LASALLE COUNTY STATION

EMERGENCY PROCEDURE GUIDELINE

TECHNICAL GUIDELINE

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PREPUBLICATION DRAFT

EMERGENCY PROCEDURE GUIDELINES

Revision 3I

BWR 1 through 6

December 8, 1982

LASALLE COUNTY STATION EMERGENCY PROCEDURE GUIDELINE

TECHNICAL GUIDELINE

This Technical Guideline has been generated from revision 3I of the Emergency Procedure Guideline. Any differences between revision 3I and revision 3 of the EPG has been designated by a letter in the margin. Attachment A consists of a description of the change and the appropriate reason. Each change is noted every time it appears throughout the Technical Guideline.

All parameters have been changed to comply with LSCS physical characteristics.

The following systems are not installed at LaSalle and all references to them are lined out without comment.

1. IC
2. HPCI
3. Mk III Containment
4. Heated Reference Legs
5. Mk I Containment
6. SPMS
7. LPCS-B

Emergency Procedure Guidelines

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, or high drywell pressure occurs, 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, or suppression pool water level, is above its high operating limit or suppression pool water level is below its low operating limit.

A

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.

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 is a list of the 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 Operators Precautions section. These "Cautions" are brief and succinct red flags for the operator. The basis for each caution as well as for every step is provided in Appendix B.

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.

TABLE I

EPG ABBREVIATIONS

ADS	-	Automatic Depressurization System
APRM	-	Average Power Range Monitor
CRD	-	Control Rod Drive
ECCS	-	Emergency Core Colling 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 Collant 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

TABLE I (continued)

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].~~ Mk III only

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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.

See Attached

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	200 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.

Heated reference legs not installed.

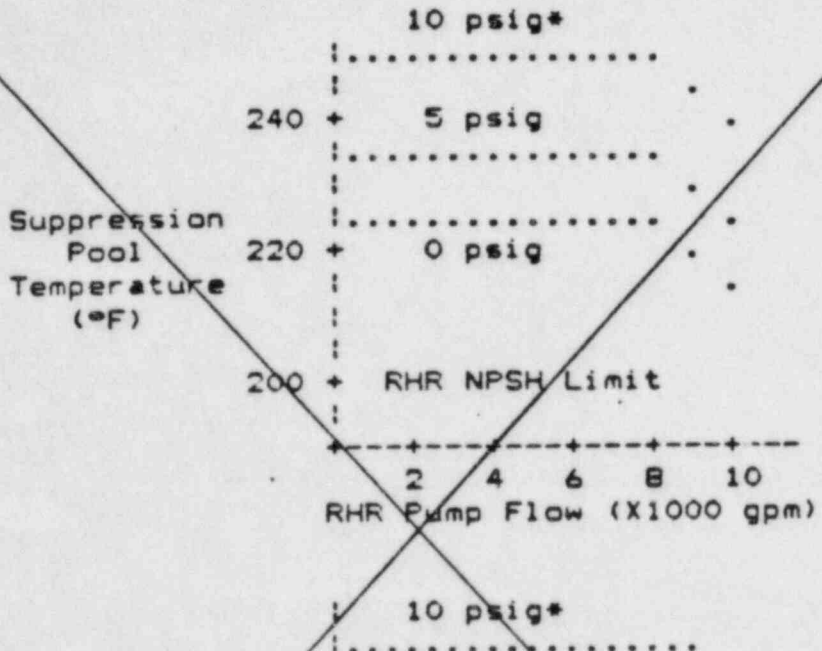
CAUTION #6

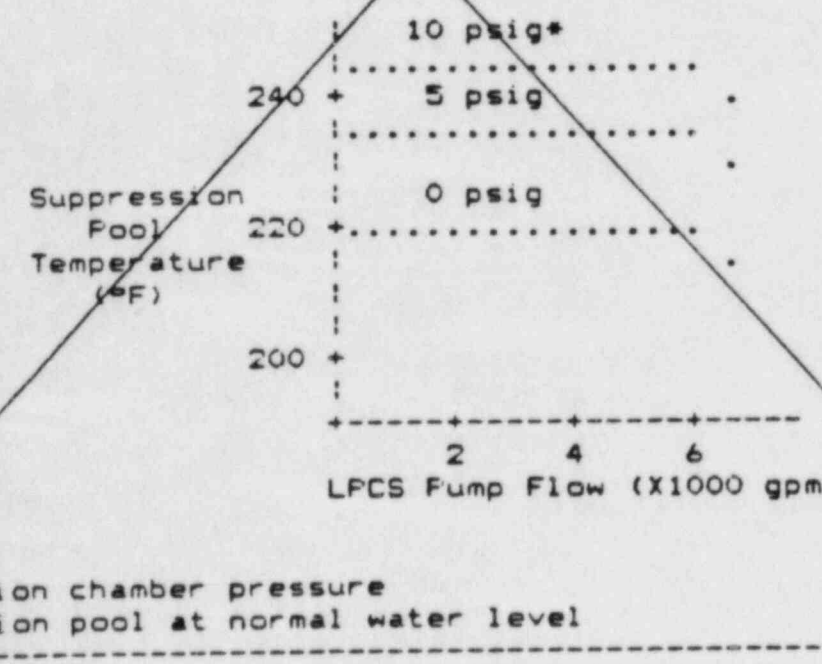
TEMPERATURE	INDICATED LEVEL	LEVEL INSTRUMENT
ANY	146 in	U-1 SHUTDOWN RANGE
ANY	150 in	U-2 SHUTDOWN RANGE
180°	175 in	U-1 UPSET RANGE
180°	180 in	U-2 UPSET RANGE

B

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.~~ +3 in. (high level suction interlock)] or low condensate storage tank water level [~~0 in.~~ 3ft 1in (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. C

CAUTION #11

If a high drywell pressure ECCS initiation signal [~~2.0~~ 1.69 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. C

CAUTION #12

Do not throttle ~~HPCI or~~ RCIC turbine# below [~~3200~~ 2100 rpm (minimum turbine speed limit per turbine vendor manual)]. C

CAUTION #13

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

CAUTION #14 57

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.

D

CAUTION #19

No Auto Trip.

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

gal

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.

MK I ONLY

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~~ 90°F < RPV water temperature < ~~212~~ 200°F (cold shutdown conditions)]).

ENTRY CONDITIONS

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

- RPV water level below [+ ~~12~~ 12.5 in. (low level scram setpoint)]
- RPV pressure above [~~1045~~ 1043 psig (high RPV pressure scram setpoint)]
- Drywell pressure above [~~2.0~~ 1.69 psig (high drywell pressure scram setpoint)]
- A condition which requires reactor scram, and reactor power above [~~3%~~ 5% (APRM downscale trip)] or cannot be determined

A

OPERATOR ACTIONS

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

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

RC/L Monitor and control RPV water level.

RC/L-1 Initiate each of the following which should have initiated but did not:

- o Isolation
- o ECCS
- [o Emergency diesel generator]

E

F

If while executing the following step:

- o Boron Injection is required or boron has been injected into the RPV, enter [procedure developed from CONTINGENCY #7].
- o RPV water level cannot be determined, RPV FLOODING IS REQUIRED; enter [procedure developed from CONTINGENCY #6].
- o RPV Flooding is required, enter [procedure developed from CONTINGENCY #6].

RC/L-2 Restore and maintain RPV water level between [+ ~~12~~ 13.5 in. (low level scram setpoint)] and [+~~60~~ 55.5 in. (high level trip setpoint)] with one or more of the following systems:

#9
#10
#11

- o Condensate/feedwater system [~~1110~~ 1076 - 0 psig (RPV pressure range for system operation)]
- o CRD system [~~1110~~ 1076 - 0 psig (RPV pressure range for system operation)]
- o RCIC system [~~1110~~ 1076-~~50~~ 57 psig (RPV pressure range for system operation)]

#12

- o ~~HPCI system [1110 - 100 psig (RPV pressure range for system operation)]~~
- o HPCS system [~~1110~~ 1076 - 0 psig (RPV pressure range for system operation)]
- o LPCS system [~~425~~ 440 - 0 psig (RPV pressure range for system operation)]

- LPCI system [~~250~~ 260 - 0 psig (RPV pressure range for system operation)]

If RPV water level cannot be restored and maintained above [~~+12~~ 13.5 in. (low level scram setpoint)], maintain RPV water level above [~~-164~~ 161 in. (top of active fuel)].

If RPV water level can be maintained above [~~-164~~ 161 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~~ 161 in. (top of active fuel)], enter [procedure developed from CONTINGENCY #1].

If Alternate Shutdown Colling 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], proceed to cold shutdown in accordance with [procedure for cooldown to cold shutdown conditions]. G

RC/P Monitor and control RPV pressure.

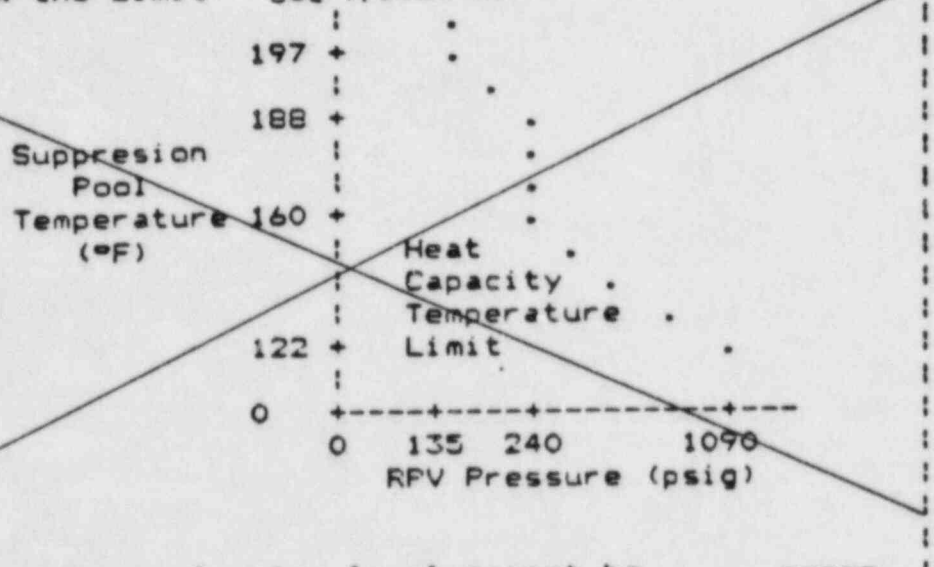
If while executing the following steps:	
o Emergency RPV Depressurization is anticipated and Boron Injection is not required, rapidly depressurize the RPV with the main turbine bypass valves.	#13 H
o Emergency RPV Depressurization or RPV Flooding is required and less than [7 (number of SRVs dedicated to ADS)] SRVs are open, enter [procedure developed from CONTINGENCY #2].	
o 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~~ 940 psig (RPV pressure at which all turbine bypass valves are fully open)].

If while executing the following steps:

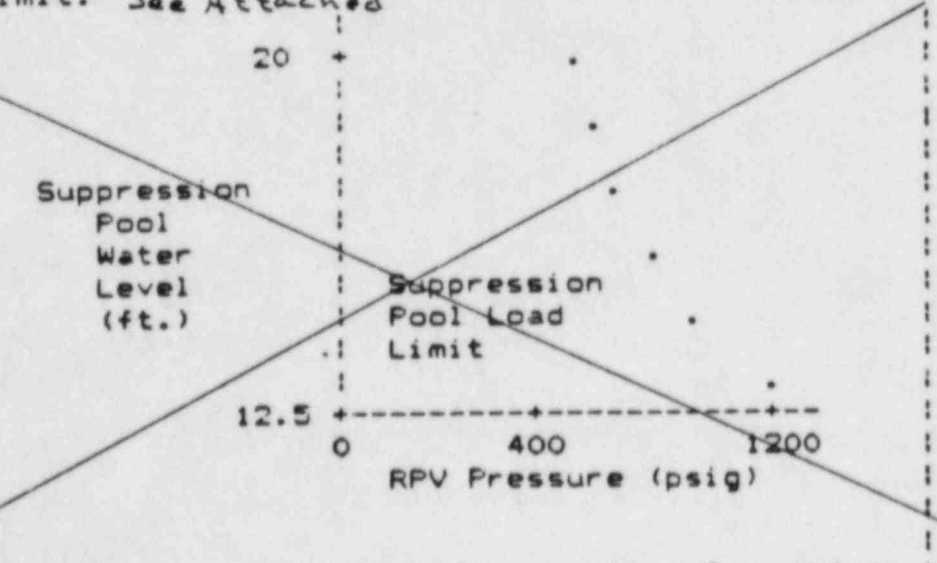
- Suppression pool temperature cannot be maintained below the Heat Capacity Temperature Limit, maintain RPV pressure below the Limit. See Attached

~~#8~~ #13 #14



- Suppression pool water level cannot be maintained below the Suppression Pool Load Limit, maintain RPV pressure below the the Limit. See Attached

#13 #14



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

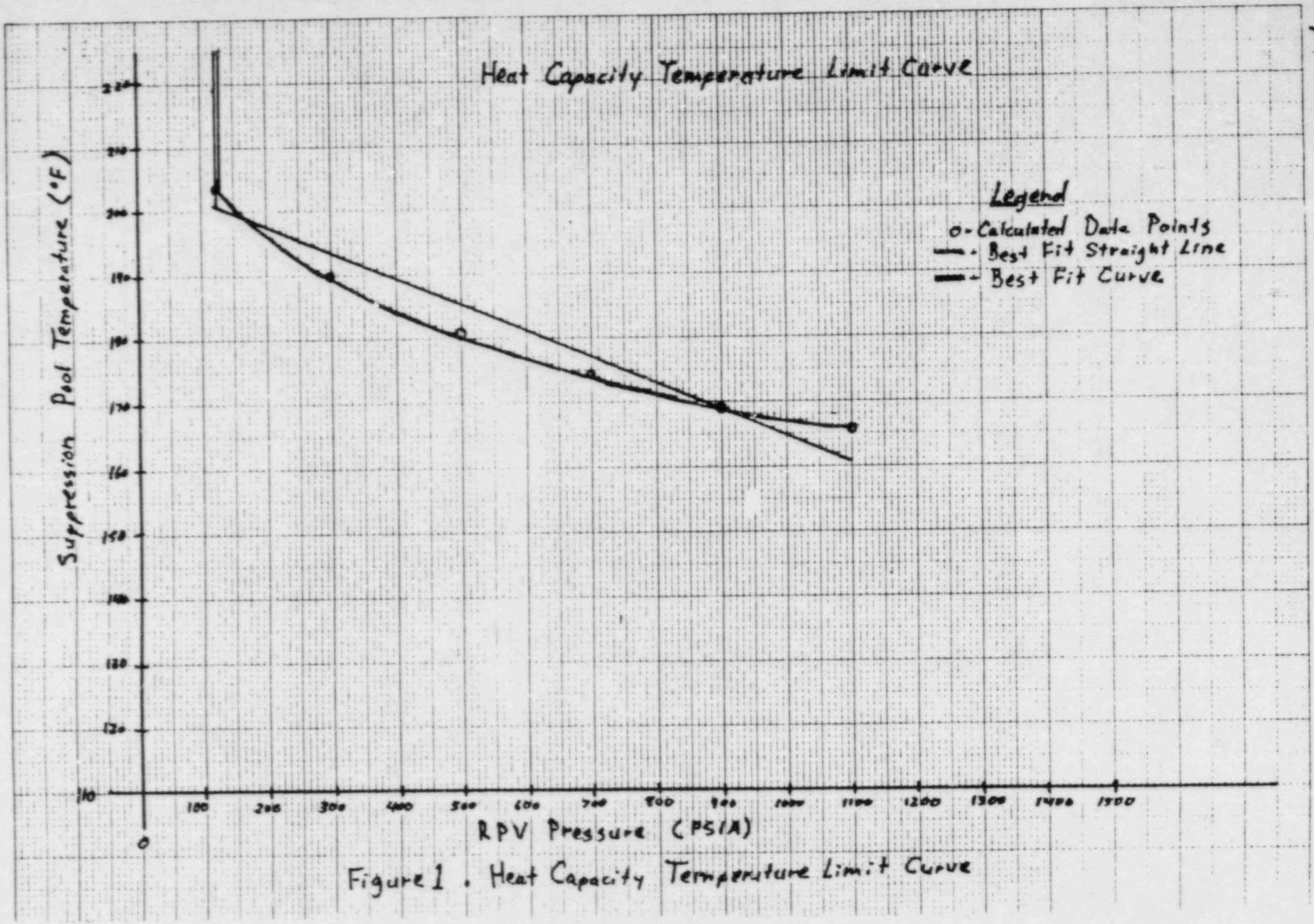


Figure 1 . Heat Capacity Temperature Limit Curve

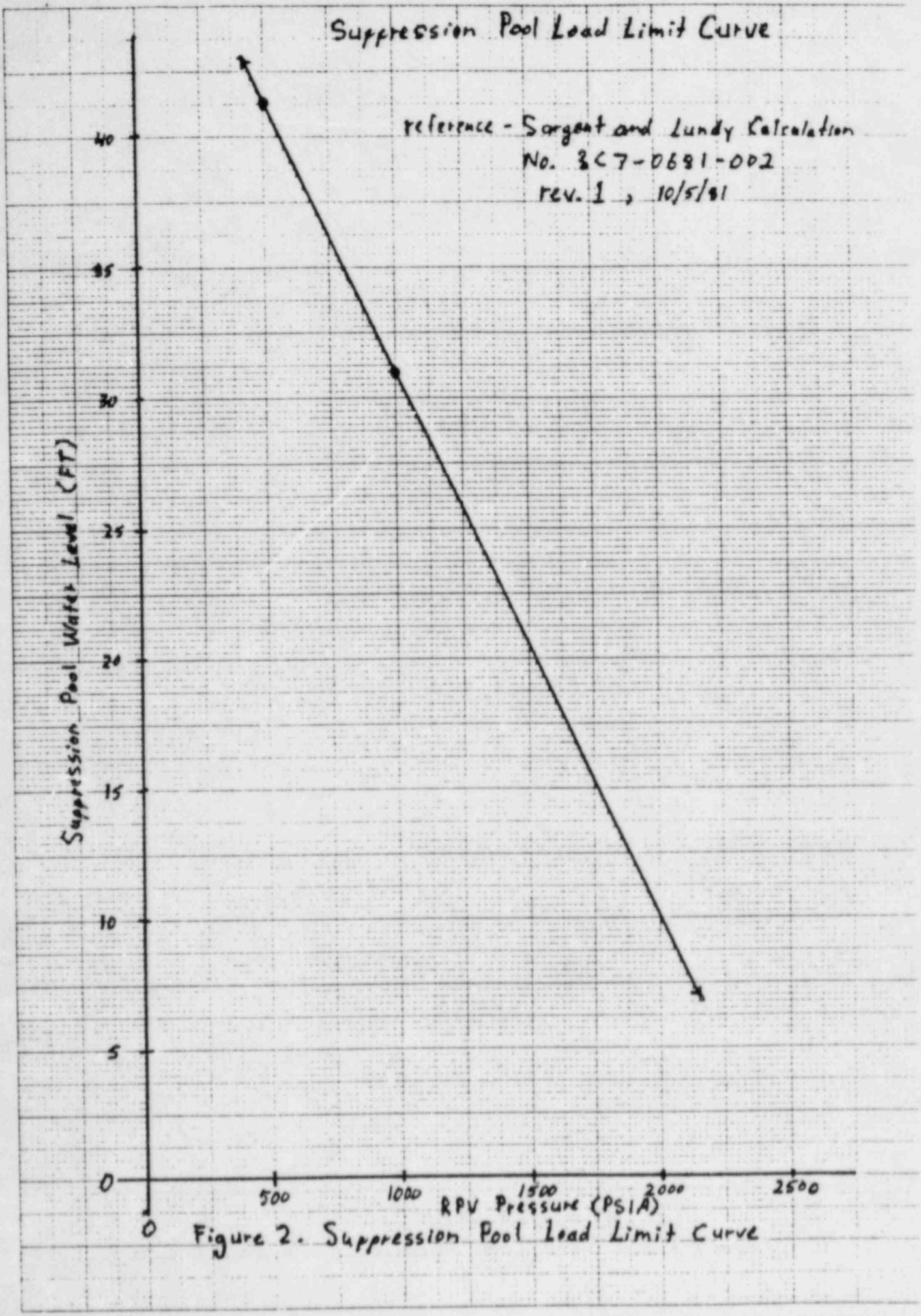


Figure 2. Suppression Pool Load Limit Curve

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~~ 1076 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~~ 5 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~~ AUTO] 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 to or beyond position [06 (maximum subcritical banked withdrawal position)], or
- [~~280 pounds~~ 3035 gal (Cold Shutdown Boron ~~Weight~~ Volume)] 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

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 to or beyond position [06 (maximum subcritical banked withdrawl 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]~~. LGP 2-1 NORMAL UNIT SHUTDOWN

RC/Q Monitor and control reactor power.

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

J

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 inititate recirculation flow runback to minimum.

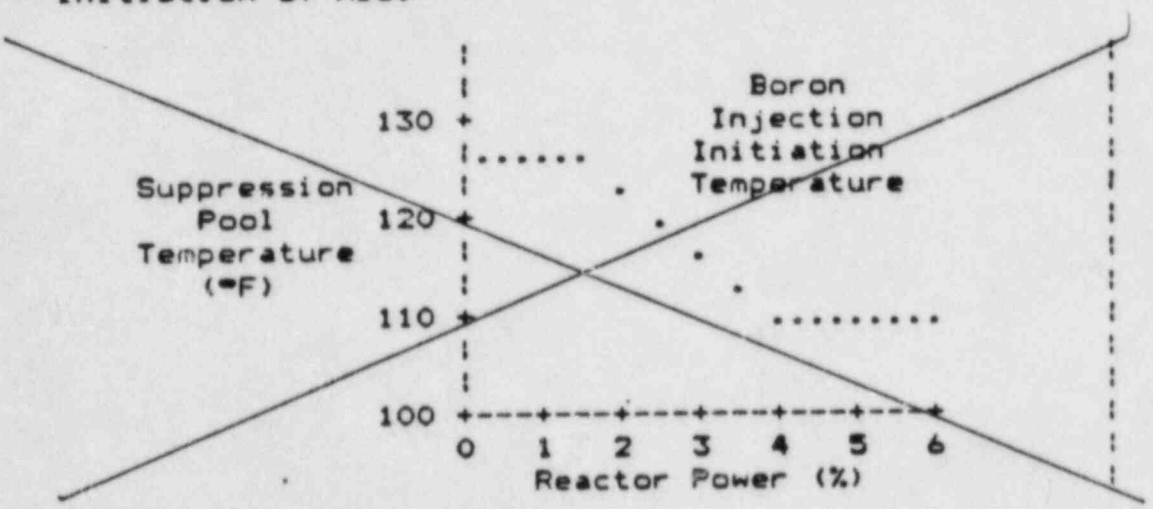
RC/Q-3 If reactor power is above [5% (APRM downscale trip)] or cannot be determined, trip the recirculation pumps.

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

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.

110°F ----- | #19 | -----

K



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

[o CRD]

[o HPCS]

[o RWCU]

[o Feedwater]

~~[o HPCI]~~

[o RCIC]

[o 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 [~~300~~ 3035 gal ~~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-F~~18~~14A,E,C,G,

  H11-P611 C71-F~~18~~14B,F,D,H

  (fuses ~~with~~ which de-energize RPS scram solenoids)].

CLOSE 1(2)IA206 Scram Air Header Supply Stop and REMOVE the Scram Air Header Supply Filter 1(2)C11-D006

- ~~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 ~~with~~ which de-energize RPS scram solenoids)].

INSTALL the Scram Air Header Supply Filter 1(2)C11-D006 and OPEN 1(2)IA206 Scram Air Header Supply Stop.

- ~~Close [C11-F008 (scram air header vent valve)] and open [C11-F095 (scram air header vent 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 Drain the scram discharge volume and 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 to or beyond position [06 (maximum subcritical banked withdrawl 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 to or beyond position [06 (maximum subcritical banked withdrawal position)]. ----- | #20 | -----

If any control rod cannot be inserted to or beyond position [06 (maximum subcritical banked withdrawl 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 to or 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)].

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~~ 100°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)]~~ (Mark III only)
- Drywell pressure above [~~2.0~~ 1.69 psig (high drywell pressure scram setpoint)]
- Suppression pool water level above [~~12 ft. 6 in.~~ +3 in. (maximum suppression pool water level LCO)]
- Suppression pool water level below [~~12 ft. 2 in.~~ -4.5 in (minimum suppression pool water level LCO)]

OPERATOR ACTIONS

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

SP/T Monitor and control suppression pool temperature.

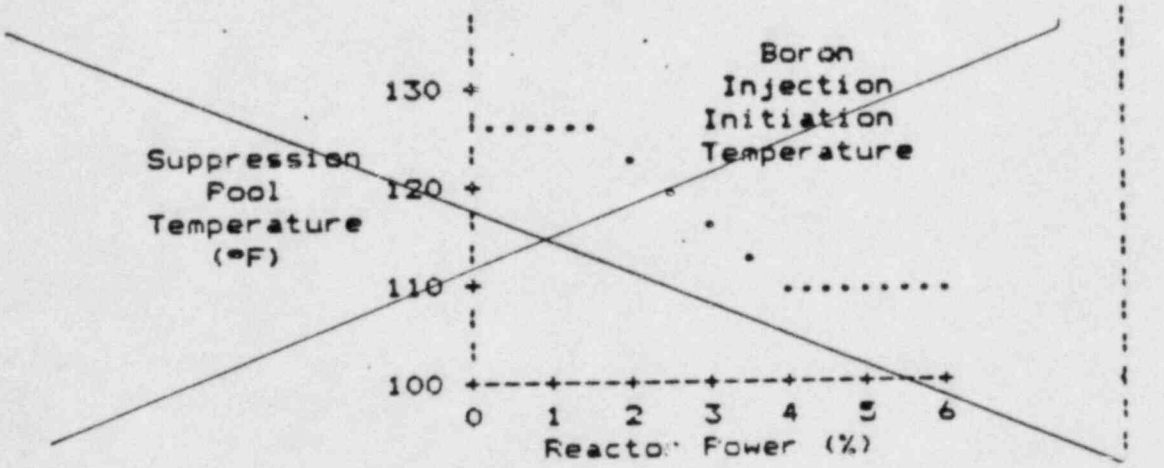
SP/T-1 Close all SORVs.

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~~ 105°F (most limiting suppression pool temperature LCO)], operate available suppression pool cooling. ----- ! #18 ! -----

SP/T-3 Before suppression pool temperature reaches 110°F [the Boron Injection Initiation Temperature], scram the reactor.

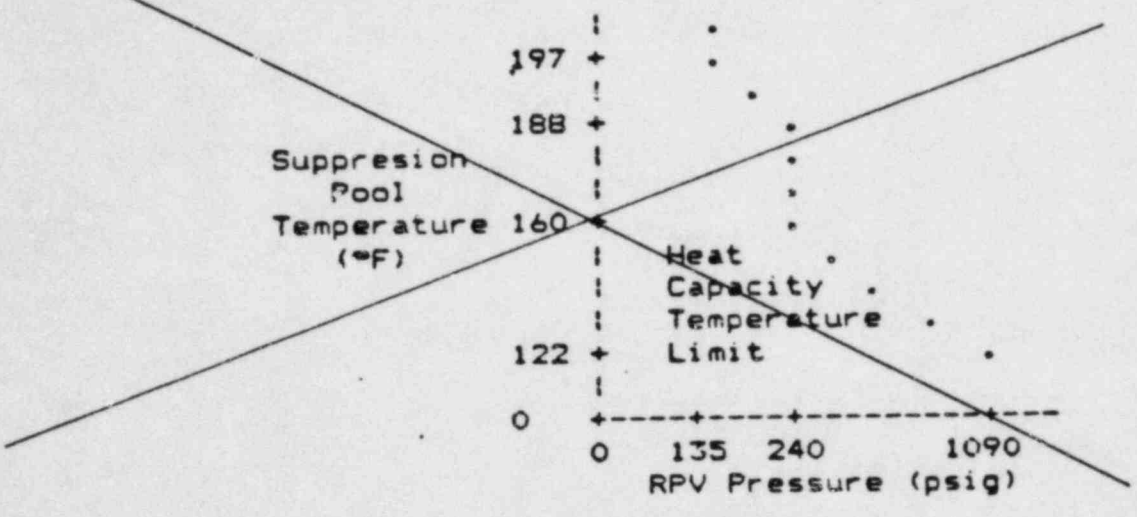
K



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. See Attached

⊕	#13
	#14

M



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

N

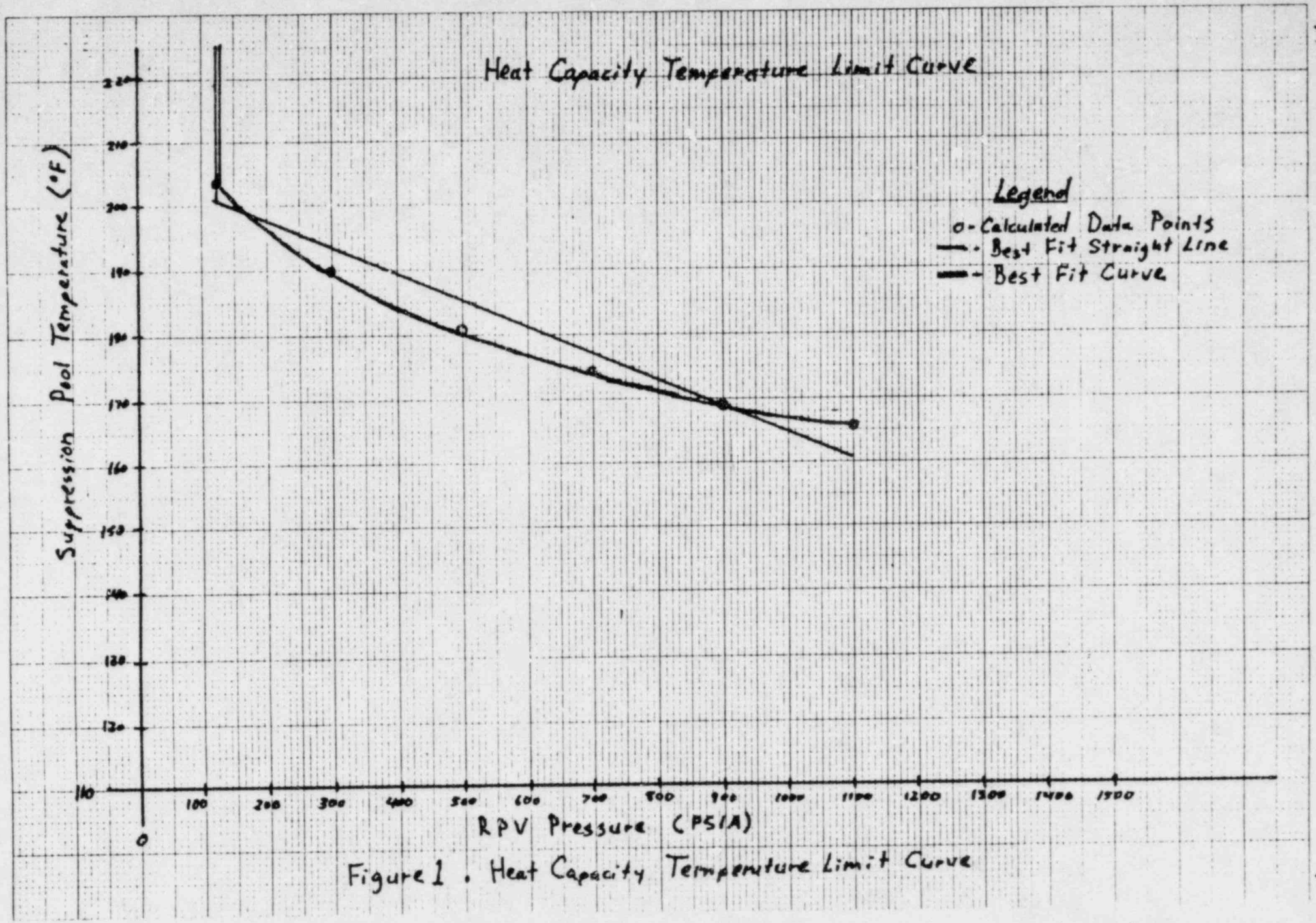


Figure 1 . Heat Capacity Temperature Limit Curve

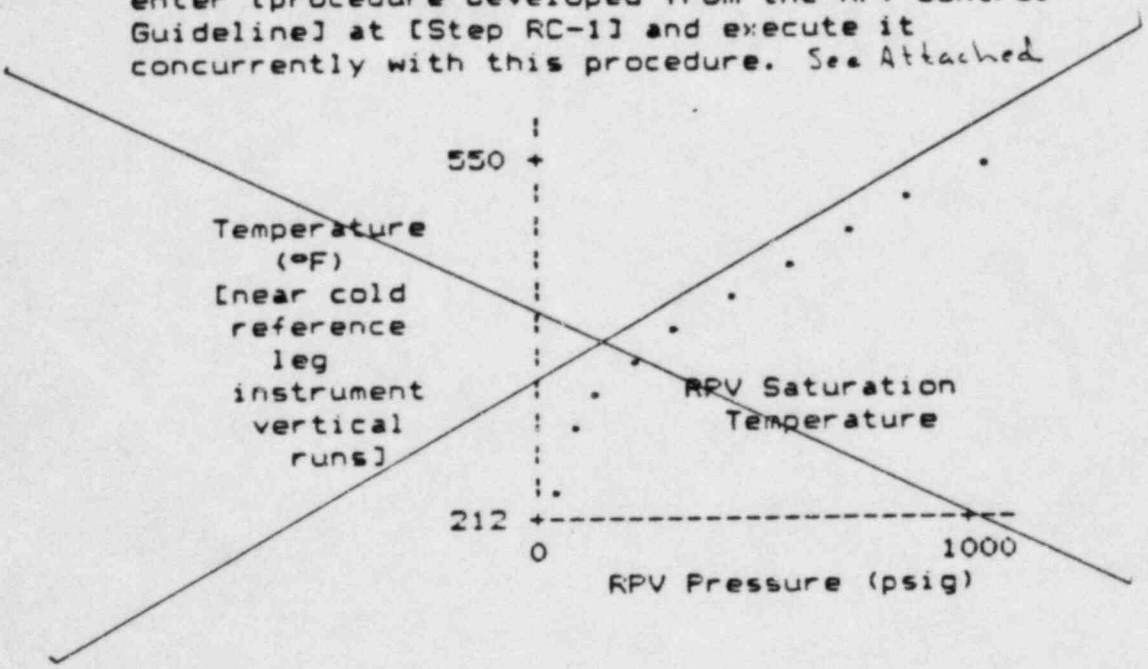
DW/T Monitor and control drywell temperature.

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. See Attached

Temp indication or ventricle run of ref not installed.



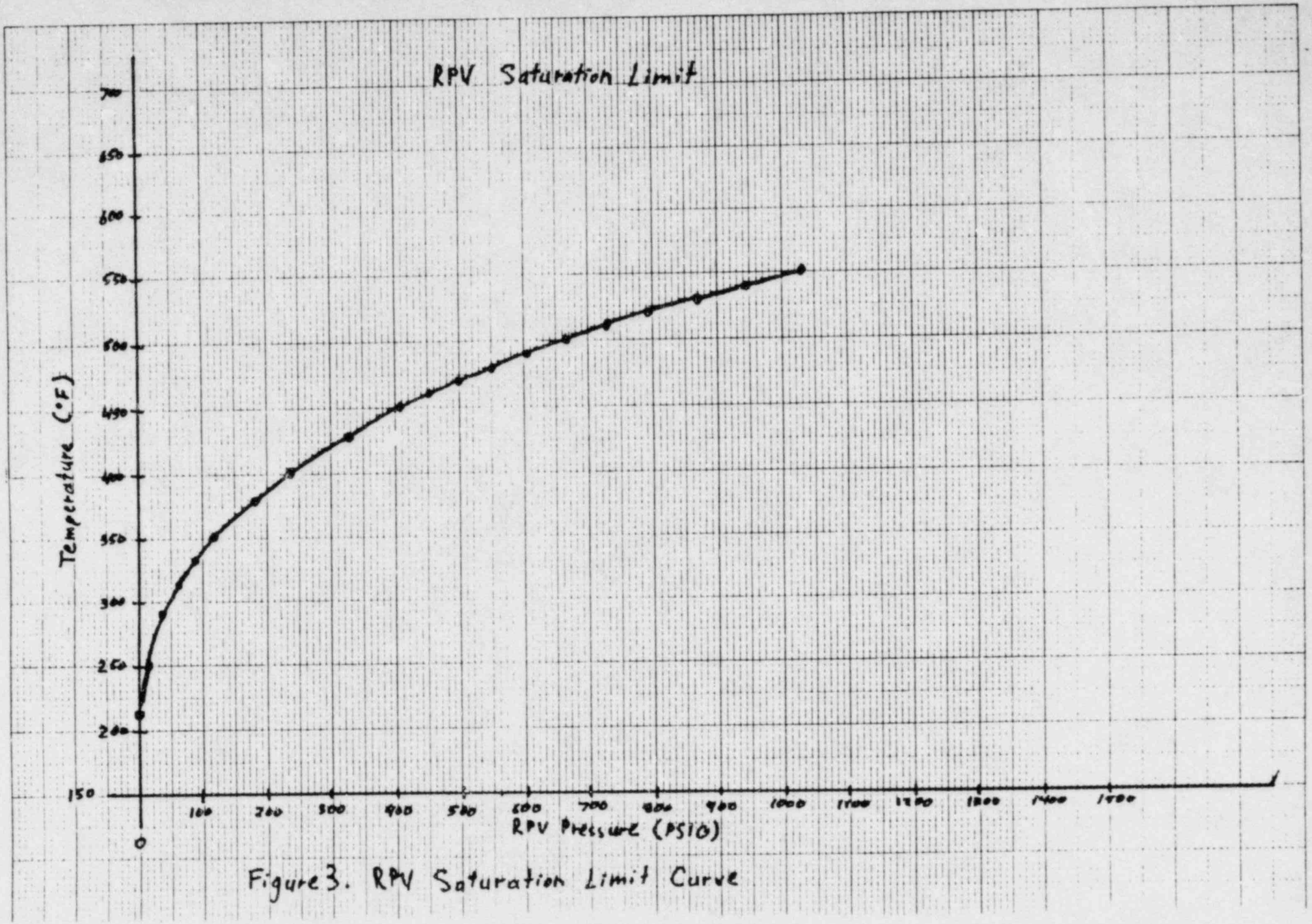
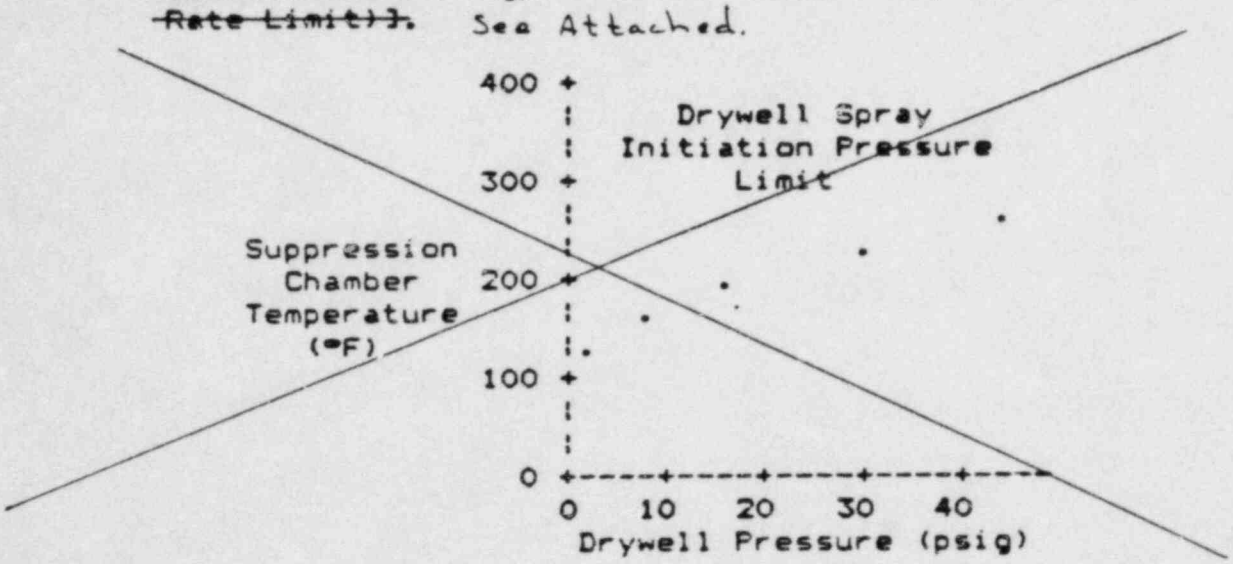


Figure 3. RPV Saturation Limit Curve

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)].~~ See Attached. per calculation C8

#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.

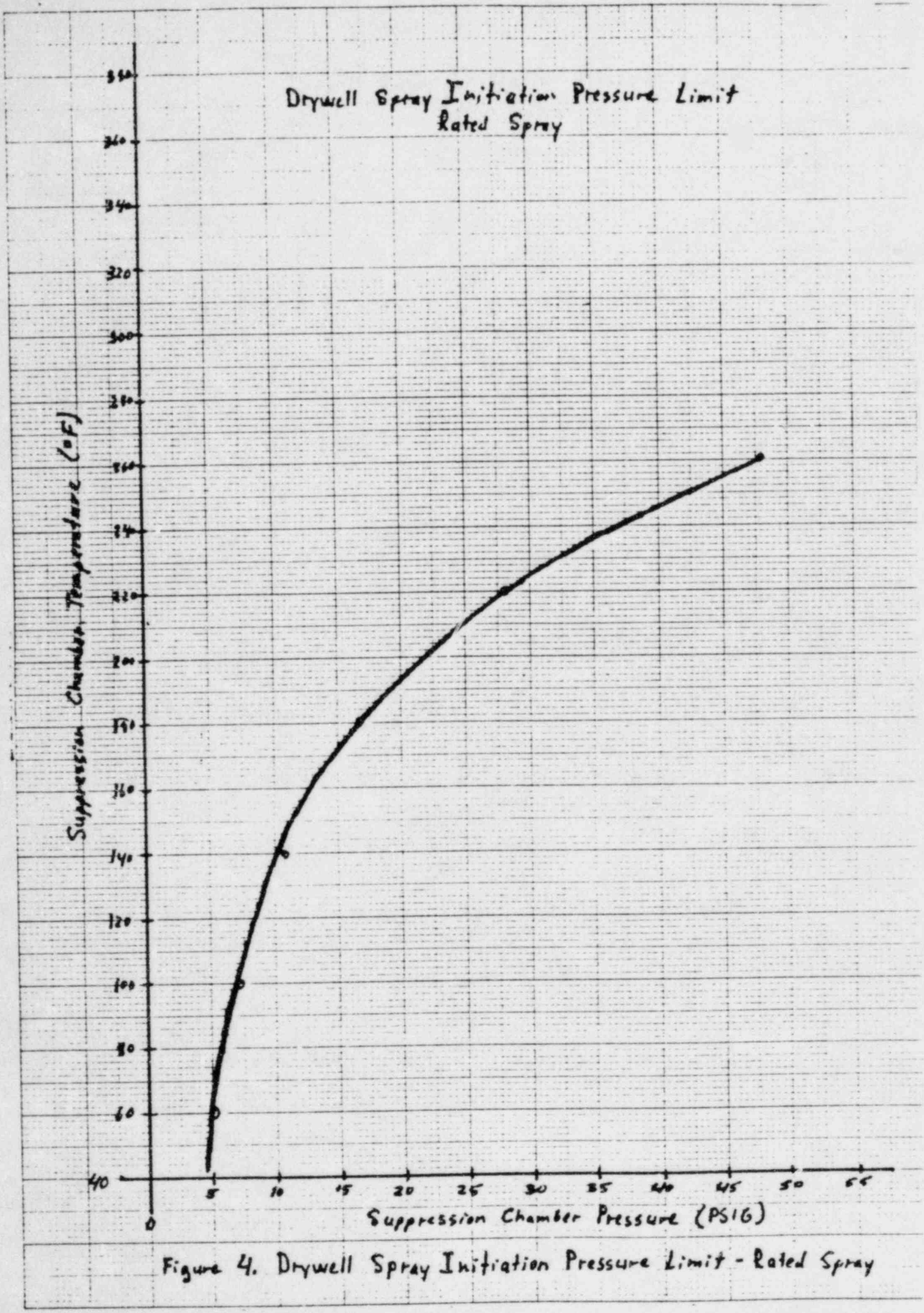


Figure 4. Drywell Spray Initiation Pressure Limit - Rated Spray

MK III ONLY

CN/T Monitor and control containment temperature.

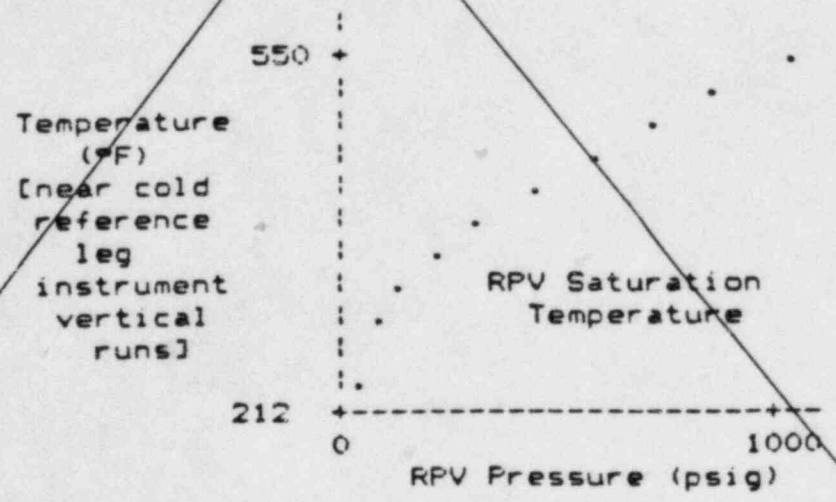
CN/T-1 When containment temperature exceeds [90°F (containment temperature LCO)], operate available containment cooling. #6

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:

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

- [o] 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~~ 19.5 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~~ 723 5/8 ft. ~~6 in.~~ (elevation of suppression pool spray nozzles)], initiate suppression pool sprays. | ~~# 8~~ #18 |

See Attached

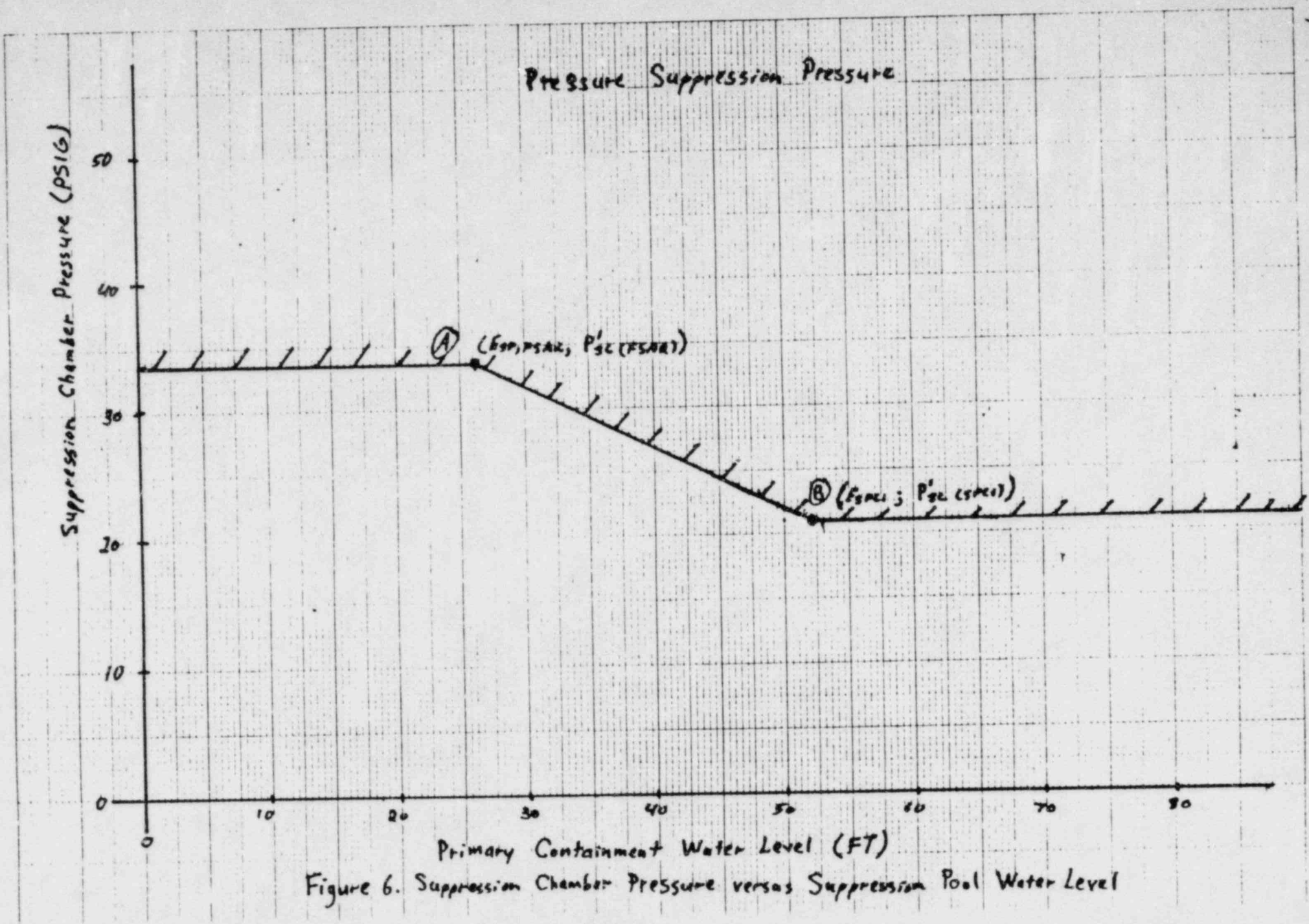
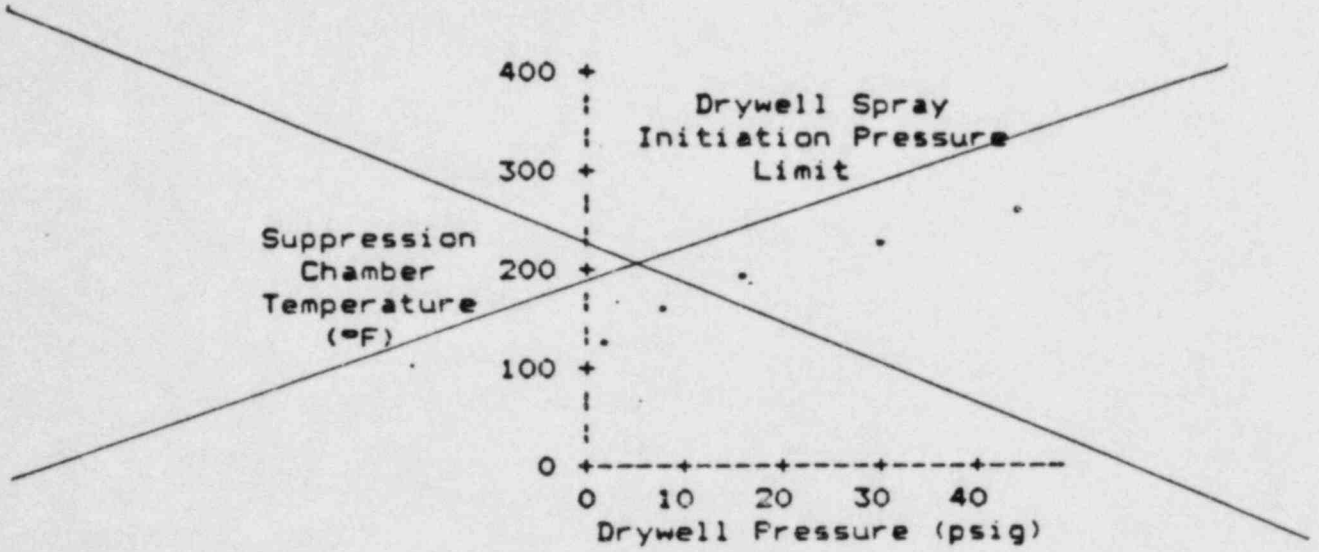


Figure 6. Suppression Chamber Pressure versus Suppression Pool Water Level

PC/P-3 If suppression chamber pressure exceeds [~~17.4~~ 19.5 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)]~~.

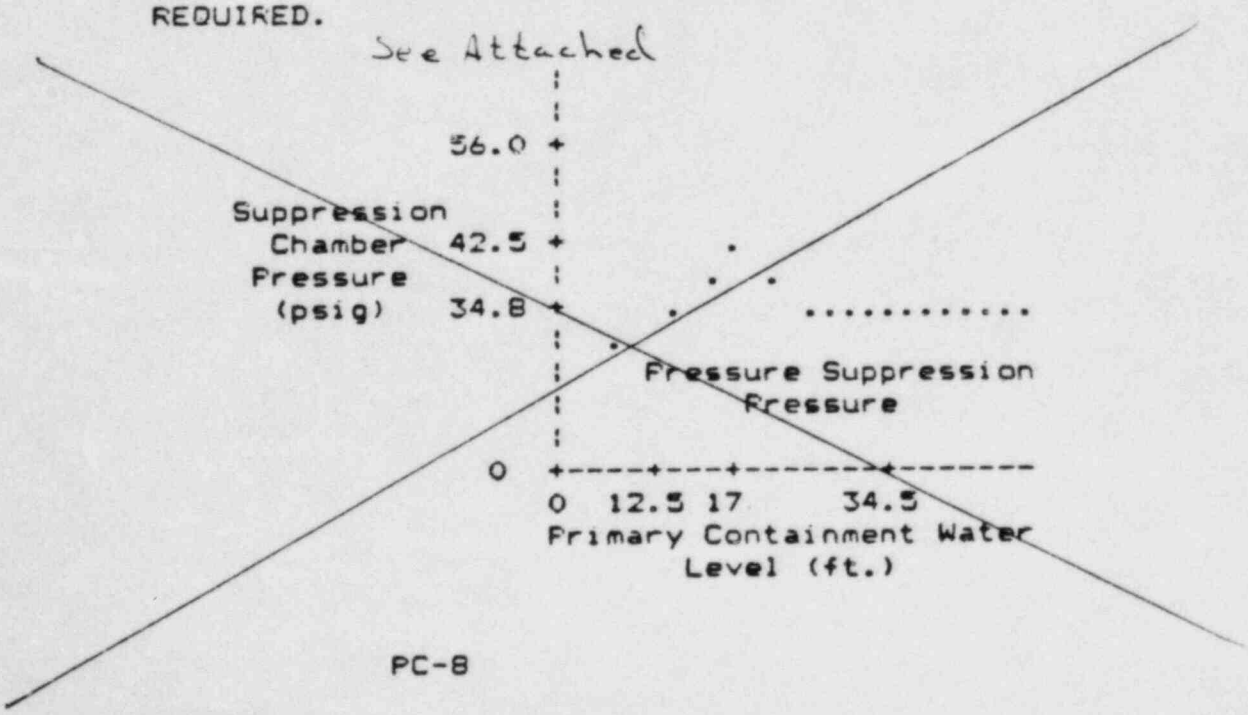
See Attached

NA per Calculation C8



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

See Attached



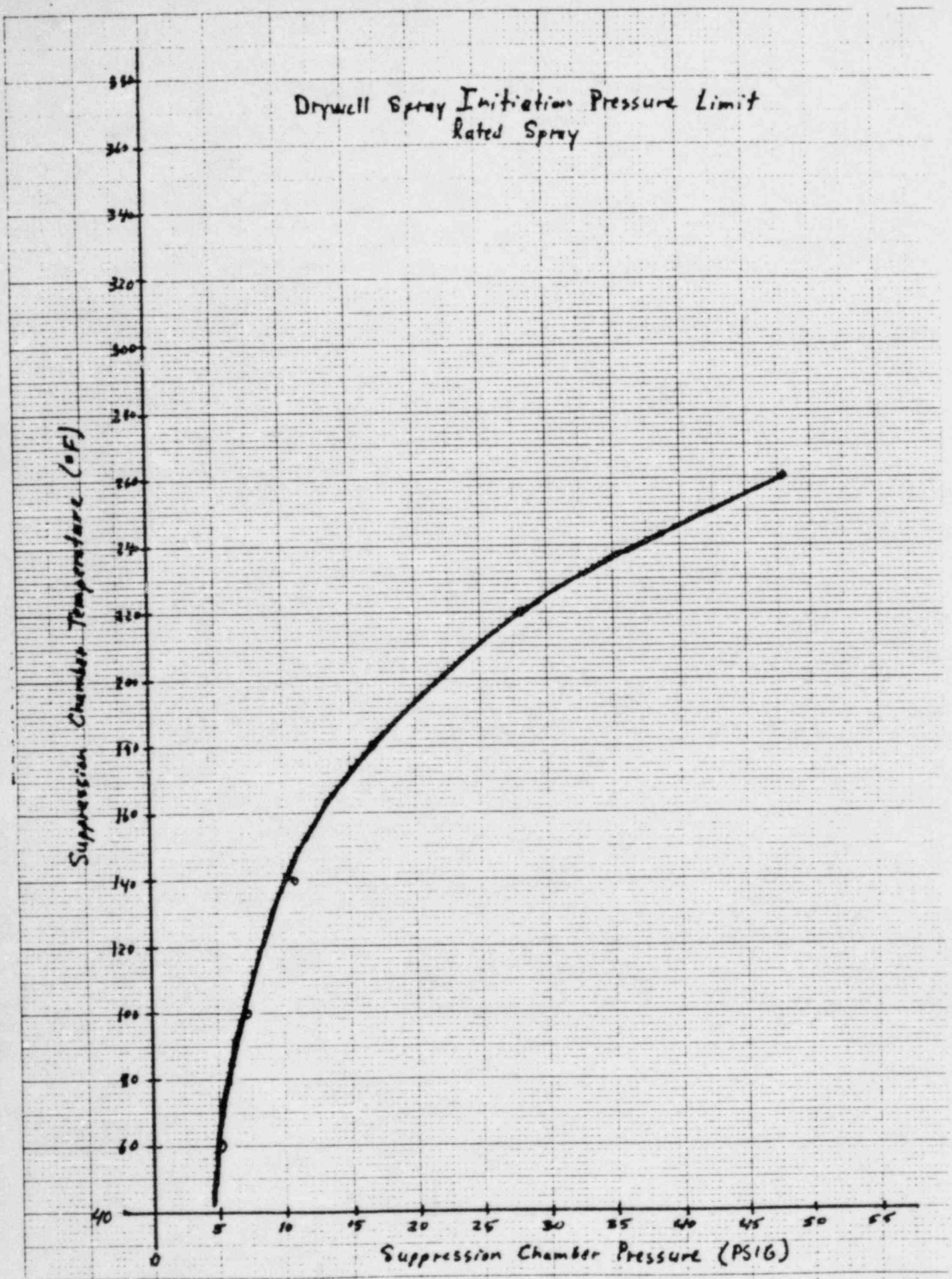


Figure 4. Drywell Spray Initiation Pressure Limit - Rated Spray

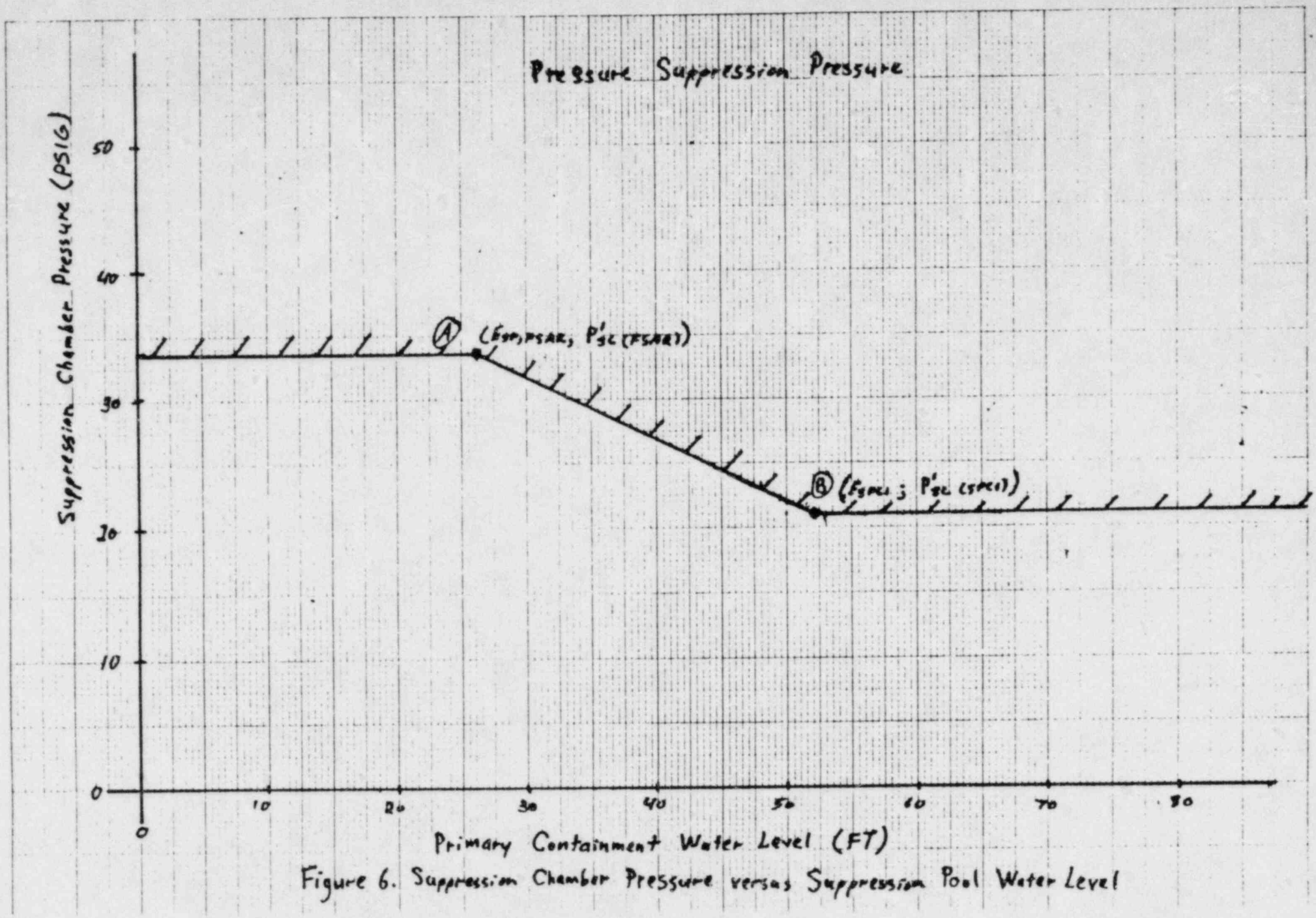
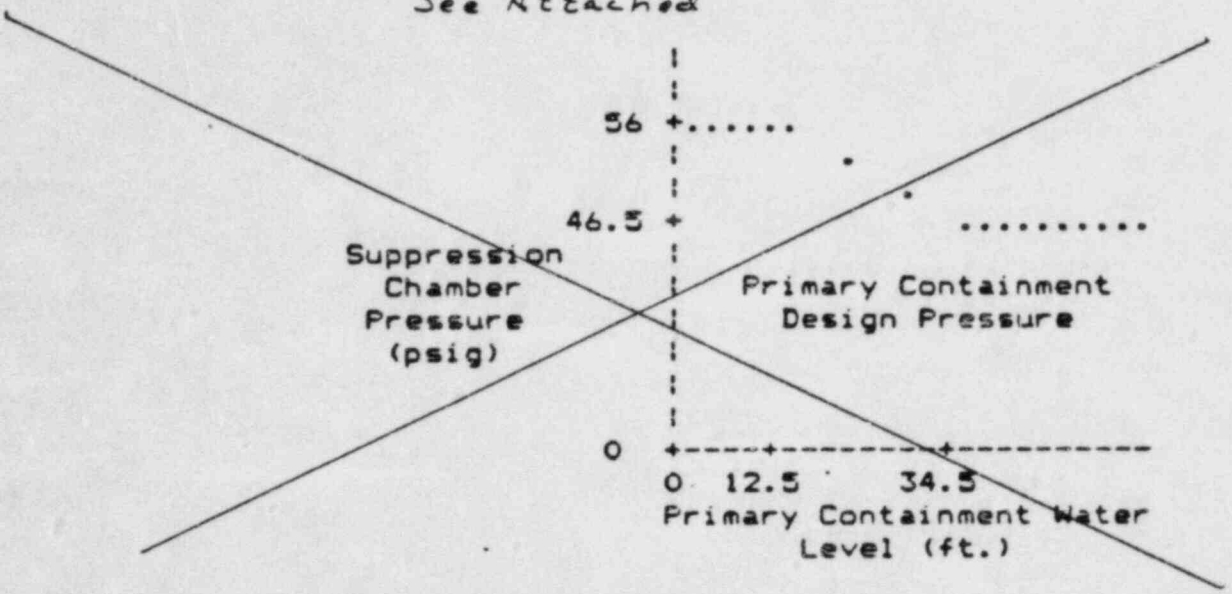


Figure 6. Suppression Chamber Pressure versus Suppression Pool Water Level

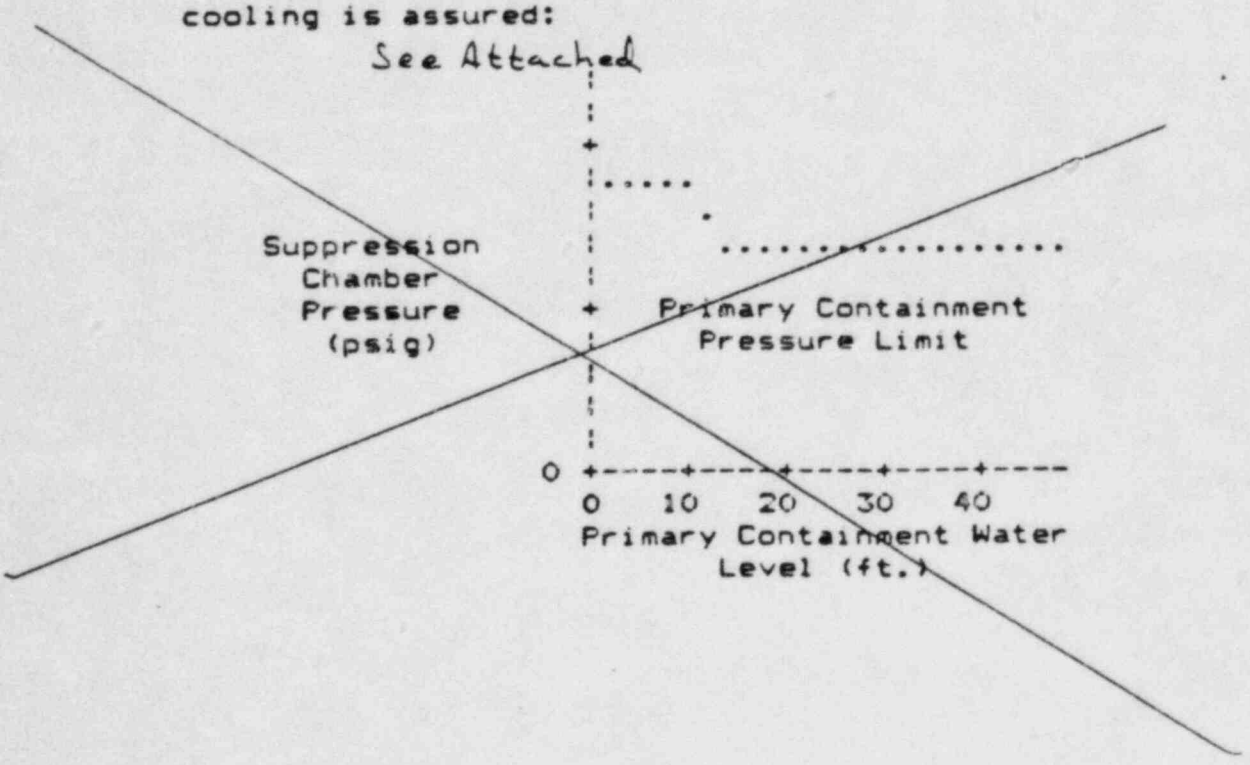
PC/P-5 If suppression chamber pressure cannot be maintained below [the Primary Containment Design Pressure], RPV FLOODING IS REQUIRED.

See Attached



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:

See Attached



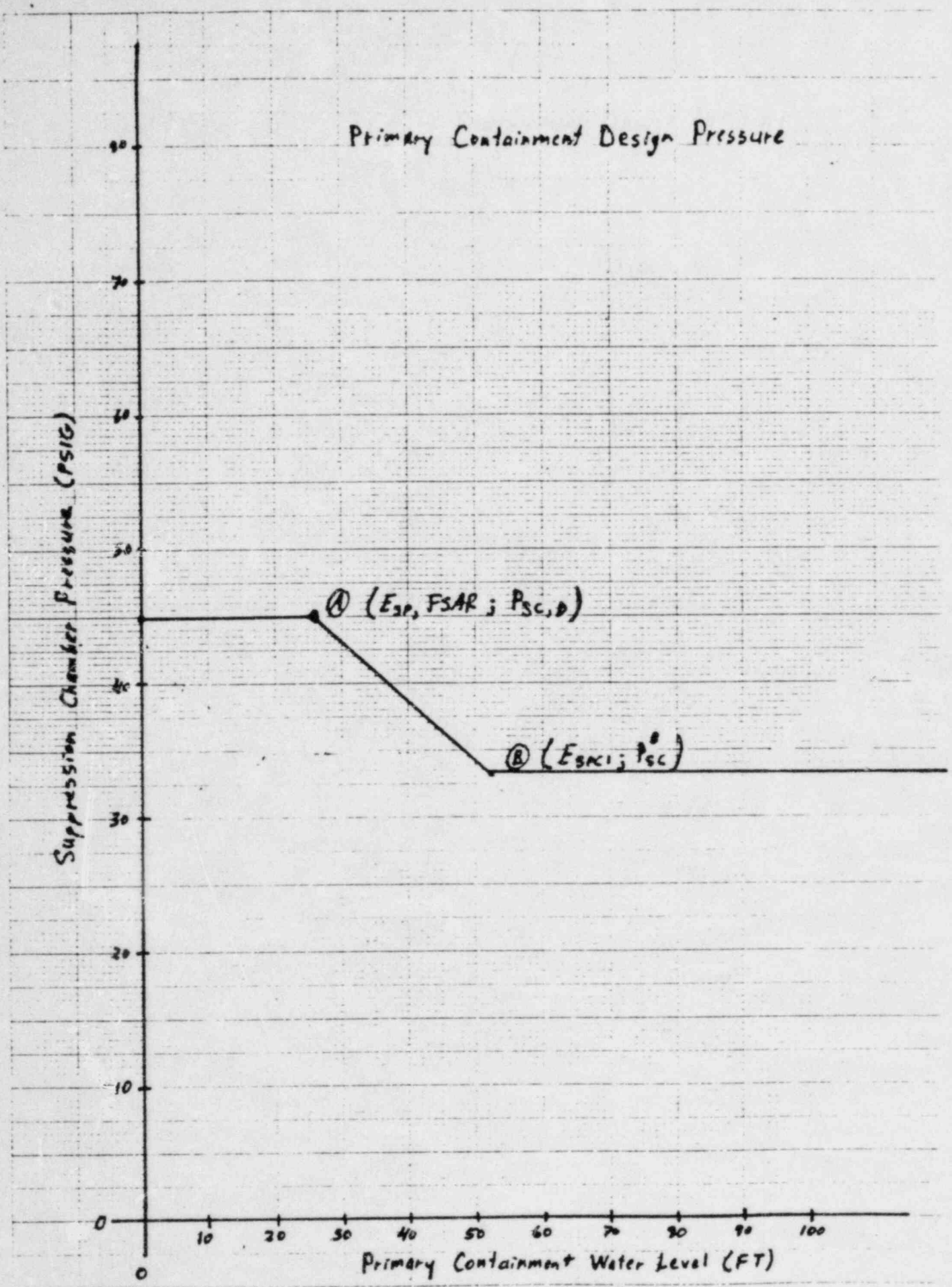


Figure 7. Primary Containment Design Pressure

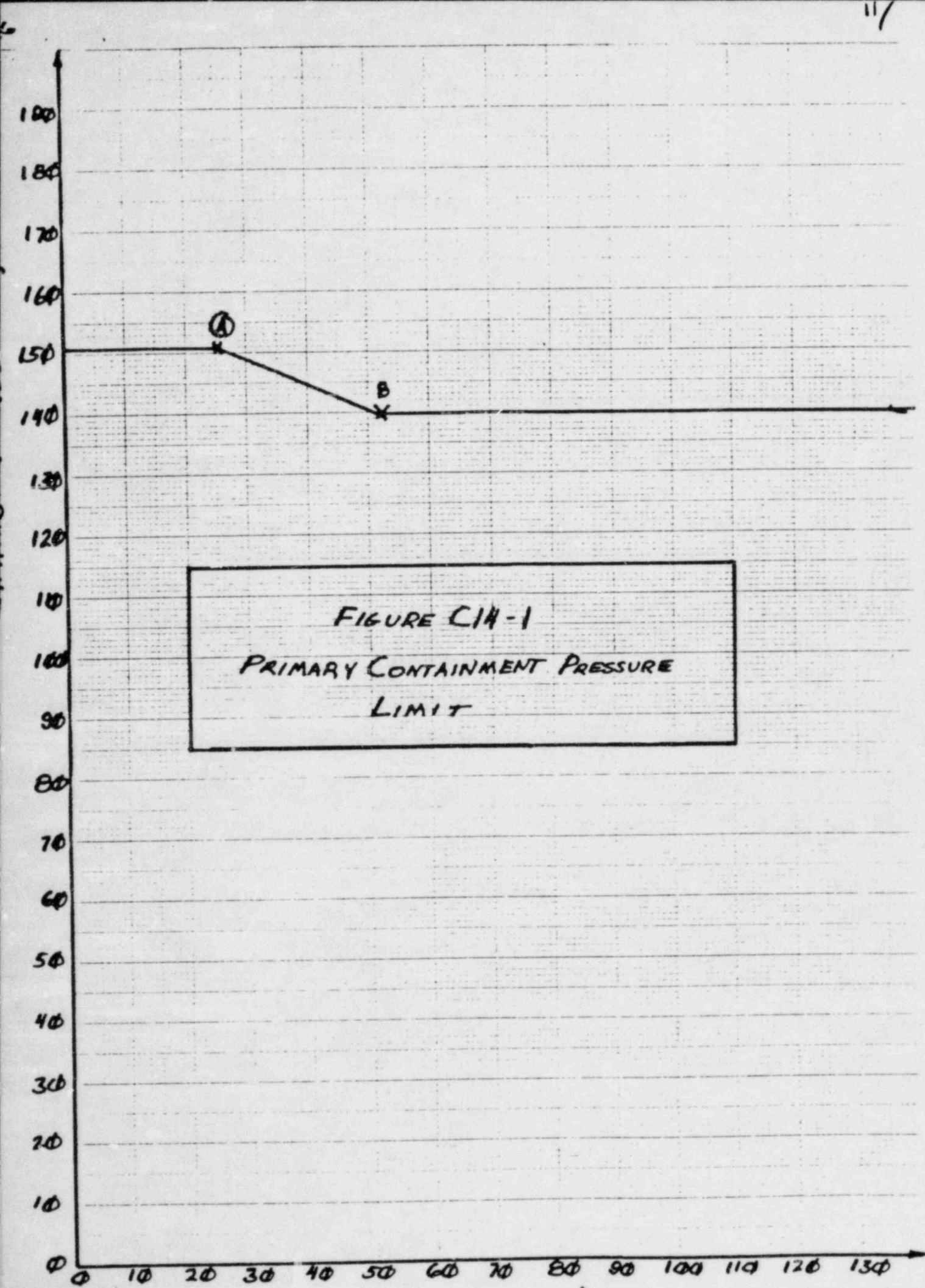


FIGURE C14-1

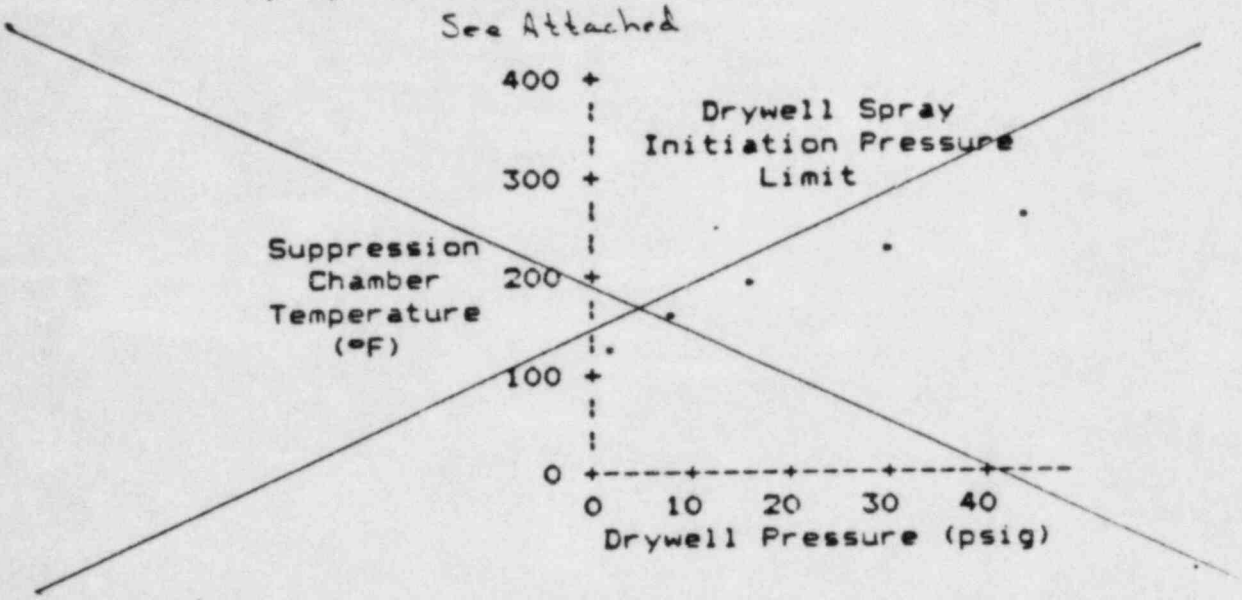
PRIMARY CONTAINMENT PRESSURE LIMIT

- o [If suppression pool water level is below ~~24 ft. 6 in.~~ 723 ft el. (elevation of suppression pool spray nozzles),] initiate suppression pool sprays.

- o 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)]~~.

per Calculation C8

See Attached



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 ! -----

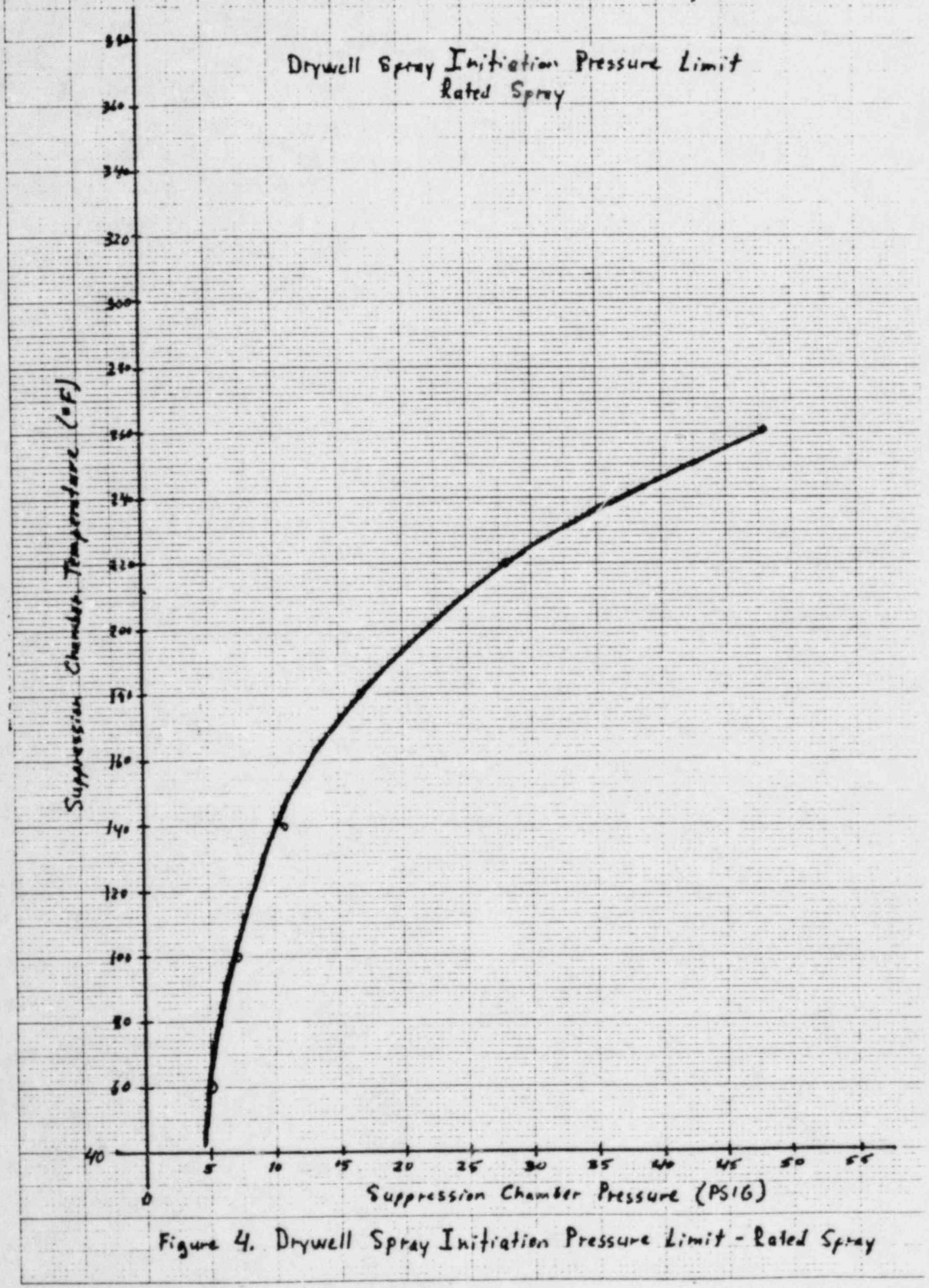


Figure 4. Drywell Spray Initiation Pressure Limit - Rated Spray

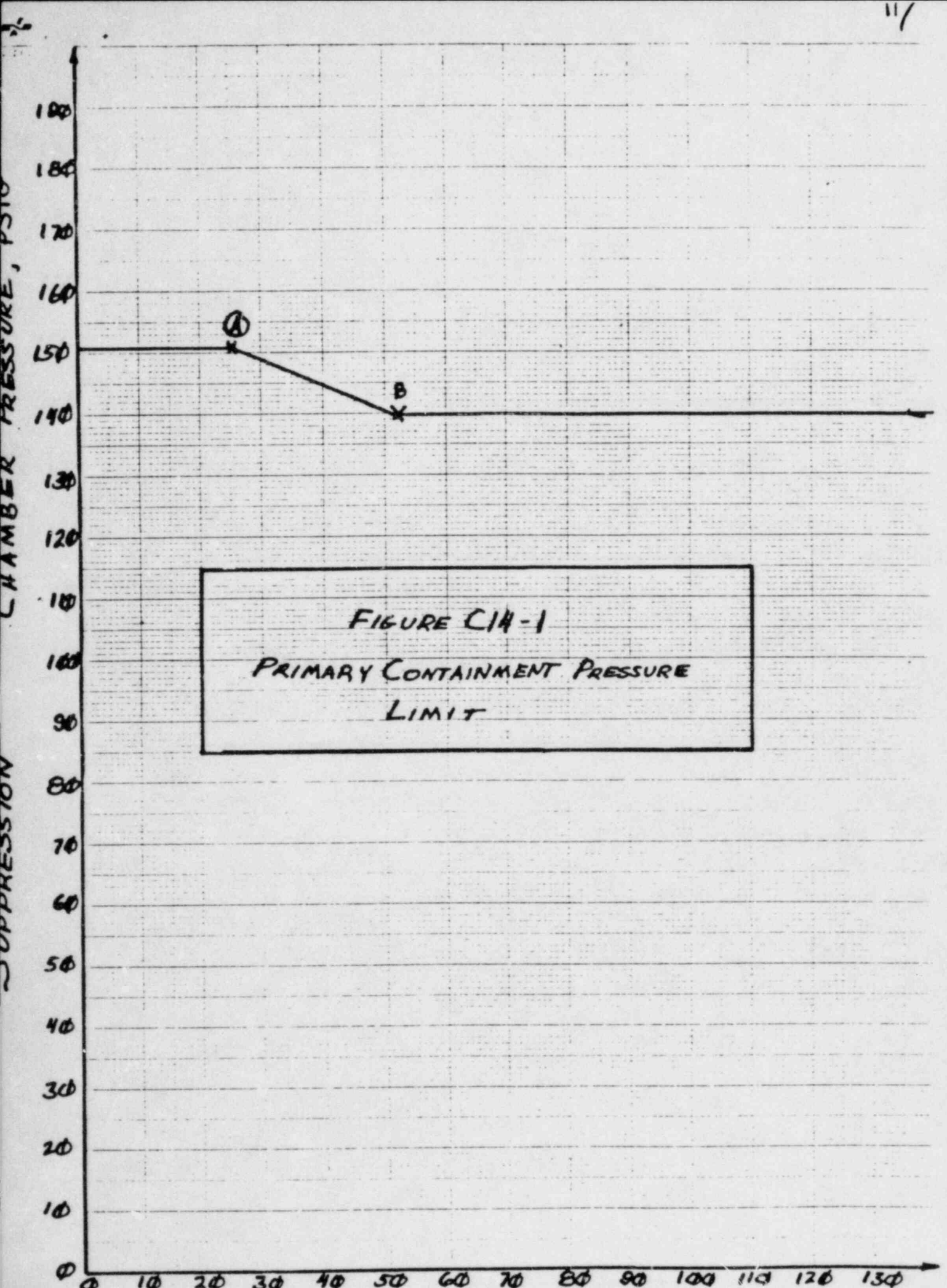


FIGURE C14-1

PRIMARY CONTAINMENT PRESSURE LIMIT

SP/L Monitor and control suppression pool water level.

SP/L-1 Maintain suppression pool water level between [~~12 ft. 6 in.~~ +3 in. (maximum suppression pool water level LCO)] and [~~12 ft. 2 in.~~ -4.5 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

MK III ONLY

~~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. 22 in. (minimum suppression pool water level LCO)].~~

If suppression pool water level cannot be maintained above [~~12 ft. 2 in.~~ -4.5 in. (minimum suppression pool water level LCO)], execute [Step SP/L-2].

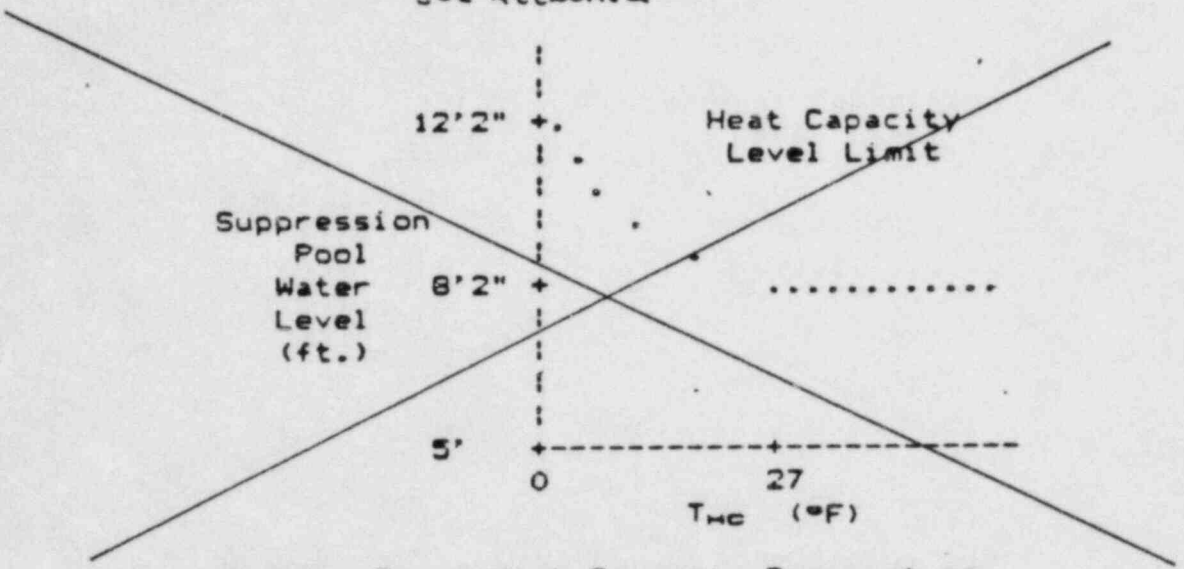
If suppression pool water level cannot be maintained below [~~12 ft. 6 in.~~ +3 in. (maximum suppression pool water level LCO)] ~~[(23 ft. 9 in. (SPMS initiation setpoint plus suppression pool water level increase which results from SPMS operation)) if SPMS has been initiated]~~, execute [Step SP/L-3].

MK III ONLY

SP/L-2 SUPPRESSION POOL WATER LEVEL BELOW [~~12 ft. 2 in.~~ -4.5 in (minimum suppresion pool water level LCO)]

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

See Attached



Where T_{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.

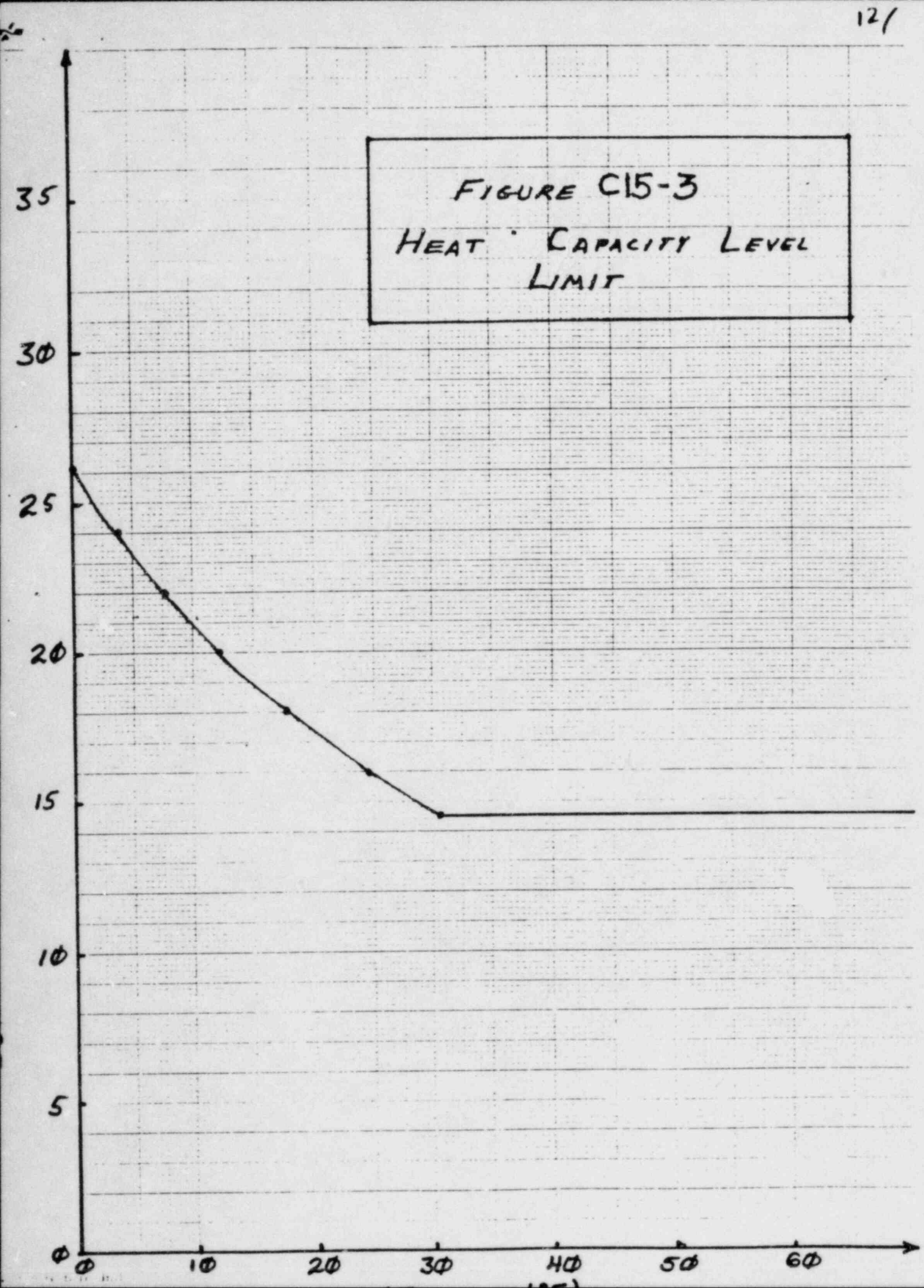


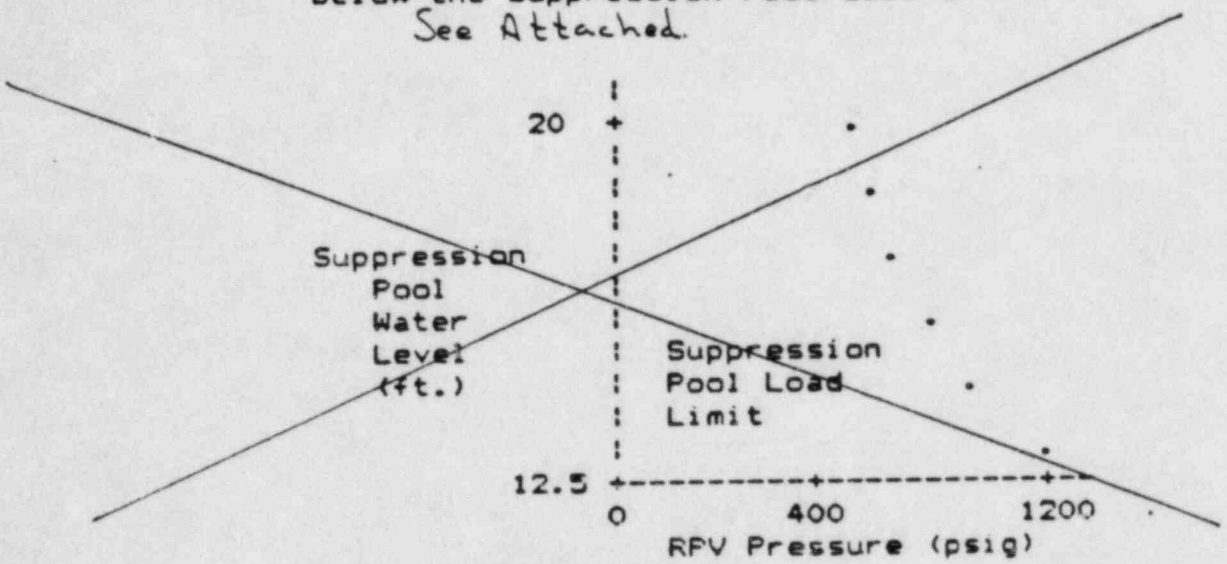
FIGURE C15-3
HEAT CAPACITY LEVEL LIMIT
35
30
25
20
15
10
5
0
0
10
20
30
40
50
60

SP/L-3 SUPPRESSION POOL WATER LEVEL ABOVE [~~12 ft. 6 in.~~ +3 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.

See Attached.



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.

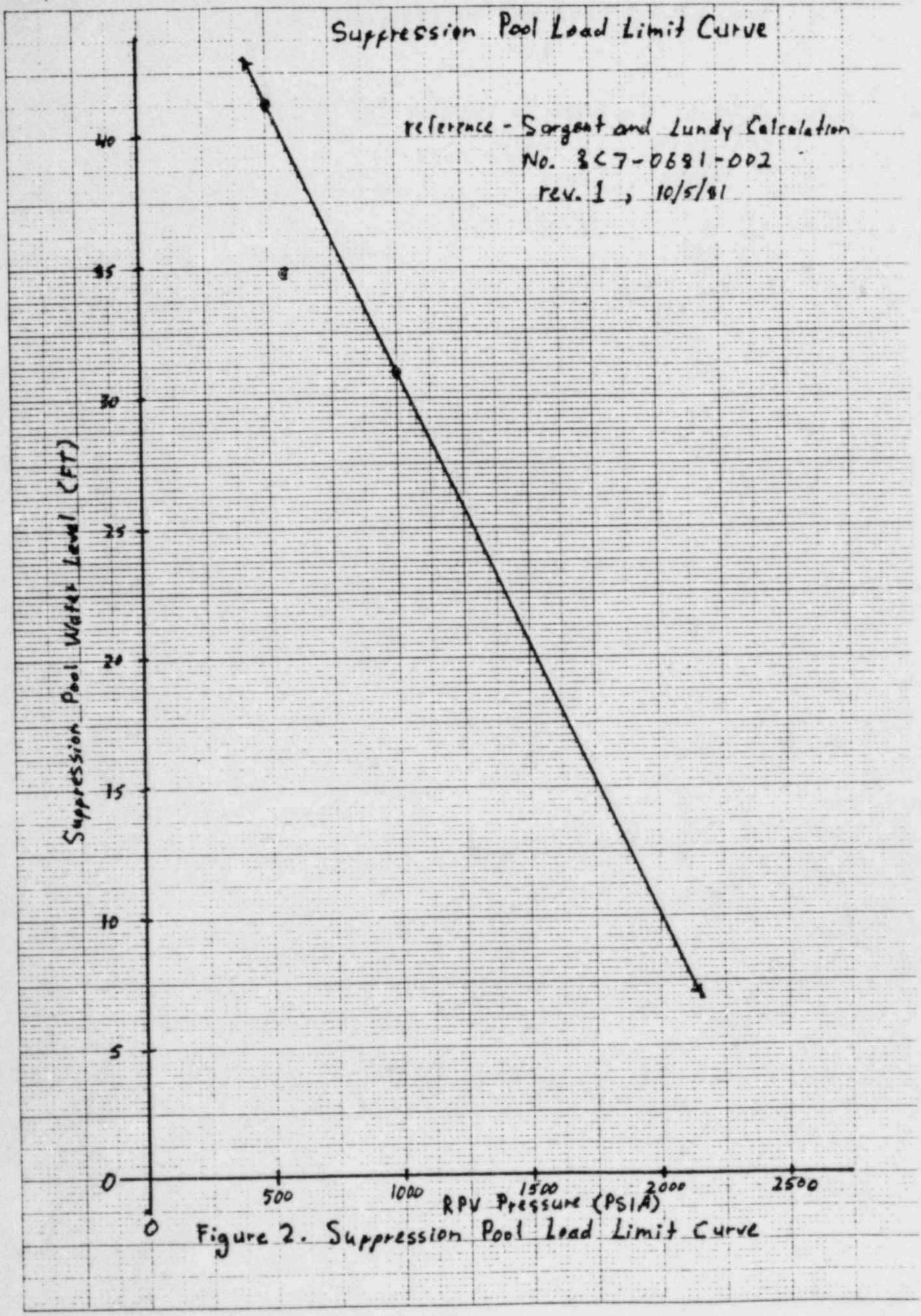


Figure 2. Suppression Pool Load Limit Curve

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 RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

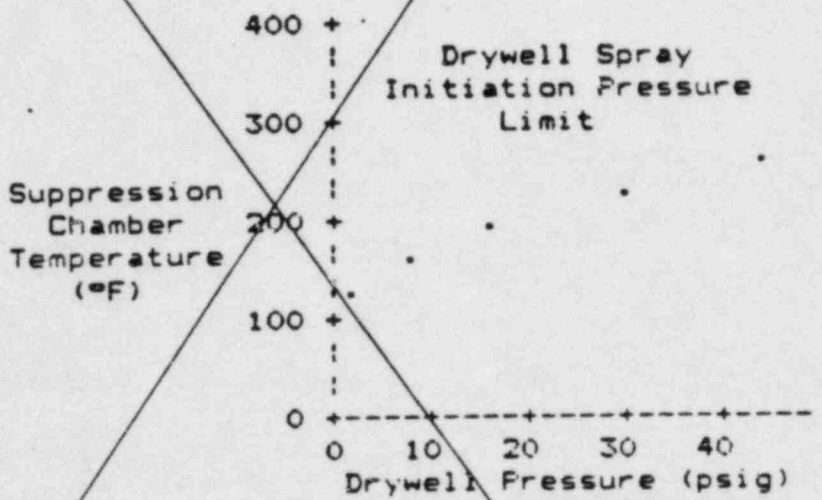
~~SP/L-3.2~~ Before suppression pool water level reaches [17 ft. 2 in. (Maximum Primary Containment Water Level Limit or elevation of bottom of Mark I internal suppression chamber to drywell vacuum breakers less vacuum breaker opening pressure in feet of water, whichever is lower)] but only if adequate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

MK I ONLY

MK I ONLY

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 |

U-1 LOA-CM-01
U-2 810 ft 6 in el.

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

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~~ 10 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~~ 10 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.

SC/T-2 If secondary containment HVAC exhaust radiation level is below [~~20~~ 16 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	MAX NORMAL[1] OPERATING VALUE	MAX SAFE[1] OPERATING VALUE
DIFFERENTIAL PRESSURE	IN. WATER	IN. WATER	IN. WATER
[Reactor Building/ outside air	0		]
[Refuel Floor/outside air	0		]
AREA TEMPERATURE See Attached.	°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.

Area Temp	Max Normal Op	Max Safe Op	Alarm
Steam Pipe Tunnel	176	212	130°F
RHR Equipment Room 1	206	212	120°F
RHR Equipment Room 2	206	212	120°F
RCIC Pipe Route	206	212	190°F
RCIC Equipment Area	206	212	120°F
RWCU Pump Room A	186	212	110°F
RWCU Pump Room B	186	212	110°F
RWCU Pump Room C	186	212	110°F
RWCU Hx Room A	199	212	130°F
RWCU Hx Room B	199	212	130°F

TABLE 1
OPERATING VALUES OF SECONDARY CONTAINMENT PARAMETERS (Continued)

See Attached

SECONDARY CONTAINMENT PARAMETER/LOCATION	ALARM	MAX NORMAL[a] OPERATING VALUE	MAX SAFE[a] 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		]

[a]Typical values not available.

Differential Temperatures	Max Norm Op	Max Safe Op	Alarm
Steam Pipe Tunnel	96	132	20°F
RHR Equipment Room 1	126	132	20°F
RHR Equipment Room 2	126	132	20°F
RCIC Pipe Route	126	132	40°F
RCIC Equipment Area	126	132	20°F
RWCU Pump Room A	106	132	34°F
RWCU Pump Room B	106	132	34°F
RWCU Pump Room C	106	132	34°F
RWCU Hx Room A	119	132	34°F
RWCU Hx Room B	119	132	34°F

TABLE 1
OPERATING VALUES OF SECONDARY CONTAINMENT PARAMETERS (Continued)

SECONDARY CONTAINMENT PARAMETER/LOCATION	ALARM	MAX NORMAL[1] OPERATING VALUE	MAX SAFE[1] OPERATING VALUE
HVAC EXHAUST RADIATION LEVEL ABOVE	MR/HR	MR/HR	MR/HR
[Reactor Building	~~20~~ 10	50	100]
[~~Refuel Floor~~ Fuel Pool Vent Exhaust	~~20~~ 10	50	100]
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		]

See Attached

[1]Typical values not available.

ARM

	D18 Inst MPL	(PT) alarm mr/hr	Isol mr/hr	EQ Service Rad	EQ Bound Rad	Upscale Reading	mr/hr max Normal	mr/hr max Safe
SBGT 820' El.	K602A					10^4		
RWCU Phase Sep	K602B	10	--	2E6	E7	10^4	10^2	10^3
RB Sample (832)Station	K601G	25		2E6	E7	10^3	250	10^3
AB Cont. Purge	K601I	10		---	---	10^4	10^2	10^3
RB HCU Module N.	K601C	3.5		2E6	E7	10^3	35	350
RB HCU Module S.	K601D	3.5		2E6	E7	10^3	35	350
TIP Room	K602D	100		2E6	E7	10^4	10^3	10^4
TIP Drives	K601E	7.5		2E6	E7	10^3	75	750
CRD Storage & Repair	K601T	10		2E6	E7	10^3	10^2	10^3
NW RHR Hx Rooms	K602F	100		5E5	E7	10^4	10^3	10^4
SE RHR Hx Rooms	602E	100		5E5	E7	10^4	10^3	10^4
RCIC Room	K602G	45		5E5	E7	10^4	450	4500
HPCS Room	K601H	3.5		5E5	E7	10^3	35	350
MSL Tunnel	K610A/D	3800	7500	6E6	E7	10^6		

TABLE 1
OPERATING VALUES OF SECONDARY CONTAINMENT PARAMETERS (Continued)

See Attached

SECONDARY CONTAINMENT PARAMETER/LOCATION	ALARM	MAX NORMAL[a] OPERATING VALUE	MAX SAFE[a] 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		]

[a]Typical values not available.

RB Basement water levels

Area	Limiting Component	Ht. from floor (Inches)
NE	RCIC Inst. rack elect. conn. box	25
SE	RHR B&C Inst rack elect. Conn. box	25
SW	HPCS Suction P.S. E22-N015 & 14	31
NW	RHR A Inst. Rack Elect. conn. box	25
Raceway	MSIV-LC elect. conn. boxes	35

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:

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

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. Q

CONTINGENCY #1
LEVEL RESTORATION

If while executing the following steps: o Boron Injection is required or boron has been injected into the RPV, enter [procedure developed from CONTINGENCY #7]. o RPV water level cannot be determined, RPV FLOODING IS REQUIRED: enter [procedure developed from CONTINGENCY #6]. o RPV Flooding is required, enter [procedure developed from CONTINGENCY #6].

F

~~C1-1 Initiate IC.~~

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

- o Condensate
- o HPCS
- o LPCI-A
- o LPCI-B
- o LPCI-C
- o LPCS-A
- ~~o 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:

- [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)]

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~~ 129 in. (ADS initiation setpoint)], prevent automatic initiation of ADS.

R

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

	RPV PRESSURE REGION		
	HIGH [~~425~~ 440 psig][1]	INTERMEDIATE	LOW [~~100~~ 57 psig][2]
LEVEL: INCREASING	C1-4	C1-5	C1-6
LEVEL: 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~~)

R

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~~ 15 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~~ 15 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~~ 12.5 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 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~~ 161 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~~ 57 psig (~~HCPI 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~~ 161 in. (top of active fuel)], enter [procedure developed from CONTINGENCY #4].

CONTINGENCY #2
EMERGENCY RPV DEPRESSURIZATION

C2-1 When either: ! #13 #14 !

- o Boron Injection is required and all injection into the RPV except from boron injection systems and CRD has been terminated and prevented, or
- o Boron Injection is not required,

C2-1.1 ~~Initiate IC~~.

C2-1.2 If suppression pool water level is above [~~4~~ 6 ft. ~~9 in.~~ (elevation of top of SRV discharge device)]:

- o Open all ADS valves.
- o 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 !

Target Rock SRV's not installed

- o Main condenser
- o RHR (steam condensing mode)
- o [Other steam driven equipment]
- o Main steam line drains
- ~~o HPCI steam line~~
- o RCIC steam line
- o Head vent
- ~~o 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]. S

CONTINGENCY #3
STEAM COOLING

C3-1. ~~Confirm initiation of IC~~.

If while executing this step 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].

T

~~If IC cannot be initiated:~~

When RPV water level drops to [-~~272~~ 276 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~~ 280 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~~ 161 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~~ two (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 Terminate and prevent all injection into the RPV except from CRD. TT

C5-6 Start one LPCS or LPCI pump with suction from the suppression pool.

C5-7 Slowly increase LPCS or LPCI injection into the RPV to the maximum.

C5-7.1 If RPV pressure does not stabilize at least [~~94~~ 75 psig (Minimum Alternate Shutdown Cooling RPV Pressure)] above suppression chamber pressure, start another LPCS or LPCI pump.

C5-7.2 If RPV pressure does not stabilize below [~~172~~ 115 psig (Maximum Alternate Shutdown Cooling RPV Pressure)], open another SRV.

C5-7.3 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]~~. Target Rock SRVs not installed.

C5-8 Control suppression pool temperature to maintain RPV water temperature above [~~70~~ 88°F (RPV NDTT or head tensioning limit, whichever is higher)].

C5-9 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 to or 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~~] 180
[6	~~135~~] 218
[5	~~165~~] 262
[4	~~210~~] 330
[3	~~280~~] 440
[2	~~430~~] 665
[1	~~870~~] 1462.96

If less than [~~1~~ 2 (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 [4 (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: U #25

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

If at least [4 (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 [4 (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: U

- 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 [2 (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 to or 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~~ 95 psig (Minimum RPV Flooding Pressure)] or more above suppression chamber pressure: W

- 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~~ 95 psig (Minimum RPV Flooding Pressure)] above suppression chamber pressure but as low as practicable by throttling injection. W

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:

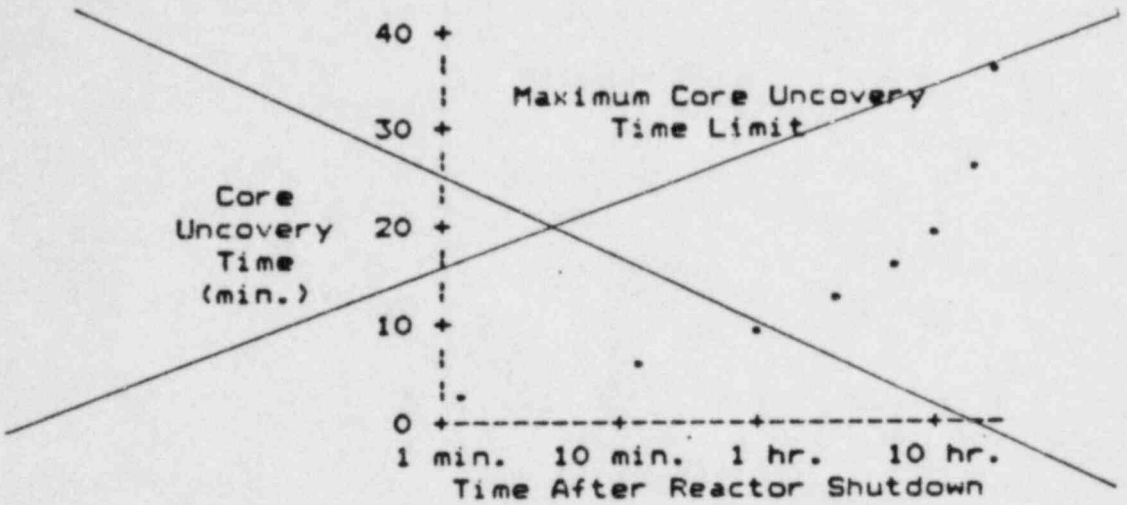
Note: Reference leg [illegible] instrument [illegible]

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.

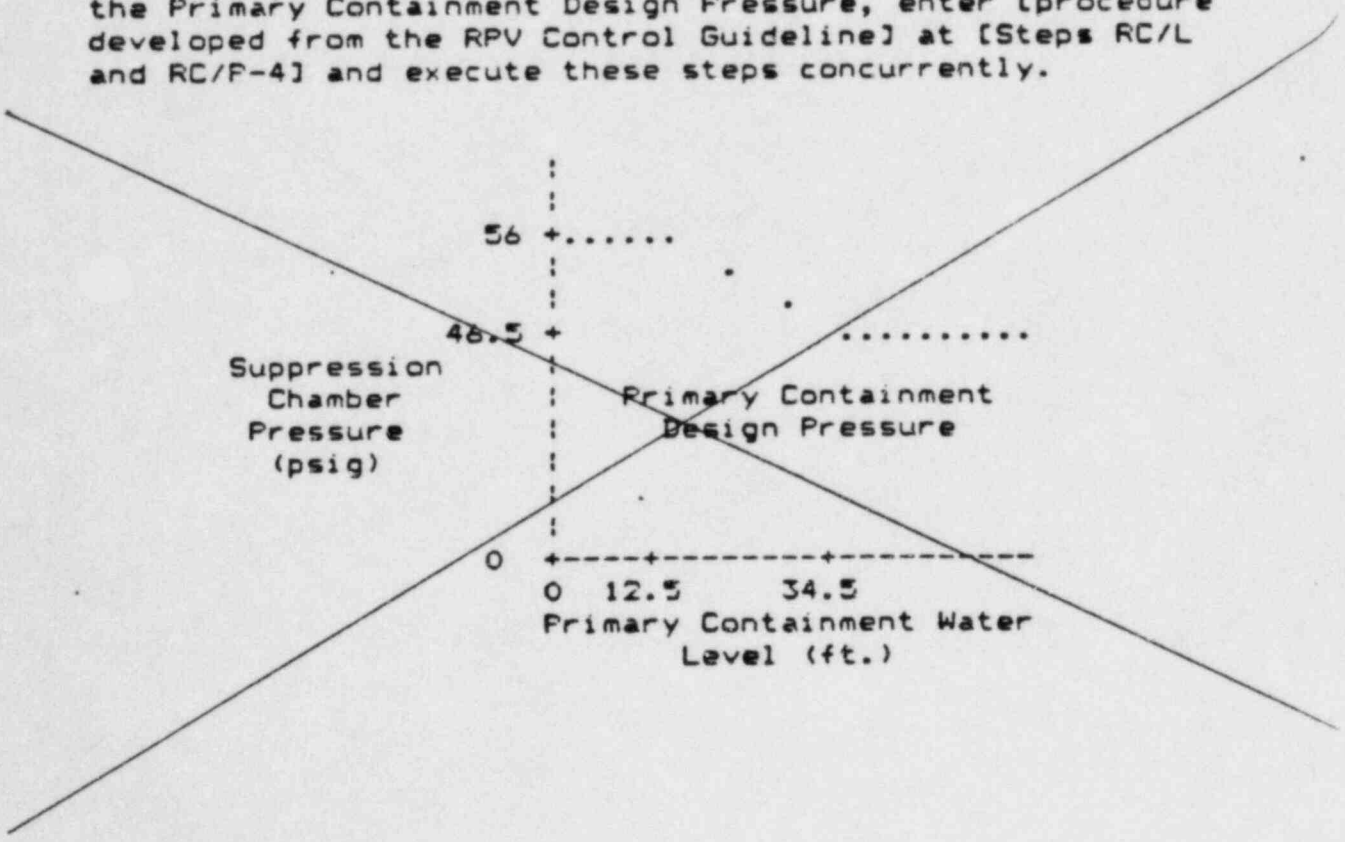
If while executing the following steps, RPV water level can be determined, continue in this procedure at [Step C6-6].

C6-5.2 If it can be determined that the RPV is filled or if RPV pressure is at least [~~77~~ 65 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]. See Attached



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.



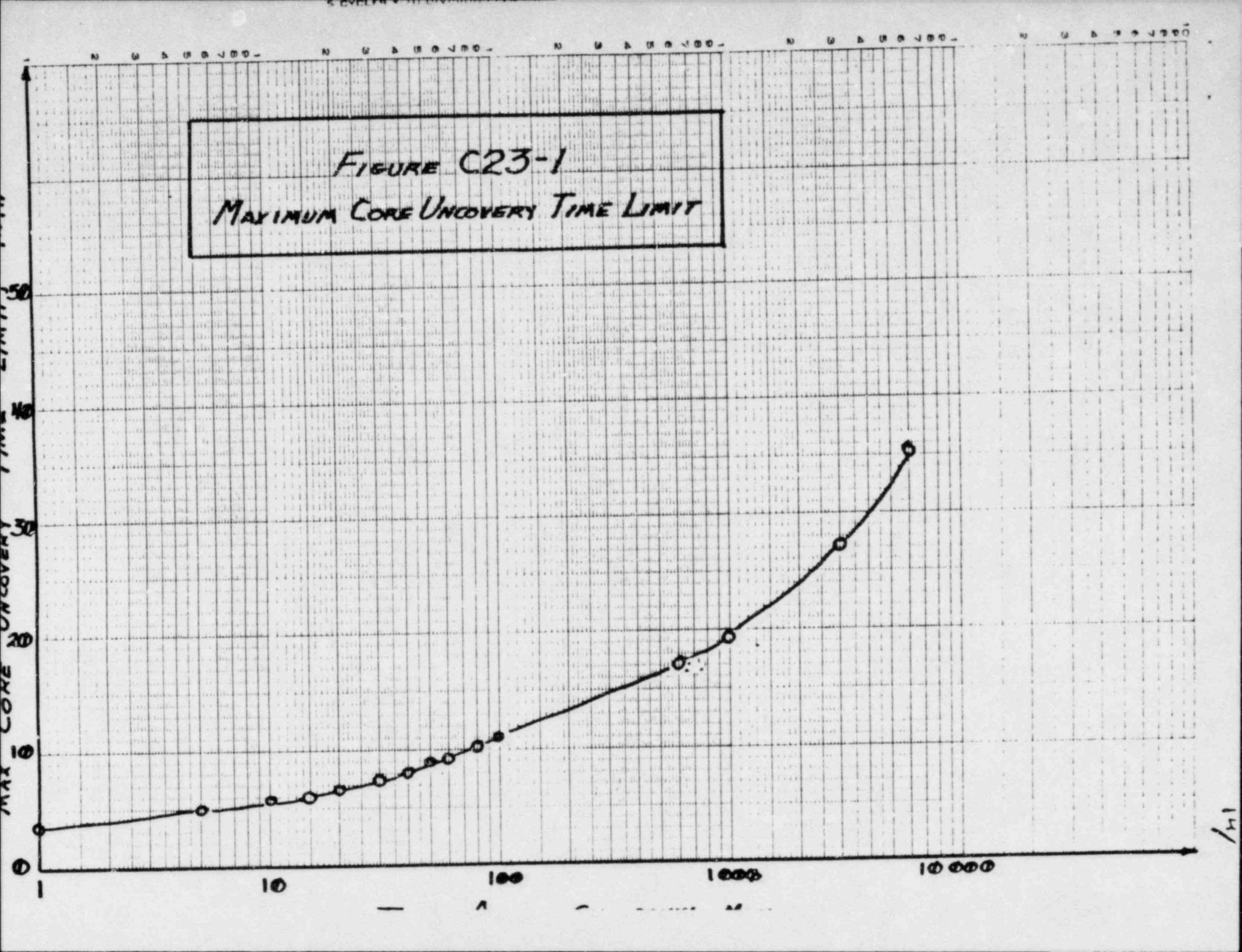


FIGURE C23-1
MAXIMUM CORE UNCOVERY TIME LIMIT
MAX CORE UNCOVERY TIME LIMIT
0
10
20
30
40
50
1
10
100
1000
10000

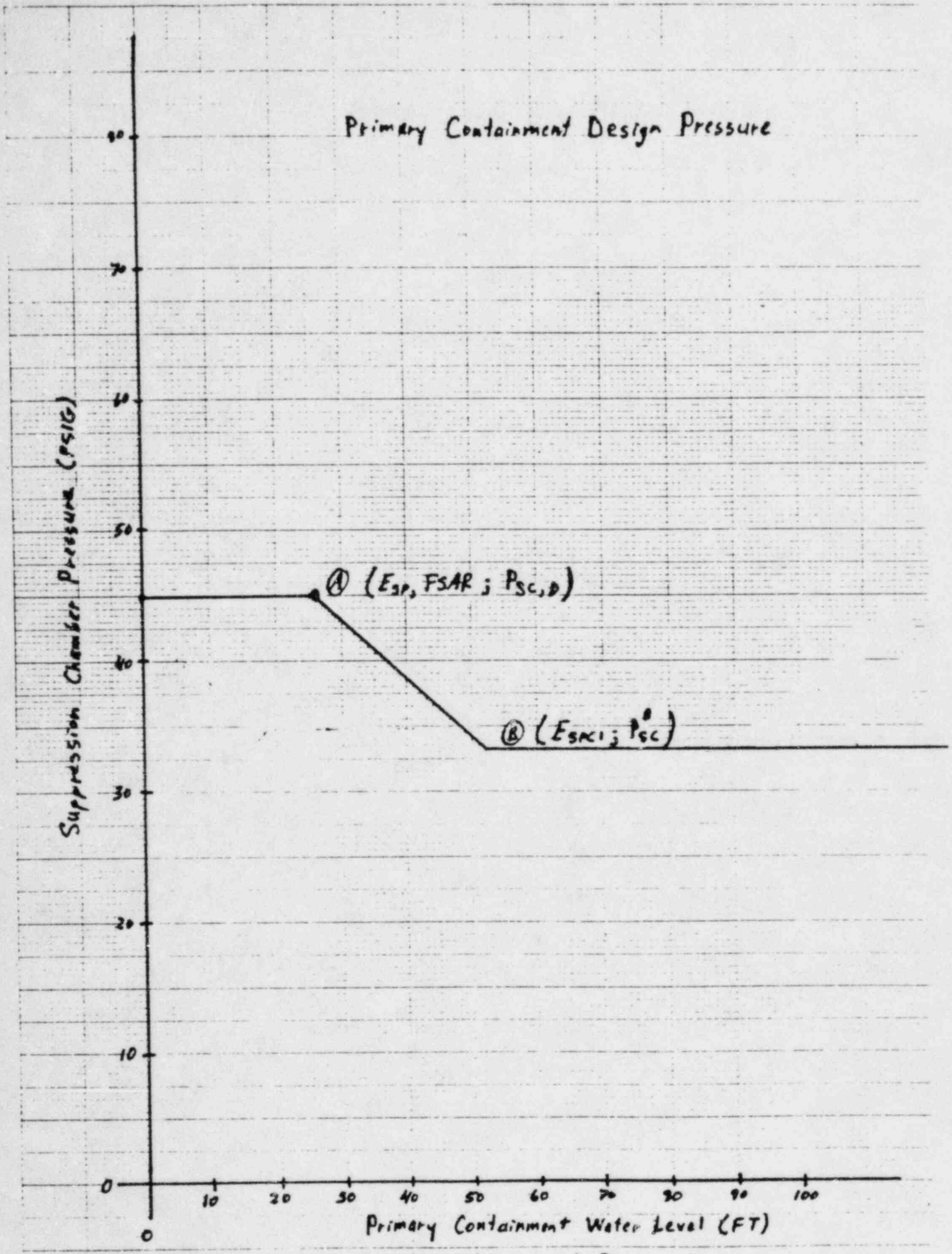


Figure 7. Primary Containment Design Pressure

CONTINGENCY #7
LEVEL/POWER CONTROL

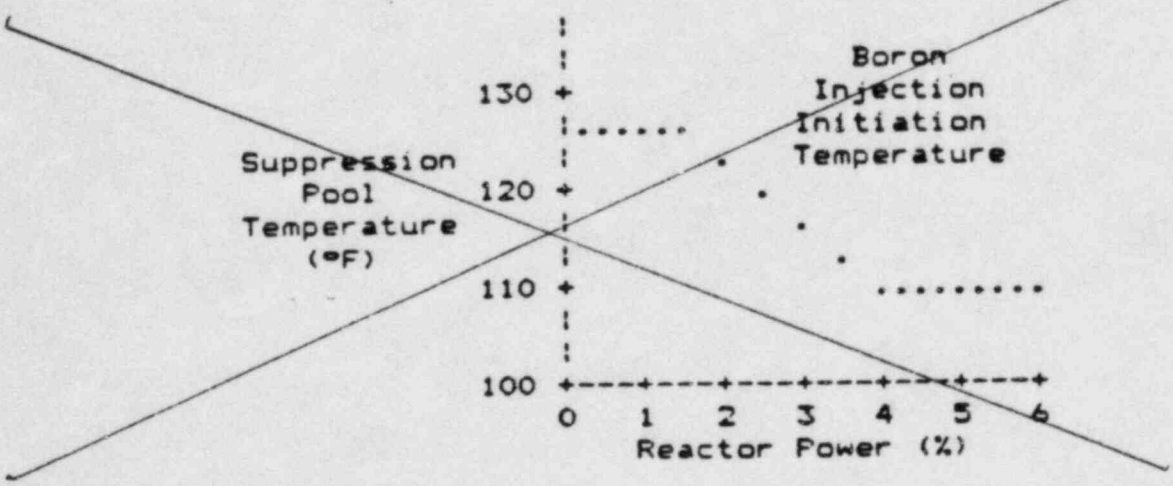
If while executing the following steps:

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

X

C7-1 If:

- Reactor power is above [~~3~~ 5% (APRM downscale trip)] or cannot be determined, and
- Suppression pool temperature is above [the Boron Injection Initiation Temperature] ~~110°F~~, and



K

- Either an SRV is open or opens or drywell pressure is above [~~2.0~~ 1.69 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~~ 5% (APRM downscale trip)], or
- RPV water level reaches [~~-164~~ -140 in. (Flow Stagnation Water Level)], or Y
- All SRVs remain closed and drywell pressure remains below [~~2.0~~ 1.68 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~~ 5% (APRM downscale trip)] or cannot be determined, and
- RPV water level is above [~~-164~~ -140 in. (Flow Stagnation Water Level)], and Y
- Suppression pool temperature is above [the 110°F Boron Injection Initiation Temperature], and K
- Either an SRV is open or opens or drywell pressure is above [~~2.0~~ 1.68 psig (high drywell pressure scram setpoint)],

return to [Step C7-1].

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

- If RPV water level was deliberately lowered in [Step C7-1], at the level to which it was lowered, or
- If RPV water level was not deliberately lowered in [Step C7-1], between [+~~12~~ 13 in. (low level scram setpoint)] and [+~~58~~ 53 in. (high level trip setpoint)],

with the following systems:

- Condensate/feedwater system [~~1110~~ 1076 - 0 psig (RPV pressure range for system operation)]
- CRD system [~~1110~~ 1076 - 0 psig (RPV pressure range for system operation)]
- RCIC system [~~1110~~ 1076 - ~~50~~ 57 psig (RPV pressure range for system operation)] ! #12 !

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

[o LPCI system [~~250~~ 260 - 0 psig (RPV pressure range for [system operation)]]

If RPV water level cannot be so maintained, maintain RPV water level above [-~~164~~ 161 in. (top of active fuel)] with these systems.

Z

If RPV water level cannot be maintained above [-~~164~~ 161 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] 180
[6	135] 218
[5	165] 262
[4	210] 330
[3	280] 440
[2	430] 665
[1	870] 1462.96

U

If less than [~~1~~ 2 (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~~ 161 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~~ -121 in. (top of active fuel)], commence and slowly increase injection into the RPV with the following systems to restore and maintain RPV water level above [~~-164~~ -121 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~~ 1695 gal (Hot Shutdown Boron ~~Weight~~ Volume)] of boron have been injected or all control rods are inserted to or beyond position [06 (maximum subcritical banked withdrawal position)], restore and maintain RPV water level between [~~+12~~ +12.5 in. (low level scram setpoint)] and [~~+60~~ +53.5 in. (high level trip setpoint)]. J

If RPV water level cannot be restored and maintained above [~~+12~~ +12.5 in. (low level scram setpoint)], maintain RPV water level above [~~-164~~ -121 in. (top of active fuel)].

If RPV water level cannot be maintained above [~~-164~~ -121 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]. AA

(2)

WRITER'S GUIDE FOR LASALLE GENERAL ABNORMAL (LGA) SYMPTOM-BASED EMERGENCY PROCEDURES

COMMONWEALTH EDISON COMPANY

LASALLE COUNTY STATION

SEPTEMBER 19, 1984

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Table 1 - LGA Acronym List

Table 2 - Action Verb List

Section 1 INTRODUCTION

1.1 PURPOSE

The purpose of this procedure is to provide administrative and technical guidance on the preparation of LGA's.

1.2 SCOPE.

This procedure applies to the writing of all of LaSalle's symptom-based emergency procedures, LGA's.

Section 2 EOP DESIGNATION AND NUMBERING

2.1 Procedure Designation

Designation of the emergency procedures will be LGA - LaSalle General Abnormal.

2.2 Procedure Numbering

- The emergency procedure numbering system is divided into two components - the procedure designator, LGA, and a serialized two digit number which identifies the LGA.

  Example: LGA-01

- Tables that are part of the LGA's shall be labeled with the appropriate LGA number followed by "T" for table and a serialized one digit number.

  Example: LGA-T1 or LGA-04-T1

Section 3 FORMAT

B.1 LGA SECTIONS

Each LGA shall be divided into four sections -

A. PURPOSE - defines briefly the basic purpose for the procedure.

B. ENTRY CONDITIONS - lists the entry conditions for the procedure.

C. OPERATOR ACTIONS - the body of the procedure.

D. REFERENCES - lists procedural references from the LGA's.

3.2 PROCEDURE HEADING AND PAGE IDENTIFICATION

Each page of the LGA's will be identified by the procedure number, the revision number, the revision date, and the page number. The pages will be numbered sequentially with the word "final" on the last page.

3.3 INSTRUCTION STEP NUMBERING

o Instruction steps will be numbered and identified as follows:

A.

1.

a.

(1)

(a)

o When an instructional step that is a subordinate step appears on a different page than the governing step, the complete number shall be used at the start of the page. For example - step a. of the second step in Section A appears on a different page than step A.1.a. If this step heads the page, it shall be labelled step A.2.a instead of just a.

3.4 PAGE FORMAT

o Margins shall be at least 1 1/4" on the binding side and 1/2" on the other side.

o. See the example below for proper alignment. Space 4 times after "If" and 2 spaces after "Then".

C. OPERATOR ACTIONS

1. If X (start typing here)
Then X

a.

(1)

(a)

3.5 TYPE SIZE

Use pitch 10 type size so that the procedure is readable under low light conditions.

Section 4 WRITING LGA's

4.1 WRITER'S INTRODUCTION

The LGA procedures exist as an aid to the operator to provide accurate, usable direction to his actions so that he may best cope with degraded conditions that have potential to threaten the plant and the public. The LGA writer must keep this in mind whenever the LGA's are being drafted or revised. The LGA's are a tool for the operator and as such they must be usable by the operator. Of course technical content is extremely important; but exactitude in the technical content of a procedure is of little value if

it is not written in a manner that can be understood and followed by an operator during accident conditions. The LGA writer is tasked with turning a technical document (ie - Emergency Procedure Guidelines) into a functional operator's tool. To accomplish this goal he must approach this translation task from the operator's viewpoint. The writer has to ensure that the intent of the Technical Guideline is maintained, while at the same time the "usability" of the procedure is maximized.

The guidance provided by this procedure will help maintain the clarity and consistency of the LGA's. The rules set forth here are generally applicable throughout the procedure; however, there may be exceptions. If careful analysis reveals that a particular principle may not be the best rule to use for a certain circumstance, then that rule may be violated. Even though a rule may be bent to fit a special situation, it will only be intentionally violated when it promotes the overall effectiveness of the procedure.

The major task for the LGA writer is not to produce a product with absolute engineering perfection; it is not to blindly follow the writing guidance contained in this guideline; but his task is to produce a procedure that can and will be used by the operator whenever the levels of plant safety are degraded.

4.2 RELATIONSHIP OF LGA's TO OTHER PROCEDURES

During normal large scale plant evolutions the plant's operation is governed by the LGP's. More detailed, system-specific instructions for operation are provided by the LOP's. Alarm information is provided by the annunciator LOA's. Instructions for testing equipment is provided by the LOS's. Abnormal operating instructions for specific events are provided in the LOA's. All of these operating procedures are used in conjunction with the others; sometimes more emphasis is placed on one type of procedure than another; other times a certain type of procedure may not even apply. The crux of the matter is that all of these operating procedures have the normal function of guiding the operation of the plant safely within the bounds of the license. Whenever conditions degrade to the point where the safety of the plant is diminished, entry into another type of procedure, the LGA, is required. The LGA entry conditions do not necessarily indicate that an emergency exists but are degraded parameters which may lead to an emergency. When an LGA is entered, it will be the governing procedure. The operator will follow the directions given by the LGA. He will be using the other station procedures to support the LGA direction. For example, the operator will still be responding to annunciators and the LOA annunciator procedures. He may be following instructions from an LGP or LOA, yet he will still be in the LGA. When the LGA's are exited, the operator will return to the normal operating procedures or to special operating instructions written for recovery.

4.3 INSTRUCTIONAL STEP LENGTH AND CONTENT

Instruction steps will be concise and precise. Conciseness denotes brevity; preciseness means exactly defined. Thus, instructions should be short and exact. This is easily stated, but not so easily achieved. General rules to be used to meet these objectives are as follows:

- Instructional steps should deal with only one idea.

- Short, simple sentences should be used.

- Complex evolutions should be broken down into a series of simpler steps

- The action the operator takes should be clear.

- Expected results of routine tasks should not be stated.

- Operator actions should be related to observable plant parameters. When possible, avoid using time as a key to operator actions.

- Give the operator enough information to accomplish the task but don't give him too much information to read. Don't clutter the procedure up with too much verbiage. There will be times when identical series of steps will be repeated. Inclusion of these same steps at every point in the procedure would make the procedure harder to follow. In these cases, the procedure will work better if the repeated steps appear at the back of the procedure book clearly identified with a tab. Whenever a conditional statement calls for taking the action, the operator will go to the tabbed section. When he has taken the required action, he will return to the procedure from which he came.

- When a list of items requires actions to be taken in a specified order, use the words "in the following order" or similar terms to identify the necessity of sequencing. Otherwise a listing would infer no specified order is required and leave the sequence up to the operator's judgement.

4.4 IF/THEN LOGIC

- Whenever a condition appears in the procedure that will require prescribed operator action, the If/Then logic style should be used if it will make the procedure more clear.

- The words "If" or "When" will normally precede the conditional statement. The word "Then" will precede the action statement.

- If, Then, and When shall be underlined when they are used to begin conditional logic statements.

- The LGA's shall be written so that the If/Then logic is used consistently. The procedure shall be constructed so that the operator will take the correct actions if he enters the procedure at the proper point and follows the logic given the following guidelines --

  "IF"- The operator reads the condition which follows. If the condition applies, he takes the action which follows in the related "Then" statement and goes on to the next procedural step. If the condition does not apply, he does not have to even look at the "Then" statement, but continues on to the next procedural step.

"Then" - The action statement which follows the "Then" will be taken by the operator if the condition (the "If" statement or the "When" statement) applies to the plant condition. If the conditional statement does not apply, the operator does not even have to read the action statement, but goes on to the next procedural step. Even if the condition does apply and the operator is performing or trying to perform the prescribed action, he should look ahead to see if the ensuing conditions apply.

"When" - The "When" statement is a special kind of "If" statement. "When" does the same thing as "If" except it infers that the step may apply at a later time. "When" emphasizes that the operator should be looking for the associated condition and that the condition is likely to occur at a later time. When the associated condition does occur, the operator should take the action specified by the "Then" statement. The "If" statement technically does the same thing, "When" is used for emphasis. Care should be taken not to overuse "When" to preserve its emphatic value.

- The "If/Then" logic takes the operator from the entry conditions through the procedure until he exits the procedure or the "If" statements no longer apply. Generally, the further the operator gets into the procedure, the more degraded the conditions are; hence the actions become more drastic. As the operator gets deeper into the procedure, he should not ignore the previous steps; he should still be taking actions those steps required. The operator should periodically go back through the previous "If" statements and ensure that if they apply, that he is taking the required actions. Conversely, the operator should not get stuck on an early step. He should look ahead in the procedure for conditions that might require more drastic actions.

- Whenever practical, the "Then" statement should appear on the same page as the "If" statement.

4.5 CAUTIONS AND NOTES

- Step specific cautions should precede the steps to which they apply.

- Procedure specific cautions should precede the procedures to which they apply.

- General Precautions should be included be included in a table at the front of the procedure. The General Precautions should be stressed during training.

- Notes should precede the steps to which they apply.

- CAUTIONS and NOTES shall be emphasized. The heading shall be all caps and centered over the statement. The heading shall be underlined. The cautionary statement or note shall be conventionally typed using both upper and lower case letters to make it easier to read. The entire note or caution shall be enclosed by a box. See the example below:

> CAUTION
>
> Cooldown rates above 100°F/hr may be required to accomplish this step.

- CAUTIONS and NOTES should not contain action steps. They should be informational or warning devises only. In rare cases a CAUTION or NOTE may have to contain an action or inferred action. This shall only be done after a very careful assessment of alternatives.

- CAUTIONS and NOTES shall not be overused. If too many CAUTIONS or NOTES are used the importance of the message may be diluted. Cautions may be minimized through training or by writing the information into the procedural step itself.

- CAUTIONS and NOTES should appear in their entirity on a single page. Do not split CAUTIONS and NOTES between pages.

- The step to which a step specific caution applies should appear on the same page as the caution.

4.6 GRAPHS, TABLES and ATTACHMENTS

- Graphs, Tables, and Attachments should be easy to read and easy to use by the operators.

- Units should be the same as those in the Control Room.

- Graphs, Tables, and Attachments shall be labeled clearly. Graphs shall have a noun name and sequential number. For example, LGA-03-G2, RPV Saturation Limit is the title of the second graph in LGA-03 and it defines the RPV Saturation Limit.

- The use of graphs shall be minimized. When a single value can be used, it is better than using a graph.

- Graphs will normally appear on the face adjacent page to where it is referenced in the text of the procedure. An exception may occur if an Overriding Instruction applies to the same page that references a graph. When an Overriding Instruction appears on the face adjacent page, the graph will be included on a foldout page.

- Where possible use a full page for the graphs.

- The maximum number of divisions per inch for the axes of graphs should be 10.

- All numbers on the graphs should be at least 4 mm high.

- All axes of the graphs shall be clearly labeled and include the units of measure.

4.7 USE OF UNDERLINING

- Underlining will be used for special emphasis.

- The headings for "NOTE" and "CAUTION" shall be underlined.

- Underlining shall be used to emphasize negatives.

- Underlining shall be used to emphasize the logic terms, "If", "Then", and "When".

- Underlining may be used to emphasize connectors such as and or or when it will increase effectiveness.

- Underlining may be used to emphasize other words in the procedure; however, the use of underlining should be limited so that the emphatic value is maintained.

4.8 REFERENCING AND BRANCHING TO OTHER PROCEDURES OR STEPS

When the term "referencing" is used in connection with another procedure, it implies that the referenced procedure will be used as a supplement to the procedure presently being used.

- Referencing other sections, pages, or steps within other procedures can result in error.

- Excessive forward and backward referencing within the same procedure can be confusing and can lead to skipping of steps, particularly since the referenced steps may not return the operator to the directing step. Also, important information preceding a referenced step can be missed.

- If operators are required to use many procedures at the same time, there is a possibility that the referenced information may not be obtained and used or the exit point from the original procedure might be forgotten. Important steps might be missed and operator delay might result.

When the term "branching" is used in connection with another procedure, it signifies that the procedure being used is to be exited and the new procedure is to be used in its entirety. Branching is an acceptable method of entering another procedure and eliminates most of the problems associated with referencing.

In determining whether to reference another part of the procedure for instructions or to repeat the instructions within the procedure, consider the following factors:

- If the referenced instructions can be repeated without greatly increasing the length of the procedure, repeat them.

- Tabbing referenced sections too long to repeat would assist the operator in locating the information quickly.

- If the procedure splits into two or more optional paths, references to other steps may be unaviodable.

- When multiple paths are taken from a single step, a matrix can be made that refers the operator to a procedure step tabbed with the same color as the matrix box.

Two types of procedure referencing are used in the LGA's.

- One type of procedure referencing requires the operator to get out the referenced procedure, observe the precautions and limitations in the procedure, and to follow it step by step. When it is required that the operator follow the procedure this closely, he will be directed to take the action "in accordance with" the referenced procedure. An example of this kind of reference would be --

  If Drywell Pressure exceeds 45 psig

  AND

  Containment Radiation levels indicate 10CFR100 limits will not be exceeded

  Then VENT the Drywell through valve 1(2)VQ035, Drywell Vent/Purge Outlet Downstream Isolation to SBGTS in accordance with LOA-VP-03, Emergency Primary Containment Pressure Relief.

  In this case, if the conditional statements were satisfied, the operator would go to LOA-VP-03, follow the procedure through (even though he is still in the LGA) until he has vented the drywell in accordance with LOA-VP-03, then he would return to the LGA from which he came and find the correct steps to take next.

- The other type of procedure referencing is just that - a reference. It is an aid to the operator giving him a reference for more detailed information on the task. This type of referencing is done by placing the referenced procedure in parentheses. For example --

  When the RHR Shutdown Cooling interlocks clear

  Then INITIATE the Shutdown Cooling mode of RHR (LOP-RH-07)

4.9 COMPONENT IDENTIFICATION

- Components identified in the LGA's shall be identified by common usage terms. The components shall be identified in the "language of the operator." When confusion may be a problem, use the nameplate terminology on the control room labels.

- Acronyms may be used in the LGA's but only when they are universally understood by the operators. A list of acronyms used in the LGA's shall be included in Table 1 of the LGA Writer's Guide. The Training Department shall be provided a copy of the Table 1 whenever the list is revised.

4.10 UNITS OF MEASURE

- Quantitative values should be stated within the range and accuracy of the instruments. An exception to this rule can be made when the common usage term does not fall within the accuracy of the instrumentation. An example of an exception would be the Tech Spec value for high drywel pressure, 1.69 psig. 1.69 psig is the setpoint the operators are trained on and is the common usage term for the high drywell pressure scram and isolation setpoint.

4.11 CONCURRENT ACTIONS / OVERRIDING INSTRUCTIONS

- There may be events which will require the operators to be in more than one LGA at the same time. Care must be taken to write the procedures such that the concurrent operator actions will not conflict.

- There may (or may not) be instances where the operator continues past a conditional statement to subsequent procedural steps only to have the previous condition satisfied. When it is very important that the operator return immediately to the previous step (ie - continuing with the later step may worsen the condition) and relying on the operator's memory or training is not feasible, then an "Overriding Instruction" is required. Overriding instructions shall appear on the face adjacent page to where it might apply. The Overriding Instruction acts as a reminder to the operator that he needs to maintain awareness of the conditional statement in the instruction.

4.12 CONNECTORS (AND, OR) LISTS

- When a step contains more than three objects of an action, list them rather than imbedding them in a sentence.

- When three or more conditions are associated with an action, list them separately ahead of the action statement.

- When it is very important to connect two statements it may be best to separate the two statements vertically with AND emphasized by capitals and underlining. For Example --

  If the Suppression Pool water level can not be maintained below 26' 10" (+3")

  AND

  adequate core cooling is assured

  Then TERMINATE injection into the reactor

- When "ands" and "ors" are mixed, care must be taken to ensure that the proper combinations are understood. Use of "ands" and "ors" is easiest to demonstrate by example. Assume there are three items A,B, and C. If we either wanted "A" or else both "B" and "C" it should be written:

  "A"
  OR
  "B" AND "C"

  If we wanted "A" and also wanted either "B" or "C" it should be written:

  "A"
  AND
  "B" OR "C"

4.13 CHECKOFF BLANKS

- Checkoff blanks shall be provided in the left hand margin adjacent to conditional statements were a check might help keep track of where the operator has been in the procedure. These checkoff blanks are not mandatory for the operator to complete, but are there for convenience if he thinks they will keep him on track.

4.14 CAPITALIZATION

- Conventional rules for capitalization shall be used except when special emphasis is warranted.
- Control Room indicator nameplate references shall be capitalized.
- Action verbs shall be capitalized.
- Acronyms shall be capitalized.
- Words with a special meaning may be capitalized. An example would be NORMAL INJECTION SYSTEM.
- Headings for procedure sections shall be capitalized.
- Headings for CAUTIONs and NOTEs shall be capitalized but the body shall use conventional upper and lower case letters.
- Connectors that are used to vertically separate items shall be capitalized.

4.15 UNIT DESIGNATION

Because of the identical nature of the two units at LaSalle, the procedures shall be written to provide guidance for both units.

- When equipment is identified by EPN, the unit one number shall be listed first followed by the unit two number in parentheses. For example --

  "CLOSE the RWCU isolation valves 1G33-F001(2G33-F001) and 1G33-F004(2G33-F004)."

- o Whenever an operational difference between Units 1 and 2 affects the emergency procedure, that difference shall be clearly addressed in the LGA. That difference shall be brought to the attention of the Training Supervisor for inclusion in the LGA training.

4.16 USE OF VERBS

- o Verbs shall be used consistently throughout the LGA's.
- o REFER to TABLE 2, Action Verb List, for definitions of commonly used verbs.
- o If a verb is used in the LGA procedure that takes on a special meaning, it should be included in TABLE 2.

TABLE 1

LGA Acronym List

ADS - Automatic Depressurization System

CRD - Control Rod Drive

CY - Cycled Condensate

ECCS - Emergency Core Cooling Sytem

FW - Feedwater

GSEP - Generating Stations Emergency Plan

HPCS - High Pressure Core Spray

LGA - LaSalle General Abnormal

LGP - LaSalle General Procedure

LOA - LaSalle Operating Abnormal

LPCI - Low Pressure Coolant Injection

LPCS - Low Pressure Core Spray

MSIV - Main Steam Isolation Valve

RCIC - Reactor Core Isolation Cooling

RHR - Residual Heat Removal

RPV - Reactor Pressure Vessel

RWCU - Reactor Water Cleanup

SBGT - Standby Gas Treatment

SBLC - Standby Liquid Control

SRV - Safety Relief Valve

T.A.F. - Top of Active Fuel

TABLE 2

Action Verb List

Approach - to continue on a trend such that a limit will be exceeded if more action is not taken to dampen the trend.

Avoid - to take action to prevent something from occurring.

Assure - to make certain.

Check - to confirm that the desired condition or indication does exist

Change - to shift from one condition to another.

Close - to change the physical position of a mechanical device to the CLOSE position so that it prevents fluid flow or permits passage of electrical current.

Continue - to maintain without interruption

Control - to regulate conditions such that a given parameter is maintained.

Cooldown - to remove heat

Decrease - DO NOT use the word "decrease". It may become confused with "increase". "Reduce" is a better word to use.

Defeat - Prevent a specified action from occurring.

Determine - to obtain definite first hand knowledge

Depress - to push in an inward direction

Depressurize - to reduce pressure

Divert - to change from one path to another.

Enter - Go to the referenced procedure. Follow the applicable steps of the reference procedure.

Evacuate - to remove persons from a given area.

Exceed - to surpass a given point.

Exit - Leave this procedure. Go to referenced procedure.

Increase - to make greater.

Initiate - to start actions to achieve a given end.

Isolate - to position a mechanical device to a position that will stop flow from one place to another.

Maintain - to keep in existing state.

Monitor - to repeatedly check item of interest. Them item should be checked often enough to notice significant changes.

Notify - to ensure that another person receives given information.

Occur - to take place.

Open - to change the physical position of a mechanical device to an unobstructive position that permits access or flow, or prevents passage of electrical current.

Operate - to perform a manipulation or a series of manipulations such that a desired end is achieved.

Perform - to carry out a prescribed action.

Prevent - to take action to ensure that a given condition will not occur.

Proceed - to go on to a desired state.

Raise - to increase a parameter.

Reach - to achieve a given level or magnitude.

Reduce - to make smaller or decrease.

Refer - to look to another source for guidance to accomplish a particular task.

Restart - to reenergize a piece of equipment.

Restore - to put back into original state.

Return - to go back to a given point

Reverse - to change direction

Scram - to rapidly insert all control rods simultaneously.

Shutdown - to Stop, to deenergize a piece of equipment.

Stabilize - to hold steady

Start - to energize a piece of equipment.

Terminate - to stop a function.

Transfer - to switch from one place to another

Trip - to activate a semi-automatic feature which will take a component out of its operating status.

Vent - to permit a gas or a liquid confined under pressure to escape the confining volume.

Verify - to check to ensure that the status of equipment/parameters is as indicated. If not, make it so.

(3)

VALIDATION DESCRIPTION FOR LASALLE GENERAL ABNORMAL (LGA) SYMPTOM-BASED EMERGENCY PROCEDURES

COMMONWEALTH EDISON COMPANY

LASALLE COUNTY STATION

SEPTEMBER 15, 1985

DOCUMENT ID 0554r/0008r

LGA VALIDATION PROGRAM

A. PURPOSE

The purpose of the Emergency Operating Procedure Validation Program is to outline the method used for determining that the actions specified in the LGA's can be followed by Control Room Operators to manage emergency conditions in the plant.

B. REFERENCES

1. None.

C. PREREQUISITES

1. None.

D. PRECAUTIONS

1. None.

E. LIMITATIONS AND ACTIONS

1. None.

F. PROCEDURE

1. Walk down the procedures at the plant to assure that the equipment which is referenced is physically installed and usable as described in the procedures.

    a. Equipment Piece Numbers are accurate and visible on the equipment as shown in the procedures.

    b. Tools/Equipment which are required can be physically transported to necessary areas.

    c. Equipment is accessible when required.

2. Walkdown the procedures using Shift Supervisors and NSO's at the BWR Simulator to assure understanding and usability of the procedures as written.

3. Comments accumulated from the walk-downs will be reviewed and incorporated in the procedures as deemed necessary.

4. Comments from operator training course are evaluated and incorporated as deemed necessary.

G. CHECKLISTS

1. None.

H. TECHNICAL SPECIFICATION REFERENCES

1. None.

(4)

VERIFICATION DESCRIPTION FOR LASALLE GENERAL ABNORMAL (LGA) SYMPTOM-BASED EMERGENCY PROCEDURES

COMMONWEALTH EDISON COMPANY

LASALLE COUNTY STATION

SEPTEMBER 15, 1984

LGA VERIFICATION

PURPOSE

Assure that the new/revised LGA meets the guidelines established by the BWR Owners Group and that the revisions to the source documents have been properly reflected in the LGA's.

REFERENCES

BOP Writers Guidelines
BOP Technical Guidelines
BOP Verification Guidelines; INPO-83-004

LIMITATIONS AND ACTIONS

A Biannual review of the LGA's will be conducted to assure that any changes in the source documents, Plant Systems, etc, are reflected in the calculations and the procedures.

Any changes to the LGA's are not to affect the intent of the LGA's

Verifiers will be chosen based on familiarity of the LGA's as well as general plant knowledge. Licensed individuals are preferrable.

PRECAUTIONS

Changes to equipment, operating limits, experience data, etc. could affect calculations and/or validity of the procedures.

PROCEDURE

1. Obtain copies of the reference documents used in preparing/revising the particular Emergency Operating Procedure (LGA).

2. Review the reference documents to assure the most recent revisions were used.

   a. If the documents are not the latest revision or data is known to be outdated, inform the Office Supervisor and take necessary actions to up-date the documents.

   b. If more recent data could affect the calculations, have new calculations completed. Check the calculation summary page to assure they were computed and reviewed by two people.

   c. Calculations determining limiting parameters will be maintained in Central File. These calculations will be completed by one engineer and checked independently by a second engineer. This double check will be documented and maintained with the calculations.

3. Review the procedure for general written correctness, format, branching and general understandability as outlined in the LaSalle Writers Guidelines (LWG's).

4. Conduct a step-by-step review of the procedure to assure it meets the requirements of the LaSalle Writers and Technical Guidelines.

   a. Entry Conditions and symptoms.

   b. Proper component/instrument identification

   c. Quantitative units with tolerances which are obtainable on Control Room and plant instruments.

   d. Equipment required is available for use (Modifications have not eliminated)

   e. Calculations to be done by operators have proper equations provided.

   f. Deficiency sheets documenting deviations from guidelines are provided and are adequately resolved.

5. Sign and Date the Verification Completion Form and forward the procedure and verification package to the Procedure Manager for tracking.

6. The Procedure Manager records the procedure status and forwards to the Department Head.

7. The Department Head reviews the package to assure resolutions to discrepancies and required actions from the verification process have been completed. He signs and dates the Verification form and the On Site Review portion of LAP-820-2 and forwards to the next person on On Site Review.

8. When the Station Superintendent signs for Final Approval, he also signs the LGA Verification Approval.

LGA VERIFICATION

LGA NUMBER_____

REVISION_____

TITLE _____

Scope of Verification:

Reference Documents

Assigned Evaluator(s)

LVG STEP	DESCRIPTION	ACCEPTABLE DATE/INITIAL	DISCREPANCY SHEET #
2	Reference Document Review	_____	_____
3	Written Correctness		
	Legibility	_____	_____
	Format	_____	_____
	Identification	_____	_____

LGA VERIFICATION

LGA_____
PAGE of

Step by Step Review

Step Caution, or Note #	Written Correctness Acceptable Init/Date	Written Correctness Discrepancy Number	Written Correctness Resolved Date/Initial	Technical Correctness Acceptable Init/Date	Technical Correctness Discrepancy Number	Technical Correctness Resolved Date/Initial

LGA VERIFICATION

Required Actions: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Conducted By _____ / _____

_____ / _____

_____ / _____

NAMES DATE

Deficiances and Required Actions are adequately resolved and procedures are acceptable for use

_____ / _____

DEPARTMENT HEAD DATE

_____ / _____

SUPERINTENDENT DATE

(5)

TRAINING DESCRIPTION FOR LASALLE GENERAL ABNORMAL (LGA) SYMPTOM-BASED EMERGENCY PROCEDURES

COMMONWEALTH EDISON COMPANY

LASALLE COUNTY STATION

SEPTEMBER 15, 1984

Training Description for LaSalle General Abnormal
(LGA) Symptom-based Emergency Procedures -

FORWARD - The following text describes the training process LaSalle Station plans to use for implementing a revision to the LGA's. It is important to realize that symptom-based emergency procedures are not new to the LaSalle licensed operator; LaSalle was the first plant to implement emergency procedures based upon the symptom-oriented Emergency Procedure Guidelines published by the BWR Owners Group. During 1981, LaSalle licensed personnel and license candidates were given one week of concentrated training on the new, symptom-oriented emergency procedures (LGA's). LaSalle Unit 1 has been safely operated using the upgraded LGA's since the operating license was received in April of 1982. Unit 2 has been safely operated throughout the startup test program using the LGA's. LGA training was included in the License Requalification Program in both 1983 and 1984. The LaSalle licensed operator has already been trained on, and is using the symptom-oriented procedures mandated by NUREG 0737. The guidelines on which the LGA's were based have been revised to incorporate reactivity control, secondary containment control, and radioactive release control. Consequently, the LGA procedures are being revised to reflect these changes. Since the reactivity control changes increase the complexity of the procedures, a significant training effort is planned. The following text describes the training program which LaSalle plans to use to train licensed operators on the revised procedure. It should be noted that this training description is as we plan it in September 1984. There may be content or structure changes to the program if these changes will further our goal towards safe and practical operations of the LaSalle County Units 1 and 2.

INTRODUCTION

The revised LGA training will consist of a Classroom Training session and a Practical Training session. The two sessions together should provide the trainee with the information necessary to obtain the objectives. The training will be provided for RO and SRO licenseholders at LaSalle. The operating crew members shall receive the training before performing licensed shift duties under the revised procedures.

LGA LEARNER OBJECTIVES

State from memory the entry conditions for Level Control, Containment Control, and Reactivity Control.

Locate Control Room instrumentation that monitor parameters which are LGA entry conditions.

Determine when the LGA's may be exited to normal operating procedures.

Discuss the basic flowpath for Alternate Shutdown Cooling.

Given the graph, discuss the basic reasons for taking actions when any of the parameters reach limits defined by graphs in the LGA's.

Given the appropriate graph and appropriate plant parameters, determine whether limits defined by graphs in the LGA's are being approached or exceeded.

Define any acronyms used in the LGA's.

Discuss any instrumentation/procedure differences between U-1 and U-2 that impact upon the LGA's.

Discuss the alternate methods for shutting down the reactor.

Using the LGA's, simulate the operator's actions required to shutdown the reactor given a failure to scram.

Using the LGA's, simulate the operator's actions required to maintain adequate core cooiing given a postulated transient with coincident equipment failure.

Discuss each General Precaution outlined in LGA-T1.

Discuss selected Cautions using the LGA procedures.

Using the LGA's, simulate the operator's actions required to maintain primary or secondary contanment parameters within limits.

CLASSROOM TRAINING SESSION

Each licensed operator shall receive classroom training on the LGA's. This classroom training will be considered complete when the licensed operator scores 80% or above, on the written LGA examination. Additional training will be required if the trainee scores below 80% on the written examination. The test questions should reflect the intent of the LGA learner objectives.

The classroom training session should take approximately three days. A typical day would be comprised of four hours of lecture, two hours of discussion and two hours of self study. Two hours will be allotted on the final day of training for the LGA examination.

The student materials for the course shall include:

LGA Student Handout
LGA procedure available for reference
LGA Flowchart available for a graphic representation of procedural flowpath.

The LGA student handout will contain two major sections - an introductory section and a procedural step explanation section.

INTRODUCTION - Will include an overview of the revised procedural structure and a review of how to follow the LGA's. This introduction will encompass the following topics:

- General Procedure Layout
- Logic Terms
- Use of General Precautions

- Use of Step Specific Cautions
- Use of Procedure Specific Cautions
- Action Verbs
- Special Definitions
- Entry and Exit of the LGA's
- Use of Accompanying Support Procedures

PROCEDURAL STEP EXPLANATION - will cover each procedure and explain why operator actions are taken. This will be accomplished by dissecting the procedures into major subsections and explaining each evolution.

PRACTICAL TRAINING

Each licensed operator shall receive practical training on using the LGA's. The practical training will include a simulation of postulated transients which will require entry into each LGA. This training will normally be conducted on the LaSalle Simulator. Two 4-hour shifts will be scheduled for LGA simulator training for each license holder. Under special circumstances, an actual control room walkthrough may be substituted for the simulator training to fulfill the practical training requirement. This special substitution must be approved by the Training Supervisor before it will be allowed.

FEEDBACK LOOP

Each trainee shall be provided with a feedback form as a means of collecting input from the license holders not only on the course but on the procedures themselves. This feedback will be considered for changes to the lesson plans and appropriate comments will be forwarded to the Operating Department procedure writers.