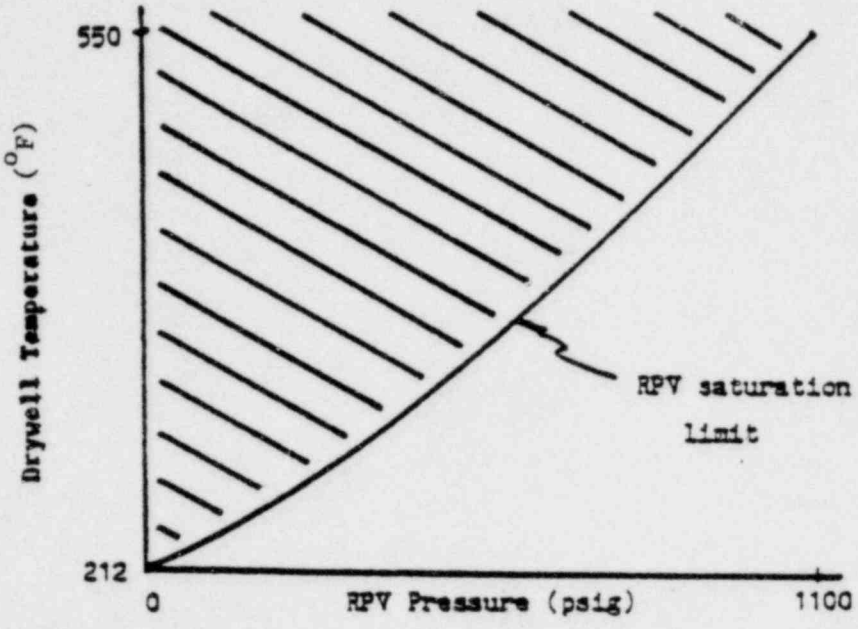
- Main condenser
- RHR (steam condensing mode) | #6 |
- Other steam driven equipment
- Main steam line drains
- RWCU (blowdown mode)
- HPCI steam line
- RCIC steam line
- Head vent
- IC tube side vent

If suppression chamber pressure cannot be maintained below the drywell spray limit, enter [procedure developed from CONTINGENCY #6].



If RPV water level cannot be determined, enter [procedure developed from CONTINGENCY #6].

If drywell temperature [near the cold reference leg instrument vertical runs] reaches the RPV saturation limit, enter [procedure developed from CONTINGENCY #6].



C2-3 Enter [procedure developed from the Level Control Guideline] at [Step LC-2.4].

CONTINGENCY #3

CORE COOLING WITHOUT INJECTION

C3-1 Confirm initiation of IC.

If IC cannot be initiated:

C3-1.1 When RPV water level drops to [-236 in. (core midplane)] or if RPV water level cannot be determined, open one SRV.

C3-1.2 As RPV pressure decreases, open additional SRVs as required by the following table:

RPV Pressure (psig)	Total Number of SRVs Open
above 800	1
between 800 and 350	2
between 350 and 250	3
between 250 and 175	4
between 175 and 125	5
between 125 and 80	6
below 80	7

When an injection or alternate injection subsystem is lined up for injection with at least one pump running, enter [procedure developed from CONTINGENCY #2].

CONTINGENCY #4

CORE COOLING WITHOUT LEVEL RESTORATION

C4-1 Open all ADS valves.

#19, #20

If not all ADS valves can 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 If RPV water level is restored to [-164 in. (top of active fuel)] enter [procedure developed from the Level Control Guideline] at [Step LC-2.4].

CONTINGENCY #5

ALTERNATE SHUTDOWN COOLING

C5-1 Initiate suppression pool cooling.

C5-2 Close the [RPV head vents,] MSIVs, and main steam line drain valves if open.

C5-3 Place the control switch for one SRV in the OPEN position.

C5-4 Slowly raise the 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 flow to the maximum single pump flow for the pressure at which the RPV stabilizes.

C5-6.1 If RPV pressure does not stabilize above [100 psig (SRV reopening pressure)] start another LPCS or LPCI pump.

C5-6.2 If RPV pressure does not stabilize below [250 psig (maximum injection pressure for LPCS or LPCI, whichever is lower)], open another SRV.

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 rapid depressurization)] SRVs are open or if HPCS or motor driven feedwater pumps are available for injection, close the MSIVs, main steam line drain valves, IC, HPCI, RCIC, RWCU and RHR steam condensing isolation valves.

C6-2 Inject water into the RPV with all of the following:

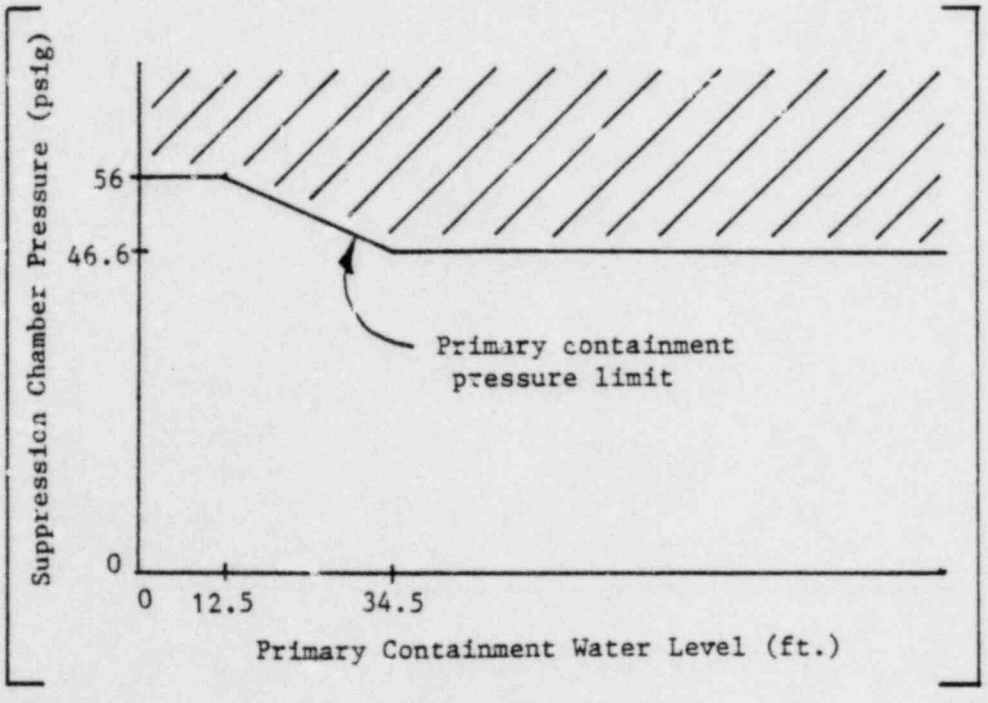
- HPCS
- Motor driven feedwater pumps
- LPCS
- LPCI
- Condensate pumps
- CRD

C6-3 If RPV pressure stabilizes within [5 min. (maximum acceptable core uncovery time)], cycle one SRV closed and open to determine the single SRV pressure rise.

C6-4 If RPV pressure does not stabilize within [5 min. (maximum acceptable core uncovery time)] or if the single SRV pressure rise is less than [xx psig (minimum single SRV pressure rise)], inject water into the RPV with all of the following:

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

C6-5 If suppression chamber pressure exceeds the primary containment pressure limit, vent the primary containment in accordance with [procedure for containment venting] to reduce pressure below the primary containment pressure limit.



C6-6 Fill all RPV level instrumentation reference columns.

C6-7 When temperature [near the cold reference leg instrument vertical runs] is below 212°F and RPV water level instrumentation is available, cycle one SRV closed and open to determine the single SRV pressure rise.

C6-8 If the single SRV pressure rise is at least [xx psig (minimum single SRV pressure rise)] or it can be determined that the RPV is filled:

C6-8.1 Terminate all injection into RPV.

If RPV water level indication is restored, enter [procedure developed from the Level Control Guideline] at [Step LC-2.4].

C6-8.2 Reduce RPV water level until RPV water level indication is restored.

If RPV water level indication is not restored within [5 min. (maximum acceptable core uncovery time)] after injection into the RPV was terminated, return to [Step C6-2].

C6-8.3 Otherwise, enter [procedure developed from the Level Control Guideline] at [Step LC-2.4].