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 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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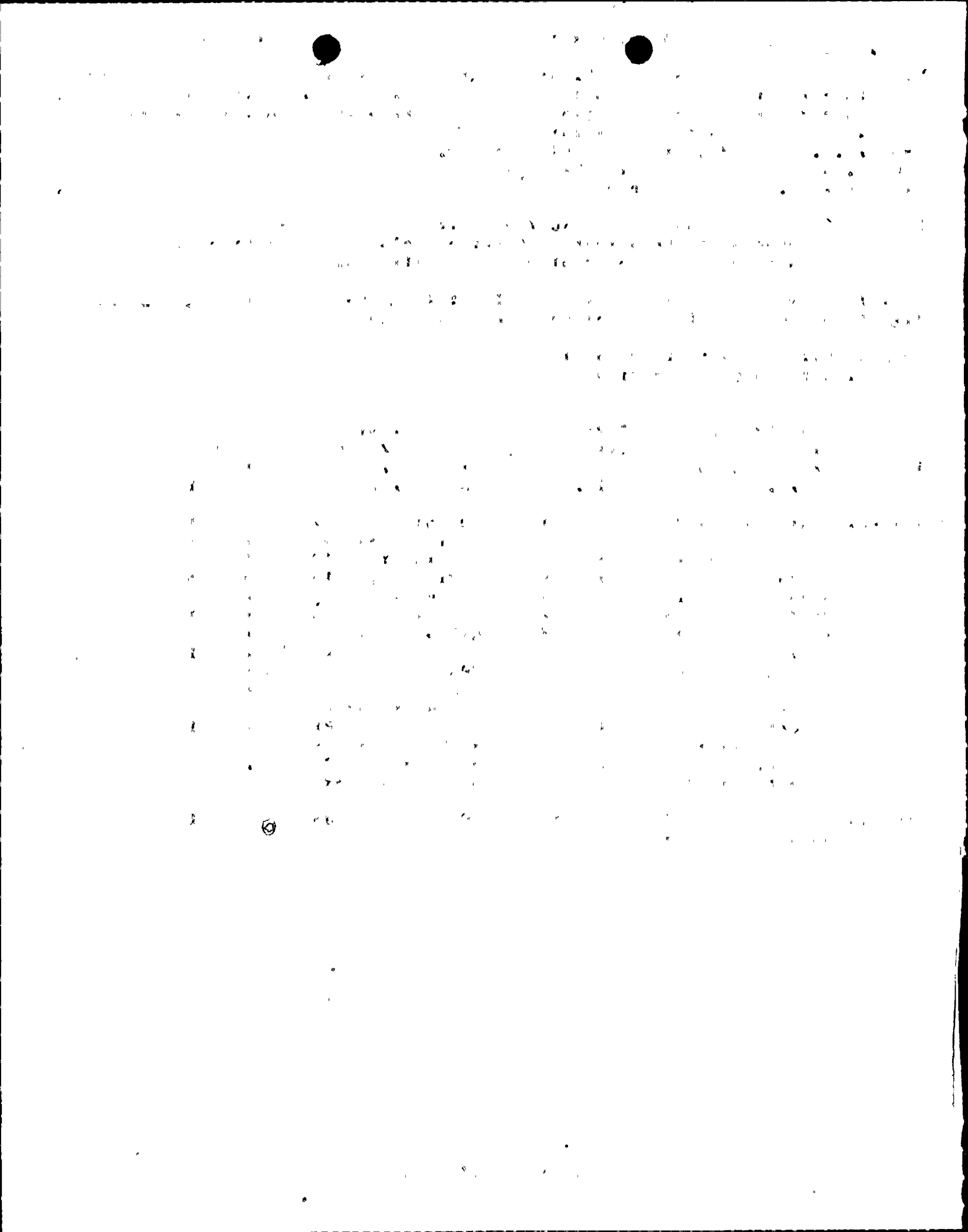
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INTERNAL:	ACCID. EVALI BR26	1	1	AUX SYS BR 07	1	1
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	CORE PERF BR 10	1	1	EFF TR SYS BR12	1	1
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	GEOSCIENCES 14	1	1	HUM FACT ENG BR	1	1
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	I&E 06	3	3	LIC GUID. BR.	1	1
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P. O. BOX 7442 • 77 BEALE STREET, 31ST FLOOR, SAN FRANCISCO, CALIFORNIA 94106
TELEPHONE (415) 781-4211 TELECOPIER (415) 543-7813

MALCOLM H. FURBUSH
VICE PRESIDENT AND GENERAL COUNSEL

ROBERT OHLBACH
ASSOCIATE GENERAL COUNSEL

CHARLES T. VAN DEUSEN

PHILIP A. CRANE, JR.

HENRY J. LAPLANTE

JOHN B. GIBSON

ARTHUR L. HILLMAN, JR.

CHARLES W. THISSELL

DANIEL E. GIBSON

ASSISTANT GENERAL COUNSEL

November 21, 1980

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ATTORNEYS

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

Enclosure
CC w/enc.: Service List

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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 an intermediate head safety-injection pump at low reactor coolant system pressure (Page 2-13).

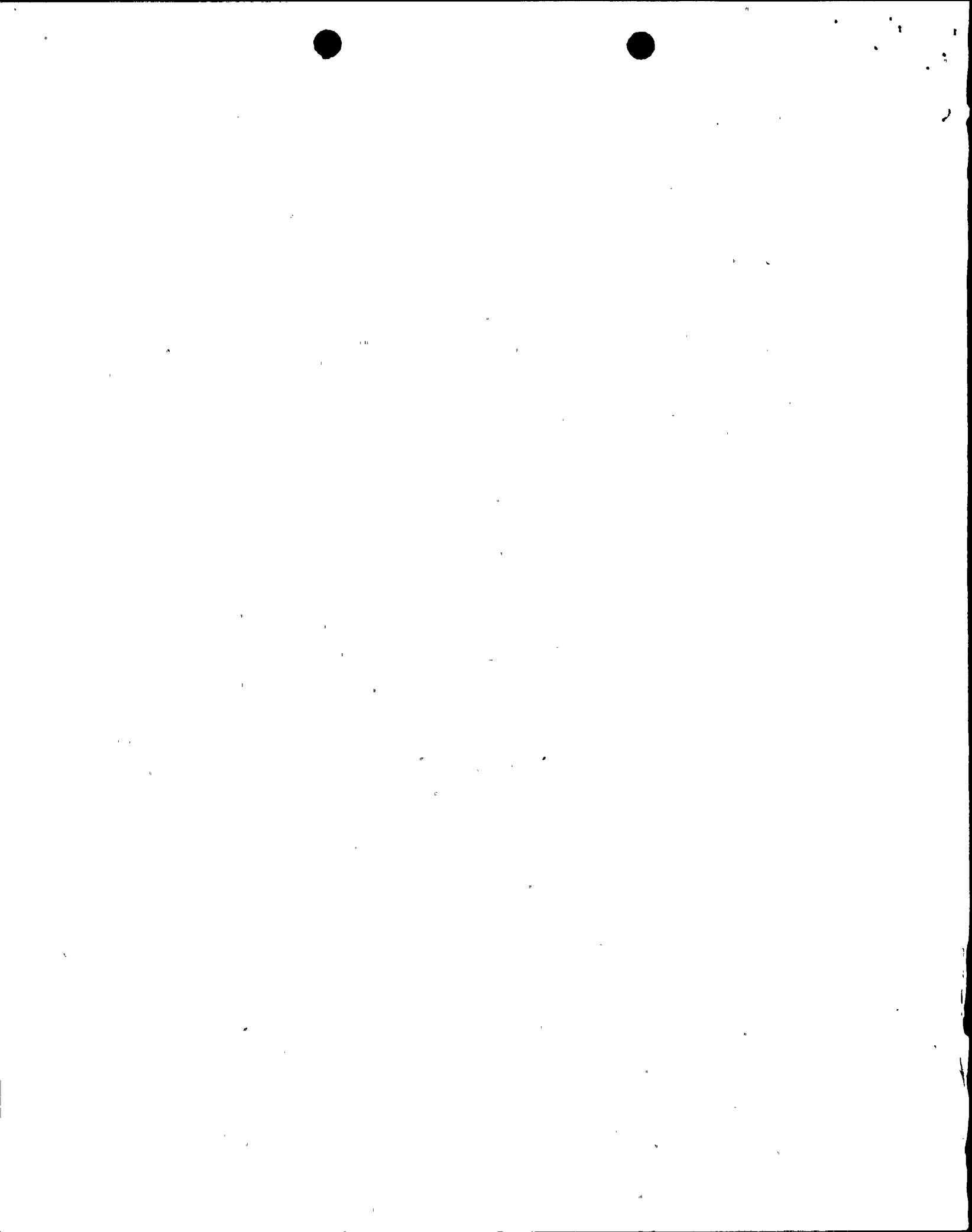
B) Heat Input

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

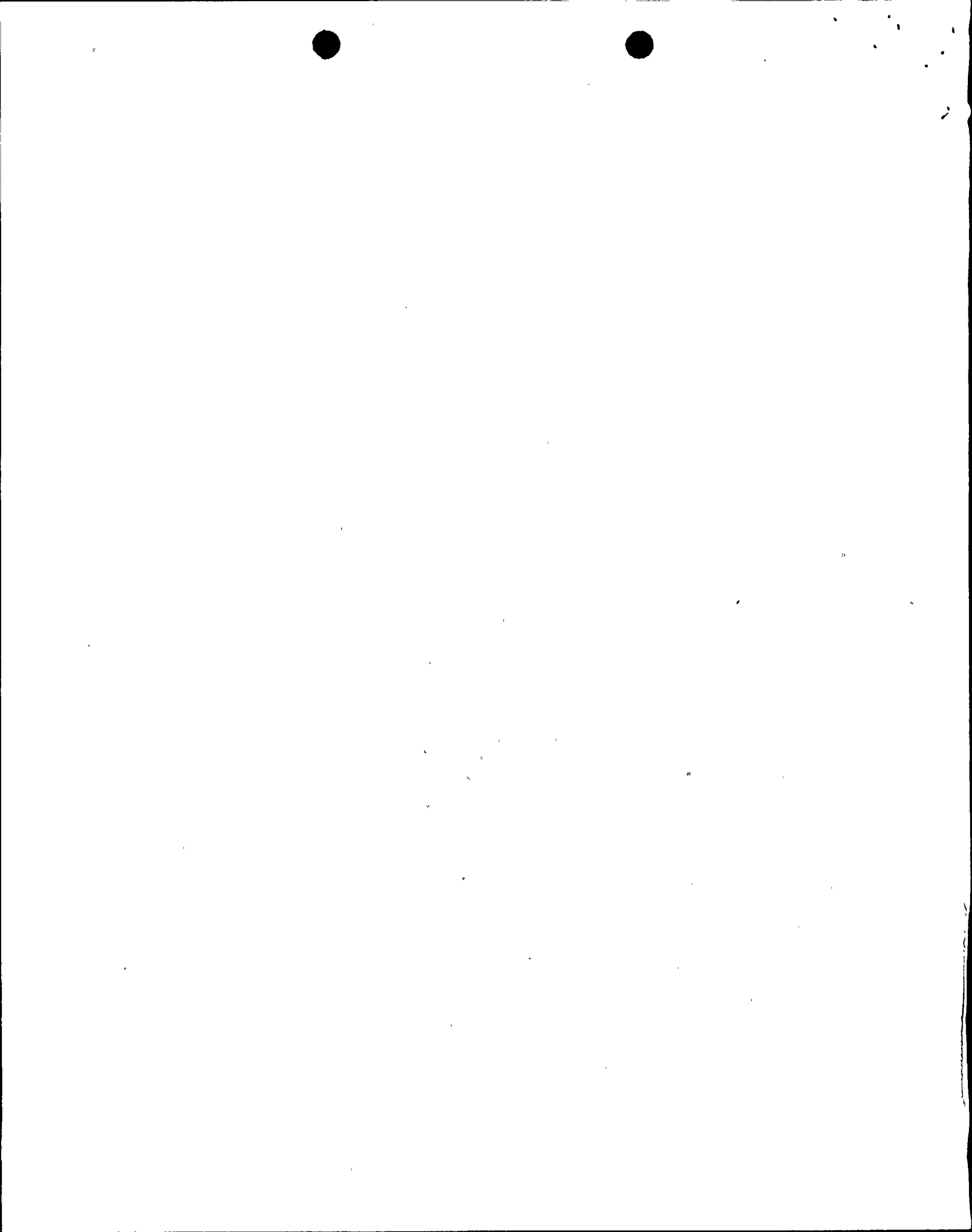
An analysis was performed by Westinghouse for the RCP start which assumed that the RCS was water solid at the initiation of the event and that a 50°F mismatch existed between the RCS and the steam generators. The peak pressures calculated were below those of the safety injection pressurization analysis.

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/cm². 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:

	<u>W Reference Valve</u>	<u>Diablo Canyon Valve</u>
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

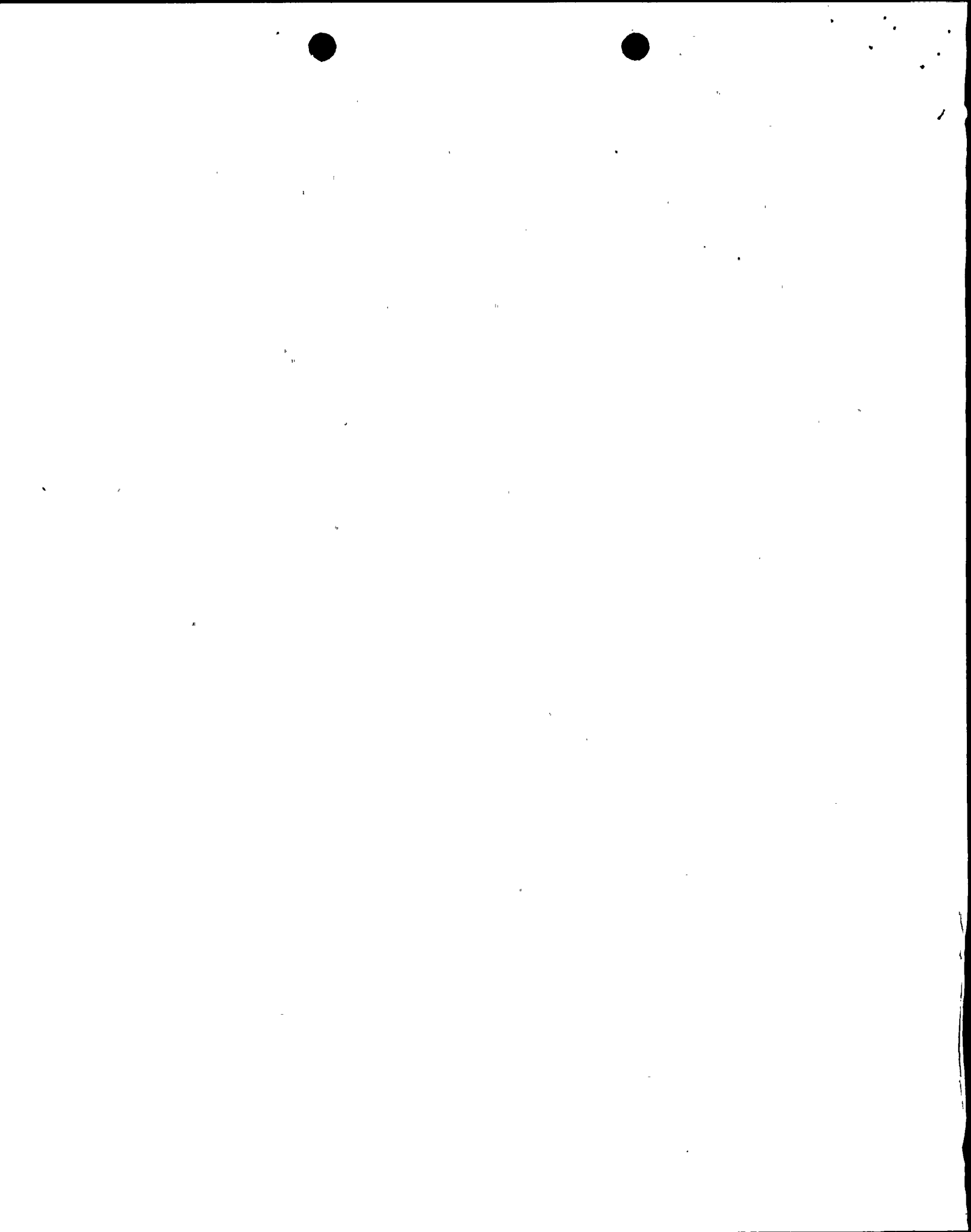
The system is completely automatic. Once enabled by the operator before startup, the system will open the pressurizer power-operated relief valves whenever the pressure exceeds 450 psi coincident with reactor coolant system temperature below 330°F.

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.

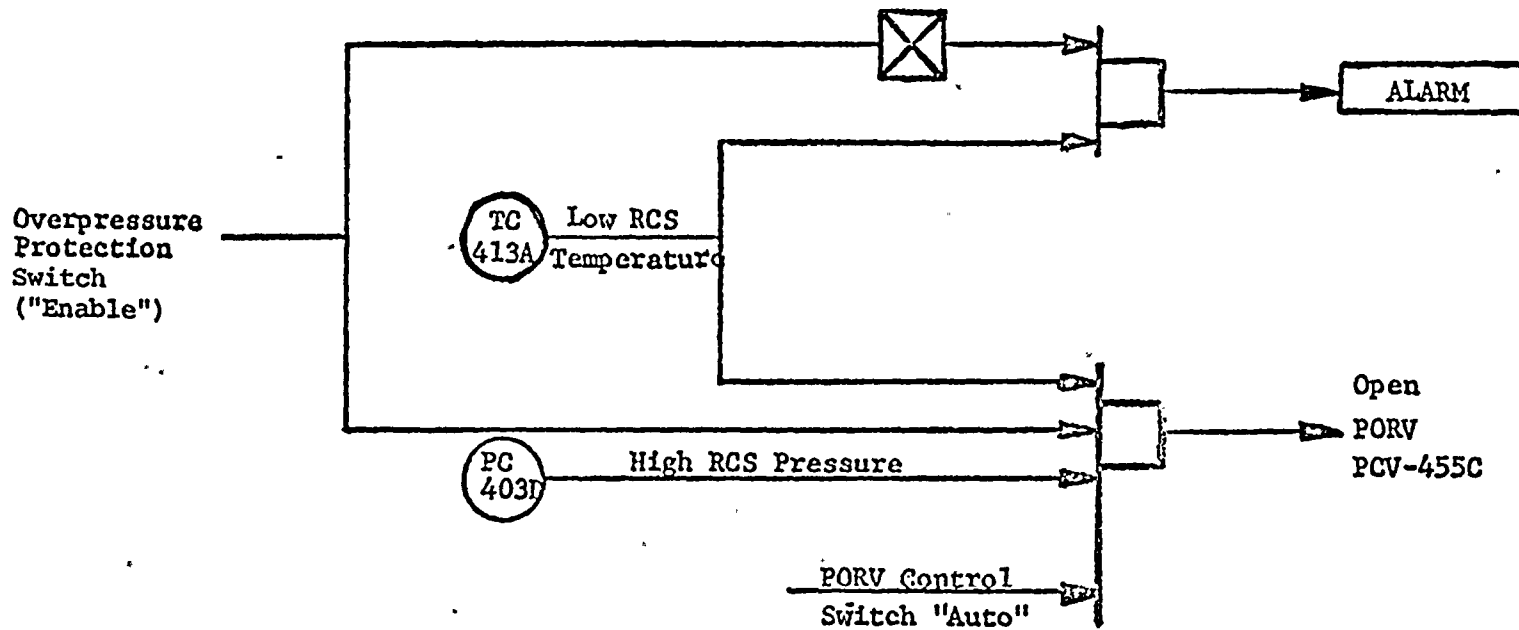
6. Discuss the administrative controls required to implement the protection system.

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

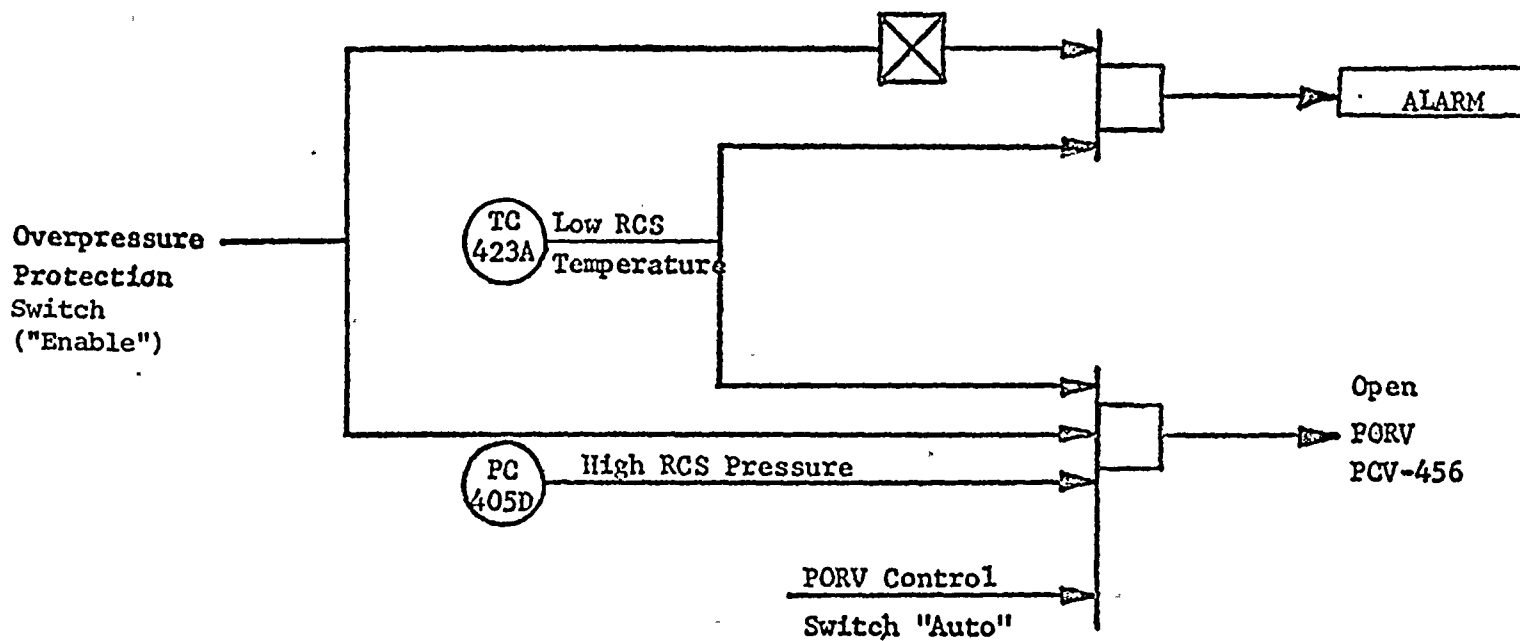
CHANNEL A

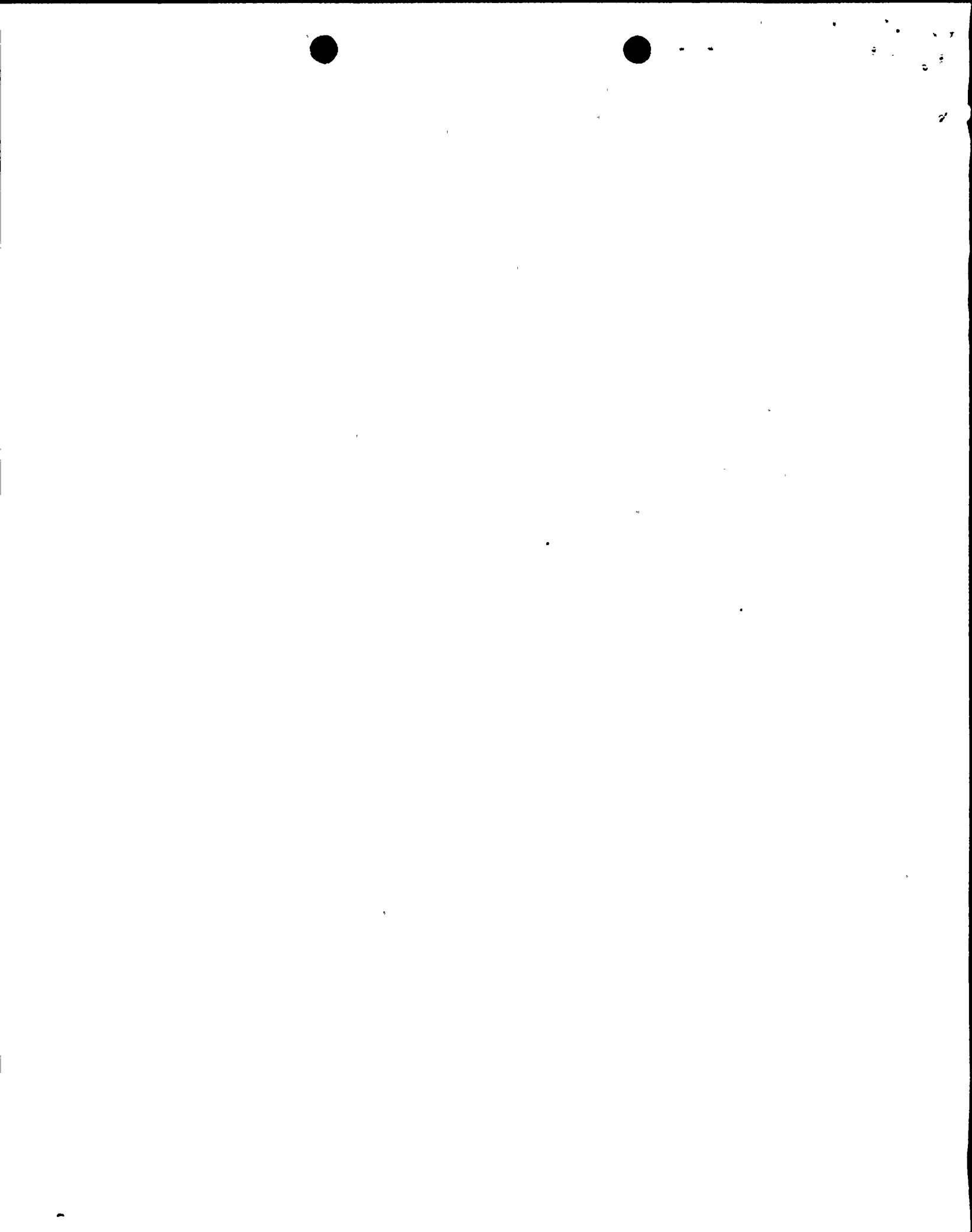




OVERPRESSURE PROTECTION

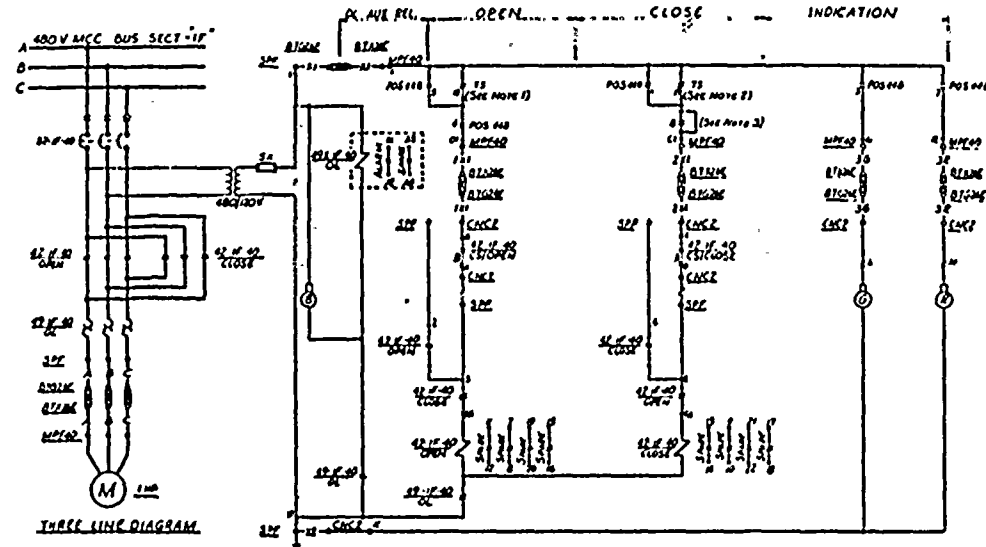
CHANNEL B





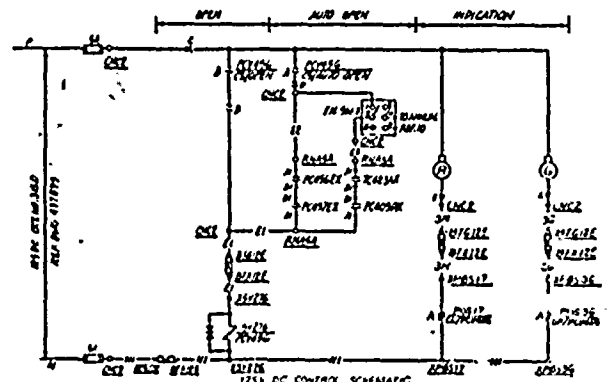


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120V AC CONTROL SCHEMATIC
 8000A PRESSURIZER POWER RELIEF STOP VALVE II - CKT NO F40P00
 PRESSURIZER RELIEF VALVES SIMILAR EXCEPT AS SHOWN IN TABLE

VALVE No.	DESCRIPTION	VALVE No.	CURRENT No.	BUS SECT.	NORMAL POSITION	CONTROL SWITCH	VALVE POSITION SWITCH (POS)	RELAY No.	FLTR	WTR
8000A	PRESSURIZER POWER RELIEF STOP VALVE II	8000A	8000A	8000A	8000A	8000A	8000A	8000A	8000A	8000A



120V AC CONTROL SCHEMATIC
 8000A PRESSURIZER POWER RELIEF VALVE - CKT NO RP00A
 PRESSURIZER RELIEF VALVES SIMILAR EXCEPT AS SHOWN IN TABLE

VALVE No.	DESCRIPTION	DC CKT NO.	DRUM NO.	WTR NO.	SR No.	SR No.	NORMAL POSITION	CONTROL SWITCH	VALVE POSITION SWITCH (POS)	RELAY No.	FLTR	WTR
8000A	PRESSURIZER POWER RELIEF VALVE	8000A	8000A	8000A	8000A	8000A	8000A	8000A	8000A	8000A	8000A	8000A

CONTACTS	POSITION	REMARKS
1-2	OPEN	NO SPRING RETURN
3-4	CLOSE	

CONTROL SWITCH 521F 20, 42G 26, 42L 21
 USED AT LOCATION CNE2
 NO SPRING RETURN

CONTACTS	VALVE POSITION	FUNCTION	FUNCTION
1-2	FULL OPEN	SPARE	SPARE
3-4	FULL CLOSED	SPARE	SPARE
5-6	SPARE	SPARE	SPARE
7-8	SPARE	SPARE	SPARE
9-10	SPARE	SPARE	SPARE
11-12	SPARE	SPARE	SPARE
13-14	SPARE	SPARE	SPARE
15-16	SPARE	SPARE	SPARE
17-18	SPARE	SPARE	SPARE
19-20	SPARE	SPARE	SPARE
21-22	SPARE	SPARE	SPARE
23-24	SPARE	SPARE	SPARE
25-26	SPARE	SPARE	SPARE
27-28	SPARE	SPARE	SPARE
29-30	SPARE	SPARE	SPARE
31-32	SPARE	SPARE	SPARE
33-34	SPARE	SPARE	SPARE
35-36	SPARE	SPARE	SPARE
37-38	SPARE	SPARE	SPARE
39-40	SPARE	SPARE	SPARE
41-42	SPARE	SPARE	SPARE
43-44	SPARE	SPARE	SPARE
45-46	SPARE	SPARE	SPARE
47-48	SPARE	SPARE	SPARE
49-50	SPARE	SPARE	SPARE
51-52	SPARE	SPARE	SPARE
53-54	SPARE	SPARE	SPARE
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97-98	SPARE	SPARE	SPARE
99-100	SPARE	SPARE	SPARE

TYPICAL VALVE POSITION SWITCH CONTACT DEVELOPMENT

CONTACTS	POSITION	REMARKS
1-2	OPEN	NO SPRING RETURN
3-4	CLOSE	

CONTROL SWITCH 8000A 8000A 8000A
 USED AT LOCATION CNE2
 NO SPRING RETURN

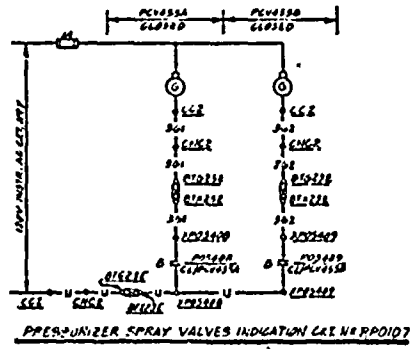
ITEM NO.	FUNCTION	STATUS	WTR TYPE	REMARKS
101	480V AC MOTOR STARTER	NO	NO	
102	480V AC MOTOR STARTER	NO	NO	
103	480V AC MOTOR STARTER	NO	NO	
104	480V AC MOTOR STARTER	NO	NO	
105	480V AC MOTOR STARTER	NO	NO	
106	480V AC MOTOR STARTER	NO	NO	
107	480V AC MOTOR STARTER	NO	NO	
108	480V AC MOTOR STARTER	NO	NO	
109	480V AC MOTOR STARTER	NO	NO	
110	480V AC MOTOR STARTER	NO	NO	
111	480V AC MOTOR STARTER	NO	NO	
112	480V AC MOTOR STARTER	NO	NO	
113	480V AC MOTOR STARTER	NO	NO	
114	480V AC MOTOR STARTER	NO	NO	
115	480V AC MOTOR STARTER	NO	NO	
116	480V AC MOTOR STARTER	NO	NO	
117	480V AC MOTOR STARTER	NO	NO	
118	480V AC MOTOR STARTER	NO	NO	
119	480V AC MOTOR STARTER	NO	NO	
120	480V AC MOTOR STARTER	NO	NO	

EQUIPMENT LOCATION NUMBERS
 20F - 480V MOTOR CONTROL BUS SECTION 1P
 40F40 - MOTOR OPERATED VALVE 0000A
 CNE2 - CONTROL BOARD, REACTOR COOLANT
 8000A - TERMINAL BOX, AREA 0, NO 16E
 8000A - PWR INCLUBAR AUX SWITCHBOARD CABLE A

- NOTES:
 1-SWITCH OPENS ON MECHANICAL TRIP DURING OPENING CYCLE (U)
 2-SWITCH OPENS ON MECHANICAL TRIP DURING CLOSING CYCLE OF FULL CLOSED TRIP (U)
 3-FWD TO INSTALL JUMPER IF TORQUE STATION IS REQUIRED

CONTACTS	VALVE POSITION	REMARKS
1-2	FULL OPEN	NO SPRING RETURN
3-4	FULL CLOSED	
5-6	SPARE	
7-8	SPARE	
9-10	SPARE	
11-12	SPARE	
13-14	SPARE	
15-16	SPARE	
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21-22	SPARE	
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99-100	SPARE	

CONTACTS	VALVE POSITION	REMARKS
1-2	FULL OPEN	NO SPRING RETURN
3-4	FULL CLOSED	
5-6	SPARE	
7-8	SPARE	
9-10	SPARE	
11-12	SPARE	
13-14	SPARE	
15-16	SPARE	
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PRESSURIZER SPRAY VALVES INDICATION CKT NO RP007

