REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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FACIL:50-275 Diablo Canyon Nuclear Power Plant, Unit 1, Pacific Ga 05000275
50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Ga 05000323
AUTH.NAME AUTHOR AFFILIATION
CRANE,P.A. Pacific Gas & Electric Co.
RECIP.NAME RECIPIENT AFFILIATION
MIRAGLIA,F.J. Resource & Scheduling Branch

SUBJECT: Forwards response to NRC 780125 ltr re long-term overpressure transient protection. Includes description of long-term sys to be employed at facilities.

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	CHEM ENG BR	08	1	1	CONT SYS BR	09	1	1
	CORE PERF BR	10	1	1	EFF TR SYS BR	12	1	1
	EMERG PREP	22	1	0	EQUIP QUALI BR	13	3	3
	GEOSCIENCES	14	1	1	HUM FACT ENG BR		1	1
	HYD/GEO BR	15	2	2	I&C SYS BR	16	1	1
	I&E	06	3	3	LIC GUID BR		1	1
	LIC QUALI BR		1	1	MATL ENG BR	17	1	1
	MECH ENG BR	18	1	1	MPA		1	0
	NRC PDR	02	1	1	OELD		1	0
	OP LIC BR		1	1	POWER SYS BR	19	1	1
	PROC/TST REV	20	1	1	QA BR	21	1	1
	RAD ASSESS BR	22	1	1	REAC SYS BR	23	1	1
	REG FILE	01	1	1	SIT ANALI BR	24	1	1
	STRUCT ENG BR	25	1	1	SYS INTERACT BR		1	1
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November 21, 1980

Mr. Frank J. Miraglia, Jr., Chief
Licensing Branch No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Docket No. 50-275
Docket No. 50-323
Diablo Canyon Units 1 and 2

Dear Mr. Miraglia:

Enclosed is information responding to the letter from Mr. John Stolz dated January 25, 1978 concerning long-term Overpressure Transient Protection. The response contains a description of the long-term systems to be employed at Diablo Canyon Unit 1 and Unit 2.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it to me in the enclosed addressed envelope.

Very truly yours,

Philip A. Crane, Jr.

Enclosure
CC w/enc.: Service List

B001
S/40

Startup and Shutdown Overpressure Protection

1. Identify and justify the most limiting pressure transients caused by mass input and heat input.

   The most limiting pressure transients caused by mass input and heat input were identified and justified by Westinghouse for the Westinghouse Owner's Group on Reactor Coolant System Overpressurization, and documented in the report entitled "Pressure Mitigating Systems Transient Analysis Results" dated July 1977 with a supplement dated September 1977.

   A) Mass Input

      The most limiting pressure transient due to mass input was identified in Section 2.3 of the report as the inadvertent starting of a intermediate head safety-injection pump at low reactor coolant system pressure (Page 2-13).

   B) Heat Input

      The most limiting pressure transient due to heat input was identified in Section 2.4 of the report as that produced by reactor coolant loop temperature asymmetry coincident with water solid operation and reactor coolant pump start (Page 2-19).

2. Show that the overpressure protection is provided (does not violate Appendix G limits) over the range of conditions applicable to shutdown/heat-up operation.

   A) Mass Input

      A transient analysis has been performed by Westinghouse for the inadvertent actuation of the safety injection pump, which is the worst transient event. The results show that a maximum pressure of 490 psia will be reached in the RCS, which is within the allowable limits. (See Technical Specification Section 3/4.4.9.) The analysis takes into account the single failure criteria; one PORV was assumed to be unavailable for RCS letdown.

B) Heat Input

An analysis was performed by Westinghouse for the RCP start which assumed that the RCS was water solid at the initiation of the event and that a 50°F mismatch existed between the RCS and the steam generators. The peak pressures calculated were below those of the safety injection pressurization analysis.

C) Analysis

A reactor vessel fracture mechanics analysis was performed to evaluate the consequences of such a pressure peak. The analysis determined the maximum calculated flaw size acceptable on the vessel inside diameter at 12 EFPY. The methods and conservatisms used to derive the maximum calculated flaw size are from Appendix G to Section III of the ASME Code.

The analysis determined the maximum calculated flaw size for a 533 psia pressure at 100°F. The Unit 1 material properties used in the analysis are 0.35 weight percent copper, 0.018 weight percent phosphorous, and an initial RT_{NDT} of 0°F. The 12 EFPY fluence at the surface is 2.6×10^{19} n/cm^2. The resulting maximum acceptable flaw size is 1.5 inches. These results demonstrate that the pressure peak consequences do not impair vessel integrity or plant safety at 12 EFPY.

3. Identify and justify that the equipment will meet pertinent parameters assumed in the analysis (e.g., valve opening time, signal delay, valve capacity).

A) Valve Opening Times

The Westinghouse analysis assumes a valve opening time of 3 seconds (Section 1.4.2, Pages 1-8). PGandE has tested these valves and measured opening times of less than 2 seconds. (Surveillance Test Procedure V-3-J-1.)

B) Signal Delay

The subject of signal delay was included in the measurement described in Part (A) above.

C) Valve Capacity

The characteristics of the Diablo Canyon pressurizer power-operated relief valves and the reference valve used in the Westinghouse analysis are given below:

	W Reference Valve	Diablo Canyon Valve
Type:	Globe	Globe
Body Size:	2 inch	2 inch
Valve Trim:	linear	linear
Maximum C_v:	50	46
Opening Time (Sec):	3.0	2.0

The difference in valve flow coefficients (c_v) is offset by the increase in opening time (2 seconds vs. 3 seconds).

4. Provide a description of the system including relevant P&I drawings and electrical schematics.

A schematic of the System is attached. There are two independent channels, one connected to pressurizer power-operated relief valve PCV-455C, and the other to PCV-456. The channel connected to PCV-455C is described below. The channel connected to PCV-456 is similar.

The system opens PCV-455C when all four of the following conditions are met:

a) Temperature sensed by Temperature Comparitor TC-413A is below 330°F,

b) The enable switch located on the main control board is in the "enable" position,

c) Pressure sensed by Pressure Comparitor PC-405D is greater than 450 psi, and

d) The PORV Control Switch is the in the "auto" position.

To provide for alarming of the system, a main annunciator input is activated when the temperature as sensed by Temperature TC-413A is below 330°F and the enable switch on the main control board is not in the "enable" position.

5. Discuss how the system meets the criteria.

A) Operator Action

The system is completely automatic. Once enabled by the operator before startup, the system will open the pressurizer power-operated relief valves whenever the pressure exceeds 450 psi coincident with reactor coolant system temperature below 330°F.

B) Single Failure

There are two separate and independent systems. The failure of either system would not affect the remaining system.

C) Testability

The system is testable at all times. The pressurizer power-operated relief valves are in series with motor-operated block valves which may be closed during testing. Test signals may be injected into the appropriate control circuits and the position of the valve monitored and timed.

D) Seismic and IEEE 279 Criteria.

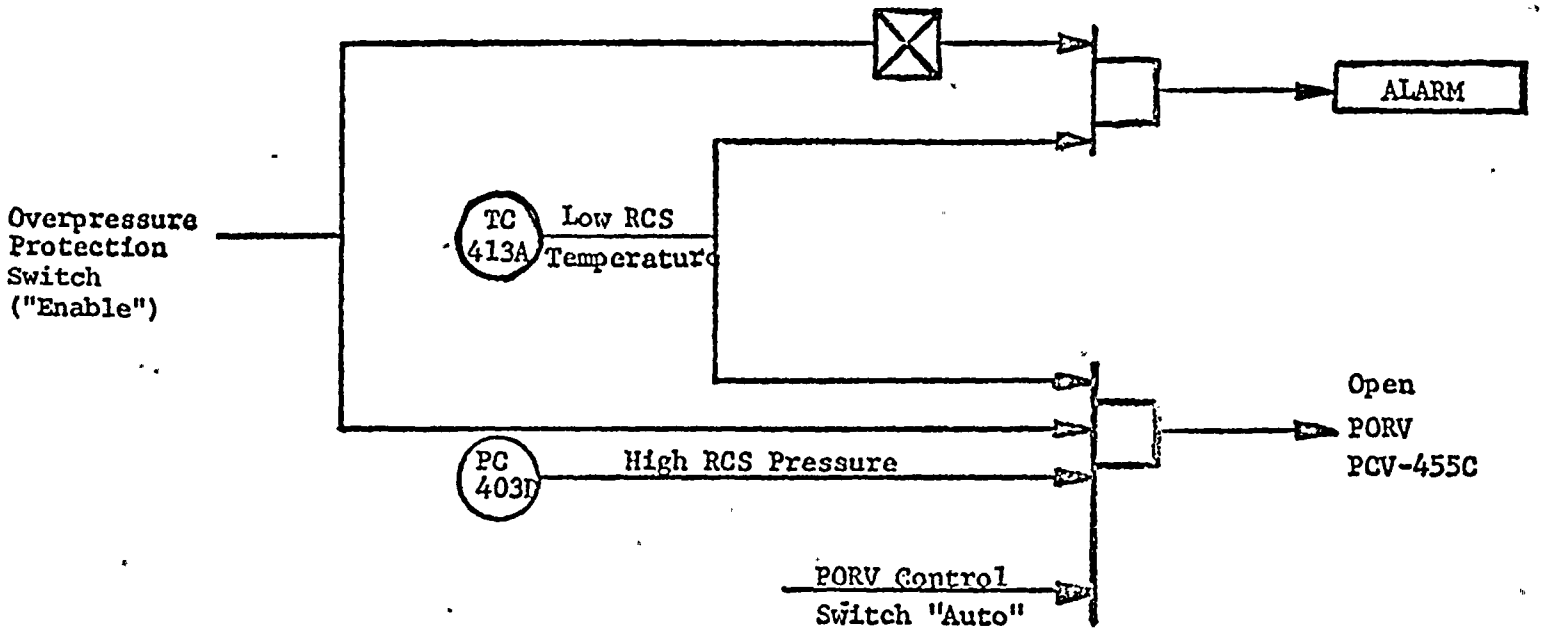
All components in the system meet seismic Category I and IEEE 279 Criteria. The electrical portions of the system are powered from invertors supplied by the station battery. The air to the valve is backed up by bottled nitrogen.

6. Discuss the administrative controls required to implement the protection system.

Instructions to enable the overpressurization protection system will be included in Plant Startup Procedure (L-1) and Plant Cooldown Procedure (L-5). A Technical Specification requiring use of the system will also be added.

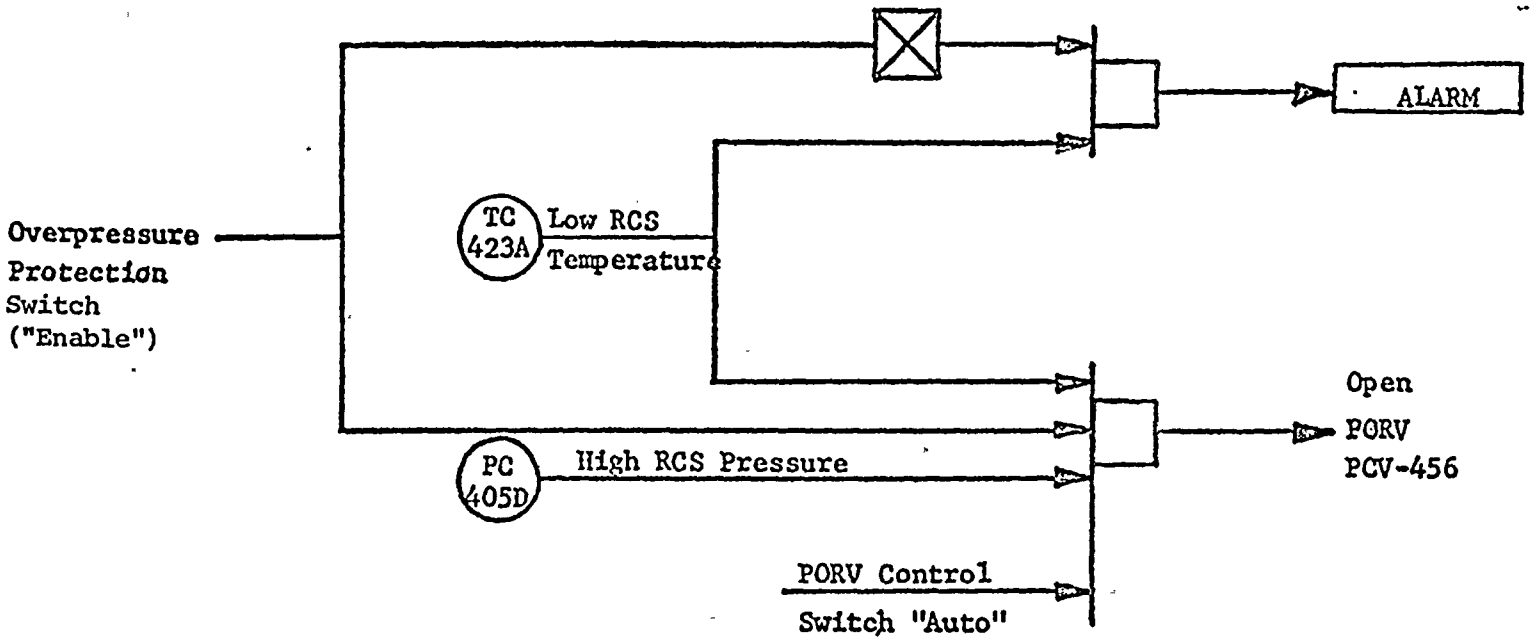
OVERPRESSURE PROTECTION

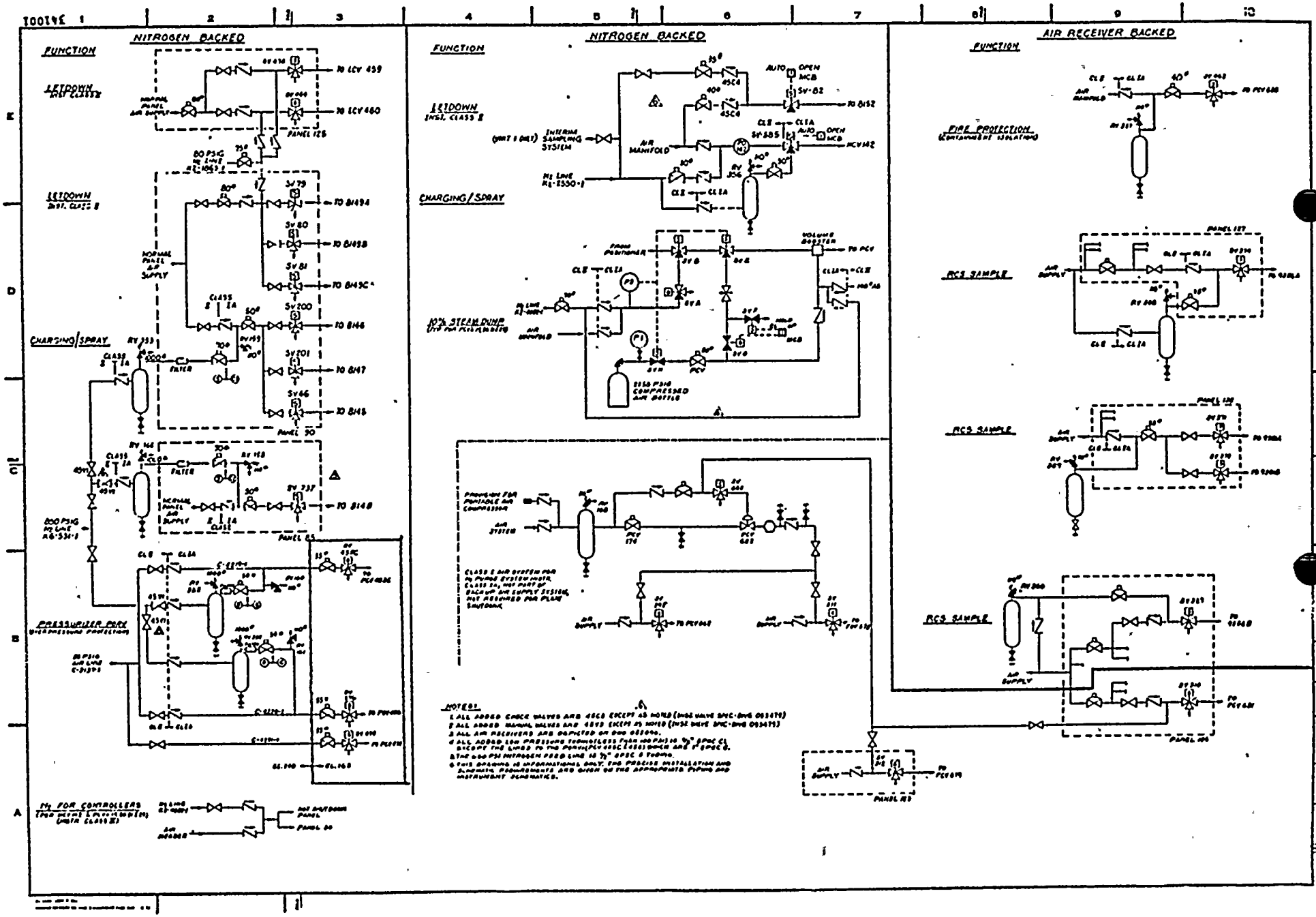
CHANNEL A



OVERPRESSURE PROTECTION

CHANNEL B




NITROGEN BACKED
FUNCTION
LETDOWN
INSIDE CLASS E
LETDOWN
INSIDE CLASS E
CHARGING/SPRAY
PRESSURIZER PORV
OVERPRESSURE PROTECTION
PX FOR CONTROLLERS
NITROGEN BACKED
FUNCTION
LETDOWN
INSIDE CLASS E
CHARGING/SPRAY
10% STEAM DUMP
AIR RECEIVER BACKED
FUNCTION
FIRE PROTECTION
RCS SAMPLE
RCS SAMPLE
RCS SAMPLE
NOTES:

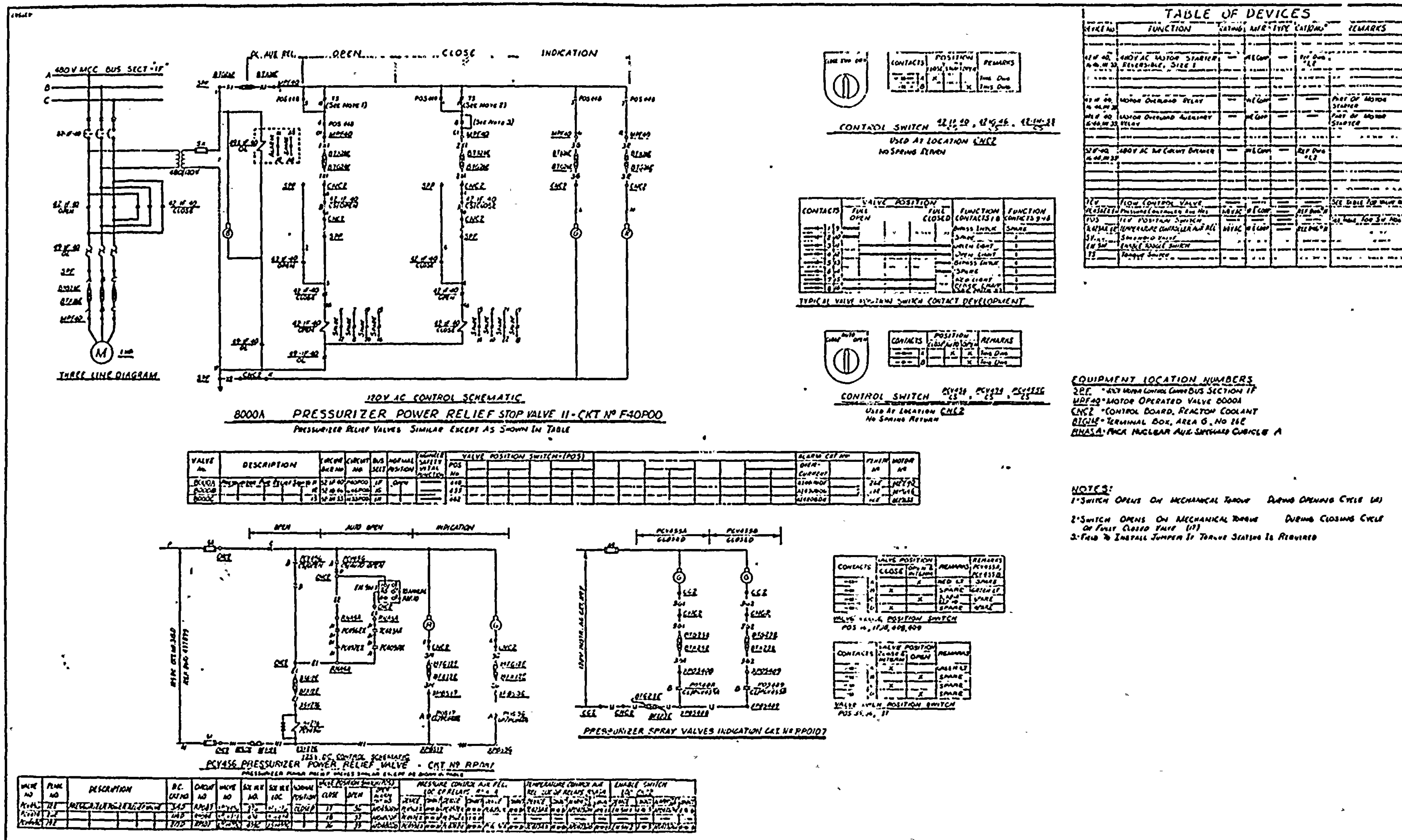


TABLE OF DEVICES
FUNCTION
REMARKS
480 V MCC BUS SECT "1F"
THREE LINE DIAGRAM
OPEN
CLOSE
INDICATION
120V AC CONTROL SCHEMATIC
8000A PRESSURIZER POWER RELIEF STOP VALVE II - CKT Nº F40P00
Pressurizer Relief Valves Similar Except As Shown In Table
VALVE NO.
DESCRIPTION
VALVE POSITION SWITCH (POS)
CONTROL SWITCH
Used At Location CNC2
No Spring Return
CONTACTS
POSITION
REMARKS
VALVE POSITION
FUNCTION
TYPICAL VALVE POSITION SWITCH CONTACT DEVELOPMENT
EQUIPMENT LOCATION NUMBERS
NOTES:
1. Switch Opens On Mechanical Torque During Opening Cycle
2. Switch Opens On Mechanical Torque During Closing Cycle
3. Field To Install Jumper If Torque Seating Is Required
AUTO OPEN
125V DC CONTROL SCHEMATIC
PCV456 PRESSURIZER POWER RELIEF VALVE - CKT Nº RP001
PRESSURIZER SPRAY VALVES INDICATION CKT Nº RP0107
DESCRIPTION