Illinois Power Company
Clinton Power Station Unit 1

EMERGENCY OPERATING PROCEDURES

OPERATOR TRAINING PROGRAM

Learning Objectives

Upon receiving EOP training the student should be able to:

1. State the entry conditions for each of the EOP's.

2. Explain the bases for any given general or specific caution associated with the EOP'S.

3. Explain the bases for any given operator action prescribed in the EOP's.

4. List the basic steps for controlling any of the parameters addressed by the EOP's.

5. Describe the display location of any parameter addressed in the EOP's.

Operational Objectives

During the EOP training the Shift/Assistant Shift Supervisor and the course instructor should:

1. Document perceived deficiencies in the EOP's and submit them to the Supervisor-Operations for review.

2. Identify abnormal system lineups utilized in the EOP's and ensure operators are trained to respond.

3. Ensure training in areas the EPG takes credit for is adequate.

Training Methods

Lecture

Group discussion

Student Handout

A portion of the student handout is attached. Each procedure step is explained in the text and the whole procedure is summarized in the flowchart at the end. The steps are taken verbatim from the EOP's. The discussions are from the generic EPG's and include the required Clinton specific information. The flowcharts are taken from the procedures but include additional training information.

The course will be taught in a lecture and group discussion format. The instructor's primary teaching device will be the marked up flowchart. Instructor guides will be developed to aid the delivery of the detailed discussion associated with the procedure steps.

Safety Parameter Display System (SPDS)

o General

SPDS displays are concise displays of critical plant parameters intended to enable the operator to rapidly assess the safety status of the plant. There are three parts to SPDS:

1. #5 CRT in P680 in which 11 critical safety functions are displayed,

2. Alarm Initiated Display (AID) which appears on the bottom of all active DCS CRT's if any of the AID parameters reach an alarm setpoint,

3. PRMS/CRT Status Grid display of plant radiological conditions.

o Access

The SPDS display (5S) on P680 is the designated display on CRT #5 during all plant operating activities as shown on the Plant Operating Activity Format Matrix incorporated in DCS. (Figure 1) This does not preclude the operator from selecting other displays for brief periods, but provides for normal utilization of #5 CRT for SPDS. Access to the SPDS display is available on any other DCS CRT and on all PMS consoles, including the TSC and EOF, via the Video Services function.

The SPDS AID is a transient display of parameters which duplicate or support SPDS parameter values. The AID does not appear on PMS CRT's but all the data is available from PMS via the Single Point on Group Point functions.

The PRMS CRT is tapped for display in the TSC. The TSC and EOF have access to PRMS information via the Spectral Analysis and Recording System (SAARS).

o Display Formats

Color coding in the SPDS and EOP Support Displays is consistent with DCS displays. Alarm conditions in general are indicated by the color red, with normal or non-alarm conditions indicated by the color green for digital values, and yellow for analog values and bar graphs. Cyan is used for alpha-numeric labels, borders, and the non-dynamic portion of the background. White is used to denote low confidence data.

The SPDS graphic display (Figure 6) consists of 11 horizontal bar graphs for dynamic display of data, with quantitative information displayed adjacent to each bar graph. Trend information is represented by a rate of change with a negative number indicating a decreasing value. Containment Isolation is represented by a line of letters indicating I (inboard) or O (outboard) isolation for each of the 11 groups. Successful isolation is indicated by the letters changing from red to green.

The AID (Figure 7) is a simple list of 12 parameters with alarm conditions indicated in red. The AID appears only in the bottom 12 lines of the display area of each DCS CRT when any one of the parameters alarms.

The PRMS Status Grid display (Figure 17) is an outline drawing of the Fuel, Containment, Auxiliary, Turbine, Control, and Radwaste buildings. Monitors are indicated by the presence of the respective unit numbers within the building outline. The color of the unit number indicates the alarm status. Red indicates a high radiation alarm, yellow indicates an alert or trend alarm. Normally unit numbers are displayed in green.

o SPDS Parameters (Figures 6 and 7)

Parameters were chosen for display in SPDS on the basis of their usefulness to the operator in assessing plant conditions in the following areas:

Reactivity Control
Reactor Core Cooling and Heat Removal from the Primary System Reactor Coolant System Integrity
Radioactivity Control

Reactivity Control

Parameters on the permanent SPDS display which assist the operator in confirming the net negative reactivity of the core are:

SRM Flux
Reactor Period
APRM Power

The AID includes SDV Level to assist the operator in determining his ability to scram the reactor.

Reactor Core Cooling and Heat Removal from the Primary System

Parameters on the permanent SPDS display associated with core cooling and heat removal from the primary system include:

- Reactor Wide Range Level
- Reactor Wide Range Pressure
- Reactor Steam Flow
- Reactor Feed Flow
- Total Core Flow

The AID includes Reactor Wide Range Level since level is the primary indication of the ability to remove heat from the core.

Reactor Coolant System Integrity

Parameters on the permanent SPDS display which provide indication of reactor coolant system integrity include:

- Reactor Wide Range Pressure
- Narrow Range Drywell Pressure
- Drywell Floor Drain Sump Flow
- Reactor Feed Flow
- Total Core Flow

The AID includes Drywell Floor Drain Sump Flow since this is the most sensitive indication of leakage.

Containment Conditions

Parameters on the permanent SPDS display which provide information on conditions within the containment include:

- Containment Pressure
- Suppression Pool Temperature
- Containment Isolation status

The AID includes:

- Drywell Temperature
- Drywell Pressure
- Suppression Pool Temperature
- Containment Hydrogen Concentration
- Containment Pressure
- Suppression Pool Level

Radioactivity Control (Figure 16)

The PRMS Status Grid displays the status of 90 permanent monitors (APM's, CAM's, PRM's) and 22 portable monitors (ARM's, CAM's) located throughout the plant.

The SPDS parameters listed below are derived from 4 redundant signals and displayed according to an algorithm:

APRM Power	Reactor Wide Range Level
SRM Counts	Suppression Pool Temperature
SRM Period	

The four signals are compared to each other such that if all four are within 10%, an average of the four will be calculated and displayed. If any one is outside the 10%, an annunciator indicating a PMS internal alarm is displayed. The operator may clear the alarm through appropriate entries at the PMS console disabling the faulty input.

A comparison of the remaining three values occurs and if all are within 10% an average is computed and displayed. If any value is outside of 10% the annunciator occurs. The operator will not be able to disable the faulty input from the PMS console.

All parameters on the permanent SPDS display are represented in three forms. Quantitatively as a digital value in engineering units, qualitatively as a dynamic bar graph, and as a transformed variable indicating rate of change (trend). The trend calculation is performed in PMS. SRM Period is used to trend source range flux in lieu of a PMS transformed variable.

Containment isolation status is derived from a truth table in which the open/close status of each inboard and outboard valve in a group is monitored. The I(O) is displayed in red until successful inboard (outboard) isolation has occurred. The I(O) then changes to green.

Data Validation

Continuous data validation is performed by DCS/PMS on the hardware and software associated with the displayed parameter. For invalid signals the last good value is substituted and displayed in white to indicate low confidence. An asterisk adjacent to the parameter name on the SPDS display or AID identifies a validated parameter.

Data Updates

The response time of DCS for display updates is less than 250 ms. Variables which are derived are updated at an operator selected rate of 2 to 10 seconds. Signals in this category are:

APRM Power
SRM Flux
Reactor Wide Range Level
Reactor Steam Flow
Narrow Range Drywell Pressure
Containment Temperature
Drywell Temperature
Suppression Pool Temperature
22 Containment Isolation Signals
Trend Information

EOP Support Displays

- **General**

  The purpose of the EOP support displays is to provide the operators with the information necessary for the performance of functions required by the upgraded Emergency Operating Procedures. The display formats incorporated into the EOP support system contribute to a significant reduction of risk and an enhancement in the safety of operation.

  The EOP display system will be used by the operators to determine specific actions required to prevent or minimize core damage or prevent release of radioactivity to the environment. This system consists of eight DCS Displays and five PMS displays which can be selected at the NUCLENET and used specifically to support the EOPs in conjunction with the SPDS.

- **Access**

  Operational control of the EOP support system is normally through the DCS Selection Matrix with the individual CRT selector switches in master. By selecting the EOP Support Integrated Plant Operating Activity the operator can simultaneously call up each of the eight EOP DCS Support displays. Figure 1 provides the new Plant Operating Activity Format Matrix for EOP Support. The use of the selector switches or selection matrix has no effect upon the displays in the Technical Support Center (TSC) or Emergency Operations Facility (EOF).

- **Alarm Initiated Display (Figure 7)**

  This is the same AID as described before. This transient display is only visible at the bottom of the CRT when one of the parameters in the display is in the alarm state. At that time all the parameters will be displayed with the alarming one(s) in red. The AID will be visible on all active DCS CRTs and provides an indication to the operator that he should consider initiating the EOPs.

- **1S Reactor Core Cooling Display (Figure 2)**

  The purpose of the Reactor Core Cooling Display is to show the reactor water level in relation to the core height and at the same time present the operator with information on the sources of water available. The display alerts the

operator that the level has exceeded various limits requiring various automatic actions. The display of all channels and reference leg temperatures aids the operator in validating water level information. The operator can also verify the automatic transfer of RCIC and HPCS to the suppression pool for suction to prevent overstressing containment with excess water inventory.

- 2S Containment Support Display (Figure 3)

  The Containment Support Display allows the operator to verify the operability of containment and aids the operator in taking the required actions to preserve the integrity of containment through the use of EOPs.

  Safety Relief Valves display is normally green and changes to red when the SRV opens.

  The dynamic values A and B are normally not displayed but appear in red when the associated Containment Spray Loop activates.

- 3S Time History Display (Figure 4)

  The level/pressure display versus time is the controlling display for level control actions. The actions are based on pressure, level, and the direction of change. This and the injection status dictate actions in the Level Control EOP.

  The plot displays reactor level in blue and reactor pressure in red. The lines (tic marks) represent one minute, the update interval. The right side of the plot is the most recent point and each update moves the plot to the left. When called up the display provides plots of the most recent 30 minute period.

- 4A Recirc Flow Display (Figure 5)

  The Recirc Flow display provides the information necessary for the operator to evaluate recirc flow and the condition of the recirc pumps.

  Valves 60A and 60B are throttle valves in which half of the valve will be green, the other half red in any but full open or full closed positions.

- 6S Reactivity Control Display (Figure 8)

  The purpose of the Reactivity Control display is to allow the operator to trace reactor power during all types of

transients without having to switch displays. Control rod drive information is included to provide the operator with information on the ability to manually insert rods.

- 7S Steam Supply and Bypass System Display (Figure 9)

  The Steam Supply and Bypass Syst ŋ display is used by the operator to ensure the steam system operates properly.

- 8S Electrical Distribution Display (Figure 10)

  The Electrical Distribution Display provides the operator with a status summary of the 1E electrical distribution system. Some main turbine parameters are included to ensure the turbine is not inadvertently damaged.

  The breakers change from green to red when closed.

  When the Turning Gear is not engaged the word "NOT" appears in red. The "NOT" is normally absent from the display.

- 9S Containment Isolation Display (Figures 11 - 16)

  The Containment Isolation display provides the operator with a summary of the status of the containment isolation groups from which the operator can quickly determine the status of any group isolation.

  Blocks for each group change from red to green when isolation occurs.

  The "PMS Display Number" at the top of the display refers to the PMS Display which must be called up. and each Group notes the page of the display, to provide details on the valves and conditions that make up the isolation group.

Integrated Plant Operating Activity	DCS CRT Assigned to Sys. Group 1	2	3	4	5	6	7	8	9
COLD STARTUP	1C	2A	3C	4A	5S	6S	7A	8B	9A
ACHIEVE CRITICALITY	1C	2A	3C	4A	5S	6S	7A	8B	9A
SRM/IRM OVERLAP	1C	2A	3C	4A	5S	6S	7A	8B	9A
HEATUP/COOLDN	1C	2A	3C	4A	5S	6S	7B	8B	9A
IRM/APRM OVERLAP	1J	2J	3E	4A	5S	6S	7B	8B	9B
HOT STARTUP/RESTART	1C	2A	3C	4A	5S	6S	7F	8B	9B
HOT STANDBY	1C	2A	3C	4B	5S	6S	7F	8B	9B
POWER VARIATION(10-30%)	1J	2J	3E	4A	5S	6S	7F	8C	9B
POWER VARIATION(30-10%)	1J	2J	3D	4J	5S	6S	7F	8C	9B
NORMAL SHUTDOWN PREP	1C	2J	3J	4J	5S	6S	7F	8C	9B
EMERG. SHUTDOWN	1C	2A	3E	4A	5S	6S	7F	8B	9B
EOP SUPPORT	1S	2S	3S	4A	5S	6S	7F	8S	9S
COLD RESTART	1C	2A	3C	4A	5S	6S	7A	8B	9B
TURB ROLL/SYNC	1C	2J	3C	4A	5S	6S	7B	8C	9B
BASE LOAD SURVEILLANCE	1J	2J	3J	4J	5S	6S	7J	8J	9J

FIGURE 1
INTEGRATED PLANT OPERATING ACTIVITY MATRIX

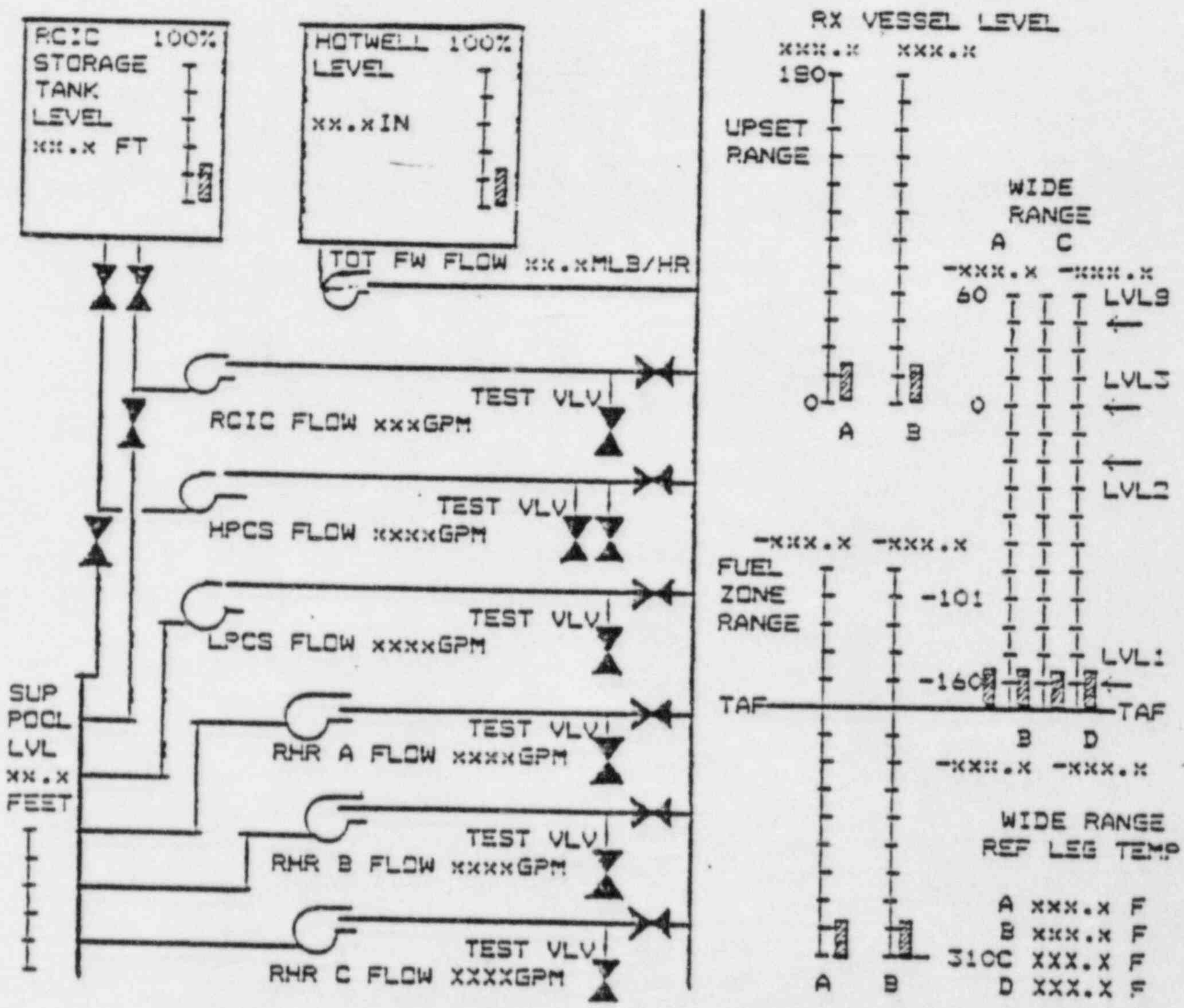


FIGURE 2
REACTOR CORE COOLING DISPLAY (1S)

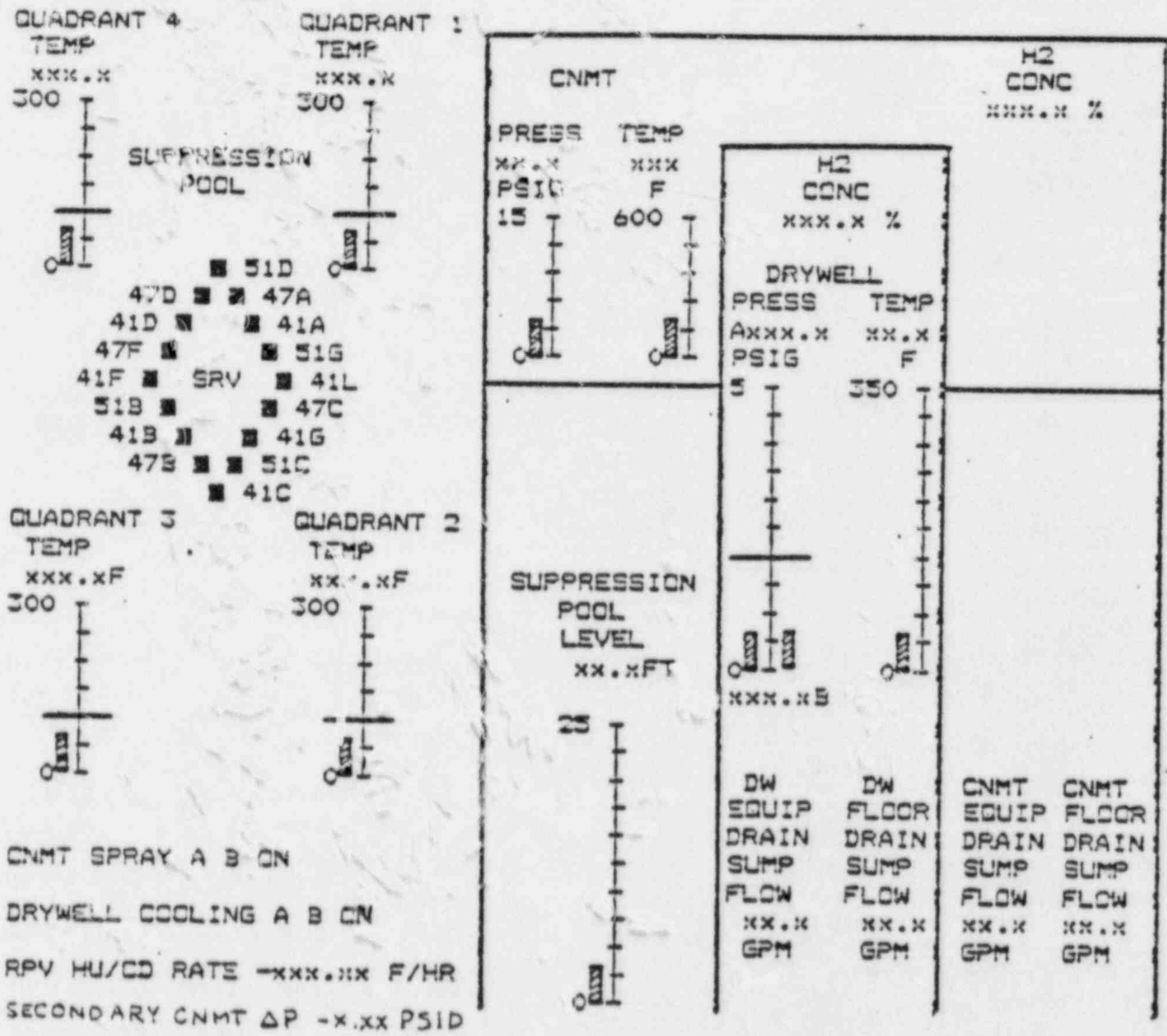


FIGURE 3
CONTAINMENT SUPPORT DISPLAY (2S)

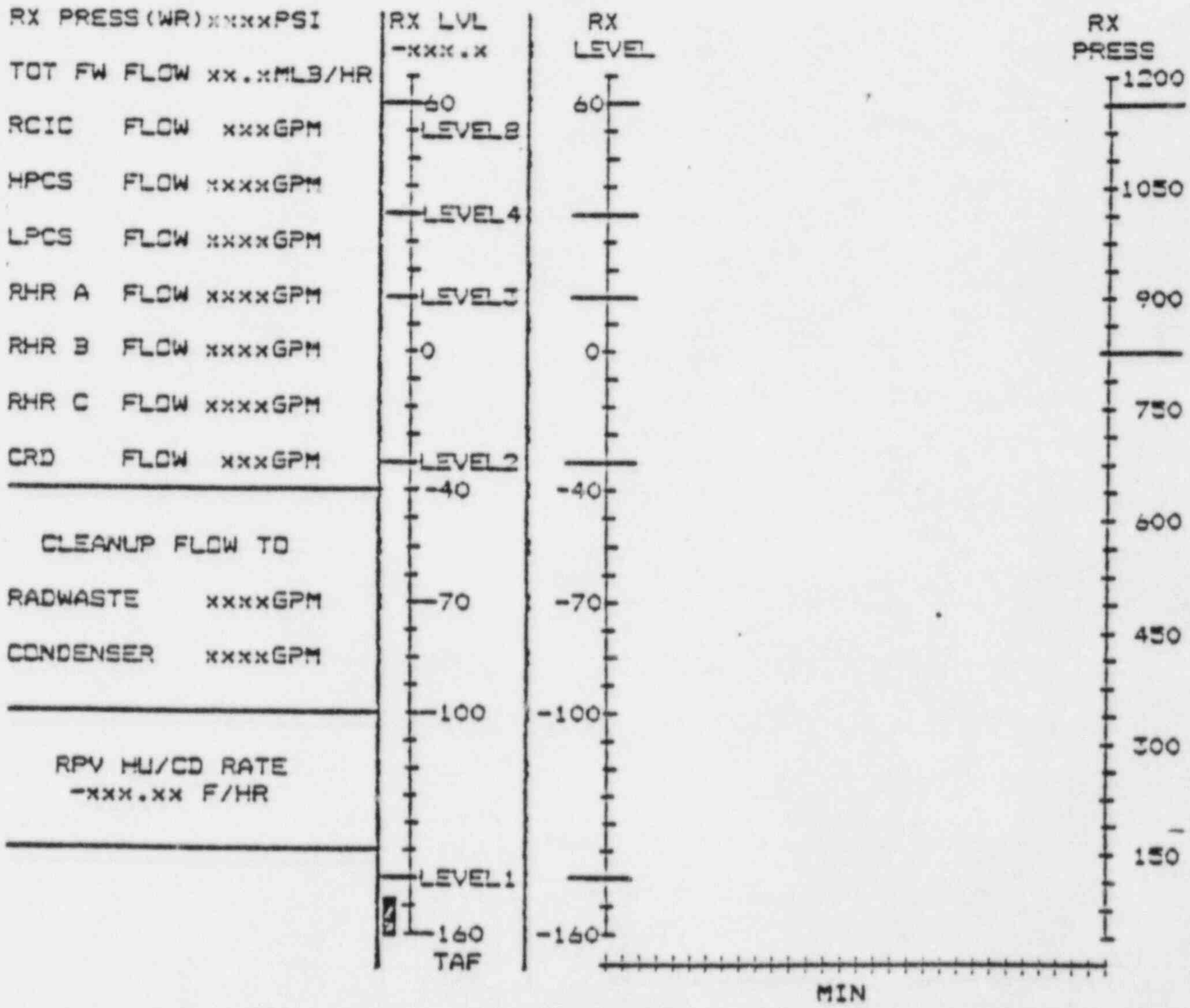


FIGURE 4
TIME HISTORY DISPLAY (3S)

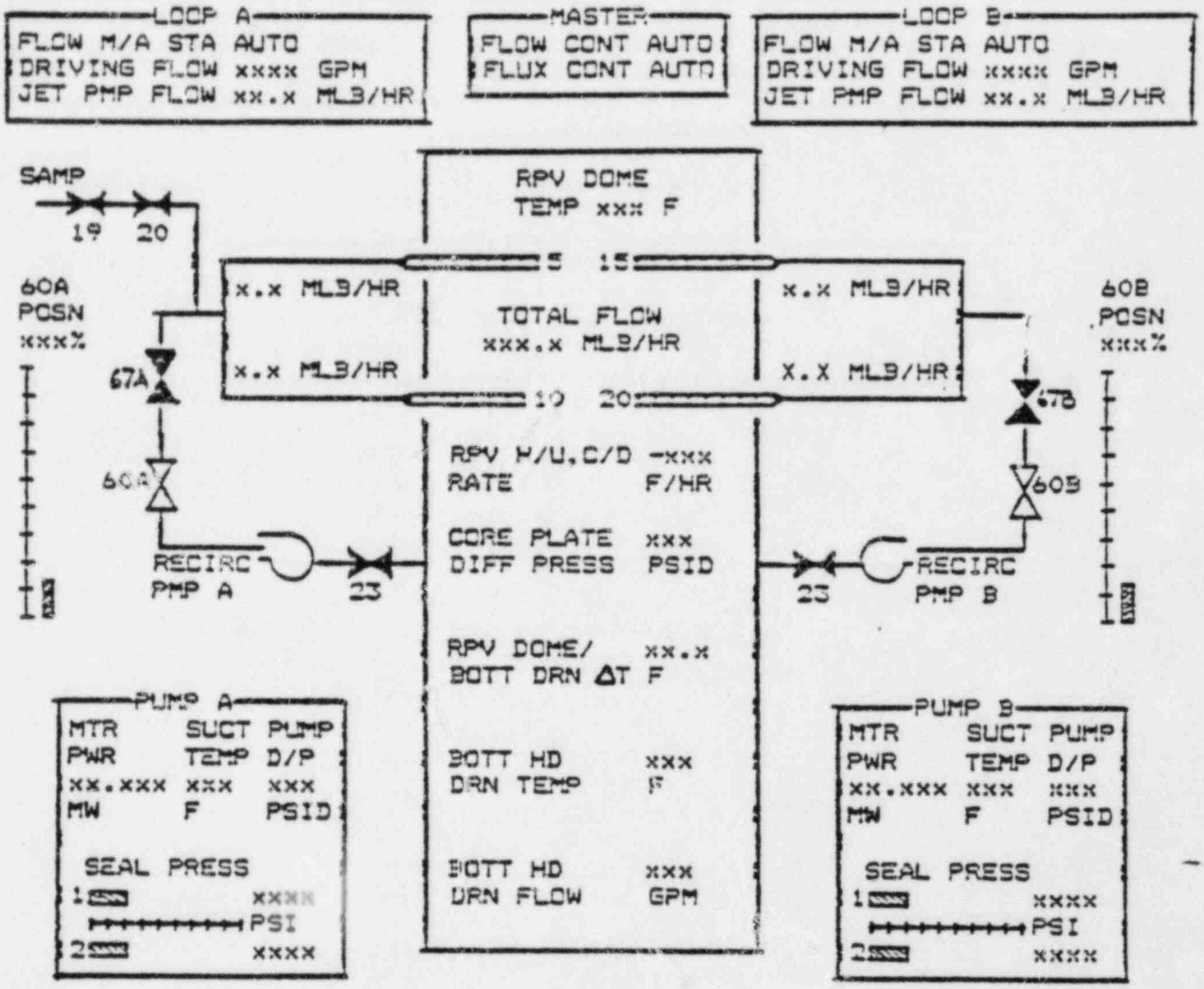


FIGURE 5
REACTOR RECIRC FLOW (4A)

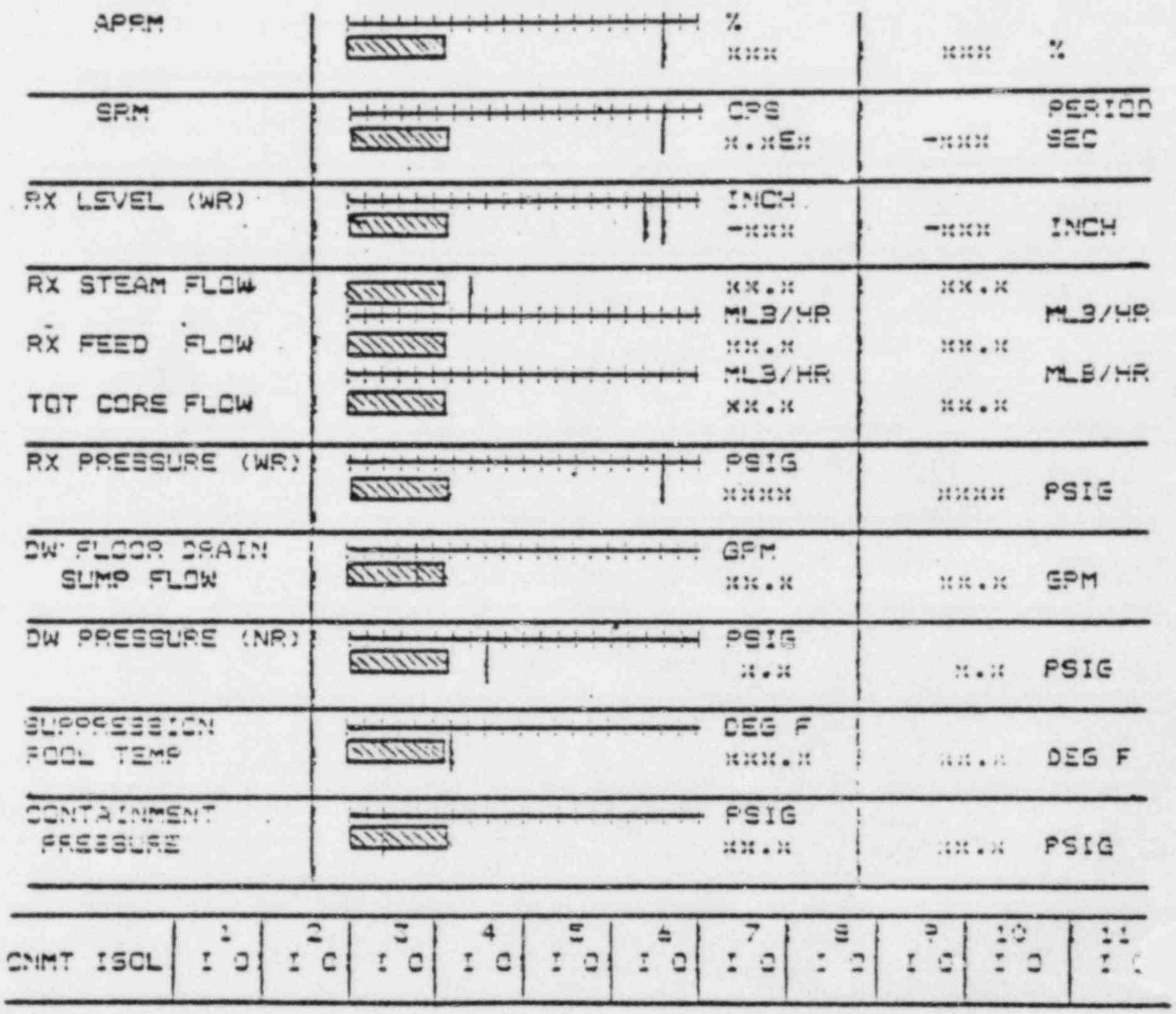


FIGURE 6
SPDS DISPLAY (5S)

RX WTR LEVEL	-xxx.x IN	SUPP POOL LVL	xx.x FT
DW PRESS	xx.x PSIG	SUPP POOL TEMP	xxx.x F
DW TEMP	xxx.x F	CNMT PRESS	xx.x PSIG
SRV STATUS (OPEN/CLOSED)		CNMT TEMP	xxx.x F
DW FL SUMP FLOW	xx.x GPM	CNMT H2 CONC	xxx.x %
SDV A LEVEL	xx GAL	SDV B LEVEL	xx GAL

FIGURE 7
AID

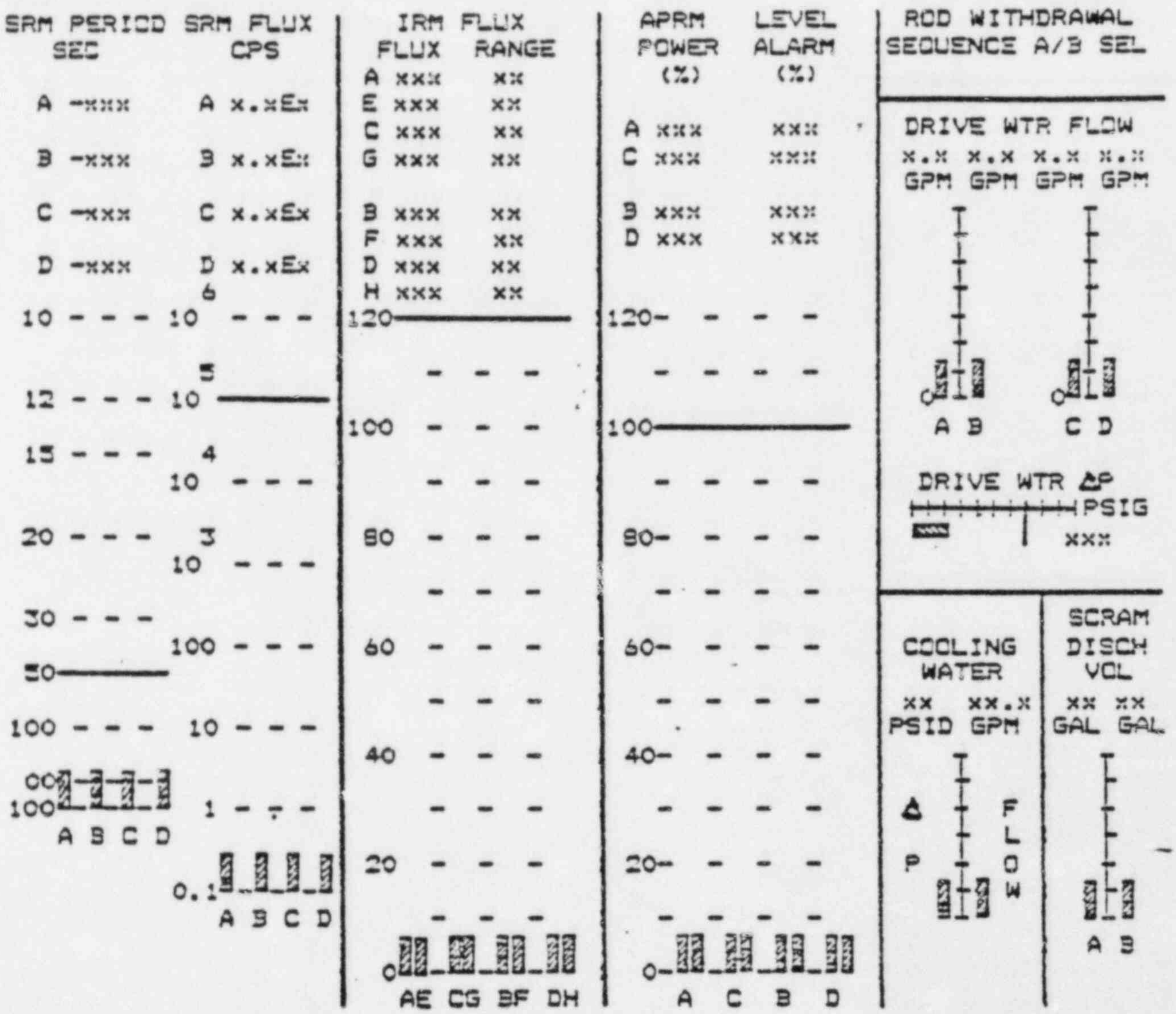


FIGURE 8
REACTIVITY CONTROL DISPLAY (6S)

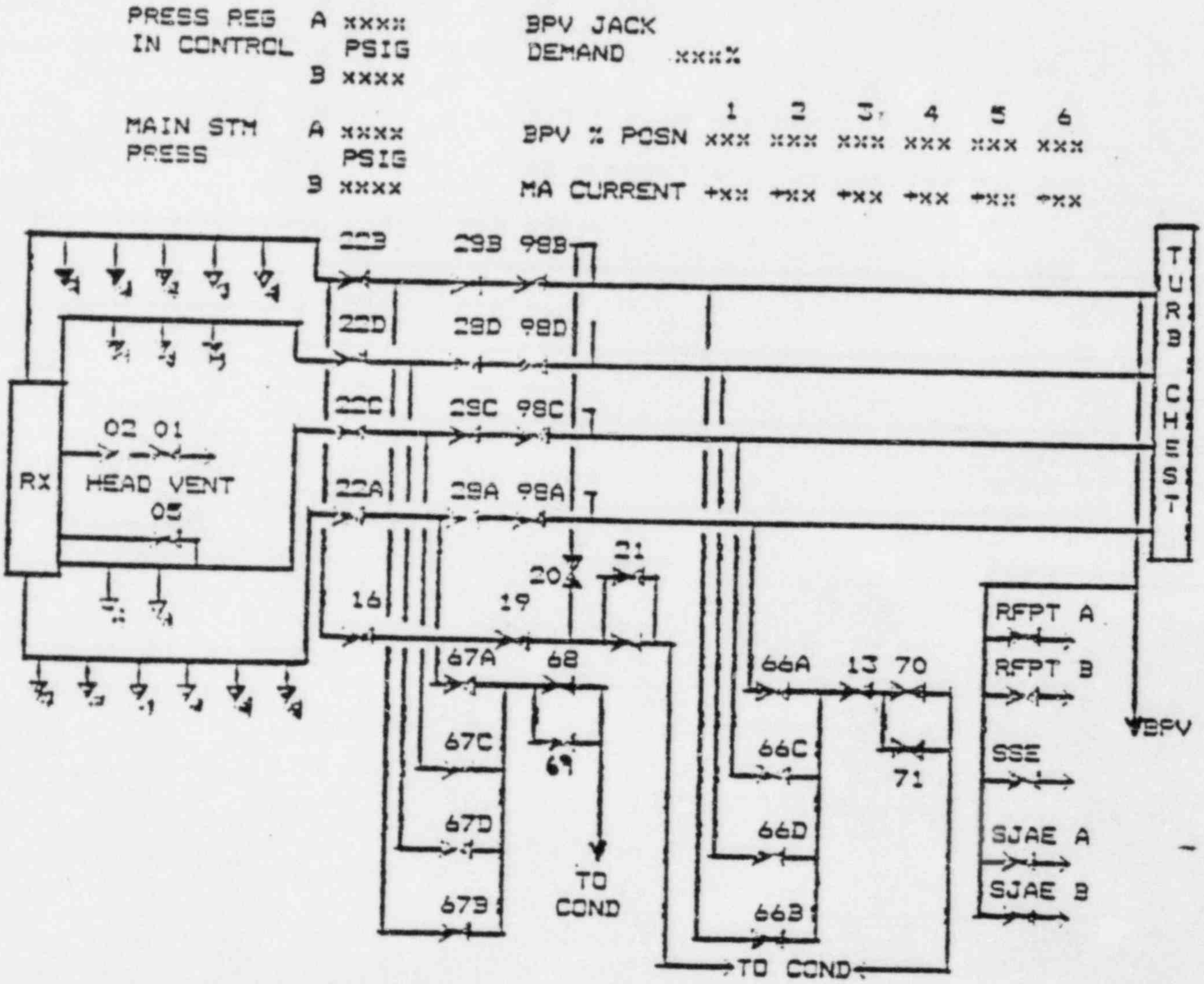


FIGURE 9
STEAM SUPPLY AND BYPASS SYSTEM (7F)

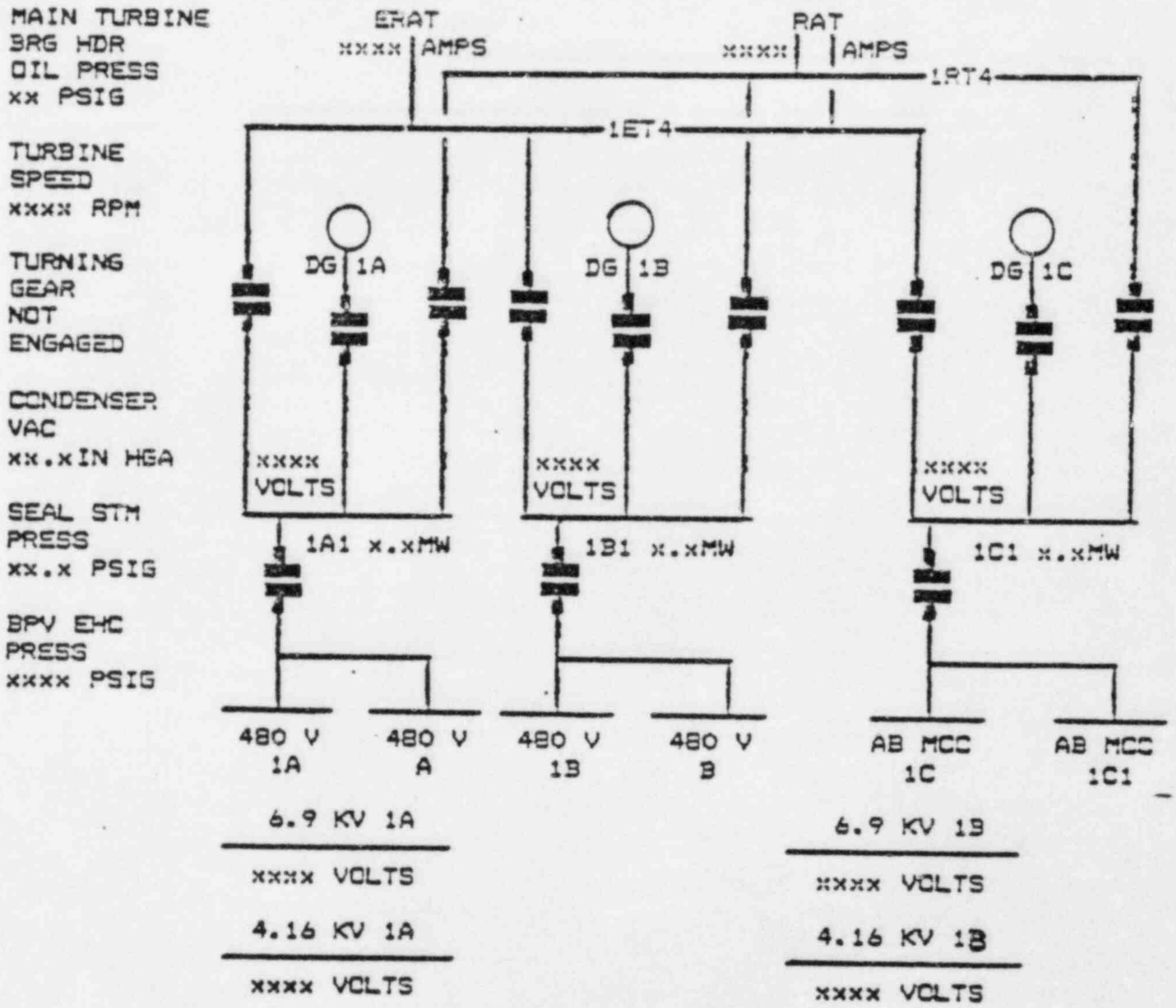


FIGURE 10
ELECTRICAL DISTRIBUTION DISPLAY (8S)

CONTAINMENT ISOLATION SUMMARY
PMS DISPLAY NUMBER (later)

INBOARD		OUTBOARD
	GROUP 1 PAGE 1	
	GROUP 2 PAGE 1	
	GROUP 3 PAGE 1	
	GROUP 4 PAGE 1	
	GROUP 5 PAGE 2	
	GROUP 6 PAGE 2	

INBOARD		OUTBOARD
	GROUP 7 PAGE 2	
	GROUP 8 PAGES 3/4	
	GROUP 9 PAGE 3	
	GROUP 10 PAGE 4	
	GROUP 11 PAGE 5	

FIGURE 11
CONTAINMENT ISOLATION DISPLAY (9S)

GROUP 1

INBOARD		OUTBOARD
■ B21F022A	A MN STM LINE CONMT ISOL	B21F028A ■
■ B21F022B	B MN STM LINE CONMT ISOL	B21F028B ■
■ B21F022C	C MN STM LINE CONMT ISOL	B21F028C ■
■ B21F022D	D MN STM LINE CONMT ISOL	B21F028D ■
■ B21F016	MN STM DRN/MSIV BYP CONMT ISOL	B21F019 ■
	A MN STM LINE DRAIN ISOL	B21F067A ■
	B MN STM LINE DRAIN ISOL	B21F067B ■
	C MN STM LINE DRAIN ISOL	B21F067C ■
	D MN STM LINE DRAIN. ISOL	B21F067D ■

GROUP 2

■ E12F049	RHR B TO RADWASTE ISOLATION	E12F040 ■
■ E12F060A	RHR A HX SAMPLE ISOLATION	E12F075A ■
■ E12F060B	RHR B HX SAMPLE ISOLATION	E12F075B ■

GROUP 3

■ E12F009	SHUTDOWN COOLING SUCT ISOL	E12F008 ■
	RHR A TO SHUTDOWN COOLING RTN	E12F053A ■
	RHR B TO SHUTDOWN COOLING RTN	E12F053B ■
■ E12F037A	RHR A TO CNMT POOL CLG SHTOFF	
■ E12F037B	RHR B TO CNMT POOL CLG SHTOFF	
	RHR B TO REACTOR HEAD SPRAY	E12F023 ■

FIGURE 12
PMS DISPLAY - CONTAINMENT ISOLATION - PAGE 1

INBOARD		OUTBOARD
	GROUP 4	
■ G33F001	RWC SUCT ISOL	G33F004 ■
■ G33F029	DRN FLOW HDR CNMT ISOL	G33F034 ■
■ G33F040	RWC RTN HDR CNMT ISOL	G33F039 ■
■ G33F053	RWC PUMPS DISH CNMT ISOL	G33F054 ■
	GROUP 5	
■ B33F019	RECIRC SYS SAMPLE ISOL	B33F020 ■
	GROUP 6	
	RCIC PUMP SUPP PL SUCT VLV	E51F031 ■
■ E51F063	RHR / RCIC ST SUPP ISOL VLV	E51F064 ■
■ E51F076	RHR / RCIC ST SUPP WARM UP ISOL VLV	
	GROUP 7	
■ E51F078	RCIC EXH VAC BKR ISOL VLV	E51F077 ■

FIGURE 13
PMS DISPLAY - CONTAINMENT ISOLATION - PAGE 2

GROUP 8

INBOARD		OUTBOARD
■ 1CCF050	CNMT CCW SUPPLY	1CCF049 ■
■ 1CCF053	CNMT CCW RETURN	1CCF054 ■
■ 1CCF057	CNMT CCW SUPPLY TO NRHX	
■ 1CCF060	CNMT CCW RETURN FROM NRHX	
■ 1CCF128	CNMT CCW RETURN FROM NRHX	
■ 1CCF127	CNMT CCW SUPPLY TO NRHX	
■ 1FCF037	CNMT FC ISOLATION	1FCF036 ■
■ 1FCF007	CNMT FC OUTLET ISOLATION	1FCF008 ■
■ 1FPF050	CNMT FP SUPPLY ISOLATION	1FPF092 ■
■ 1FPF052	CNMT FP SUPPLY ISOLATION	1FPF051 ■
■ 1FPF053	CNMT FP SUPPLY ISOLATION	1FPF054 ■
■ 1IAF012B	CNMT COMPRESS GAS	1IAF012A ■
■ 1IAF013B	CNMT COMPRESS GAS	1IAF013A ■
■ 1IAF006	CNMT INST AIR SUPPLY	1IAF005 ■
■ 1SAF030	CNMT SERVICE AIR SUPPLY	1SAF029 ■
■ 1SXF089A	CNMT SX SUPPLY ISOLATION	1SXF088A ■
■ 1SXF089B	CNMT SX SUPPLY ISOLATION	1SXF088B ■
■ 1SXF096A	CNMT SX SUPPLY ISOLATION	1SXF097A ■
■ 1SXF096B	CNMT SX SUPPLY ISOLATION	1SXF097B ■
■ 1SFF002	CNMT SF RETURN ISOLATION	1SFF001 ■
	CNMT SF SUPPLY ISOLATION	1SFF004 ■
■ 1WOF001B	CNMT CHILL WTR SUPPLY ISOL	1WOF001A ■
■ 1WOF002B	CNMT CHILL WTR RETURN ISOL	1WOF002A ■
■ 0MCF010	CNMT MAKE UP CONDENSATE ISOL	0MCF009 ■
■ 1CYF017	CNMT CYCLE CONDENSATE ISOL	1CYF016 ■

"CONTINUED"

FIGURE 14
PMS DISPLAY - CONTAINMENT ISOLATION - PAGE 3

GROUP 8 (CONT)

INBOARD		OUTBOARD
■ 1VRF002B	CNMT HVAC BYPASS ISOLATION	1VRF002A ■
■ 1VQF006B	CNMT EXH BYPASS ISOLATION	1VQF006A ■
	CNMT EXH/ PURGE ISOLATION	1VQF003 ■
■ 1REF021	CNMT EQUIP DRN SUMP DISCH	1REF022 ■
■ 1RFF021	CNMT FLR DRN SUMP DISCH	1RFF022 ■
■ 1WXF019	RWCU F/D BACKWASH TANK PMP	1WXF020 ■
	DW CH WTR A SUPP ISOLATION	1VPF004A ■
	DW CH WTR A RTRN ISOLATION	1VPF015A ■
	DW CH WTR B SUPP ISOLATION	1VPF004B ■
	DW CH WTR B RTRN ISOLATION	1VPF015B ■
	CNMT CGCS ISOLATION	1HGF001 ■
	CNMT CGCS ISOLATION	1HGF004 ■
		1HGF005 ■
		1HGF008 ■

GROUP [illegible]

■ 1VFF006Y	FUEL BLDG SUPP ISOLATION	1VFF004Y ■
■ 1VFF007Y	FUEL BLDG EXH ISOLATION	1VFF009Y ■

FIGURE 15
PMS DISPLAY - CONTAINMENT ISOLATION - PAGE 4

GROUP 10

INBOARD			OUTBOARD
■ 1VQF001B	DRYWELL PURGE SUPPLY	ISOL	1VQF001A ■
■ 1VQF002	DRYWELL PURGE	ISOL	
■ 1VQF004B	CNMT BLDG EXH/PURGE	ISOL	1VQF004A ■
■ 1VQF005	DW HEAD PURGE EXH	ISOL	
■ 1VRF001B	CNMT BLDG SUPPLY	ISOL	1VRF001A ■

GROUP 11

■ 1CCF071	RR PMP SSW RTN CNMT	ISOL	1CCF072 ■
■ 1CCF074	CNMT SSW SUPPLY	ISOL	1CCF073 ■

FIGURE 16
PMS DISPLAY - CONTAINMENT ISOLATION - PAGE 5

STATUS GRID

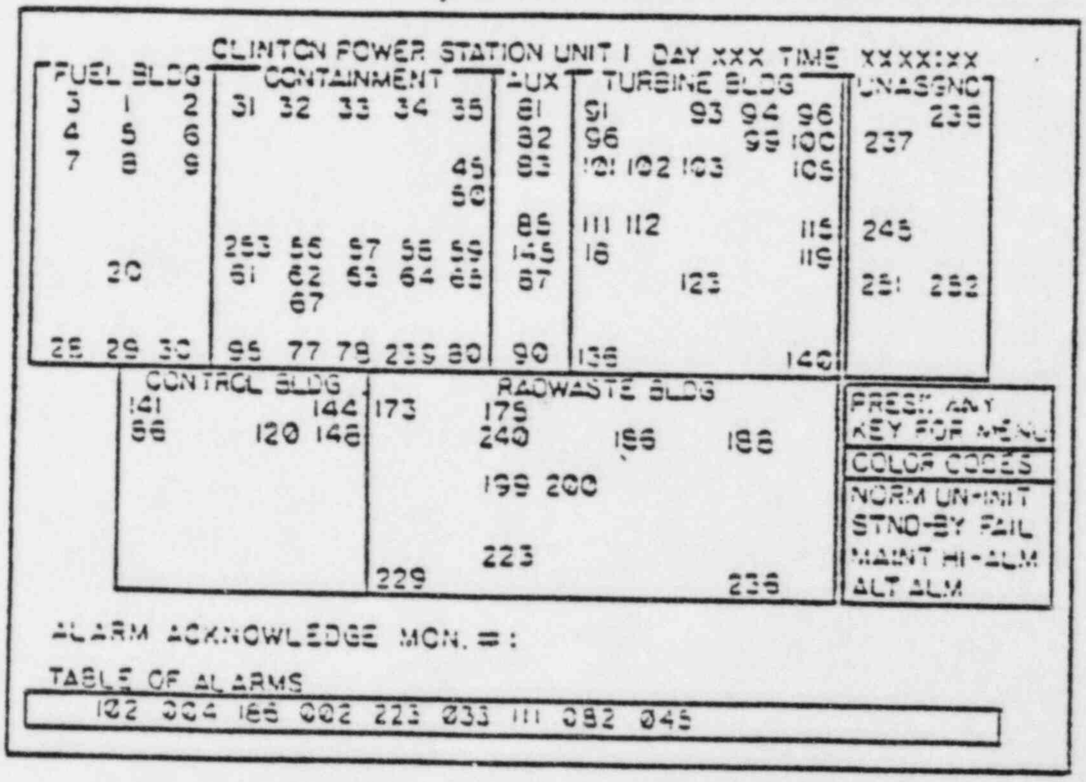


FIGURE 17
PRMS STATUS GRID

3.2 (DW/T) Drywell Temperature and Pressure Control

Section DW/T attempts to maintain drywell temperatures and pressure within desirable limits by operation of CGCS compressors and drywell coolers. If temperatures increase high enough to affect the accuracy of RPV water level instruments, RPV flooding is required. If temperatures increase high enough to jeopardize the pressure suppression function or challenge containment integrity, the RPV is depressurized.

A simplified flow diagram of DW/T is illustrated in Figure DW/T-1.

STEPS	OBJECTIVES
Initiate Auto action which did not occur (DW/T-1)	Scram, isolate, initiate ECCS
Start a CGCS compressor (DW/T-2)	Reduce drywell pressure
Operate available drywell cooler (DW/T-3)	Reduce drywell temperature
If temp. reaches RPV saturation, flood RPV (DW/T-4)	Assure core cooling
If temp. can't be maintained 330°F, Depressurize RPV (DW/T-5)	Terminate energy addition

Figure DW/T-1 Drywell Temperature and Pressure Control

NOTE

Perform step 3.6 (PC/P) concurrently with this procedure.

CAUTION #6

Whenever Drywell temperatures exceed the temperature in Table 1 and the instrument reads below the indicated level listed in Table 1, the actual RPV water level may be anywhere below the elevation of the lower instrument tap.

TABLE 1

Temperature	Level	Instrument
Any	66	Shutdown Range
232	73	Upset Range
545	-160	Wide Range
545	0	Narrow Range
545	-150	Fuel Zone

3.2.1 (DW/T-1)	IF	2 psig Drywell pressure is reached
	THEN	Verify the appropriate automatic actions have occurred and manually perform any that have not.

Objective: Initiate appropriate scram, isolation and ECCS initiation signals.

Discussion: High drywell pressure is indicative of a LOCA and certain automatic responses are incorporated in the plant design.

Scram initiation, containment isolation, and ECCS initiation are verified because of their importance in the plant's response to a LOCA.

General Caution #6 is applied here to remind the operator that elevated drywell temperature may affect the validity of displayed water level trends.

3.2.2 (DW/T-2)	IF	The high drywell pressure of 2 psig was due to a loss of the Drywell Cooling System
	THEN	Start Combustible Gas Control System Compressors 1A & 1B, 1HG02CA & B, per CPS No. 3316.01, CONTAINMENT COMBUSTIBLE GAS CONTROL (HG).

Objective: Reduce drywell pressure to below the containment isolation setpoint.

Discussion: The use of the CGCS compressor to reduce drywell pressure is permitted if the cause of the drywell high pressure is loss of normal cooling. At this pressure, all normal means of cooling and reducing drywell pressure would be isolated. Without utilizing the RPV had been sufficiently cooled down.

CGCS is not directed to be used until after the drywell pressure scram/isolation setpoint is reached to ensure the automatic actions associated with a LOCA condition, which may exist, are not overridden. Also when drywell pressure is less than 2 psig the normal cooling and ventilation methods should be available.

3.2.3 3320.01, (DW/T-3)	Operate all available Drywell Coolers as per CPS No. 3320.01, DRYWELL COOLING (VP).

Objective: Reduce drywell temperatures to below normal limits.

Discussion: If elevated drywell temperatures exist, the operator should attempt to reduce the temperature to within the normal operating range by using available drywell coolers. If available cooling is sufficient to prevent further temperature increases, the operator need progress no further in Section DW/T. Similarly, if some other condition required entry to the Containment Control Guideline (e.g., low suppression pool water level) and drywell temperature is already within acceptable limits, no action need be taken in DW/T.

NOTE

Perform steps 3.2.4 and 3.2.5 concurrently.

3.2.4 (DW/T-4)	IF	Drywell temperature reaches the RPV saturation temperature shown on Graph 2.
	THEN	RPV Flooding is required, enter section 4.1 EMERGENCY RPV DEPRESSURIZATION and section 4.2 RPV FLOODING. Execute them concurrently with this section.

Objective: Assure core cooling under conditions in which RPV water level instrumentation cannot be relied upon.

Discussion: As discussed in Caution #6, BWR water level instruments sense liquid level in the downcomer region by measuring the pressure differential between a variable leg water column and a reference leg water column. If reference leg water temperatures reach saturation (defined by the curve in step DW/T-4), the column of water will begin to boil, and the reference leg water inventory will gradually be depleted. As the level of water in the reference leg drops, the differential pressure sensed by the level instrument will decrease, and the indicated RPV water level will become erroneously high. The effect is slow, but nonetheless suggests potentially serious consequences. The operator might gradually throttle injection systems in response to the perceived slow increase in water level until, ultimately, the actual water level may fall below the lower instrument top.

With the loss of these instruments, the operator no longer has the capability of ascertaining RPV water level. It is then appropriate to flood the vessel so that core cooling may be

assured, even though the actual water level in unknow. The operator is therefore directed to enter the RPV Level Control Guideline at the beginning, whether or not he has already performed actions in that section. In accordance with directions preceding Step RC/L-2, he will enter Contingency #6 and flood the vessel. Section RC/P will establish the mode of pressure control appropriate for these actions in accordance with the instructions preceding Step RC/P-1.

Because the reference leg pressure is equal to RPV pressure, a reference leg temperature above saturation requires a drywell temperature above the RPV temperature. Since the reactor is the primary heat input to the containment, this an unlikely set of circumstances, but by no means impossible. For instance, if drywell coolers are lost, the drywell temperature will increase until, assuming no further action, it ultimately equals the RPV temperature. If, subsequently, emergency RPV depressurization is required, RPV pressure could be reduced below the saturation curve, and reference leg boiling could occur.

3.2.5 (DW/T-5)	<u>IF</u>	Drywell temperature cannot be maintained below 330°F
	<u>THEN</u>	EMERGENCY RPV DEPRESSURIZATION is required, enter section 4.1 EMERGENCY RPV DEPRESSURIZATION and execute it concurrently with this section.

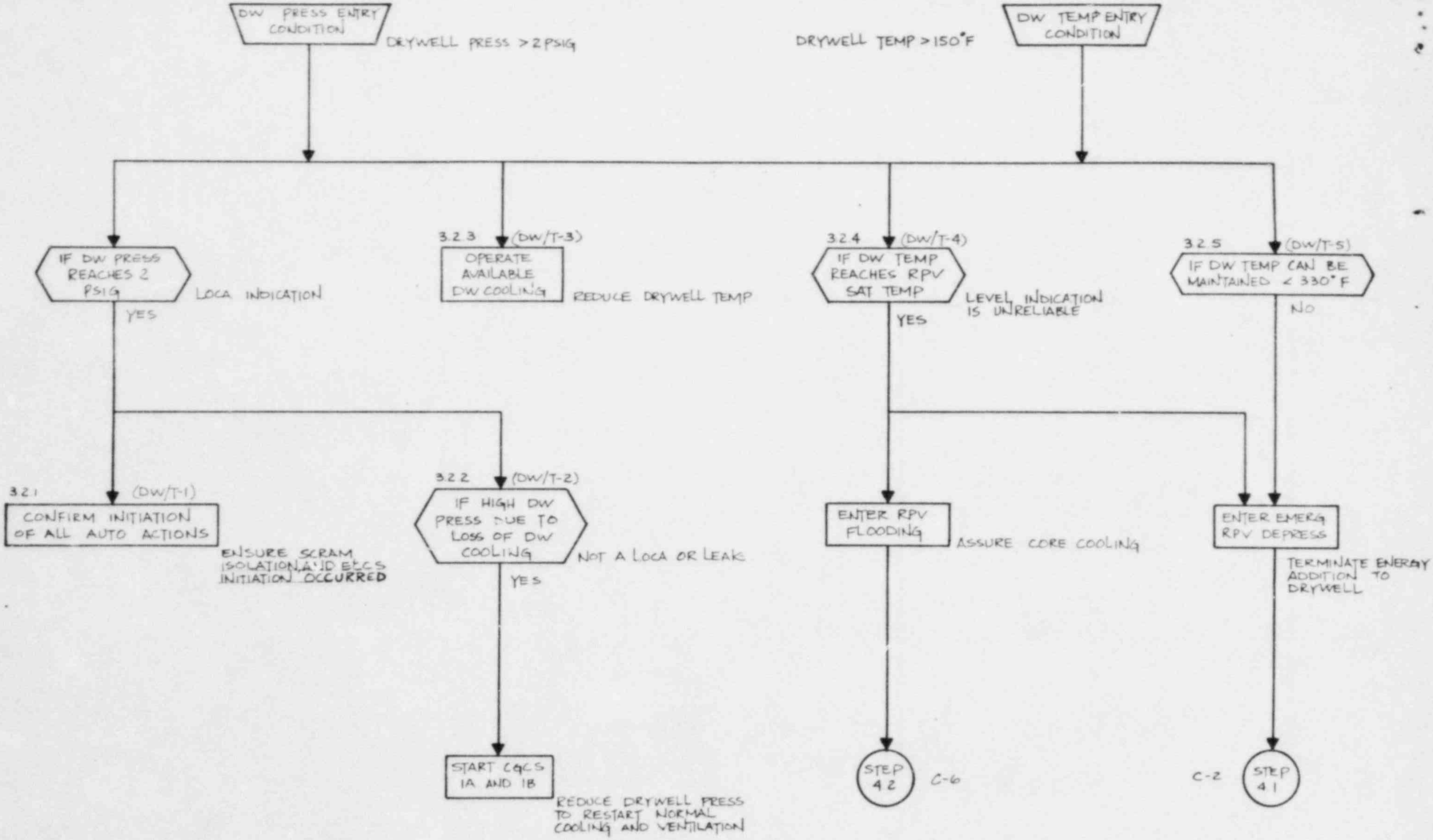
<u>Objective</u>: (1) Terminate energy addition to drywell.

(2) Prevent inopportune loss of pressure suppression function.

<u>Discussion:</u> If drywell temperatures cannot otherwise be maintained below design limits, the energy addition to the drywell should be terminated by rapidly depressurizing the RPV. This will transfer energy from the RPV to the suppression pool, lowering RPV temperatures to approximately 300°F (assuming the RPV is depressurized to 50 psig) and reducing any existing break flow. Continued heatup of the drywell is thereby avoided.

Once the necessity for emergency RPV depressurization has been established, the operator is directed to enter the RPV Control Guideline at the beginning, whether or not he has already performed actions in that section. He will then scram the reactor (if not

already done) and execute Sections RC/L, RC/P, and RC/Q concurrently. Contingency #2 will be entered in accordance with the instructions preceding Step RC/P-1.



FLOWCHART DW/T