Event 7

RSP (Reactor Scram Procedure)

RVCP (Reator Vessel Control Procedure)

PCCP (Primary Containment Control)

C. OPERATOR ACTIONS

1. Control Operator Immediate Actions

The control operator immediate actions are those actions which may be performed following a reactor scram prior to entering the scram procedure (EOP-01). These actions are not mandatory and shall not conflict with entering the scram procedure. All the control operator immediate actions are located in the scram procedure flowchart. There are no control operator immediate actions in EOP-02 through EOP-04. In the event the actions are not performed prior to entering the scram procedure, the scram procedure shall take precedence. The control operator immediate actions which should be memorized by control operators, are defined as follows:

a. Unit 2 Only: After steam flow is less than 3×10^6 lb/hr, PLACE the reactor mode switch to SHUTDOWN.
Unit 1 Only: PLACE the reactor mode switch to SHUTDOWN.

b. IF reactor power is below 2% (APRM downscale trip), THEN TRIP the main turbine.

c. ENSURE the master reactor level controller setpoint is +170".

d. IF two reactor feed pumps are running, AND reactor vessel level is above +170" AND rising, THEN TRIP one.

The EOP actions are those which are contained within EOP-01 through EOP-04. In the event the control operator immediate actions are not performed prior to entering EOP-01, these actions become EOP actions.

Since the EOP actions are readily available to the control operator, there is no need to memorize them.

The operator is not required to have the Operating Procedures in hand while executing the EOPs, but may use any other procedure as necessary.

The following guidance applies to referencing of supporting material that is not included in the procedure but provides information required in the performance of a step (ERFIS, instructional aids, Users' Guide, etc.).

a. If the information is available from several sources and a specific source is preferred, then that source is explicitly referenced at the point it is needed.

b. If the information is provided by a source which is not readily recognized by the operator, then the source is explicitly referenced at the point it is needed.

SCRAM CARD

. ENSURE SCRAM VALVES ARE OPEN BY MANUAL SCRAM OR **ARI** TRIP

. CONTROL REACTOR PRESSURE BETWEEN 800 AND 1000 PSIG

. CONTROL REACTOR VESSEL LEVEL BETWEEN +170 AND +200 INCHES

. INSERT NUCLEAR INSTRUMENTATION

. PLACE RECIRC PUMP SPEED CONTROLLERS TO 10%

. ENSURE HEATER DRAIN PUMPS ARE TRIPPED

. ENSURE TURBINE OIL SYSTEM OPERATING

. PLACE **SULCV** IN SERVICE

S/907

RCIC OPERATIONS FOR EOPs

MANUAL RCIC INJECTION
(OP-16 SECTION 5.3)

_____ 1. **ENSURE** THE FOLLOWING VALVES ARE OPEN: E51-V8 (VALVE POSITION), E51-V8 (ACTUATOR POSITION), AND E51-V9

_____ 2. **OPEN** E51-F046

_____ 3. **START** VACUUM PUMP AND LEAVE SWITCH IN START.

_____ 4. **OPEN** E51-F045

_____ 5. **OPEN** E51-F013

_____ 6. **ENSURE** RCIC TURBINE STARTS AND COMES UP TO SPEED AS DIRECTED BY RCIC FLOW CONTROL

_____ 7. **ADJUST** RCIC FLOW CONTROLLER TO OBTAIN DESIRED FLOW RATE.

_____ 8. **ENSURE** E51-F019 IS CLOSED WITH FLOW ABOVE 80 GPM.

_____ 9. **ENSURE** THE FOLLOWING VALVES ARE CLOSED: E51-F025, E51-F026, E51-F004, AND E51-F005

_____ 10. **START** SBGT (OP-10)

_____ 11. **OPEN** THE SGT-V8 AND SGT-V9

_____ 12. **ENSURE** BAROMETRIC CNDSR CONDENSATE PUMP OPERATES

RCIC PRESSURE CONTROL
(OP-16 SECTION 8.2)

_____ 1. **ENSURE** THE FOLLOWING VALVES ARE OPEN: E51-V8 (VALVE POSITION), E51-V8 (ACTUATOR POSITION) AND E51-V9.

_____ 2. **OPEN** E51-F046

_____ 3. **START** VACUUM PUMP AND LEAVE SWITCH IN START.

_____ 4. **ENSURE** E51-F013 IS CLOSED

_____ 5. **ENSURE** E41-F011 IS OPEN

_____ 6. **THROTTLE OPEN** E51-F022 UNTIL DUAL INDICATION IS OBTAINED

_____ 7. **OPEN** E51-F045

_____ 8. **THROTTLE OPEN** E51-F022 OR **ADJUST** RCIC FLOW CONTROL, E51-FIC-R600, TO OBTAIN DESIRED SYSTEM PARAMETERS AND REACTOR PRESSURE.

_____ 9. **ENSURE** E51-F019 IS CLOSED WITH FLOW ABOVE 80 GPM.

_____ 10. **ENSURE** THE FOLLOWING VALVES ARE CLOSED: E51-F025, E51-F026, E51-F004, AND E51-F005.

_____ 11. **START** SBGT (OP-10)

_____ 12. **OPEN** THE SGT-V8 AND SGT-V9

_____ 13. **ENSURE** BAROMETRIC CNDSR CONDENSATE PUMP OPERATES

FOR SHUTDOWN REFER TO OP-16

HPCI INJECTION IN EOPs
(OP-19 SECTION 5.3)

_____ 1. **ENSURE** AUXILIARY OIL PUMP IS NOT RUNNING

_____ 2. **ENSURE** E41-V9 AND E41-V8 ARE CLOSED

_____ 3. **OPEN** E41-F059

_____ 4. **START** VACUUM PUMP AND **LEAVE** IN START

_____ 5. **OPEN** E41-F001

_____ 6. **START** AUXILIARY OIL PUMP AND **LEAVE** IN START

_____ 7. **OPEN** E41-F006, IMMEDIATELY AFTER E41-V8 HAS DUAL INDICATION

_____ 8. **ENSURE** E41-V9 AND E41-V8 ARE OPEN

_____ 9. **ENSURE** HPCI TURBINE COMES UP TO SPEED

_____ 10. **ADJUST** HPCI FLOW CONTROL, E41-FIC-R600 TO OBTAIN DESIRED FLOW RATE

_____ 11. **ENSURE** E41-F012 IS CLOSED WHEN FLOW HAS INCREASED ABOVE 800 GPM

_____ 12. **ENSURE** FOLLOWING E41 DRAIN VALVES ARE CLOSED: F025, AND F026

_____ 13. **START** SBGT (OP-10) AND **OPEN** SGT-V8 AND SGT-V9

_____ 14. **ENSURE** BAROMETRIC CNDSR CONDENSATE PUMP IS OPERATING.

TRANSFER TO PRESSURE CONTROL FROM LEVEL CONTROL
(OP-19 SECTION 8.3)

_____ 1. **ENSURE** HPCI IS NOT NEEDED FOR LEVEL CONTROL

_____ 2. **ENSURE** HPCI INITIATION SIGNAL IS RESET

_____ 3. **ENSURE** E51-F022 IS CLOSED

_____ 4. **TRANSFER** HPCI FLOW CONTROL TO MANUAL (M)

_____ 5. **REDUCE** HPCI TURBINE SPEED TO BETWEEN 3000 AND 3300 RPM

_____ 6. **OPEN** E41-F011

_____ 7. **CLOSE** E41-F006

_____ 8. WHEN E41-F006 IS CLOSED, THEN **THROTTLE OPEN** E41-F008 UNTIL FLOW IS GREATER THAN 1000 GPM

_____ 9. **ENSURE** E41-F012 IS CLOSED

_____ 10. **ADJUST** SETPOINT AND **TRANSFER** HPCI FLOW CONTROL TO AUTOMATIC (A)

_____ 11. **MAINTAIN** REACTOR PRESSURE BY THROTTLING E41-F008 OR VARYING HPCI FLOW USING THE FLOW CONTROLLER

TRANSFER TO LEVEL CONTROL FROM PRESSURE CONTROL
(OP-19 SECTION 8.4)

_____ 1. IF NECESSARY, **TRANSFER** HPCI FLOW CONTROL TO MANUAL (M)

_____ 2. **REDUCE** HPCI TURBINE SPEED TO BETWEEN 3000 AND 3300 RPM

_____ 3. **CLOSE** E41-F008

_____ 4. **OPEN** E41-F006

_____ 5. **ADJUST** SETPOINT AND **TRANSFER** HPCI FLOW CONTROL TO AUTOMATIC (A)

_____ 6. **ADJUST** HPCI FLOW CONTROL SETPOINT FOR DESIRED FLOW RATE

_____ 7. **ENSURE** E41-F012 IS CLOSED

_____ 8. IF DESIRED, THEN **CLOSE** E41-F011

EMERGENCY SUPPRESSION POOL COOLING

START

RHR SW A LOOP (CONV)

____ : OPEN SW-V101

____ : CLOSE SW-V143

____ : IF LOCA SIGNAL IS PRESENT
PLACE RHR SW BOOSTER PUMPS
A & C LOCA OVERRIDE SWITCH
TO MANUAL OVERRIDE

____ : START RHR SW PMP

____ : ADJUST E11-PDV-F068A

____ : SUPPLY CLG WTR TO VITAL HDR

RHR SW A LOOP (NUC)

____ :OPEN SW-V105

____ :CLOSE SW-V143

____ :OPEN SW-V102

____ :IF LOCA SIGNAL IS PRESENT
PLACE RHR SW BOOSTER PUMPS
A & C LOCA OVERRIDE SWITCH
TO MANUAL OVERRIDE

____ : START RHR SW PMP

____ : ADJUST E11-PDV-F068A

____ : SUPPLY CLG WTR TO VITAL HDR

START
RHR LOOP A

____ : IF LOCA SIGNAL IS PRESENT, VERIFY
SPRAY LOGIC IS MADE UP

____ :IF E11-F015A IS OPEN, THEN
CLOSE E11-F017A

____ : START LOOP A RHR PMP

____ : OPEN E11-F028A

____ : THROTTLE E11-F024A

____ : THROTTLE E11-F048A

REFERENCE OP-17 AND OP-43

S/1062

EMERGENCY SUPPRESSION POOL COOLING

START

RHR SW LOOP (NUC)

____ : OPEN SW-V105

____ : CLOSE SW-V143

____ : IF LOCA SIGNAL IS PRESENT
PLACE RHR SW BOOSTER PUMPS
B & D LOCA OVERRIDE SWITCH
TO MANUAL OVERRIDE

____ : START RHR SW PMP

____ : ADJUST E11-PDV-F068B

____ : SUPPLY CLG WTR TO VITAL HDR

RHR SW B LOOP (CONV)

____ :OPEN SW-V101

____ :CLOSE SW-V143

____ :OPEN SW-V102

____ :IF LOCA SIGNAL IS PRESENT
PLACE RHR SW BOOSTER PUMPS
B & D LOCA OVERRIDE SWITCH
TO MANUAL OVERRIDE

____ : START RHR SW PMP

____ : ADJUST E11-PDV-F068B

____ : SUPPLY CLG WTR TO VITAL HDR

START
RHR LOOP B

____ : IF LOCA SIGNAL IS PRESENT, VERIFY
SPRAY LOGIC IS MADE UP

____ :IF E11-F015B IS OPEN, THEN
CLOSE E11-F017B

____ : START LOOP B RHR PMP

____ : OPEN E11-F028B

____ : THROTTLE E11-F024B

____ : THROTTLE E11-F048B

REFERENCE OP-17 AND OP-43

REACTOR SCRAM PROCEDURE

BNP VOL- VI 2EOP- 01- RSP

REVISION NO: 9

UNIT 2 ONLY

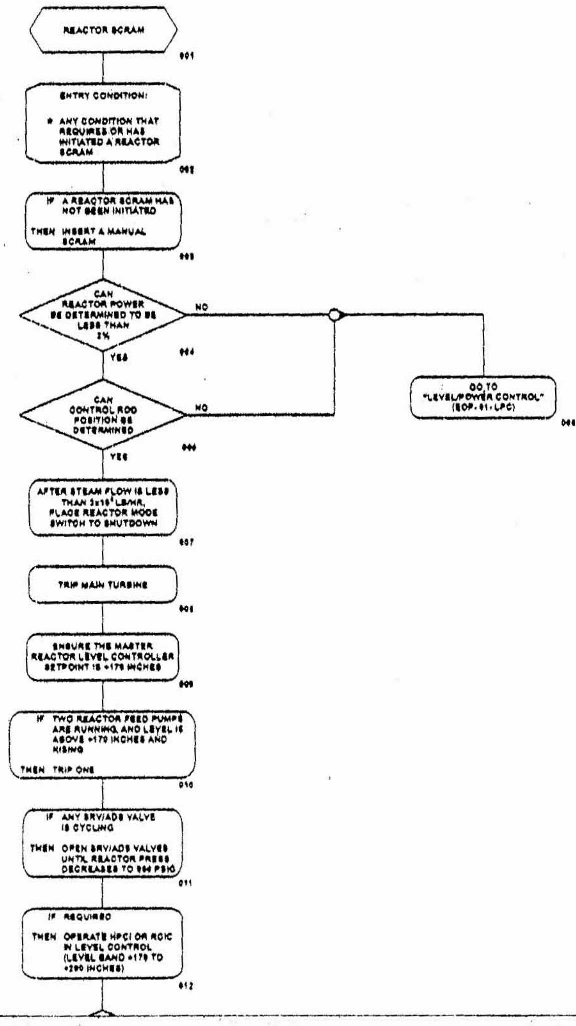
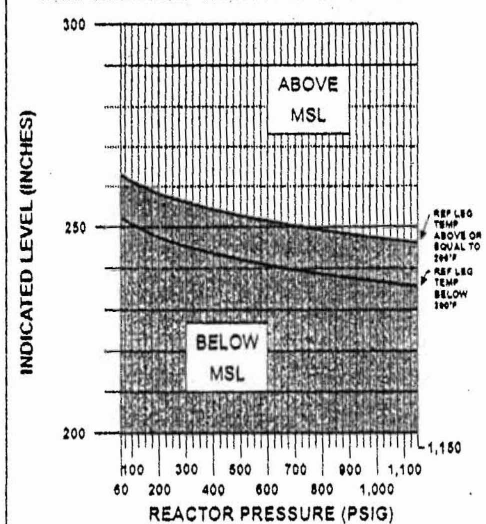
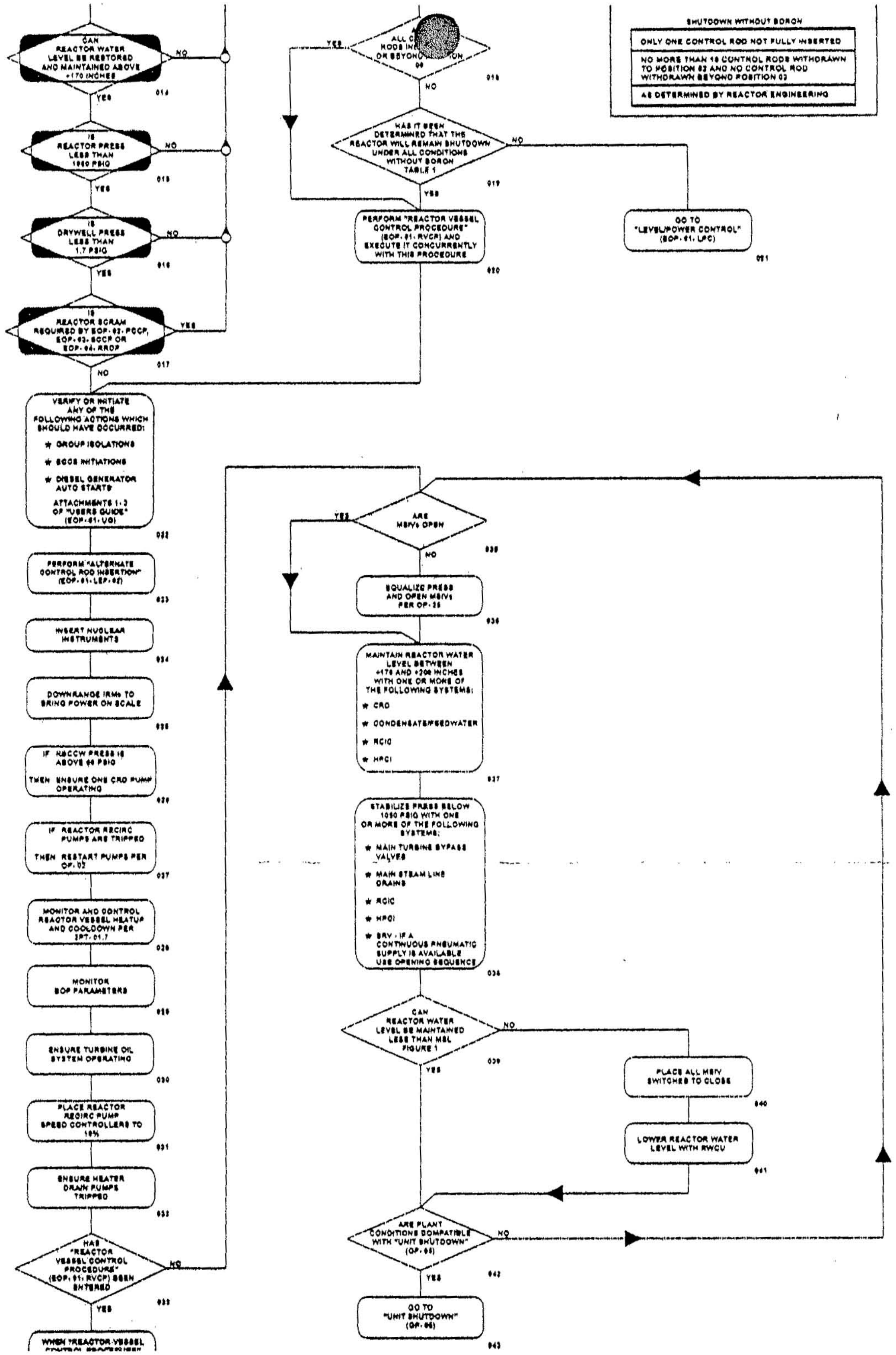


FIGURE 1

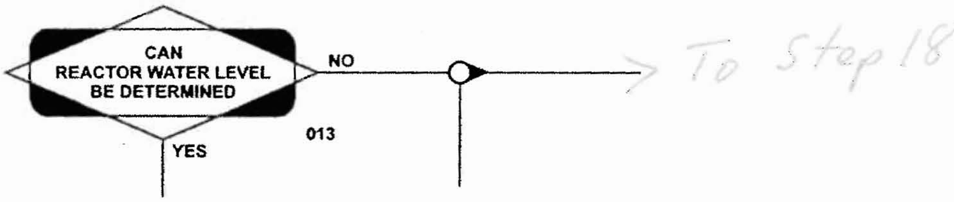
REACTOR WATER LEVEL AT MSL DETERMINATION USING B21- LI- R605A (N027A) OR B21- LI- R605B (N027B)



NOTE
WHEN REACTOR PRESSURE IS LESS THAN 60 PSIG, USE INDICATED LEVEL. MSL IS +250 INCHES.


CAN REACTOR WATER LEVEL BE RESTORED AND MAINTAINED ABOVE +170 INCHES
014
IS REACTOR PRESS LESS THAN 1050 PSIG
015
IS DRYWELL PRESS LESS THAN 1.7 PSIG
016
IS REACTOR SCRAM REQUIRED BY EOP-02-PCCP, EOP-03-SCCP OR EOP-04-RRCP
017
YES
NO
OR BEYOND
018
HAS IT BEEN DETERMINED THAT THE REACTOR WILL REMAIN SHUTDOWN UNDER ALL CONDITIONS WITHOUT BORON TABLE 1
019
PERFORM "REACTOR VESSEL CONTROL PROCEDURE" (EOP-01-RVCP) AND EXECUTE IT CONCURRENTLY WITH THIS PROCEDURE
020
GO TO "LEVEL/POWER CONTROL" (EOP-01-LPC)
021
SHUTDOWN WITHOUT BORON
ONLY ONE CONTROL ROD NOT FULLY INSERTED
NO MORE THAN 10 CONTROL RODS WITHDRAWN TO POSITION 02 AND NO CONTROL ROD WITHDRAWN BEYOND POSITION 02
AS DETERMINED BY REACTOR ENGINEERING
VERIFY OR INITIATE ANY OF THE FOLLOWING ACTIONS WHICH SHOULD HAVE OCCURRED:
* GROUP ISOLATIONS
* ECCS INITIATIONS
* DIESEL GENERATOR AUTO STARTS
ATTACHMENTS 1-3 OF "USERS GUIDE" (EOP-01-UG)
022
PERFORM "ALTERNATE CONTROL ROD INSERTION" (EOP-01-LEP-02)
023
INSERT NUCLEAR INSTRUMENTS
024
DOWNRANGE IRMs TO BRING POWER ON SCALE
025
IF RBCCW PRESS IS ABOVE 60 PSIG THEN ENSURE ONE CRD PUMP OPERATING
026
IF REACTOR RECIRC PUMPS ARE TRIPPED THEN RESTART PUMPS PER OP-02
027
MONITOR AND CONTROL REACTOR VESSEL HEATUP AND COOLDOWN PER 2PT-01.7
028
MONITOR BOP PARAMETERS
029
ENSURE TURBINE OIL SYSTEM OPERATING
030
PLACE REACTOR RECIRC PUMP SPEED CONTROLLERS TO 10%
031
ENSURE HEATER DRAIN PUMPS TRIPPED
032
HAS "REACTOR VESSEL CONTROL PROCEDURE" (EOP-01-RVCP) BEEN ENTERED
033
WHEN REACTOR VESSEL
ARE MSIVs OPEN
035
EQUALIZE PRESS AND OPEN MSIVs PER OP-25
036
MAINTAIN REACTOR WATER LEVEL BETWEEN +170 AND +200 INCHES WITH ONE OR MORE OF THE FOLLOWING SYSTEMS:
* CRD
* CONDENSATE/FEEDWATER
* RCIC
* HPCI
037
STABILIZE PRESS BELOW 1050 PSIG WITH ONE OR MORE OF THE FOLLOWING SYSTEMS:
* MAIN TURBINE BYPASS VALVES
* MAIN STEAM LINE DRAINS
* RCIC
* HPCI
* SRV - IF A CONTINUOUS PNEUMATIC SUPPLY IS AVAILABLE USE OPENING SEQUENCE
038
CAN REACTOR WATER LEVEL BE MAINTAINED LESS THAN MSL FIGURE 1
039
PLACE ALL MSIV SWITCHES TO CLOSE
040
LOWER REACTOR WATER LEVEL WITH RWCU
041
ARE PLANT CONDITIONS COMPATIBLE WITH "UNIT SHUTDOWN" (OP-65)
042
GO TO "UNIT SHUTDOWN" (OP-65)
043

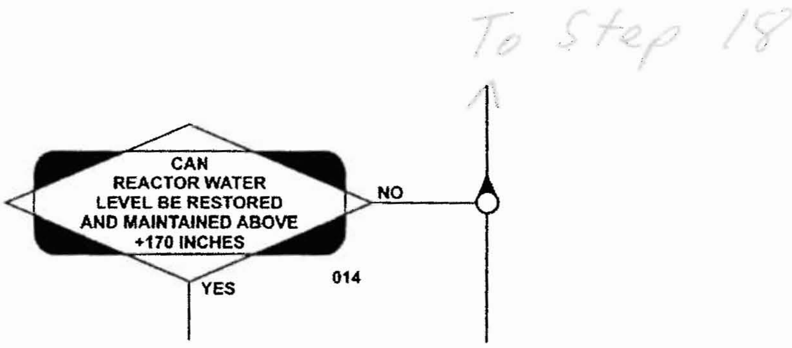
STEP 013



STEP BASES:

This step requires the operator to evaluate plant conditions and determine the status of actual reactor water level and its indications. This critical step will direct the operator to the Reactor Vessel Control Procedure or Level/Power Control should level instrumentation indicate that vessel level recovery actions are necessary.

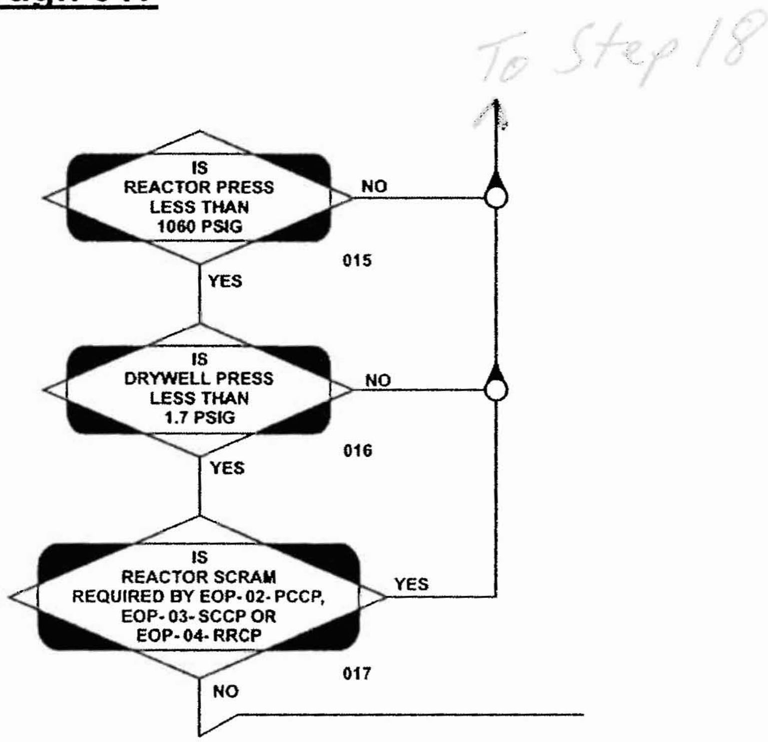
STEP 014



STEP BASES:

If reactor water level cannot be maintained above +170 inches, additional level control measures must be taken. These additional measures will be taken once the operator enters the Reactor Vessel Control Procedure or Level/Power Control procedure.

STEPS 015 through 017



STEP BASES:

These steps are used to determine if an entry condition exists for the Reactor Vessel Control Procedure or the Level/Power Control procedure. The parameters selected are RPS Scram setpoints or critical parameters, which indicate that an emergency condition exists which requires the use of the above referenced procedures. It also directs entry to the EPG based procedures if required to scram by Containment Control procedures or the Radioactivity Release Control Procedure.

STEPS 018 through 021

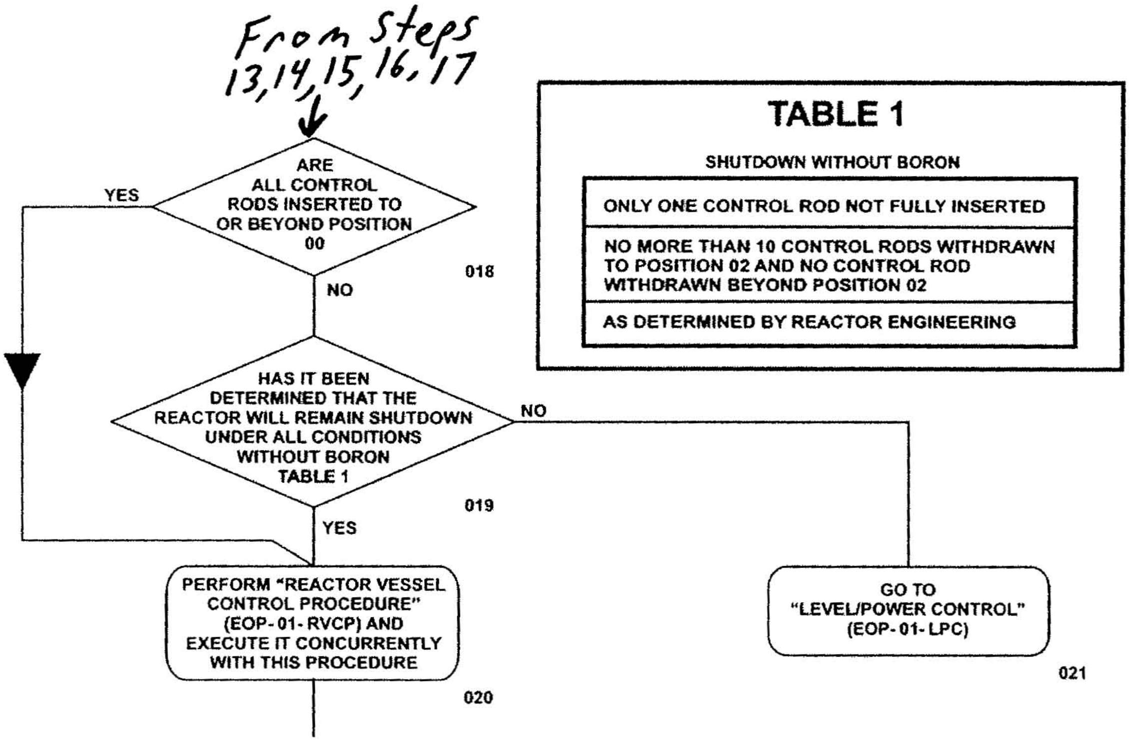


TABLE 1

SHUTDOWN WITHOUT BORON

ONLY ONE CONTROL ROD NOT FULLY INSERTED
NO MORE THAN 10 CONTROL RODS WITHDRAWN TO POSITION 02 AND NO CONTROL ROD WITHDRAWN BEYOND POSITION 02
AS DETERMINED BY REACTOR ENGINEERING

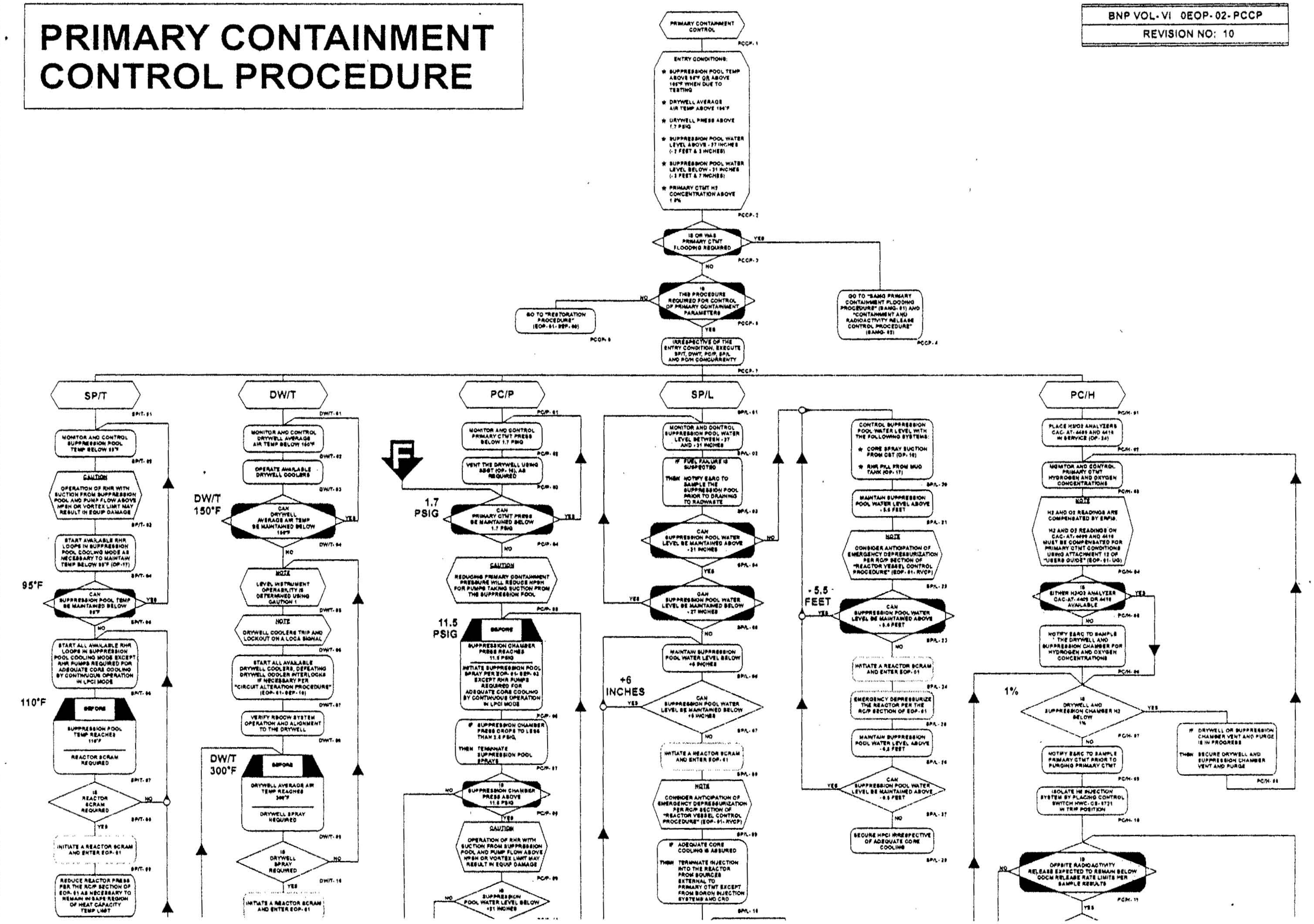
STEP BASES:

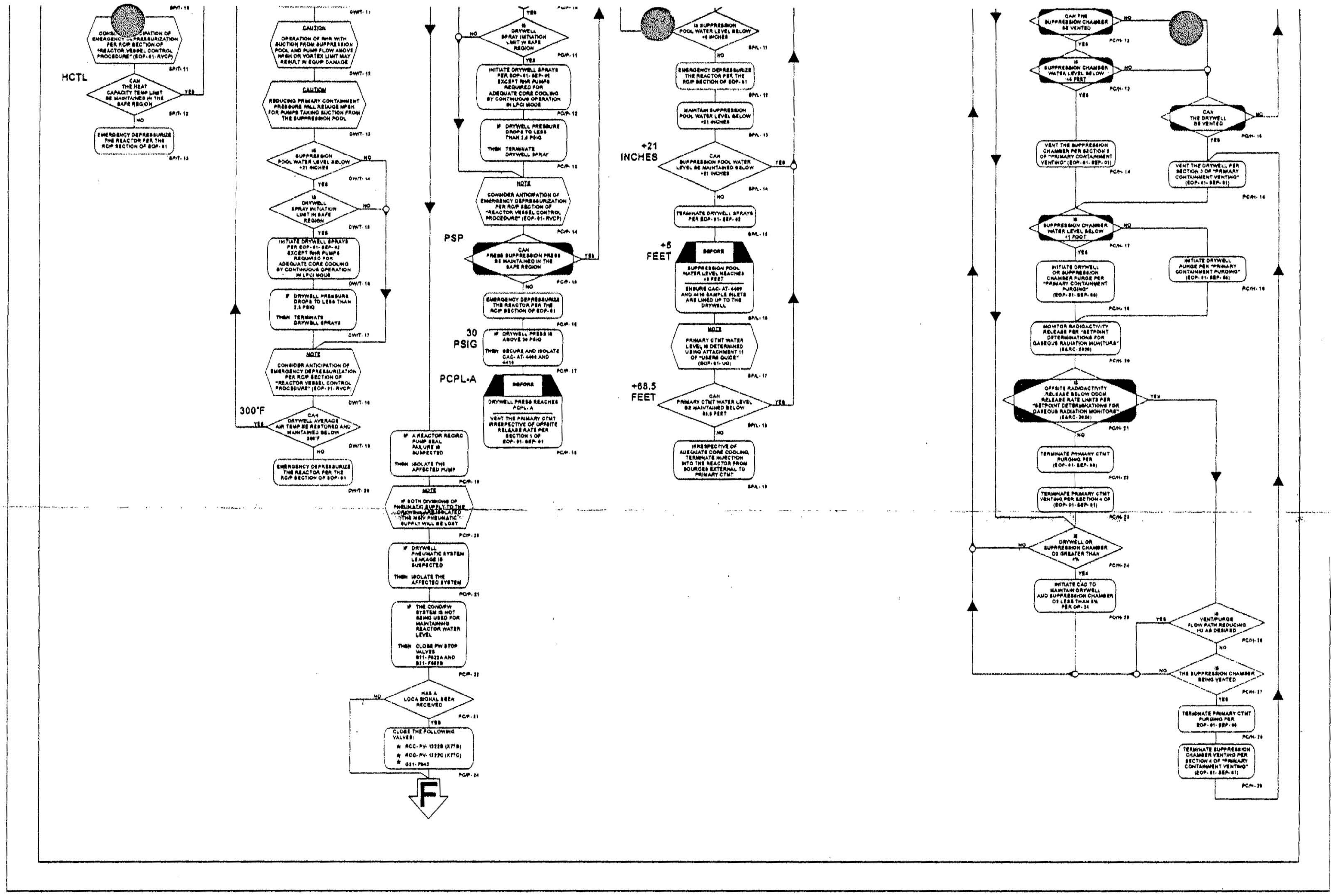
These steps determine whether entry to the Reactor Vessel Control Procedure or the Level/Power Control procedure is required based on whether or not a cold shutdown control rod configuration exists. If cold shutdown is not assured on control rods alone, then entry to the Level/Power Control procedure is directed where the required actions to control reactor water level, pressure, and power and to insert control rods are found. If cold shutdown is assured, then entry to the Reactor Vessel Control Procedure, where guidance on the control of reactor water level and pressure are found, is directed. Execution of the Reactor Vessel Control Procedure and the remainder of the Reactor Scram Procedure are then performed concurrently.

Positive confirmation that the reactor will remain shut down under all conditions is best obtained by determining that no control rod is withdrawn beyond the Maximum Subcritical Bank Withdrawal Position, of position 00. Table 1 has been added to provide a listing of those conditions for the reactor being shutdown under all conditions without boron. This was added specifically for condition where 10 control rods could be withdrawn to position 02 as long as no control rod is withdrawn beyond position 02.

On a loss of UPS or any other condition where control rod position can not be determined, then entry to the Level/Power Control procedure is required.

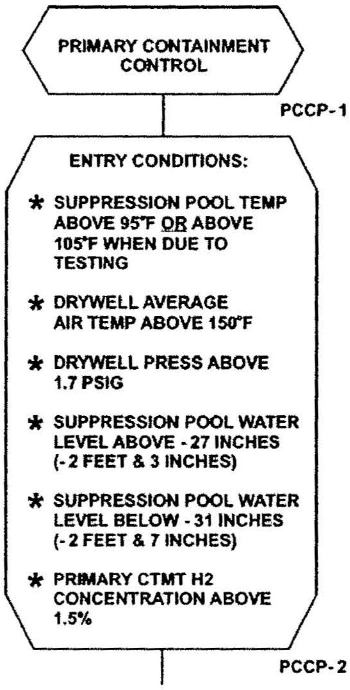
PRIMARY CONTAINMENT CONTROL PROCEDURE




SP/T-10
CONSIDER ANTICIPATION OF EMERGENCY DEPRESSURIZATION PER RC/P SECTION OF "REACTOR VESSEL CONTROL PROCEDURE" (EOP-01-RVCP)
SP/T-11
HCTL
CAN THE HEAT CAPACITY TEMP LIMIT BE MAINTAINED IN THE SAFE REGION
YES
NO
SP/T-12
EMERGENCY DEPRESSURIZE THE REACTOR PER THE RC/P SECTION OF EOP-01
SP/T-13
DW/T-11
CAUTION
OPERATION OF RHR WITH SUCTION FROM SUPPRESSION POOL AND PUMP FLOW ABOVE NPSH OR VORTEX LIMIT MAY RESULT IN EQUIP DAMAGE
DW/T-12
CAUTION
REDUCING PRIMARY CONTAINMENT PRESSURE WILL REDUCE NPSH FOR PUMPS TAKING SUCTION FROM THE SUPPRESSION POOL
DW/T-13
IS SUPPRESSION POOL WATER LEVEL BELOW +21 INCHES
DW/T-14
IS DRYWELL SPRAY INITIATION LIMIT IN SAFE REGION
DW/T-15
INITIATE DRYWELL SPRAYS PER EOP-01-SEP-02 EXCEPT RHR PUMPS REQUIRED FOR ADEQUATE CORE COOLING BY CONTINUOUS OPERATION IN LPCI MODE
DW/T-16
IF DRYWELL PRESSURE DROPS TO LESS THAN 2.5 PSIG
THEN TERMINATE DRYWELL SPRAYS
DW/T-17
NOTE
CONSIDER ANTICIPATION OF EMERGENCY DEPRESSURIZATION PER RC/P SECTION OF "REACTOR VESSEL CONTROL PROCEDURE" (EOP-01-RVCP)
DW/T-18
300°F
CAN DRYWELL AVERAGE AIR TEMP BE RESTORED AND MAINTAINED BELOW 300°F
DW/T-19
EMERGENCY DEPRESSURIZE THE REACTOR PER THE RC/P SECTION OF EOP-01
DW/T-20
IS DRYWELL SPRAY INITIATION LIMIT IN SAFE REGION
PC/P-11
INITIATE DRYWELL SPRAYS PER EOP-01-SEP-02 EXCEPT RHR PUMPS REQUIRED FOR ADEQUATE CORE COOLING BY CONTINUOUS OPERATION IN LPCI MODE
PC/P-12
IF DRYWELL PRESSURE DROPS TO LESS THAN 2.5 PSIG
THEN TERMINATE DRYWELL SPRAY
PC/P-13
NOTE
CONSIDER ANTICIPATION OF EMERGENCY DEPRESSURIZATION PER RC/P SECTION OF "REACTOR VESSEL CONTROL PROCEDURE" (EOP-01-RVCP)
PC/P-14
PSP
CAN PRESS SUPPRESSION PRESS BE MAINTAINED IN THE SAFE REGION
PC/P-15
EMERGENCY DEPRESSURIZE THE REACTOR PER THE RC/P SECTION OF EOP-01
PC/P-16
30 PSIG
IF DRYWELL PRESS IS ABOVE 30 PSIG
THEN SECURE AND ISOLATE CAC-AT-4409 AND 4410
PC/P-17
PCPL-A
BEFORE
DRYWELL PRESS REACHES PCPL-A
VENT THE PRIMARY CTMT IRRESPECTIVE OF OFFSITE RELEASE RATE PER SECTION 1 OF EOP-01-SEP-01
PC/P-18
IF A REACTOR RECIRC PUMP SEAL FAILURE IS SUSPECTED
THEN ISOLATE THE AFFECTED PUMP
PC/P-19
NOTE
IF BOTH DIVISIONS OF PNEUMATIC SUPPLY TO THE DRYWELL ARE ISOLATED THE MSIV PNEUMATIC SUPPLY WILL BE LOST
PC/P-20
IF DRYWELL PNEUMATIC SYSTEM LEAKAGE IS SUSPECTED
THEN ISOLATE THE AFFECTED SYSTEM
PC/P-21
IF THE COND/FW SYSTEM IS NOT BEING USED FOR MAINTAINING REACTOR WATER LEVEL
THEN CLOSE FW STOP VALVES B21-F032A AND B21-F032B
PC/P-22
HAS A LOCA SIGNAL BEEN RECEIVED
PC/P-23
CLOSE THE FOLLOWING VALVES:
RCC-PV-1222B (X77B)
RCC-PV-1222C (X77C)
G31-F042
PC/P-24
F
IS SUPPRESSION POOL WATER LEVEL BELOW +6 INCHES
SP/L-11
EMERGENCY DEPRESSURIZE THE REACTOR PER THE RC/P SECTION OF EOP-01
SP/L-12
MAINTAIN SUPPRESSION POOL WATER LEVEL BELOW +21 INCHES
SP/L-13
+21 INCHES
CAN SUPPRESSION POOL WATER LEVEL BE MAINTAINED BELOW +21 INCHES
SP/L-14
TERMINATE DRYWELL SPRAYS PER EOP-01-SEP-02
SP/L-15
+5 FEET
BEFORE
SUPPRESSION POOL WATER LEVEL REACHES +5 FEET
ENSURE CAC-AT-4409 AND 4410 SAMPLE INLETS ARE LINED UP TO THE DRYWELL
SP/L-16
NOTE
PRIMARY CTMT WATER LEVEL IS DETERMINED USING ATTACHMENT 11 OF "USERS GUIDE" (EOP-01-UG)
SP/L-17
+68.5 FEET
CAN PRIMARY CTMT WATER LEVEL BE MAINTAINED BELOW 68.5 FEET
SP/L-18
IRRESPECTIVE OF ADEQUATE CORE COOLING, TERMINATE INJECTION INTO THE REACTOR FROM SOURCES EXTERNAL TO PRIMARY CTMT
SP/L-19
CAN THE SUPPRESSION CHAMBER BE VENTED
PC/H-12
IS SUPPRESSION CHAMBER WATER LEVEL BELOW +6 FEET
PC/H-13
CAN THE DRYWELL BE VENTED
PC/H-15
VENT THE SUPPRESSION CHAMBER PER SECTION 2 OF "PRIMARY CONTAINMENT VENTING" (EOP-01-SEP-01)
PC/H-14
VENT THE DRYWELL PER SECTION 3 OF "PRIMARY CONTAINMENT VENTING" (EOP-01-SEP-01)
PC/H-16
IS SUPPRESSION CHAMBER WATER LEVEL BELOW +1 FOOT
PC/H-17
INITIATE DRYWELL OR SUPPRESSION CHAMBER PURGE PER "PRIMARY CONTAINMENT PURGING" (EOP-01-SEP-06)
PC/H-18
INITIATE DRYWELL PURGE PER "PRIMARY CONTAINMENT PURGING" (EOP-01-SEP-06)
PC/H-19
MONITOR RADIOACTIVITY RELEASE PER "SETPOINT DETERMINATIONS FOR GASEOUS RADIATION MONITORS" (E&RC-2020)
PC/H-20
IS OFFSITE RADIOACTIVITY RELEASE BELOW ODCM RELEASE RATE LIMITS PER "SETPOINT DETERMINATIONS FOR GASEOUS RADIATION MONITORS" (E&RC-2020)
PC/H-21
TERMINATE PRIMARY CTMT PURGING PER (EOP-01-SEP-06)
PC/H-22
TERMINATE PRIMARY CTMT VENTING PER SECTION 4 OF (EOP-01-SEP-01)
PC/H-23
IS DRYWELL OR SUPPRESSION CHAMBER O2 GREATER THAN 4%
PC/H-24
INITIATE CAD TO MAINTAIN DRYWELL AND SUPPRESSION CHAMBER O2 LESS THAN 5% PER OP-24
PC/H-25
IS VENT/PURGE FLOW PATH REDUCING H2 AS DESIRED
PC/H-26
IS THE SUPPRESSION CHAMBER BEING VENTED
PC/H-27
TERMINATE PRIMARY CTMT PURGING PER EOP-01-SEP-06
PC/H-28
TERMINATE SUPPRESSION CHAMBER VENTING PER SECTION 4 OF "PRIMARY CONTAINMENT VENTING" (EOP-01-SEP-01)
PC/H-29

3.0 STEP BASES

STEPS PCCP-1 and PCCP-2



STEP BASES:

The conditions which require entry into the Primary Containment Control Procedure are symptomatic of an emergency or conditions which, if not corrected, could degrade into an emergency. This set of entry conditions is sufficient to assure that procedures will be entered for transients and accidents, which are within the design and licensing basis for BWRs and for additional events which have been evaluated as significant with respect to emergency response actions.

Similar to the rationale which formed the basis for selecting the Reactor Control Guideline entry condition parameters and setpoints, setpoints for the Primary Containment Control Procedure entry condition parameters are simple, unambiguous, operationally significant, readily identifiable, and familiar to plant operators. For example, each of the entry conditions is typically one or more of the following:

a. Scram setpoint

b. Annunciator alarm setpoint

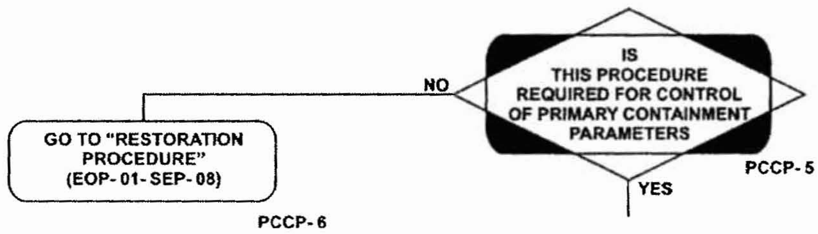
STEPS PCCP-1 and PCCP-2 (continued)

c. Technical specification limit

d. ECCS automatic initiation logic trip setpoint

The entry condition setpoints are specified so as to provide advance warning to operators of potential emergency conditions, allowing action to be taken sufficiently early to prevent more severe consequences.

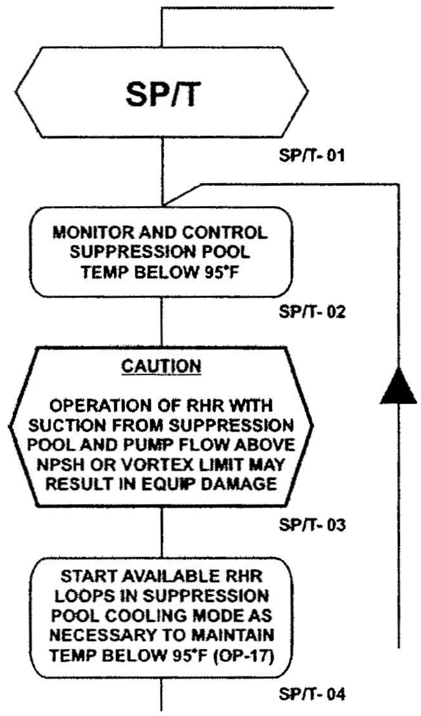
STEPS PCCP-5 and PCCP-6



STEP BASES:

If performing the actions specified in the Primary Containment Control Procedure restores the entry condition(s) to normal, and this procedure is no longer required to control primary containment parameters, then the operator may exit this procedure since primary containment will no longer be threatened at this point. EOP-01-SEP-08 is entered to ensure all jumpers and inhibits used during execution of PCCP are restored to normal and all safety systems are returned to normal.

STEPS SP/T-01 through SP/T-04



STEP BASES:

The initial action taken to control suppression pool temperature employs the same method typically used during normal plant operations: monitoring its status and placing available suppression pool cooling in operation, as required, to maintain temperature within technical specification limits. These steps thus provide a smooth transition from general plant procedures to the Emergency Operating Procedures and assure that the normal method of suppression pool temperature control is attempted in advance of initiating more complex actions to terminate rising suppression pool temperature.

As long as suppression pool temperature remains below the value of the most limiting suppression pool temperature LCO, no further operator action is required in this section of the procedure other than continuing to monitor and control suppression pool temperature using available suppression pool cooling systems.

The NPSH (Net Positive Suction Head) limits are defined to be the highest suppression pool temperature which provides adequate net positive suction head for pumps taking suction on the pool. The NPSH Limits are functions of pump flow and suppression chamber overpressure (airspace pressure plus the hydrostatic head of water over the pump suction). It is utilized to preclude pump damage from cavitation. It should be noted that containment pressurization of up to 5 psig is credited for maintaining NPSH margins for BNP. Therefore, as actions are taken that reduce suppression chamber pressure (i.e. suppression pool cooling, containment sprays), pump NPSH requirements should be considered, and closer attention directed towards observing the performance of the RHR and Core Spray pumps for signs of NPSH problems.

The vortex limits are defined to be the lowest suppression pool water level above which air entrainment is not expected to occur in pumps taking suction on the pool. These levels are functions of ECCS flow. Exceeding the limits can lead to air entrainment at the pump suction strainers.

The NPSH and vortex limits are addressed through a caution for the following reasons:

a. It is difficult to define in advance exactly when the limits should be observed and when pumps should be operated irrespective of the limits.

b. Pumps to which the limits apply are used in more than one parameter control path, or in different procedures. RHR pumps, for example, may be used in the Reactor Vessel Control Procedure, the Level/Power Control procedure, or the Primary Containment Control Procedure. Authorizing operation of the pumps "irrespective of NPSH and vortex limits" in one path may conflict with instructions in another path where flow would normally be controlled below the limits.

The identified systems should be operated within the NPSH and vortex limits if possible. If the situation warrants, however, the limits may be exceeded. A judgment as to whether a pump should be operated beyond its limits in a particular event should consider such factors as:

a. The availability of other systems

b. The current trend of plant parameters

c. The anticipated time such operation will be required

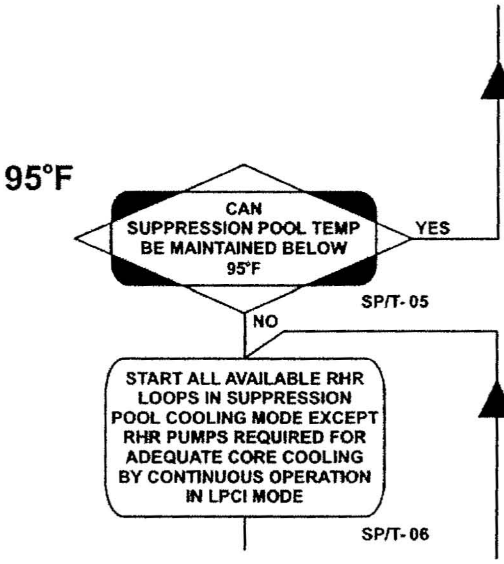
d. The degree to which the limit will be exceeded

e. The sensitivity of the pump to operation beyond the limit

f. The consequences of *not* operating the pump beyond the limit

Immediate and catastrophic failure is not expected if a pump is operated beyond the NPSH or vortex limit.

STEPS SP/T-05 and SP/T-06

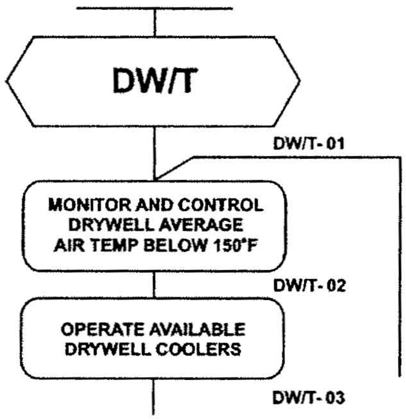


STEP BASES:

When it is determined that suppression pool temperature cannot be maintained below the value of the most limiting suppression pool temperature LCO, a conclusion that may be reached in advance of suppression pool temperature actually reaching this value, the general direction of Step SP/T-04 is supplemented with the explicit instruction to place into operation all available methods by which Suppression Pool Cooling can be effected.

Step SP/T-06 assures adequate core cooling takes precedence over maintaining suppression pool temperature below the LCO since catastrophic failure of the primary containment is not expected to occur at this temperature. In addition, further action still remains available for reversing a rising suppression pool temperature trend. Therefore, only if continuous operation of a RHR pump in the LPCI mode is not required to assure adequate core cooling is it permissible to use that pump for Suppression Pool Cooling. This step, however, does permit alternating the use of RHR pumps between LPCI injection and Suppression Pool Cooling as the need for each occurs and so long as adequate core cooling is able to be maintained.

STEPS DW/T-01 through DW/T-03



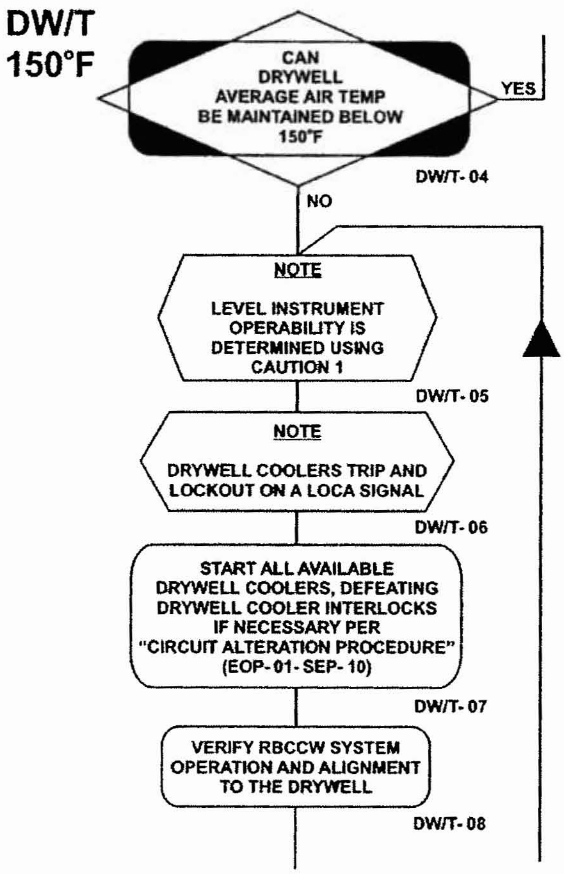
STEP BASES:

The initial action taken to control drywell temperature employs the same method typically used during normal plant operations: monitoring its status and placing available drywell cooling in operation, as required, to maintain temperature within specified normal operating limits (below drywell average air temperature LCO of 150°F).

These steps provide a smooth transition from general plant procedures to the Emergency Operating Procedures, and assure that the normal method of drywell temperature control is attempted in advance of initiating more complex actions to terminate rising drywell temperature.

As long as drywell temperature remains below normal operating limits no further operator action is required in this section of the EOP other than continuing to monitor and control drywell temperature using available drywell cooling.

STEPS DW/T-04 through DW/T-08



STEP BASES:

When it is determined that drywell temperature cannot be maintained below the drywell average temperature LCO limit of 150°F, a conclusion that may be reached prior to drywell temperature actually reaching this value, the general direction of Step DW/T-03 is supplemented with the explicit instruction to place into operation all available methods by which drywell cooling can be effected as indicated in Step DW/T-07. A note is added to inform the operator at Step DW/T-06 that the drywell coolers are tripped and locked out on a LOCA signal.

STEPS DW/T-04 through DW/T-08 (continued)

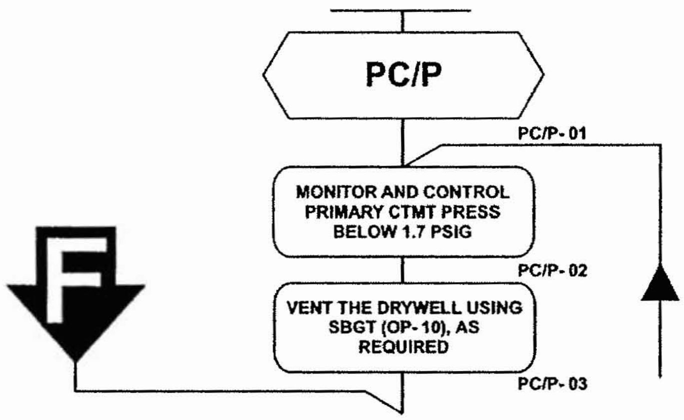
All available drywell coolers should be started in an effort to reduce drywell average temperature, unless actual LOCA conditions exist in the drywell. Step DW/T-07, through EOP-01-SEP-10, allows inhibiting of the LOCA signal-drywell cooler lockout if reactor water level is low. Defeating of interlocks recognizes that concurrent actions by other procedures (i.e. Level/Power Control) may otherwise preclude normal drywell cooler operation.

RBCCW pressure and temperatures should be verified to ensure proper system operation. If the Reactor Building is accessible, additional RBCCW heat exchangers and/or SW to the RBCCW heat exchangers can be placed in service. In addition, nonessential equipment serviced by RBCCW can be taken out of service and isolated.

Step DW/T-05 is used to alert the operator that elevated drywell temperatures may adversely affect reactor level instrumentation. A detailed discussion of this caution is contained within the EOP User's Guide.

If drywell temperature can be maintained below 150°F, then the operator is directed back into Step DW/T-02 so that he can continue to monitor and control drywell temperatures until they reach the normal operating value.

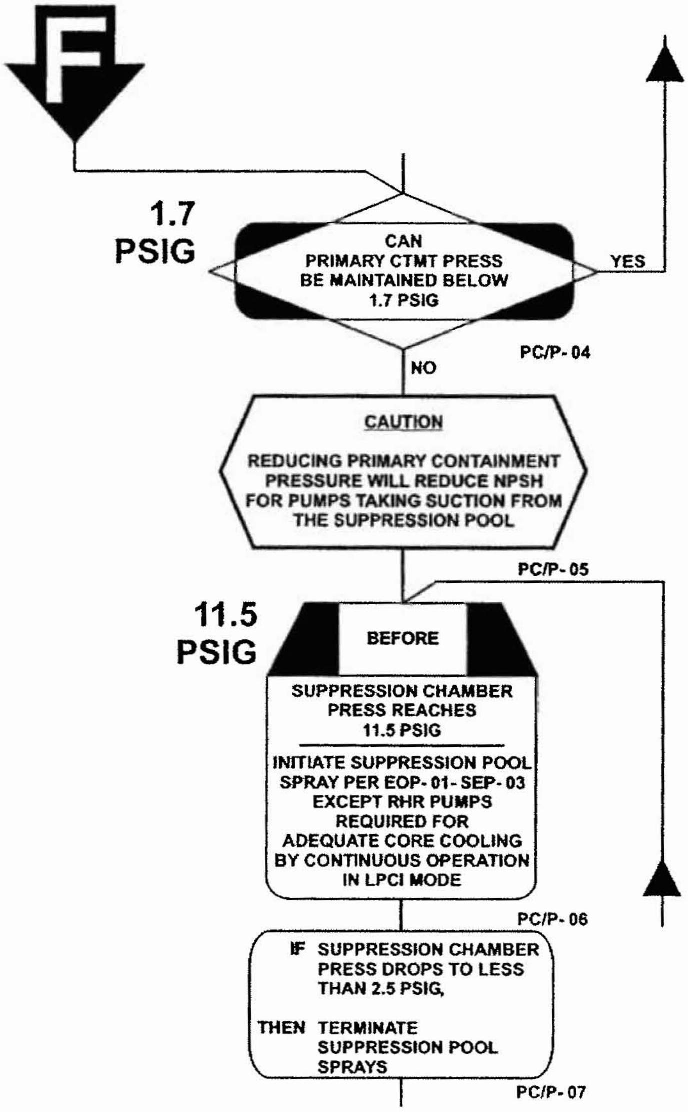
STEPS PC/P-01 through PC/P-03



STEP BASES:

These steps provide the initial action taken to control primary containment pressure which employs the same methods typically used during normal plant operations: monitoring its status and using containment and drywell pressure control systems (including Standby Gas Treatment System), as required, to maintain containment pressure below the high drywell pressure scram setpoint. These steps thus provide a smooth transition from general plant operating procedures to the Emergency Operating Procedures, and assure that normal methods of primary containment pressure control are attempted in advance of initiating more complex actions to terminate rising primary containment pressure.

STEPS PC/P-04 through PC/P-07



STEP BASES:

Operation of suppression pool sprays reduces primary containment pressure by condensing steam that may be present in the suppression chamber airspace, and by absorbing heat energy from the enclosed atmosphere through the processes of evaporative and convective cooling.

STEPS PC/P-04 through PC/P-07 (continued)

The Suppression Chamber Spray Initiation Pressure is defined to be the lowest suppression chamber pressure which can occur when 95% of the noncondensibles in the drywell have been transferred to the airspace of the suppression chamber. This pressure is utilized to preclude chugging: the cyclic condensation of steam at the downcomer openings of the drywell vents.

When a steam bubble collapses at the exit of the downcomers, the rush of water filling the void (some of it drawn up into the downcomer pipe) induces a severe stress at the junction of the downcomer and the vent header. Repeated application of this stress can cause these joints to experience fatigue failure (i.e., crack) thereby creating a pathway which bypasses the pressure suppression function of the containment. Subsequent steam discharges through the downcomers would directly pressurize the suppression chamber airspace rather than being discharged to and condensed in the suppression pool.

Scale model tests have demonstrated that chugging will not occur so long as the drywell atmosphere contains at least 1% noncondensibles. To preclude the occurrence of conditions under which chugging may happen, the Suppression Chamber Spray Initiation Pressure is conservatively defined by specifying 5% noncondensibles.

Although operation of suppression pool sprays may not, by itself, preclude chugging, suppression pool sprays are initiated before reaching the Suppression Chamber Spray Initiation Pressure (11.5 psig) to assure that operation of this system is attempted for reducing primary containment pressure before operation of drywell sprays is directed.

The operation of suppression pool sprays is terminated when suppression chamber pressure decreases to 2.5 psig to assure that primary containment pressure is not reduced below atmospheric. Maintaining a positive suppression chamber pressure precludes air from being drawn in through the vacuum relief system to deinert the primary containment, and also assures that a positive margin to the negative design pressure of the primary containment exists.

It is acceptable to use drywell pressure instead of suppression chamber if the suppression chamber instruments are not available. It should be noted however that during transient conditions; i.e., a steam leak in drywell, drywell pressure may be significantly higher than suppression chamber pressure.

The NPSH (Net Positive Suction Head) limits are defined to be the highest suppression pool temperature which provides adequate net positive suction head for pumps taking suction on the pool. The NPSH Limits are functions of pump flow and suppression chamber overpressure (airspace pressure plus the hydrostatic head of water over the

STEPS PC/P-04 through PC/P-07 (continued)

pump suction). It is utilized to preclude pump damage from cavitation. It should be noted that containment pressurization of up to 5 psig is credited for maintaining NPSH margins for BNP. Therefore, as actions are taken that reduce suppression chamber pressure (i.e. suppression pool cooling, containment sprays), pump NPSH requirements should be considered, and closer attention directed towards observing the performance of the RHR and Core Spray pumps for signs of NPSH problems.

The NPSH limit is addressed through a caution for the following reasons:

a. It is difficult to define in advance exactly when the limits should be observed and when pumps should be operated irrespective of the limits.

b. Pumps to which the limits apply are used in more than one parameter control path, or in different procedures. RHR pumps, for example, may be used in the Reactor Vessel Control Procedure, the Level/Power Control procedure, or the Primary Containment Control Procedure. Authorizing operation of the pumps irrespective of NPSH in one path may conflict with instructions in another path where flow would normally be controlled below the limits.

The identified systems should be operated within the NPSH and vortex limits if possible. If the situation warrants, however, the limits may be exceeded. A judgment as to whether a pump should be operated beyond its limits in a particular event should consider such factors as:

a. The availability of other systems

b. The current trend of plant parameters

c. The anticipated time such operation will be required

d. The degree to which the limit will be exceeded

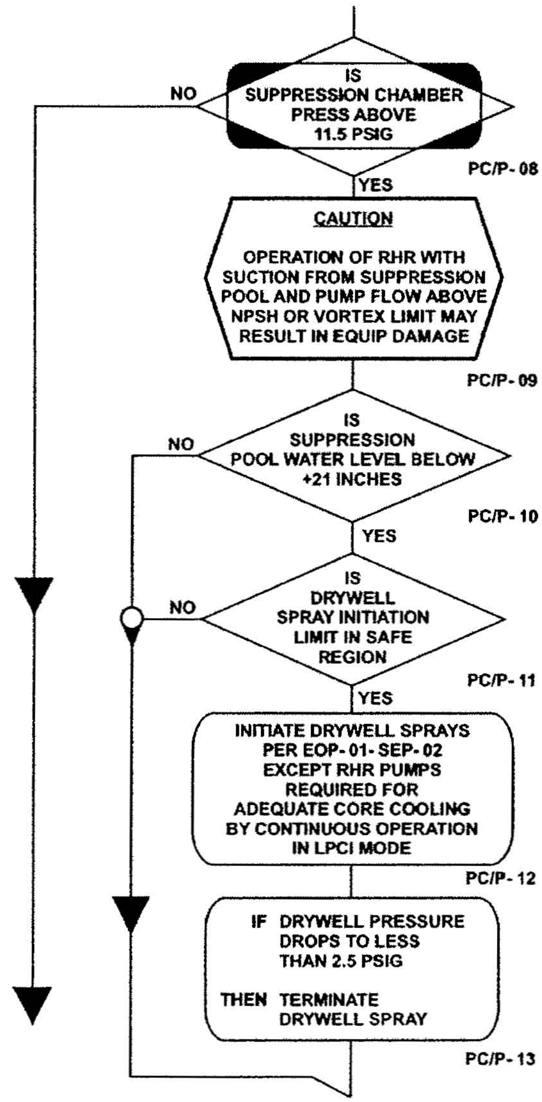
e. The sensitivity of the pump to operation beyond the limit

f. The consequences of *not* operating the pump beyond the limit

Immediate and catastrophic failure is not expected if a pump is operated beyond the NPSH or vortex limit.

Suppression chamber sprays are initiated per Suppression Pool Spray Procedure (EOP-01-SEP-03).

STEPS PC/P-08 through PC/P-13



STEP BASES:

If suppression pool sprays could not be initiated or if their operation was not effective in reversing the rising trend of primary containment pressure, as evidenced by suppression chamber pressure exceeding the Suppression Chamber Spray Initiation Pressure (11.5 psig), drywell sprays are initiated to effect the desired pressure reduction.

The Suppression Chamber Spray Initiation Pressure is described in the discussion of Step PC/P-06.

STEPS PC/P-08 through PC/P-13 (continued)

The NPSH (Net Positive Suction Head) limits are defined to be the highest suppression pool temperature which provides adequate net positive suction head for pumps taking suction on the pool. The NPSH Limits are functions of pump flow and suppression chamber overpressure (airspace pressure plus the hydrostatic head of water over the pump suction). It is utilized to preclude pump damage from cavitation. It should be noted that containment pressurization of up to 5 psig is credited for maintaining NPSH margins for BNP. Therefore, as actions are taken that reduce suppression chamber pressure (i.e. suppression pool cooling, containment sprays), pump NPSH requirements should be considered, and closer attention directed towards observing the performance of the RHR and Core Spray pumps for signs of NPSH problems.

The initiation of drywell sprays is conditioned on the following restrictions on the plant. First, the recirculation pumps and drywell cooling fans are required to be secured prior to the initiation of drywell sprays. These actions are covered in EOP-01-SEP-02.

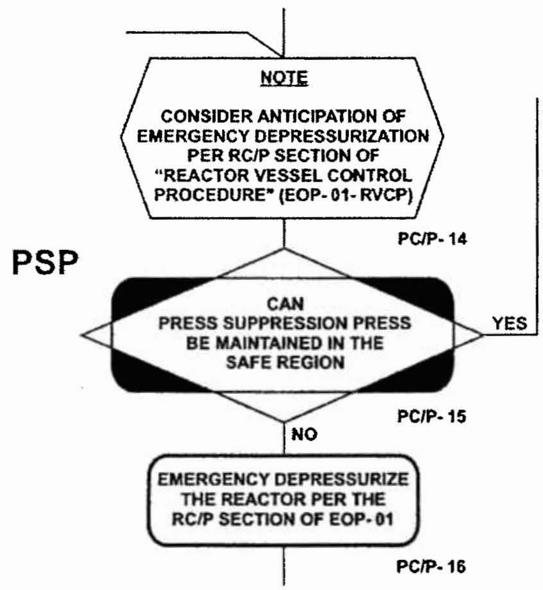
A second restriction on the initiation of drywell sprays is for suppression pool water level to be below +21 inches. This provides protection for the operation of the suppression chamber-to-drywell vacuum breakers. The vacuum breakers will not function as designed if any portion of the valve is covered with water. The specified water level assures that no portion of the drywell side of the valve is submerged for any drywell below wetwell differential pressure less than or equal to the valve opening differential pressure. Spray operation with vacuum breakers inoperable (i.e., with no drywell vacuum relief capability) may cause the containment differential pressure capability to be exceeded and is therefore not permitted.

Step PC/P-12 assures adequate core cooling takes precedence over initiating drywell spray in this case since catastrophic failure of the primary containment is not expected under the conditions for which spray requirements are established. The wording of the step does permit alternating between reactor vessel injection and drywell spray modes as the need for each occurs, provided adequate core cooling can be maintained.

Drywell sprays are secured if drywell pressure drops to 2.5 psig. This is a backup step to the automatic securing of the sprays during a LOCA condition when the spray permissive interlock drops out. This precludes air from being drawn in through the vacuum relief system to de-inert the primary containment and also provides a positive margin to the negative design pressure of the primary containment.

The drywell sprays are actuated in accordance with EOP-01-SEP-02.

STEPS PC/P-14 through PC/P-16



STEP BASES:

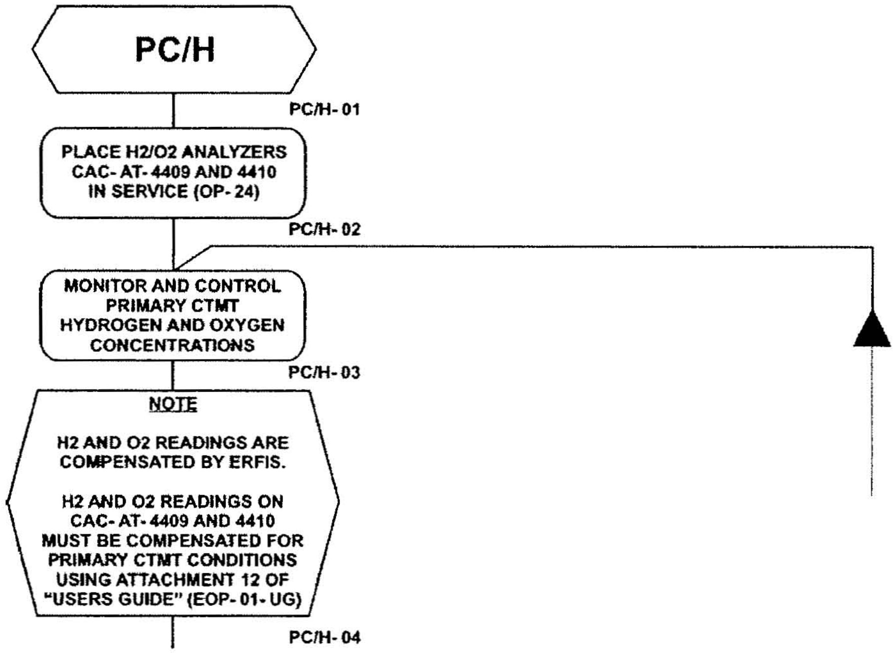
If suppression pool and/or drywell sprays could not be initiated or if operation was not effective in reversing the rising trend of primary containment pressure, as evidenced by not being able to maintain suppression chamber pressure below the Pressure Suppression Pressure, the reactor is depressurized to minimize further release of energy from the reactor vessel to the primary containment. This action serves to terminate, or reduce as much as possible, any continued primary containment pressure rise.

The Pressure Suppression Pressure is defined to be the lesser of either (1) the highest suppression chamber pressure which can occur without steam in the suppression chamber airspace or (2) the highest suppression chamber pressure at which initiation of reactor depressurization will not result in exceeding Primary Containment Pressure Limit A before reactor pressure drops to the Minimum Reactor Flooding Pressure, or (3) the highest suppression chamber pressure which can be maintained without exceeding the suppression pool boundary design load if SRVs are opened. This pressure is a function of primary containment water level, and it is utilized to assure the pressure suppression function of the containment is maintained while the reactor is at pressure. (For additional information about the Pressure Suppression Pressure see the EOP User's Guide.)

STEPS PC/P-14 through PC/P-16 (continued)

A note is added to remind the operator that rapid depressurization per the reactor pressure control guidance of the Reactor Vessel Control Procedure may be allowed prior to the direction to Emergency Depressurize. See discussion on Step SP/T-11.

STEPS PC/H-01 through PC/H-04



STEP BASES:

The primary containment hydrogen control (PC/H) section of the Primary Containment Control Procedure specifies appropriate actions for controlling combustible gas concentration in containment.

Hydrogen and oxygen must both be present and in sufficient concentration for combustion to occur.

Measurable levels of hydrogen could appear in the primary containment from the following sources:

a. The high temperature reaction of metal (typically zirconium) with water to produce hydrogen gas and metal oxide

b. Radiolysis of water to produce hydrogen and oxygen

c. Feedwater injection of hydrogen to control reactor water chemistry

STEPS PC/H-01 through PC/H-04 (continued)

Elevated concentrations of oxygen are not expected during normal power operations except during brief periods at startup and shutdown of the plant when the containment atmosphere is being inerted and deinerted. However, oxygen may be generated due to the radiolysis of water, and oxygen could enter the containment from leaks in the instrument air system and from operation of Reactor Building-to-suppression pool vacuum breakers. Oxygen concentration is routinely monitored and controlled during reactor operation in accordance with Technical Specification requirements.

These steps are included to ensure the monitors are placed in service as required.

Step PC/H-04 alerts the operator of the need to compensate for H_2/O_2 based on primary containment conditions.