WNP-2

EMERGENCY PROCEDURE GUIDELINES

FEBRUARY 1, 1983

INTRODUCTION

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

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

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

Brackets [ ] enclose plant unique setpoints, design limits pump shutoff pressures, etc., and parentheses ( ) within brackets indicate the source for the bracketed variable.

At various points throughout these guidelines, precautions are noted by the symbol [#]. The number within the box refers to a numbered "Caution" contained in the Operator Precautions section. These "Cautions" are brief and succinct red flags for the operator.

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 Technical Specifications. This is not to imply that operation beyond the Technical Specifications is recommended in an emergency. Rather, such operation may be required under certain degraded conditions in order to safely mitigate the consequences of those degraded conditions. The limits specified in the guidelines establish the boundaries within which continued safe operation of the plant can be assured. Therefore, conformance with the guidelines does not ensure strict conformance with a plant's Technical Specifications or other licensing bases.

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

TABLE I

ABBREVIATIONS

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

OPERATOR PRECAUTIONS

GENERAL

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

CAUTION #1

Monitor the general state of the plant. If an entry condition for an Emergency Procedure occurs, enter that procedure. When it is determined that an emergency no longer exists, return to normal plant operating procedures.

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

NOT APPLICABLE TO WNP-2

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

CAUTION #6

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

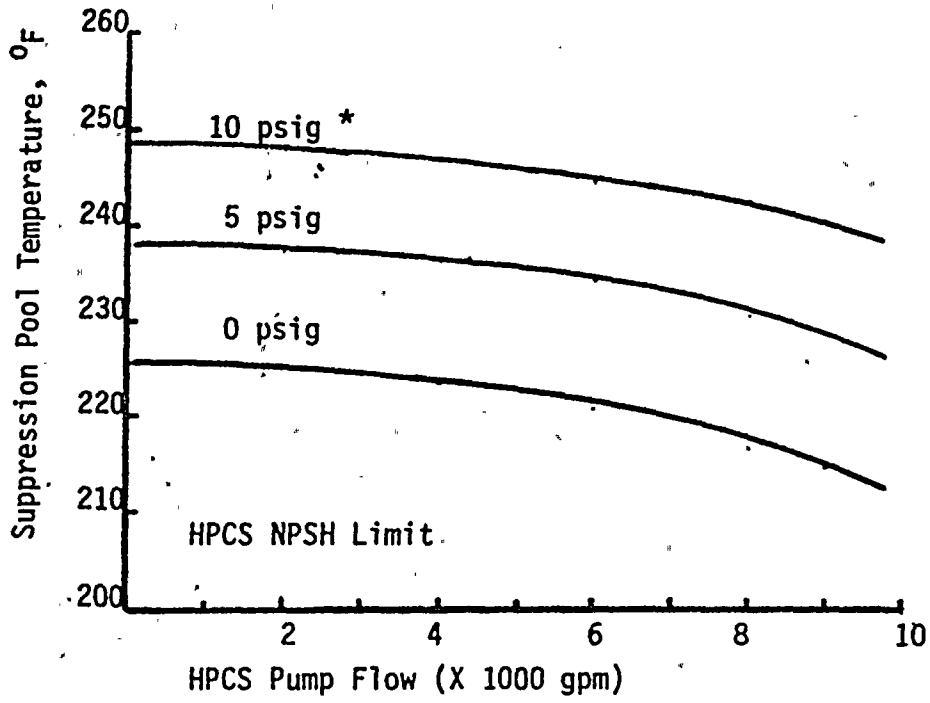
Temperature	Indicated Level	Instrument
any	197 in.	Shutdown Range Level (0 to 400 in.)
any	160 in	Upset Range Level (0 to 180 in.)

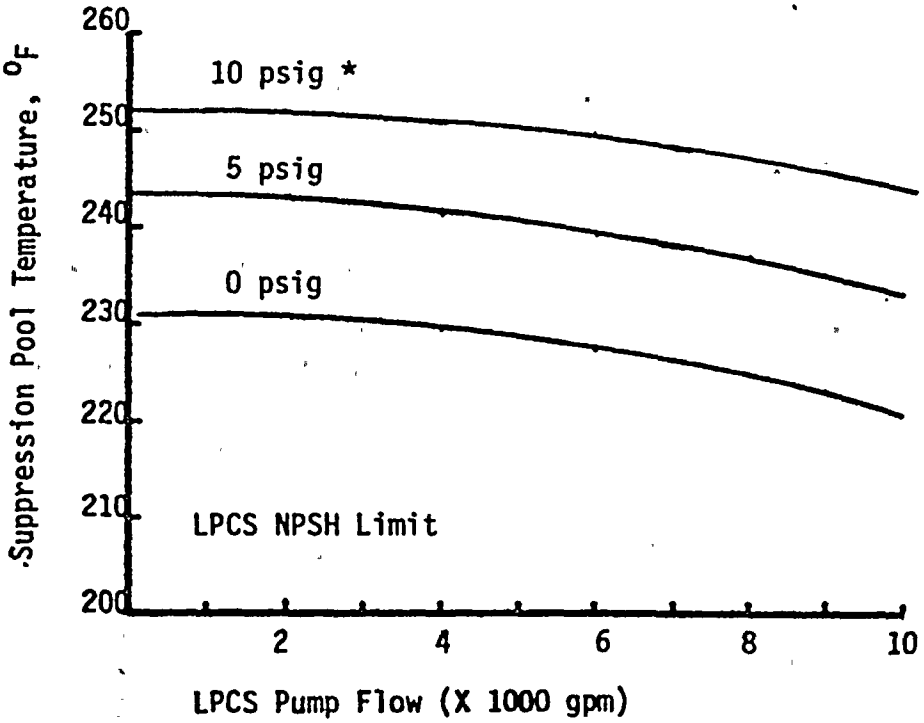
CAUTION #7

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

CAUTION 8

Observe NPSH requirements for pumps taking suction from the suppression ppol

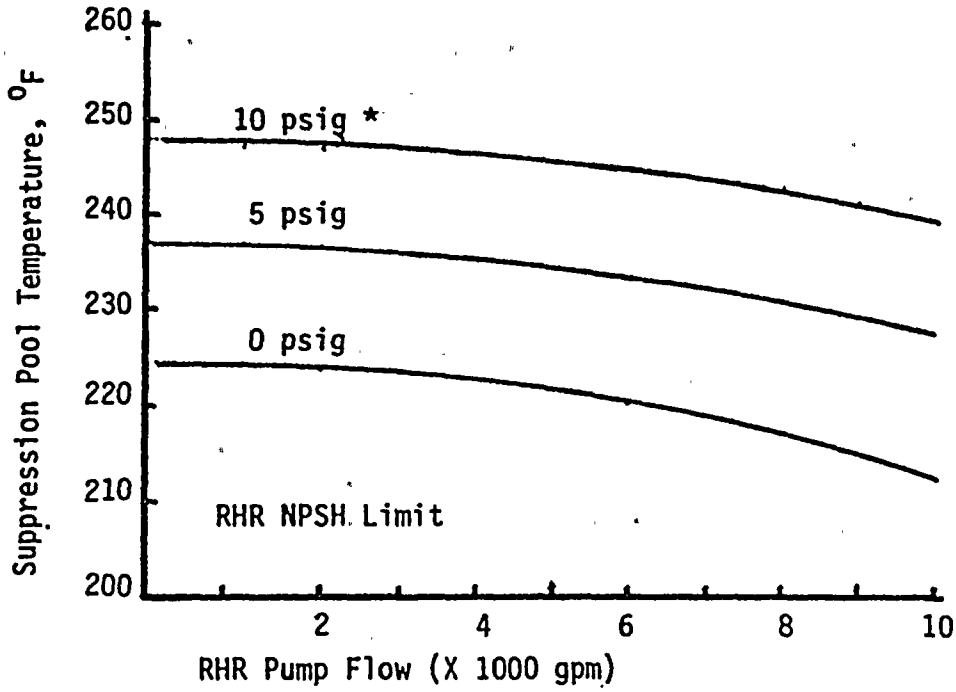


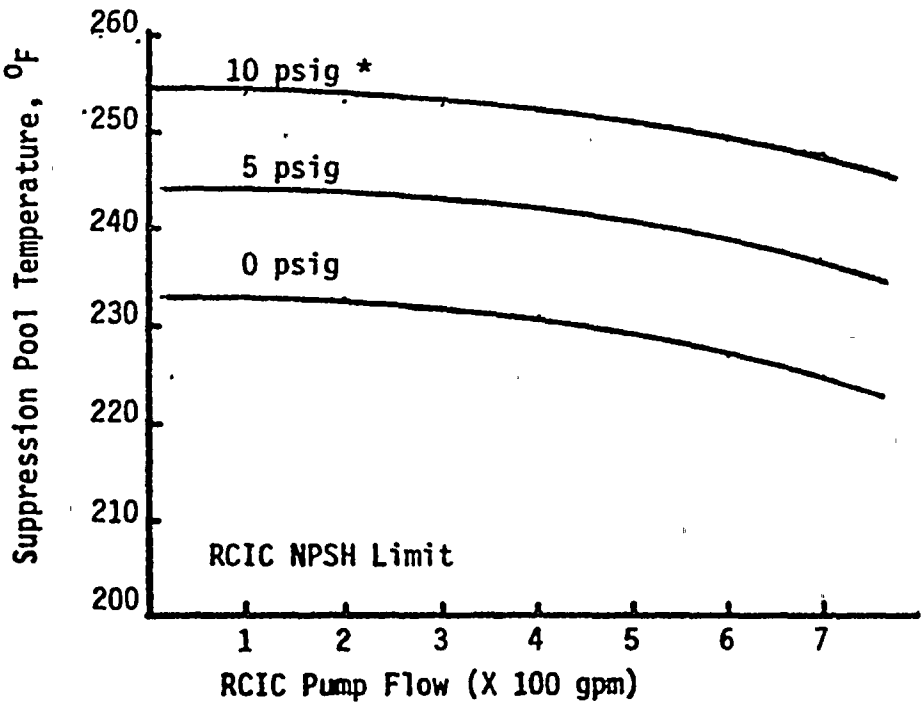


*Suppression chamber pressure with nornal pool water level (31')

CAUTION 8

Observe NPSH requirements for pumps taking suction from the suppression pool





*Suppression chamber pressure with normal pool water level (31')

CAUTION #9

If signals of high suppression pool water level [31' 7" (high level suction interlock)] or low condensate storage tank water level [LOW CST LEVEL HPCS/RCIC SUCTION SWITCH OVER alarms (low level suction interlock)] occur, confirm automatic transfer of or manually transfer HPCS and RCIC suction from the condensate storage tank to the suppression pool.

SPECIFIC

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

CAUTION #10

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

CAUTION #11

If a high drywell pressure ECCS initiation signal [1.69 psig (drywell pressure which intiates ECCS)] occurs or exists while depressurizing, prevent injection from those LPCS and LPCI pumps not required to assure adequate core cooling prior to reaching their maximum injection pressures. When the high drywell pressure ECCS initiation signal clears, restore LPCS and LPCI to AUTOMATIC/STANDBY mode.

CAUTION #12

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

CAUTION #13

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

CAUTION #14

Do not depressurize the RPV below [57 psig (RCIC low pressure isolation setpoint,)] unless motor driven pumps sufficient to maintain RPV water level are running and available for injection.

CAUTION #15

Open SRV's in the following sequence if possible:

1.	MS-RV-5B	8.	MS-RV-1A	15.	MS-RV-2D
2.	MS-RV-3D	9.	MS-RV-2B	16.	MS-RV-2A
3.	MS-RV-5C	10.	MS-RV-1C	17.	MS-RV-3B
4.	MS-RV-4D	11.	MS-RV-1B	18.	MS-RV-3A
5.	MS-RV-4B	12.	MS-RV-2C		
6.	MS-RV-4A	13.	MS-RV-1D		
7.	MS-RV-4C	14.	MS-RV-3C		

CAUTION #16

Bypassing low RPV water level 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 is required to assure adequate core cooling, do not divert all RHR pumps from LPCI mode.

CAUTION #19

Manually trip SLC pumps at [0% level] in the SLC tank.

CAUTION #20

Defeating RSCS interlocks may be required to accomplish this step.

CAUTION #21

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

CAUTION #22

Defeating isolation interlocks may be required to accomplish this step.

CAUTION #23

Do not initiate drywell sprays if suppression pool water level is above [54 ft. 6 in. (elevation of bottom of 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.~~

NOT APPLICABLE TO THIS GUIDELINE

CAUTION #25

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

CAUTION #26

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

RPV CONTROL GUIDELINE

PURPOSE

The purpose of this guideline is to:

- Maintain adequate core cooling,
- Shut down the reactor, and
- Cool down the RPV to cold shutdown conditions ([100°F <RPV water temperature <200°F (cold shutdown conditions)]).

ENTRY CONDITIONS

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

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

OPERATOR ACTIONS

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

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

RC/L. Monitor and control RPV water level.

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

- Isolation
- ECCS
- Emergency diesel generator

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

If while executing the following step;

- Boron Injection is required,
  enter [procedure developed from CONTINGENCY #7].

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

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

RC/L-2 Restore and maintain RPV water level between [+ 12.5 in. (low level scram setpoint)] and [+55.5 in. (high level trip setpoint)] with one or more of the following systems: #9 # 10 # 11

- Condensate/feedwater system [1130 - 0 psig (RPV pressure range for system operation)]

- CRD system [1130 - 0 psig (RPV pressure range for system operation)]

- RCIC system [1130 - 57 psig (RPV pressure range for system operation)] #12

- HPCS system [1130 - 0 psig (RPV pressure range for system operation)]

- LPCS system [290 - 0 psig (RPV pressure range for system operation)]

- LPCI system [200 - 0 psig (RPV pressure range for system operation)]

If RPV water level cannot be restored and maintained above [+ 12.5 in. (low level scram setpoint)], maintain RPV water level above [-161 in. (top of active fuel)].

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

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

RC/L-3 Proceed to cold shutdown in accordance with [procedure for cool-down to cold shutdown conditions].

RC/P Monitor and Control RPV Pressure.

If while executing the following steps:

- Emergency RPV Depressurization is anticipated, rapidly depressurize the RPV with the main turbine bypass valves. #13

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

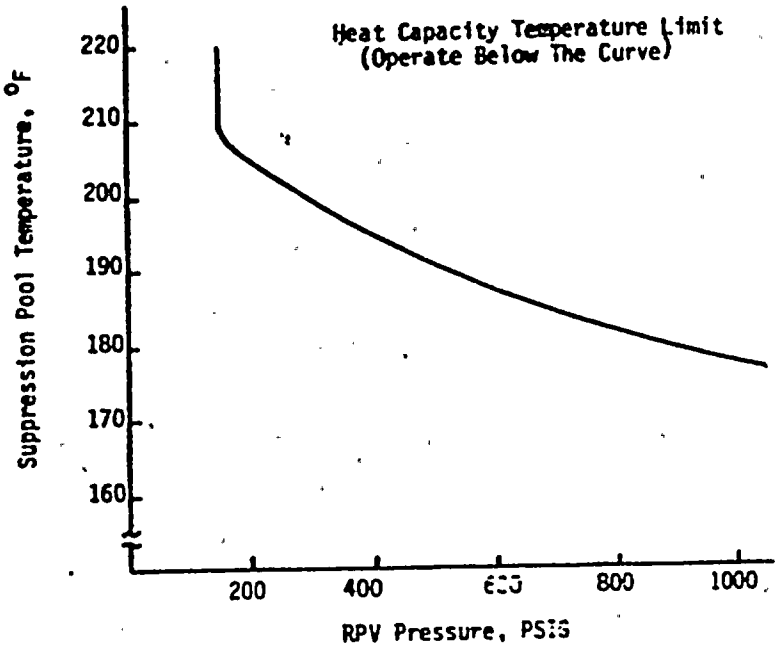
- RPV Flooding is required and at least [7 (number of SRV's dedicated to ADS)] SRV's are open, enter [procedure developed from CONTINGENCY #6].

RC/P-1 If any SRV is cycling, manually open SRV's until RPV pressure drops to [930 psig (RPV pressure at which all turbine bypass valves are fully open)].

at while executing the following steps:

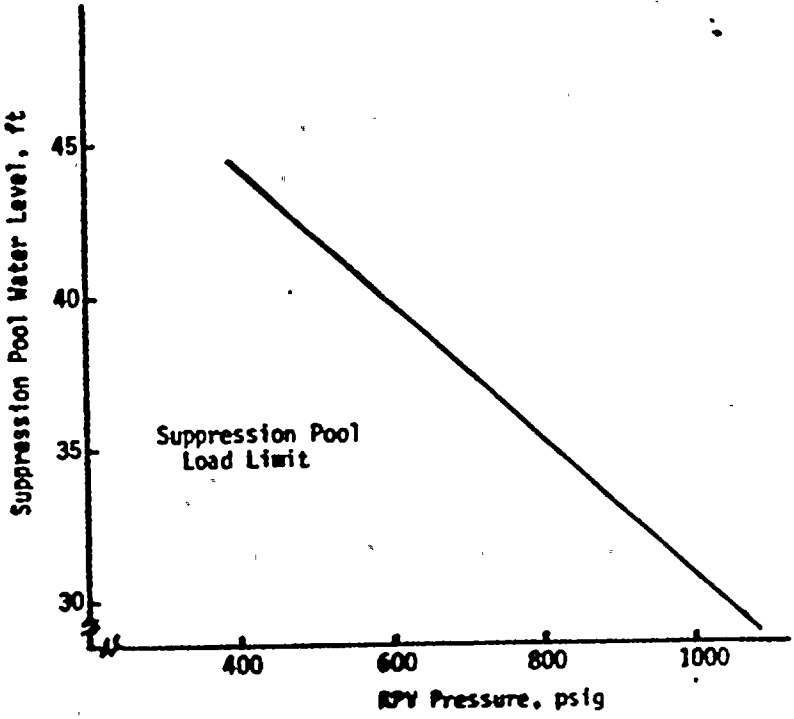
- Suppression pool temperature cannot be maintained below the Heat Capacity Temperature Limit, maintain RPV pressure below the Limit.

#8
#13
#14



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

#13
#14



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

If while executing the following steps:

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

open MSIV's to re-establish the main condenser as a heat sink. #16

RC/P-2 Control RPV pressure below [1075 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:

- SRV's only when suppression pool water level is above [17' (elevation of top of SRV discharge device)]. If the continuous SRV pneumatic supply is or becomes unavailable, depressurize with sustained SRV opening. #15
- RCIC
- RWCU (recirculation mode) if no boron has been injected into the RPV.
- Main steam line drains
- RWCU (blowdown mode) if no boron has been injected into the RPV. Refer to [sampling procedures] prior to initiating blowdown.

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

RC/P-3 When either:

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

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

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 beyond position [06 (maximum subcritical banked withdrawal position)], ALTERNATE SHUTDOWN COOLING IS REQUIRED; enter [procedure developed from CONTINGENCY #5].

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

If while executing the following steps:

- All control rods are inserted beyond positon [06 (maximum subcritical banked withdrawal position)], terminate boron injection and enter [scram procedure].

- The reactor is shutdown and no boron has been injected into the RPV, enter [scram procedure].

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

RC/Q-2 If the main turbine generator is on-line and the MSIV's are open, confirm or initiate 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 [110°F (Boron Injection Initiation Temperature)], BORON INJECTION IS REQUIRED; inject boron into the RPV with SLC and prevent automatic initiation of ADS. #19

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

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

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

RC/Q-4.2 Continue to inject boron until [553 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:

  H13-P609 C72-F17A, E, C, G
  H13-P611 C72-F17B, F, D, H

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

- Close [CRD-V-95 (scram air header supply valve)] and open [CRD-V-64 (scram air header vent valve)].

When control rods are not moving inward:

- [Replace:

  H13-P609 C72-F17A, E, C, G
  H13-P611 C72-F17B, F, D, H

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

- Close [CRD-V-64 (scram air header vent valves)] and open [CRD-V-95 (Scram air header supply valve)].

RC/Q-5.2 Reset the reactor scram.

If the reactor scram cannot be reset:

1. Start all CRD pumps.

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

2. Close [CRD-V-34 (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 [CRD-V-34 (HCU accumulator charging water header valve)].

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

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

2. Reset the reactor scram.

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

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

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

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

RC/Q-5.5 Reset the reactor scram.

If the reactor scram cannot be reset:

1. Start all CRD pumps.

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

2. Close [CRD-V-34 (HCU accumulator charging water header valve)].

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

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

1. Individually direct the effluent from [CRD-V-102 (CRD withdraw line vent valve)] to a contained radwaste drain and open [CRD-V-102 (CRD withdraw line vent valve)] for each control rod not inserted beyond position [06 (maximum subcritical banked withdrawal position)].

2. When a control rod is not moving inward, close its [CRD-V-102 (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 [90°F (most limiting suppression pool temperature LCO)].
- Drywell temperature above [135°F (drywell termperature LCO or maximum normal operating temperature, whichever is higher)].
- Drywell pressure above [1.69 psig (high drywell pressure scram setpoint)].
- Suppression pool water level above [31' 2" (maximum suppression pool water level LCO)].
- Suppression pool water level below [30' 10" (minimum suppression pool water level LCO)].

OPERATOR ACTIONS

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

SP/T Monitor and Control Suppression Pool Temperature.

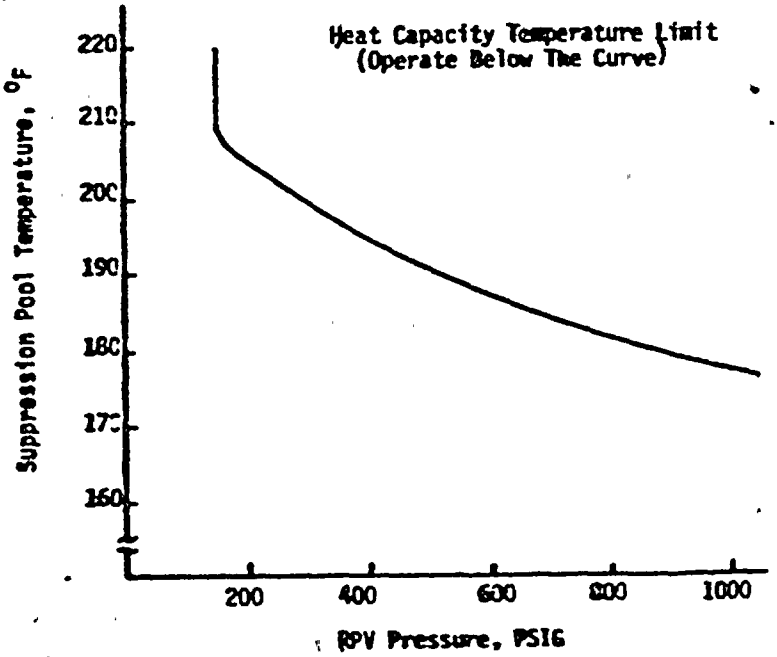
SP/T-1 Close all SORV's.

If any SORV cannot be closed withing 2 minutes, scram the reactor.

SP/T-2 When suppression pool temperature exceeds [90°F (most limiting suppression pool temperature LCO)], operate available suppression pool cooling. #18

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

SP/T-4 If suppression pool temperature cannot be maintained below the Heat Capacity Temperature Limit, maintain RPV pressure below the limit. #8 #13 #14



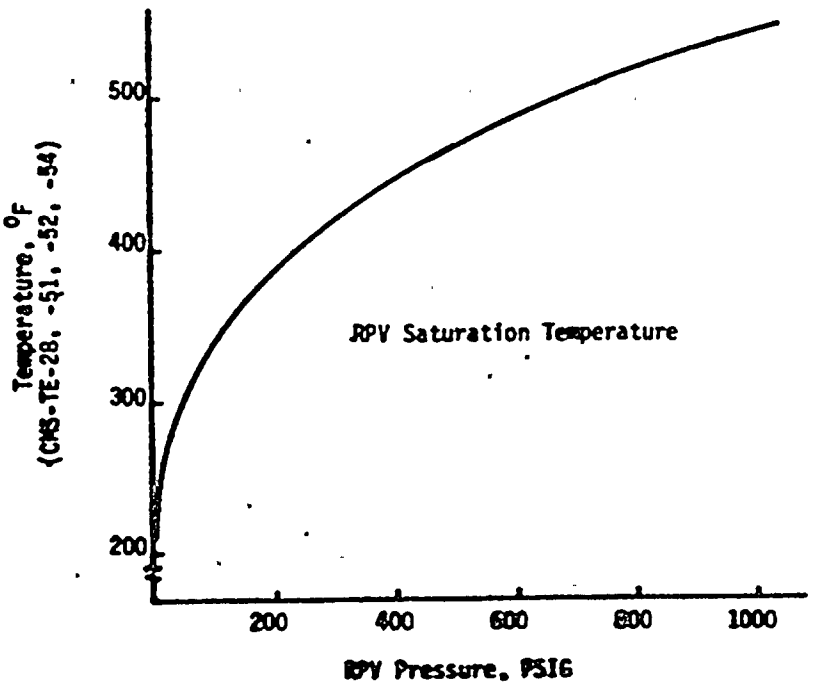
If suppression pool temperature and RPV pressure cannot be restored and maintained below the Heat Capacity Temperature Limit, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.

DW/T Monitor and Control Drywell Temperature.

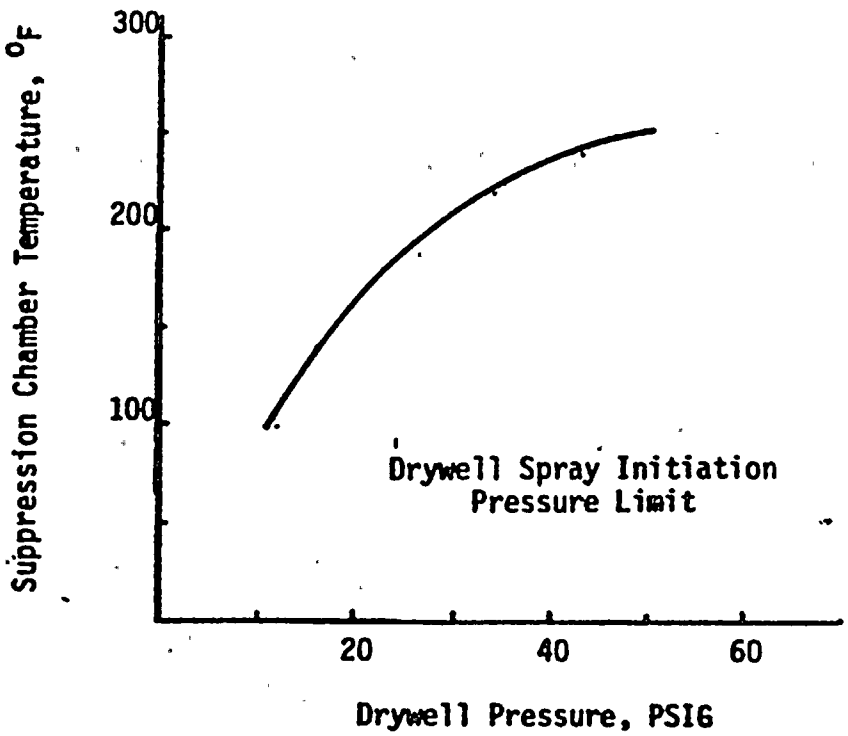
DW/T-1 When drywell temperature exceeds [135°F (drywell temperature LCO or maximum normal operating temperature, whichever is higher)], operate available drywell cooling. #6

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, and level cannot be determined, RPV FLOODING IS REQUIRED; enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with this procedure.



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 860 gpm (Maximum Drywell Spray Flow Rate Limit)]. #18



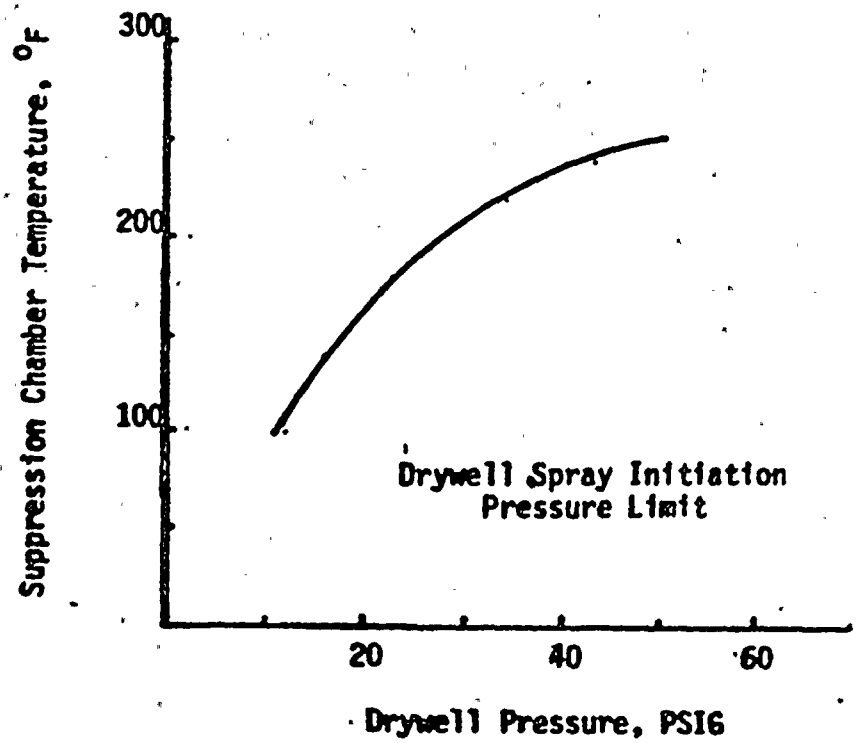
If drywell temperature cannot be maintained below [340°F (maximum temperature at which ADS qualified or drywell design temperature, whichever is lower)], EMERGENCY RPV DEPRESSURIZATION IS REQUIRED: enter [procedure developed from the RPV Control Guideline] at [Step RC-1] and execute it concurrently with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

PC-P Monitor and Control Primary Containment Pressure.

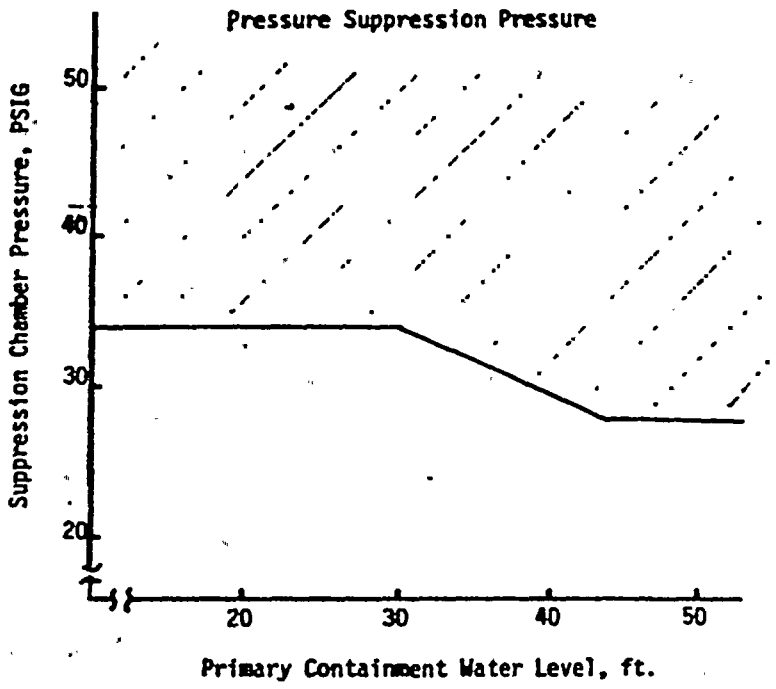
PC/P-1 Operate SBGT [drywell purge], only when the temperature in the space being evacuated is below [212°F (Maximum Noncondensible Evacuation Temperature)]. Use [SBGT and drywell purge operating procedures]. #21

PC/P-2 Before suppression chamber pressure reaches [the Pressure Suppression Pressure], [16.5 psig (Suppression Chamber Spray Initiation Pressure)], but only if [suppression pool water level is below 53 ft. (elevation of suppression pool spray nozzles)], initiate suppression pool sprays. #8, #18

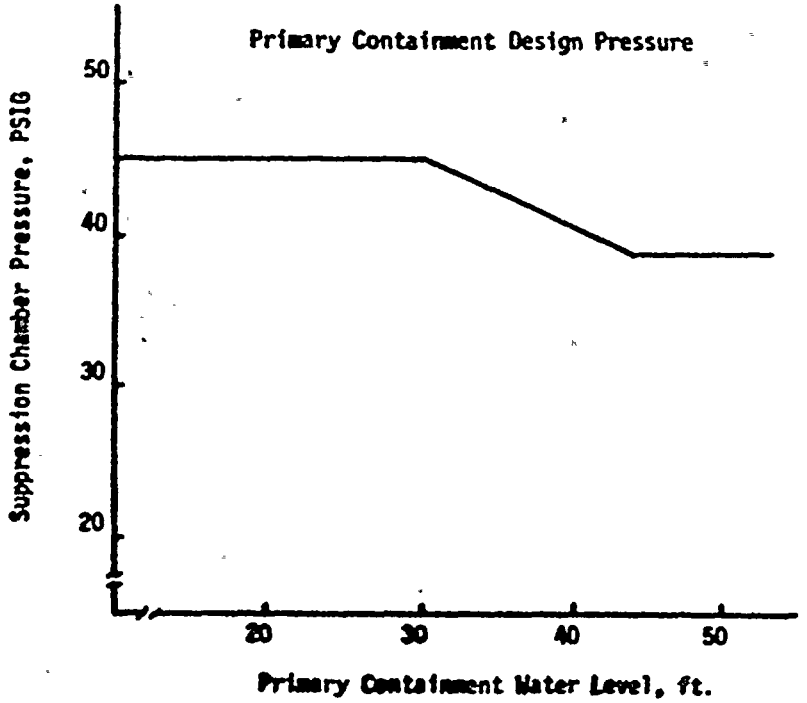
PC/P-3 If suppression chamber pressure exceeds [16.5 psig (Suppression Chamber Spray Initiation Pressure)] but only if [suppression chamber temperature and drywell pressure are below the Drywell Spray Initiation Pressure Limit], [shut down recirculation pumps and drywell cooling fans and] initiate drywell sprays [restricting flow rate to less than 860 gpm Maximum Drywell Spray Flow Rate Limit)]. #18



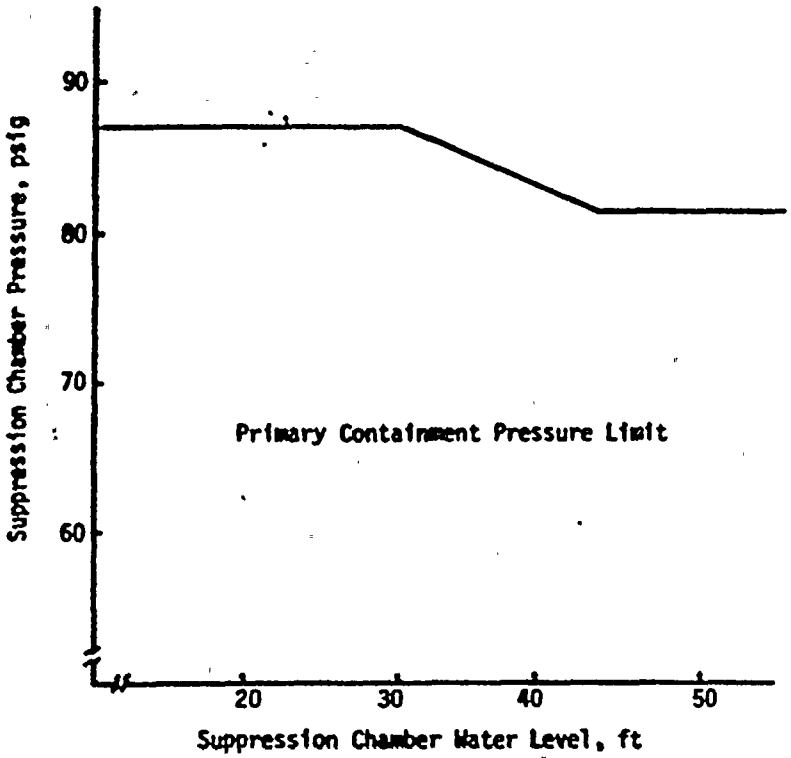
PC/P-4 If suppression chamber pressure cannot be maintained below [the Pressure Suppression Pressure], EMERGENCY RPV DEPRESSURIZATION IS REQUIRED.



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



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



- [If suppression pool water level is below 53 ft. (elevation of suppression pool spray nozzles)], initiate suppression pool sprays.

- If [suppression chamber temperature and drywell pressure are below the Drywell Spray Initiation Pressure Limit], [shut down recirculation pumps and drywell cooling fans and] initiate drywell sprays [restricting flow rate to less than 860 gpm (Maximum Drywell Spray Flow Rate Limit)].

PC/P-7 If suppression chamber pressure exceeds the Primary Containment Pressure Limit, vent the primary containment in accordance with [procedure for containment venting] to reduce and maintain pressure below the Primary Containment Pressure Limit. #22

SP/L Monitor and Control Suppression Pool Water Level

SP/L-1 Maintain suppression pool water level between [31 ft. 2 in. (maximum suppression pool water level LCO)] and [30 ft. 10 in. (minimum suppression pool water level LCO)]. Refer to [sampling procedure] prior to discharging water. #8, #9

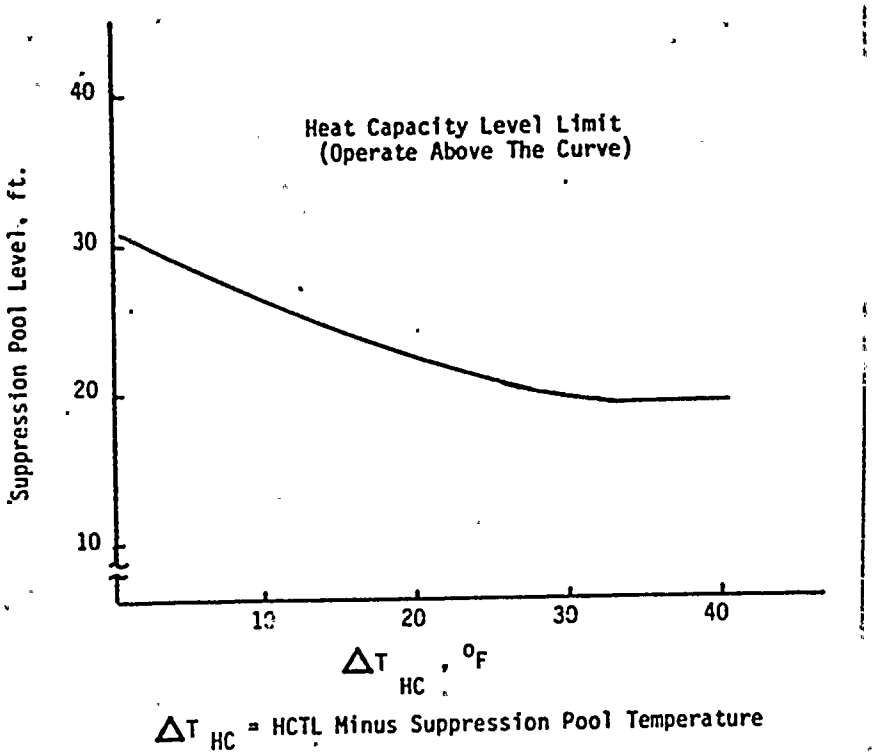
If suppression pool water level cannot be maintained above [30 ft. 10 in. (minimum suppression pool water level LCO)], execute [Step SP/L-2].

If suppression pool water level cannot be maintained below [31 ft. 2 in. (maximum suppression pool water level LCO)], execute [Step SP/L-3].

SP/L-2 SUPPRESSION POOL WATER LEVEL BELOW [30 ft. 10 in. (minimum suppression pool water level LCO)].

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

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.

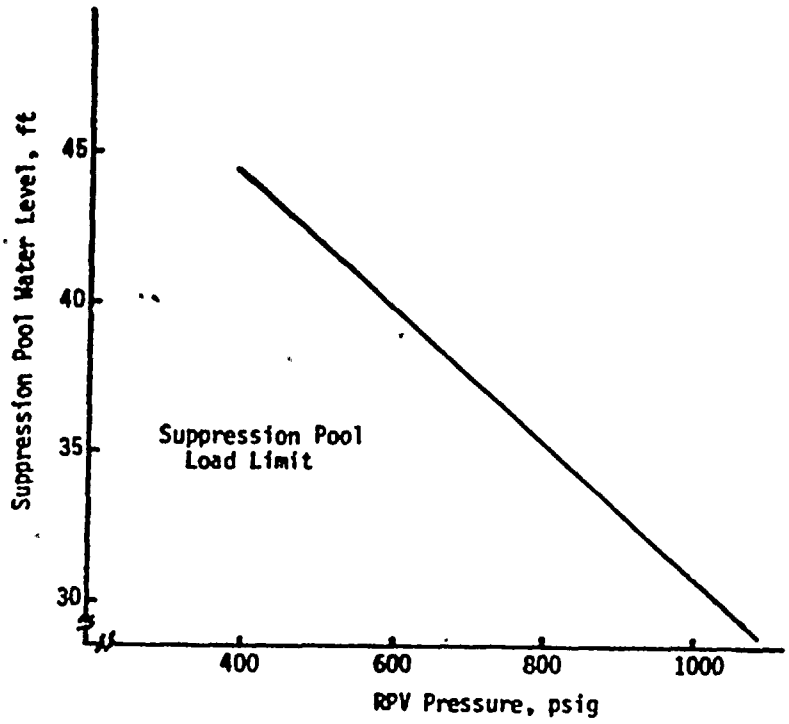


ΔT_{HC} = HCTL Minus Suppression Pool Temperature

SP/L-3 SUPPRESSION POOL WATER LEVEL ABOVE [31 ft. 2 in. (maximum suppression pool water level LCO)]

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

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



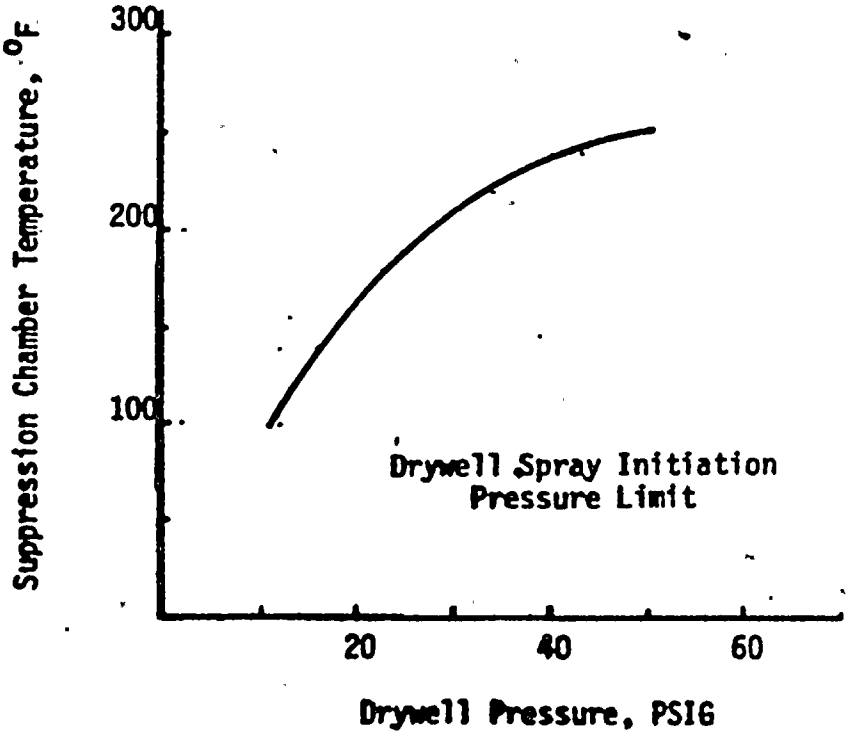
If suppression pool water level cannot be maintained below the Suppression Pool Load Limit, maintain RPV pressure below the Limit. #13 #14

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

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

SP/L-3.2 Before suppression pool water level reaches [54 ft. 6 in. (Maximum Primary Containment Water Level Limit or elevation of bottom of internal suppression chamber to drywell vacuum breakers less vacuum breaker opening pressure in feet of water, whichever is lower)] but only if adequate core cooling is assured, terminate injection into the RPV from sources external to the primary containment except from boron injection systems and CRD.

1. When suppression pool water level reaches [54 ft. 6 in. (elevation of bottom of internal suppression chamber to drywell vacuum breakers less vacuum breacker 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 860 gpm (Maximum Drywell Spray Flow Rate Limit)]. #18



2. If suppression pool water level exceeds [54 ft. 6 in. (elevation of bottom of internal suppression chamber to drywell vacuum breakers less vacuum breaker opening pressure in feet of water)], continue to operate drywell sprays [below 860 gpm (Maximum Drywell Spray Flow Rate Limit)]. #23

3. When primary containment water level reaches [118 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.

CONTINGENCY #1

LEVEL RESTORATION

If while executing the following steps:

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

C1-1 Line up for injection and start pumps in 2 or more of the following injection subsystems:

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

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

- RHR Service Water Crosstie
- Fire System
- ECCS Keep-Full Systems
- SLC (test tank)
- SLC (boron tank)

C1-2 Monitor RPV pressure and water level. Continue in this procedure at the step indicated in the following table:

RPV PRESSURE REGION

RPV LEVEL	HIGH [290 psig][1]	INTERMEDIATE	LOW [57 psig][2]
INCREASING	C1-4	C1-5	C1-6
DECREASING	C1-7		C1-8

[1](RPV pressure at which LPCS shutoff head is reached)
[2](RCIC low pressure isolation setpoint)

If while executing the following steps:

- The RPV water level trend reverses or RPV pressure changes region, return to [Step C1-2].
- RPV water level drops below [-149 in (ADS initiation setpoint)], prevent automatic initiation of ADS.

C1-3 RPV WATER LEVEL INCREASING, RPV PRESSURE HIGH

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

C1-4 RPV WATER LEVEL INCREASING, RPV PRESSURE INTERMEDIATE

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

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

Otherwise, when RPV water level reaches [+12.5 in. (low level scram setpoint)], enter [procedure developed from the RPV Control Guideline] at [Step RC/L].

C1-5 RPV WATER LEVEL INCREASING, RPV PRESSURE LOW

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

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

C1-6 RPV WATER LEVEL DECREASING, RPV PRESSURE HIGH OR INTERMEDIATE

If HPCS 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 [-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 C1-2].

- Otherwise, EMERGENCY RPV DEPRESSURIZATION IS REQUIRED. When RPV water level is increasing or RPV pressure drops below [57 psig (RCIC low pressure isolation setpoint, return to [Step C1-2].

C1-7 RPV WATER LEVEL DECREASING, RPV PRESSURE LOW

[If no HPCS or LPCS sybsystem 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 [-167 in. (top of active fuel)], enter [procedure developed from CONTINGENCY #4].

CONTINGENCY #2

EMERGENCY RPV DEPRESSURIZATION

C2-1 When either: #13, #14

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

- Boron Injection is not required,

C2-1.1 If suppression pool water level is above [17 ft. (elevation of top of SRV discharge device)]:

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

C2-1.2 If less than [3 (minimum number of SRV's required for Emergency depressurization)] SRV's are open, rapidly depressurize the RPV using one or more of the following systems (use in order which will minimize radioactive release to the environment): #22

- Main condenser
- RHR (steam condensing mode)
- Main steam line drains
- RCIC steam line
- Head 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-4].

CONTINGENCY #3

STEAM COOLING

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

C3-1 When RPV water level drops to [-278 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 SRV's until [7 (number of SRV's 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 [122 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 [-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,] MSIV's, main steam line drain valves and RCIC isolation valves.

C5-3 Place the control switch for [two (minimum number of SRV's required for alternate shutdown cooling)] SRV[s] in the OPEN position.

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

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

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

C5-6.1 If RPV pressure does not stabilize at least [76 psig (minimum alternate shutdown cooling RPV pressure)] above suppression chamber pressure, start another LPCS or LPCI pump.

C5-6.2 If RPV pressure does not stabilize below [92 psig (maximum alternate shutdown cooling RPV pressure)], open another SRV.

C5-6.3 If the cooldown rate exceeds [100°F/hr (maximum RPV cooldown rate LCO)], reduce LPCS or LPCI injection into the RPV until the cooldown rate decreases below [100°F/hr (maximum RPV cooldown rate LCO)].

C5-7 Control suppression pool temperature to maintain RPV water temperature above [80°F (RPV NDTT or head tensioning limit, whichever is higher)].

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

CONTINGENCY #6

RPV FLOODING

C6-1 If at least [3 (minimum number of SRV's required for emergency depressurization)] SRV's can be opened or if HPCS or motor driven feedwater pumps are available for injection, close the MSIV's, main steam line drain valves, RCIC and RHR steam condensing isolation valves.

C6-2 If any control rod is not inserted beyond position [06 (maximum subcritical banked withdrawal 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 SRV's	Minimum Alternate RPV Flooding Pressure (psig)
7 or more	185
6	215
5	265
4	330
3	445
2	675

If less than [2 minimum number of SRV's 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 [2 (minimum number of SRV's for which the Minimum Alternate RPV Flooding Pressure is below the lowest SRV lifting pressure)] SRV's are open and RPV pressure is above the Minimum Alternate RPV Flooding Pressure: #25

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

If at least [2 minimum number of SRV's 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 [2 (minimum number of SRV's 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:

- HPCS
- LPCS
- [RHR service water crosstie
- Fire System
- ECCS keep-full systems]

C6-2.3 Maintain at least [2 (minimum number of SRV's 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 by throttling injection.

C6-2.4 When:

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

continue in this procedure.

C6-3 If RPV water level cannot be determined:

C6-3.1 Commence and increase injection into the RPV with the following systems until at least [3 (Minimum Number of SRV's Required for Emergency Depressurization)] SRV's are open and RPV pressure is not decreasing and is at least [98 psig (Minimum RPV Flooding Pressure)] above suppression chamber pressure.

- HPCS
- LPCS
- LPCI
- Condensate pumps
- CRD
- [RHR service water crosstie
- Fire System
- ECCS keep-full systems
- SLC (test tank)
- SLC (boron tank)]

C6-3.2 Maintain at least [3 (Minimum Number of SRV's Required for Emergency Depressurization)] SRV's open and RPV pressure at least [98 psig (Minimum RPV Flooding Pressure)] above suppression chamber pressure by throttling injection.

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

- HPCS
- LPCS
- LPCI
- Condensate pumps
- CRD
- [RHR service water crosstie
- Fire System
- ECCS keep-full systems
- SLC (test tank)
- SLC (boron tank)]

C6-5 If RPV water level cannot be determined:

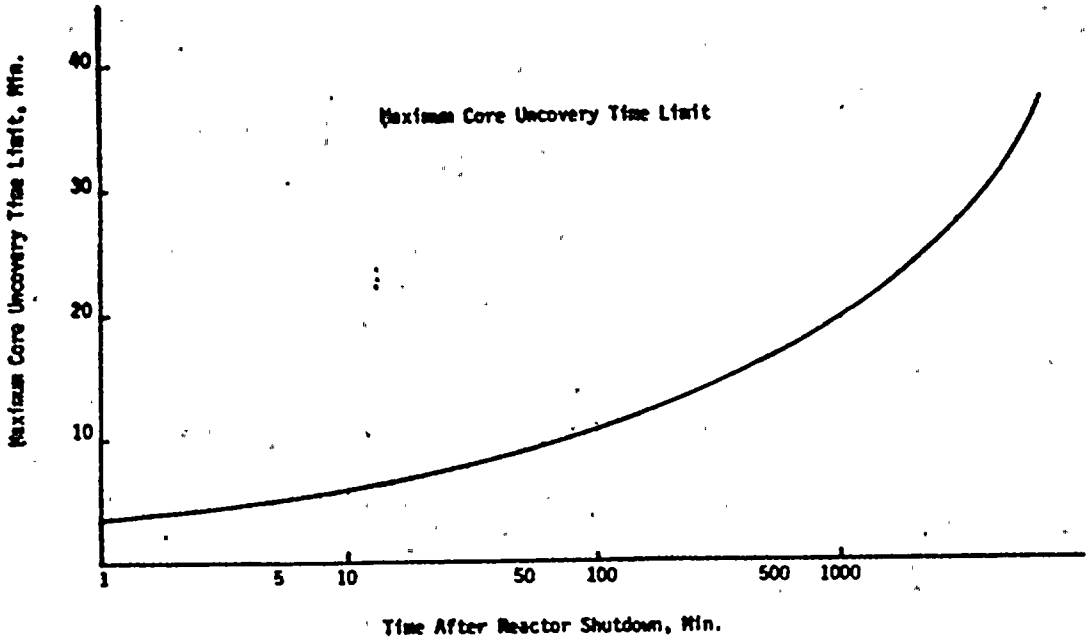
C6-5.1 Fill all RPV water level instrumentation reference columns.

C6-5.2 Continue injecting water into the RPV until water level instrumentation is available.

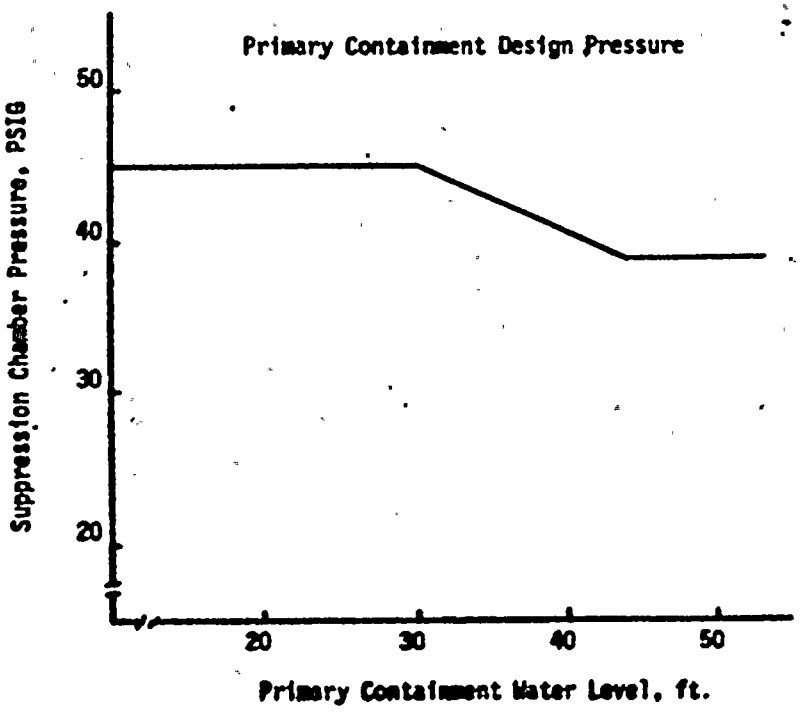
If while executing the following steps, RPV water level can be determined, continue in this procedure at [Step C6-6].

C6-5.3 If it can be determined that the RPV is filled or if RPV pressure is at least [98 psig (Minimum RPV Flooding Pressure)] above suppression chamber pressure, terminate all injection into the RPV and reduce RPV water level.

C6-5.4 If RPV water level indication is not restored within the Maximum Core Uncovery Time Limit after commencing termination of injection into the RPV, return to [Step C6-3].



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



CONTINGENCY #7

LEVEL/POWER CONTROL

If while executing the following steps RPV Flooding is required or RPV water level cannot be determined, control injection into the RPV to maintain reactor power above [8% (Reactor Flow Stagnation Power)] but as low as practicable. However, if reactor power cannot be determined or maintained above [8% (Reactor Flow Stagnation Power)], RPV FLOODING IS REQUIRED: enter [procedure developed from CONTINGENCY #6].

C7-1 If:

- Reactor power is above [5% (APRM downscale trip)] or cannot be determined, and
- Suppression pool temperature is above [110°F (Boron Injection Initiation Temperature)], and
- Either an SRV is open or opens or drywell pressure is above [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 [5% (APRM downscale trip)], or
- RPV water level reaches [-161 in. (top of active fuel)], or
- All SRV's remain closed and drywell pressure remains below [1.69 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 [5% (APRM downscale trip)] or cannot be determined and
- RPV water level is above [-161 in. (top of active fuel)], and
- Suppression pool temperature is above [110°F (Boron Injection Initiation Temperature)], and
- Either an SRV is open or opens or drywell pressure is above [1.69 psig (high drywell pressure scram setpoint)],

return to [Step C7-1].

C7-2 Maintain RPV water level either: [#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 [+12.5 in. (low level scram setpoint)] and [+55.5 in. (high level trip setpoint)],

with the following systems:

- Condensate/feedwater system [1130 - 0 psig (RPV pressure range for system operation)]
- CRD system [1130 - 0 psig (RPV pressure range for system operation)]
- RCIC system [1130 - 57 psig (RPV pressure range for system operation)] #12
- [LPCI system [200 - 0 psig (RPV pressure range for system operation)]]

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

If RPV water level cannot be maintained above [-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 SRV's	Minimum Alternate RPV Flooding Pressure (psig)
7 or more	185
6	215
5	265
4	330
3	447
2	675

If less than [2 (minimum number of SRV's 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 [-161 in. (top of active fuel)]: #25

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

If RPV water level cannot be restored and maintained above [-161 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 [-161 in. (top of active fuel)]:

- HPCS
- LPCS
- RHR service water crosstie
- Fire System
- 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 [331 pounds (Hot Shutdown Boron Weight)] of boron have been injected or all control rods are inserted beyond position [06 (maximum subcritical banked withdrawal position)], restore and maintain RPV water level between [+12.5 in. (low level scram setpoint)] and [+55.5 in. (high level trip setpoint)].

If RPV water level cannot be restored and maintained above [+12.5 in. (low level scram setpoint)], maintain RPV water level above [-161 in. (top of active fuel)].

If RPV water level cannot be maintained above [-161 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 Proceed to cold shutdown in accordance with [procedure for cooldown to cold shutdown conditions].

WNP-2

PROGRAM

FOR

VERIFICATION AND VALIDATION

OF

EMERGENCY PROCEDURES

I. VERIFICATION OBJECTIVES

Emergency Procedure (EP) verification objectives are to confirm the EP's:

1. Accurately incorporate provisions of the WNP-2 EP Guidelines.

2. Are written in compliance to the EP Writers Guide.

3. Present a level of detail enabling effective operator comprehension and response.

4. Utilize a language compatible to operator training and experience.

5. Are compatible to plant equipment, controls and indications regarding:

   a. Equipment operation

   b. Control/indication locations (with respect to procedure need)

   c. Nomenclature

   d. Instrument unit of measure and readability

II. VALIDATION OBJECTIVE

The objective of EP validation is to determine that specified operations can be performed by the shift staff to manage the emergency conditions.

III. VERIFICATION METHODS

1. Desk-Top Reviews

The following desk-top reviews will be conducted for EP verification; indicated assignments represent a primary review function rather than a restriction:

a. Plant Technical will review EP's for compliance to the EP Guidelines and compatibility to plant equipment, controls, indications and the Graphic Display System.

b. Corporate Technology will review EP's for use and accuracy of plant-specific calculated parameters.

c. Plant QA will review EP's for compliance to the Writers Guide, for level of detail and language use.

d. Plant Safety Engineering Group (SEG) will review EP's for level of detail, language use and compatibility to controls and indications.

e. NSS Vendor (General Electric Company) will perform a general review of EP's for compliance to plant-specific and generic technical guidelines; plant-specific calculated parameters will be reviewed against generic BWR values.

2. Control Room Walk-Throughs

a. Plant Operations, on each rotating shift, will walk EP's through the WNP-2 Control Room to verify level of detail and compatibility to equipment nomenclature, control/indication location and instrument applicability.

b. SEG, working with the BWR Owners' Group Control Room Human Factors Review Team, will have completed a review of the WNP-2 Control Room during the week beginning January 10, 1983. This review included use of draft EP's; review results will be used in finalizing EP's.

IV. VALIDATION METHODS

1. WNP-2 Control Room walk-throughs by each rotating shift crew will demonstrate actions required by EP's can be related to equipment, control, indications using the Graphic Display System (GDS) and without using GDS.

2. Training exercises at the Browns Ferry and Perry simulators using applicable WNP-2 EP's will be used to demonstrate and measure generic effectiveness for managing emergency conditions.

EP's will be further evaluated using the WNP-2 simulator when it is installed and made operational.

V. DOCUMENTATION

1. Desk-Top Reviews

Implementation of desk-top reviews will be documented by memorandum or letter (accompanied by marked-up copies of procedures if desireable).

2. Walk-Throughs

a. SEG Human Factors Review results will be documented by report.

b. WNP-2 Control Room walk-throughs will be documented by checklist (Attachment 1).

c. Generic simulator exercises at Browns Ferry and Perry simulators will be documented by checklist (Attachment 2).

All documentation will be retained as a part of the EP preparation file.

VI. COMMENT AND CHECKLIST DISPOSITIONS

All review comment and checklists will be routed to the WNP-2 Operations Manager who has responsibility for coordinating the preparation of EP's.

For those inputs not conflicting with the WNP-2 Emergency Procedure Guidelines and Writers Guide, input will be incorporated into procedures or a resolution reached with the reviewers. Where conflicts arise, the WNP-2 Plant Operations Committee will provide final resolution.

WNP-2

EMERGENCY PROCEDURE

PLANT OPERATIONS WALK-THROUGH CHECKLIST

PROCEDURE NO. _____

DATE _____

List any step for which:

1. Level of detail is inadequate or should be revised to improve "how to" instruction. _____

2. Equipment (pump, valve, instrument, switch, etc) identification is incorrect or omitted when identification is required. _____

3. Travel from one location to another while complying with the procedures is impractical. _____

4. An action is required but no apparent instrument, alarm indicating light, etc. monitors the effect of the action. _____

5. Installed instrumentation reads out in units different than specified in the procedure. _____

Comments _____

Signed: _____

Shift Manager

Attachment I

WNP-2

EMERGENCY PROCEDURE

GENERIC SIMULATOR CHECKLIST

Simulator _____

Transient _____

Procedure(s) Used _____

Date _____

1. List any step(s) resulting in immediate unexpected simulator response. _____

Describe the unexpected response. _____

2. List any step(s) that were difficult to perform in the necessary time interval. _____

Why? _____

3. List any step(s) that were being performed when management of the emergency was judged a failure. _____

What was the nature of the failure? _____

Recommendations: _____

Signed: _____

Shift Manager

WNP - 2

PLANT-SPECIFIC WRITERS GUIDE

FOR EMERGENCY PROCEDURES

Table of Contents

Table of Contents (Continued)

1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide administrative and technical guidance on the preparation of EPs.

1.2 Scope

This writers guide applies to the writing of all emergency procedures (EPs).

2.0 EP DESIGNATION AND NUMBERING

EPs are procedures that govern the plant operation during emergency conditions and specify operator actions to be taken to return the plant to a stable condition.

Each EP shall be uniquely identified. This identification permits easy administration of the process of procedure preparation, review, revision, distribution, and operator use.

2.1 Cover Sheet

Every EP shall have a cover sheet (see Figure 1) that identifies the procedure and revision. To identify the procedure, a descriptive title is to be used that also designates the scope.

2.2 Procedure Designation

Designation of the emergency operating procedure shall be WNP-2 Plant Procedures Manual Volume 5, i.e., each procedure number shall have a 5 prefix.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

PLANT PROCEDURES MANUAL

WNP. 2

PROCEDURE NUMBER	APPROVED	DATE
5.1.1		
VOLUME NAME: 5 EMERGENCY PROCEDURES		
SECTION: 5.1 RPV CONTROL		
TITLE: 5.1.1 RPV LEVEL CONTROL		

5.1.1.1 Purpose

5.1.1.2 Entry Conditions

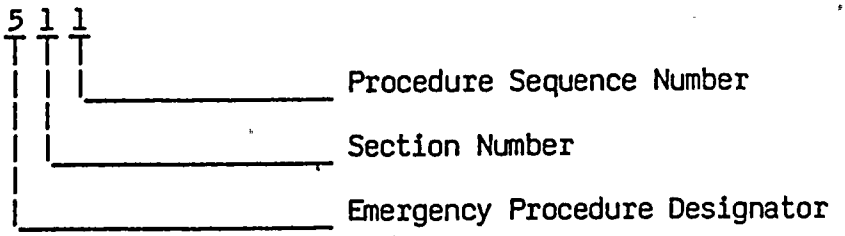
5.1.1.3 Operator Actions

1. IF reactor scram has not been initiated - - -
2. Monitor initiation of:
   a. ECCS
   b. Emergency Diesels

Figure 1 - Page Format and Cover Sheet

2.3 Procedure Numbering

Emergency procedures will be designated as the "5" series of plant procedures and numbered as follows:



2.4 Revision Numbering and Designation

Procedure revision numbering will be designated in the revision number block at the bottom of each page.

To identify revisions to the text of an EP, a change bar located in the right margin alongside the text change will be used.

2.5 Page Identification and Numbering

Each page of the procedure will be identified by:

A. The procedure number.

B. The revision number

C. The page number specified as "Page ___ of ___". This information will be together and located at the bottom of each page, as shown in Figure 1.

3.0 FORMAT

The following format is to be applied consistently for all EPs.

3.1 Page Format

A single column format will be used (similar to Figure 1).

3.2 Procedure Organization

The following section headings will be used for all EPs.

A. Purpose

The purpose will be stated for operator association with the procedure.

B. Entry Conditions

The entry conditions will include only those alarms, indications, operating conditions, automatic system actions, or other unique symptoms that the operator is to use in deciding to use the procedure.

C. Operator Actions

The operator actions will be short, concise, identifiable instructions that give appropriate directions to the user.

3.3 Section Numbering

Arabic numerals will be used for numbering sections and subsections in the following decimal format:

5.1.1.1 First Level Section Number

5.1.1.2 First Level Section Number

Second level sections (subsections) will not be used.

3.4 Instruction Step Numbering

Instruction steps in a section or subsection will be numbered and indented as follows:

1. Verify . . . .

    1.1 Start . . . (used only when subsequent actions or conditions relete directly to the proeding step).

        a. Check . . . .

            1) Position . . . . (not desirable)

Every effort should be made to avoid using the 1) level of indenting.

4.0 WRITING INSTRUCTIONAL STEPS

4.1 Instruction 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 in meeting these objectives are as follows:

A. Instruction steps should deal with only one idea.

B. Short, simple sentences should be used in preference to long, compound, or complex sentences.

C. Objects of operator actions should be specifically stated. This includes identification of exactly what is to be done and to what.

D. For instructional steps that involve an action verb relating to three or more objects, the objects will be listed with space provided for operator checkoff.

E. Limits should be expressed quantitatively whenever possible (refer to Subsection 5.5).

F. Mandatory sequence of steps is assumed unless otherwise stated.

G. Identification of components and parts should be complete.

H. Instruction content should be written to communicate to the user.

I. Expected results of routine tasks need not be stated.

J. When actions are required based upon receipt of an annunciated alarm, list the setpoint of the alarm for ease of verification.

K. When requiring resetting or restoration of an alarm or trip, list the expected results immediately following the resetting or restoration if it would be beneficial to the operator.

L. When considered beneficial to the user for proper understanding and performance, describe the system response time associated with performance of the instruction.

O. When system response dictates a time frame within which the instruction must be accomplished, prescribe such time frame. If possible, however, avoid using time to initiate operator actions. Operator actions should be related to plant parameters.

P. When anticipated system response may adversely affect instrument indications, describe the conditions that will likely introduce instrument error and means of determining if instrument error has occurred by using a NOTE.

Q. When additional confirmation of system response is considered necessary, prescribe the backup readings to be made.

4.2 Use of Logic Terms

The logic terms and, or, not, if, if not, when, and then are often necessary to describe precisely a set of conditions or sequence of actions. When logic statements are used, logic terms will be underlined so that all the conditions are clear to the operator.

The use of and and or within the same action shall be avoided. When and and or are used together, the logic can be very ambiguous.

Use other logic terms as follows:

A. When attention should be called to combinations of conditions, the word and shall be placed between the description of each condition. The word and shall not be used to join more than three conditions. If four or more conditions need to be joined, a list format shall be used.

B. The word or shall be used when calling attention to alternative combinations of conditions. The use of the word or shall always be in the inclusive sense. To specify the exclusive "or", the following may be used: "either A or B but not both".

C. When action steps are contingent upon certain conditions or combinations of conditions, the step shall begin with the words if or when followed by a description of the condition or conditions (the antecedent), a comma, the word then, followed by the action to be taken (the consequent). When is used for an expected condition. If is used for an unexpected but possible condition.

D. Use of if not should be limited to those cases in which the operator must respond to the second of two possible conditions. If should be used to specify the first condition.

E. Then shall not be used at the end of an action step to instruct the operator to perform the next step because it runs actions together.

4.3 Use of Cautionary Information and Notes

Cautionary information can be considered in two fundamental categories: those that apply to the entire procedure and those that apply to a portion or a specific step of the procedure. Those that apply to the entire procedure are called "PRECAUTIONS" and are covered in operator training. Those that apply to a portion of a procedure are called "CAUTIONS" and are placed immediately before the procedural steps to which they apply.

Cautions shall be centered in the page as shown in the Example: CAUTION. This placement of cautions contributes to readability and helps ensure that the procedure user observes the caution before performing the step. A caution cannot be used instead of an instructional step. It should be used to denote a potential hazard to equipment or personnel associated with or consequent to the subsequent instructional step.

If additional information other than cautions is necessary to support an action instruction, a NOTE should be used. A NOTE should be present information only, not instructions, and should be located as shown in the following example.

The following examples illustrates these instructions.

1. Example CAUTION:

CAUTION

When loading the Diesel, the continuous high current trip could occur if equipment is rapidly loaded.

2. Example NOTE:

NOTE

Injection from RHR will not occur until reactor pressure is less than 195 psig.

4.4 Calculations

Mathematical calculations should be avoided in EPs. If a value has to be determined in order to perform a procedural step, a chart or graph should be used whenever possible.

4.5 Use of Underlining

Underlining will be used for emphasis of logic terms and CAUTION.

4.6 Referencing and Branching to Other Procedures or Steps

Referencing implies that an additional procedure or additional steps will be used as a supplement to the procedure presently being used. Referencing other steps within the procedure being used, either future steps or completed steps, should be minimized. When only a few steps are involved in the referencing, the steps should be stated in the procedure whenever they are needed.

To minimize potential operator confusion, branching will be used when the operator is to leave one procedure or step and use another procedure or step. Use the key words "go to". Therefore, the operator will know to leave the present step and not return until directed.

Use quotation marks to emphsize the title of the referenced or branched procedures; examples: Go to E-1, "Loss of Reactor Coolant". Go to Step 20.

4.7 Component Identification

With respect to identification of components, the following rules are to be followed:

A. Equipment, controls, and displays will be identified in operator language (common usage) terms. These terms may not always match engraved names on panels but will be complete.

B. When the engraved names and numbers on panel placards and alarm windows are specifically the item of concern in the procedure, the engraving should be quoted verbatim and emphasized by using all capitals.

C. The names of plant system titles are emphasized by initial capitalization. When the word "system" is deleted from the title because of brevity and is understood because of the context, the title is also emphasized by initial capitalization.

D. If the component is seldom used or it is felt that the component would be difficult to find, location information should be given in parentheses following the identification.

4.8 Level of Detail

Too much detail in EPs should be avoided in the interest of being able to effectively execute the instructions in a timely manner. The level of detail required is the detail that a newly trained and licensed operator would desire during an emergency condition.

To assist in determining the level of EP detail, the following general rules apply:

A. For each control with a number engraved on the control panel placard, the number should be included in parentheses within the instructional step; for example, "Start RCIC Water Leg Pump (S33)".

B. For control circuitry that executes an entire function upon actuation of the control switch, the action verb appropriate to the component suffices without further amplification of how to manipulate the control device; for example, "Close FEED PUMP A SUCTION VALVE (F028A)". Recommended action verbs are as follows:

1. For power-driven rotating equipment, use Start, Stop.

2. For valves, use Open, Close, Throttle Open, Throttle Close, Throttle.

3. For power distribution breakers, use Synchronize and Close, Trip.

C. For control switches with a positional placement that establishes a standby readiness condition, the verb "Set" should be used, along with the engraved name of the desired position.. Positional placements are typically associated with establishing readiness of automatic functions and are typically named AUTO or NORMAL; for example, "Set the Gland Seal Air Compressor Control Switch (S15) in AUTO".

D. For multiposition control switches that have more than one position for a similar function, placement to the desired position should be specified; for example, "Place Diesel Fire Pump Selector Switch to TEST NO. 2".

E. Standard practices for observing for abnormal results need not be prescribed within procedural steps. For example, observation of noise, vibration, erratic flow, or discharge pressure need not be specified by steps that start pumps.

4.9 Printed Operator Aids

When information is presented using graphs, charts, tables, and figures, these aids must be self-explanatory, legible, and readable under the expected conditions of use and within the reading precision of the operator.

4.9.1 Units of Measure

Units of measure on figures, tables, and attachments should be given for numerical values that represent observed, measurement data, or calculated results. A virgule (slant line) should be used instead of "per"; examples: ft/sec, lbs/hr.

4.9.2 Titles and Headings

Capitalization should be used for references to tables and figures, titles of tables and figures within text material, and column headings within a table.

Example: Refer to Figure 201 for . . . . . as shown in Table 201, Equipment Power Supplies, the . . . .

4.9.3 Figure, Table, and Attachment Numbering

Sequential arabic numbers should be assigned to figures, tables, and attachments in separate series. The sequence should correspond with the order of their reference in the text. The symbol "#" and abbreviation "No." are unnecessary and should not be used. The number alone suffices.

Example: Figure 1, Figure 2, etc.
Table 1, Table 2, etc.
Attachment 1, Attachment 2, etc.

Page identification for attachments should consist of a block of information that identifies:

A. Procedure Number

B. Attachment Number

C. Page Number

D. Revision Number.

Page numbering of attachments should meet the requirements of Subsection 2.5.

Section numbering for attachments should be in accordance with Subsection 3.3.

5.0 MECHANICS OF STYLE

5.1 Spelling

Spelling should be consistent with modern usage. When a choice of spelling is offered by a dictionary, the first spelling should be used.

5.2 Hyphenation

Hyphens are used between elements of a compound word when usage calls for it. The following rules should be followed for hyphenation:

A. When doubt exists, the compound word should be restructured to avoid hyphenation.

B. Hyphens should be used in the following circumstances:

1. In compound numerals from twenty-one to ninety-nine; example: one hundred thirty-four.

2. In fractions; examples: one-half, two-thirds.

3. In compounds with "self"; examples: self-contained, self-lubricated.

4. When the last letter of the first word is the same vowel as the first letter of the second word -- as an alternative, two words may be used; example: fire-escape or fire escape.

5. When misleadings or awkward consonants would result by joining the words; example: bell-like.

6. To avoid confusion with another word; examples: re-cover to prevent confusion with recover, pre-position to avoid confusion with preposition.

7. When a letter is linked with a noun; examples: X-ray, O-ring, U-bolt, I-beam.

8. To separate chemical elements and their atomic weight; examples: Uranium-235, U-235.

5.3 Punctuation

Punctuation should be used only as necessary to aid reading and prevent misunderstanding. Word order should be selected to require a minimum of punctuation. When extensive punctuation is necessary for clarity, the sentence should be rewritten and possibly made into several sentences. Punctuation should be in accordance with the following rules:

5.3.1 Brackets

Do not use brackets.

5.3.2 Colon

Use a colon to indicate that a list of items is to follow, for example: Restore cooling flow as follows:

5.3.3 Comma

Use of many commas is a sign the instruction is too complex and needs to be rewritten. Therefore, evaluate the number of commas to ensure the instruction is not too complex.

Use a comma after conditional phrases for clarity and ease of reading. Example: When level decreases to 60 inches, then start pump . . . .

5.3.4 Parentheses

Parentheses shall be used to indicate alternative items in a procedure, instruction, or equipment numbers.

5.3.5 Period

Use a period at the end of complete sentences and for indicating the decimal place in numbers.

5.4 Vocabulary

Words used in procedures should convey precise understanding to the trained person. The following rules apply.

A. Use simple words. Simple words are usually short words of few syllables. Simple words are generally common words.

B. Use common usage if it makes the procedure easier to understand.

C. Use words that are concrete rather than vague, specific rather than general, familiar rather than formal, precise rather than blanket.

D. Define key words that may be understood in more than one sense.

E. Verbs with specific meaning should be used. Examples are listed in Table 1.

F. Equipment status should be denoted as follows:

1. Operable/operability -- These words mean that a system, subsystem, train, component, or device is capable of performing its specified function(s) in the intended manner. Implicit in this definition is the assumption that all necessary attendant instrumentation, controls, normal and emergency electrical power sources, cooling or seal water, lubrication or other auxilliary equipment required for the system, subsystem, train, component, or device to perform its function(s) are also capable of performing related support function(s).

2. Operating -- This word means that a system, subsystem, train, component, or device is in operation and is performing its specified function(s), and that "Out of Service Cards" or other conditions do not prevent it from maintaining that service.

3. Available -- This word means that a system, subsystem, train, component, or device is operable and can be used as desired; however, it need not be operating.

Table 1 - Action Verbs

Verb	Application
Allow	To premit a stated condition to be achieved prior to proceeding, for example: "allow discharge pressure to stabilize"
Check	To perform a comparison with a procedural requirement "Check if LPCS can be terminated"
Close	To change the physical position of a mechanical device so that it prevents physical access or flow or permits passage of electrical current, for example: "close valve RHR-V-42C"
Complete	To accomplish specified procedural requirements, for example: "complete valve checkoff list 'A'", "complete data report QA-1", "complete Steps 7 through 9 of Section III"
Decrease	Do not use because of oral communication problems.
Establish	To make arrangements for a stated condition, for example: "establish communication with Control Room"
Increase	Do not use because of oral communication problems.
Inspect	To measure, observe, or evaluate a feature or characteristic for comparison with specified limits; method of inspection should be included, for example: "visually inspect for leaks"
Open	To change the physical position of a mechanical device, such as valve or door to the unobstructed position that permits access or flow, for example: "open valve RHR-V-42C"
Record	To document specified condition or characteristic, for example: "record discharge pressure"
Set	To physically adjust to a specified value an adjustable feature, for example: "set diesel speed to . . . 'rpm'"
Start	To originate motion of an electric or mechanical device directly or by remote control, for example: "start . . . pump"

Table 1 - Action Verbs (Continued)

Verb	Application
Stop	To terminate operation, for example: "stop . . . pump"
Throttle	To operate a valve in an intermediate position to obtain a certain flow rate, for example: "throttle valve LPCS-V-5 to . . ."
Trip	To manually activate a semi-automatic feature for example: "trip breaker . . ."
Vent	To permit a gas or liquid confined under pressure to escape at a vent, for example: "vent . . . pump"
Verify	To observe an expected condition or characteristic, for example: "verify discharge pressure is stable"

5.5 Numerical Values

The use of numerical values should be consistent with the following rules:

A. Arabic numerals should be used.

B. For numbers less than unity, the decimal point should be preceded by a zero; for example: 0.1.

C. The number of significant digits should be equal to the number of significant digits available from the display and the reading precision of the operator.

D. Acceptance values should be specified in such a way that addition and subtraction by the user is avoided if possible. This can generally be done by stating acceptance values as limits. Examples: 510°F maximum, 300 psig minimum, 580° to 600°F. For calibration points, statement of the midpoint and its lower and upper limits for each data cell would accomplish the same purposes; for example: 10 milliamperes (9.5 to 10.5). Avoid using ±.

E. Engineering units should always be specified for numerical values of process variables. They should be the same as those used on the Control Room displays, for example: psig instead of psi.

5.6 Abbreviations, Letter Symbols, and Acronyms

The use of abbreviations should be minimized because they may be confusing to those who are not thoroughly familiar with them. Abbreviations may be used where necessary to save time and space, and when their meaning is unquestionably clear to the intended reader. The full meaning of the abbreviation should be written in before the first use of the abbreviation and whenever in doubt. Consistency should be maintained throughout the procedure.

Capitalization of abbreviations should be uniform. If the abbreviation is comprised of lowercase letters, it should appear in lowercase in a title or heading. The period should be omitted in abbreviations except in cases where the omission would result in confusion.

Letter symbols may be used to represent operations, quantities, elements, relations, and qualities.

An acronym is a type of symbol formed by the initial letter or letters of each of the successive parts or major parts of a compound term. Acronyms may be used if they are defined or commonly used.

Abbreviations, symbols, and acronyms should not be overused. Their use should be for the benefit of the reader. They can be beneficial by saving reading time, ensuring clarity when space is limited, and communicating mathematic ideas.

6.0 TYPING FORMAT

6.1 General Typing Instructions

For emergency operating procedures, the following general requirements are to be followed:

A. Paper size should be 8-1/2 x 11 inches.

B. White, bond paper should be used.

C. Procedures are to be typed on Wang equipment.

D. Courier, pitch 12, print wheel is to be used.

6.2 Page Arrangement

A. Page margins are one inch on the left and right.

B. Page identification information (refer to Subsection 2.4) will be located in the page number block located at the bottom right hand side of each page.

C. The 8-1/2 inch by 11 inch edges shall constitute text and top and bottom of pages. Tables and Figures shall be readable with the page so arranged. Rotation of printed matter should be avoided for emergency operating procedures. Refer to Subsection 6.5 if rotation is absolutely necessary.

6.3 Heading and Text Arrangement

Indent style, as illustrated in Figure 1, is to be used. Section headings shall be upper and lower case, with an underscore.

A. Section numbers shall begin one inch from the left.

B. One line space shall be allowed between headings and respective text.

C. Text will be typed using single line spacing.

6.4 Breaking of Words

Breaking of words shall be avoided to facilitate operator reading.

6.5 Rotation of Pages

If pages need to be rotated, these rules shall be followed:

A. The top of the page with rotated print is the normal left-hand edge.

B. The page margins do not rotate.

C. Page identification and numbering will not be rotated.

6.6 Printed Operator Aids

Figures include graphs, drawings, diagrams, and illustrations. The following rules are established:

A. The figure number and its title are place one line space below the figure field (refer to Subsection 4.9).

B. The figure number and title should be of courier type, pitch 12.

C. The figure field must not violate specified page margins.

D. The figure field should be of sufficient size to offer good readability.

E. The essential message should be clear; simple presentations are perferred.

F. Grid lines of graphs should be at least 1/8-inch apart; numbered grid lines should be bolder than unnumbered grid lines.

G. Labeling of items within the figure should be accompanied by arrows pointing to the item.

H. The items within the figure should be oriented naturally insofar as possible. For example: height on a graph should be along the vertical axis.

I. In general, items within the figure should be labeled. Typed labels should use courier type, pitch 12. Handwritten labels should be printed, using all capitals, with letters and numbers at least 1/8-inch high.

J. All lines in figures should be reproducible.

Tables should be typed using the following rules:

A. Type style and size should be the same as that for the rest of the procedure.

B. The table number and title should be located above the table field and one line space below preceding text.

C. A heading should be entered for each column and centered within the column; the first letter of words in the column headings should be capitalized.

D. Horizontal lines should be placed above and below the column headings; vertical lines, while desirable, are not necessary or required.

Tabular headings should be aligned as follows:

A. Horizontally by related entries.

B. Vertically by decimal point for numerical entries.

C. Vertically by first letter for word entries; however, run-over lines should be indented three spaces.

D. Single spacing between horizontal entries suffices to segregate such entries, although horizontal lines may also be used if desired. If used, single horizontal lines should be used above and below the column headings.

E. There should not be a vacant cell in the table. If no entry is necessary, "N/A" should be entered to indicate not applicable.

6.7 Cautions and Notes

All notes and cautions should be distinguishable from the rest of the text by using the following format:

A. The applicable NOTE and CAUTION should be capitalized, centered and placed one line space below the preceding text; CAUTION will be underlined.

B. The text of the note or caution should be block format, single line spaced. The caution text will be indented twenty-one spaces from the left-hand printed margin, blocked between twenty-one and sixty-six spaces, and begun one line space below the heading. The text for notes will similarly located.

C. Examples are presented in Subsection 4.3.

6.8 Use of Foldout Pages

When used, a foldout page is treated as a single page. It should follow the same format as a standard page except the width is different. The page should be folded so that a small margin exists between the fold and the right-hand edge of standard pages. This will reduce wear of the fold.

6.9 Use of Oversized Pages

Oversized pages should not be used. They should be reorganized or reduced to a standard page. If this cannot be done, a foldout page should be used.

6.10 Use of Reduced Pages

Reduced pages should be avoided whenever possible. Final size of reduced pages should be standard page size. Reduced pages should be readable.

7.0 REPRODUCTION

Reproduction will be done on a standard copier, single-sided copy only.

WNP-2 EMERGENCY PROCEDURES

TRAINING PROGRAM

I. Brief Description

A. Licensed operator candidates have/will have had the following training on WNP-2 Emergency Procedures/Graphic Display System prior to their license exam:

1. Emergency Procedure Guidelines/Bases

- Reading assignment

2. Classroom walkthrough of EP Flow Chart - eight hours

- Includes entry conditions, applicability, contingencies, etc.

3. EP/GDS Course - 40 hours

- Formal classroom training on basis behind WNP-2's EPs, use of the GDS, Classification of Emergencies; also, actual hands-on training using the GDS

4. Simulator Refresher Training - 40 hours

- Actual use of WNP-2's EPs during simulator refresher training

5. EP Verification and Validation Program

- Plant Operations, on each rotating shift, will walk the EPs through the WNP-2 Control Room to verify the level of detail and compatibility to equipment nomenclature, control/indication location and instrument applicability. This will demonstrate that the actions required by the EPs can be related to the equipment, controls, indications, and the Graphic Display System

6. Mitigating Core Damage - 40 hours

- A portion of this course (approximately eight hours) will be devoted to provide instruction to plant personnel in the use of the WNP-2 Emergency Procedure for recognizing and mitigating the consequences of incidents, transients, and abnormal events