AUG 16 1974

DOCKET NO.: 50-313

APPLICANT : ARKANSAS POWER AND LIGHT COMPANY (AP&L)

FACILITY : ARKANSAS NUCLEAR ONE, UNIT 1

REPORT OF MEETING AT BETHESDA, MARYLAND ON JULY 30, 1974

Introduction

This meeting was held to discuss details of the following outstanding electrical, instrumentation, and control matters on Arkansas Nuclear One, Unit 1 (ANO-1); these matters are undergoing specific post-licensing review:

1. Reactor Protection System Modification
2. Emergency Feedwater System Control
3. Steam Line Break Instrumentation & Control System (SLBIC)

The applicant responded to all questions raised at this meeting. The applicant informed the staff that there will be additional delay in the delivery of a pair of key components for the SLBIC, delaying completion of the system at least until the end of 1974.

Discussion

1. Reactor Protection System Modification

There was some general discussion of this modification and discussion of drawing details. This modification consists of some minor circuit changes to produce an automatic change of the overpower trip setpoint from 105.5% to 5% whenever the shutdown bypass mode is selected. Previously, the Reactor Technician had to adjust the trip setpoint manually each time. The applicant presented a handout (Attachment 2) which summarizes the principal features of this modification.

2. Emergency Feedwater System Control

There was brief discussion of this matter which involves the acceptability of isolating devices which separate a non-safety grade automatic control system from safety grade motor operated valves which must remain manually operable during emergency conditions. AP&L clarified some of the explanations given in the April 29, 1974 letter on this subject.

OFFICE ➤						
SURNAME ➤						
DATE ➤						

3. Steam Line Break Instrumentation & Control System (SLBIC)

The applicant gave a detailed presentation reviewing the design basis and details of the system. A 30-page handout, including copies of the slides and pertinent electrical schematics, was presented; a copy of this handout is attached to the docket file copy of this meeting summary. The presentation covered the safety aspects of the system and included an itemized review of how the applicant feels the system satisfies the specific requirements of applicable design standards (IEEE-279, etc.). The following items were noted in particular:

a. The valves controlled by the SLBIC, the main steam block valves (air open-spring shut), and the main feedwater block valves (motor-operated), can be cycled through partial stroke for surveillance testing while the plant is operating.

b. The individual sensors and logic trains are testable while the plant is operating.

c. All SLBIC equipment is seismic Category I.

d. The SLBIC cabinets are located in the Electrical Equipment Room; the pressure signal is brought to that room by small diameter (3/8 inch O.D.) steam line.

e. The pressure switches close contacts on decreasing pressure.

f. The SLBIC uses General Electric HFA relays. Seismic test data (5-33 Hz) is available for the relays, but the SLBIC cabinets are computer analyzed for seismic response.

g. The SLBIC panels have been built; the critical component delivery is the two new, high-speed (20-second stroke) operators for the main feedwater block valves whose delivery date has slipped to December 1, 1974.

Subject to AEC review and acceptance the SLBIC can be installed quickly except for the feedwater valve operators. The existing operators on these valves are slow acting (90-second stroke). AP&L and B&W will determine whether a steam line break calculation can be made to establish how far into core life the plant could operate with reliance on such slow-acting valves. They agreed to notify the staff within a week of the results of this determination.

Conclusion

The staff noted to the applicant that some of the documentation of these matters appears inadequate, an FSAR amendment to cover them appears to be appropriate. The schedule for installation of the SLBIC will be determined along with the conclusion of the staff review.

Original Signed by

Robert M. Bernero, Project Manager
Light Water Reactors Branch 2-3
Directorate of Licensing

Attachments:
1. List of Attendees
2. Reactor Protection System

DISTRIBUTION:
Docket Files
AEC PDR
LPDR
L Reading
LWR 2-3 Reading
AGiambusso
RSBoyd
RP ADs
RP BCs
SVarga
DEisenhut
RKlecker
FSchroeder
TR ADs
TR BCs
RO (3)
RS (3)
OGC
RMBernero
EGoulbourne
ACRS (16)
RSchool
FAnderson

OFFICE ➤	x7886/LWR 2-3					
SURNAME ➤	RMBernero:cjb					
DATE ➤	8/13/74					

ATTACHMENT 1

MEETING WITH ARKANSAS POWER AND LIGHT COMPANY
ARKANSAS NUCLEAR ONE, UNIT 1
HELD JULY 30, 1974

LIST OF ATTENDEES

Atomic Energy Commission

R. Bernero
R. Scholl
F. Anderson

Arkansas Power & Light Company

W. Cavanaugh
D. Rueter
J. Grisham
D. Admas
D. Smither

Babcock & Wilcox

E. Willingham, Jr.
R. Williamson
H. Baker
E. Patterson

Bechtel Corporation

E. Smith
W. Mehegan
K. Bailey
G. Smith

TTACHMENT 2

Reactor Protection System (RPS)

I. Subject: Shutdown Bypass Power Level Trip Bistable

II. References: 1) Arkansas Nuclear One, Unit 1, Final Safety Analysis Report
2) Babcock & Wilcox Topical Report BAW-10003, Revision 2, Qualification Testing of Protection System Instrumentation

III. Discussion

A. Present Shutdown Bypass High Power Level Trip Bistable

1. There are four high power level trip bistables, one in each of the RPS's four protection channels as shown in Reference 1's Figure Number 7-1. Each high power level trip bistable is set to trip its protection channel whenever the power level reaches or exceeds the trip setpoint (nominally $\leq$ 105.5% of full power as noted in Reference 1, Section 15's Table 2.3-1) during plant operation.

2. There are four shutdown bypass circuits, one in each of the RPS's four protection channels as shown in Reference 1's Figure Number 7-1. As discussed in Reference 1's Section 15.2.3 F., whenever the shutdown bypass circuit is used two conditions are imposed:

"1. By administrative control the nuclear overpower trip set point must be reduced to a value $\leq$ 5.0 percent of rated power during reactor shutdown.

2. A high reactor coolant system pressure trip set point of 1720 psig is automatically imposed."

Condition 1 is met by manually adjusting the four high power level trip bistables, discussed in 1. above, from their normal trip setpoint ($\leq$ 105.5%) to the shutdown bypass trip setpoint ($\leq$ 5.0%). Condition 2 is met by having four high reactor coolant pressure trip bistables, one in each of the RPS's four protection channel shutdown bypass circuits, previously set to the shutdown bypass trip setpoint ($\leq$ 1720 psig).

3. When the shutdown bypass circuit is returned to normal, the four high power level trip bistables, discussed in 1. and 2. above, must be manually readjusted from the shutdown bypass trip setpoint ($\leq$ 5.0%) back to their normal trip setpoint ($\leq$ 105.5%) in order to return to full power operation.

B. Proposed Shutdown Bypass High Power Level Trip Bistable

1. Four additional high power level trip bistables would be added to the present four for a total of eight, two in each of the RPS's

four protection channels. The first, and present, high power level trip bistable would be set to trip its protection channel whenever the power level reaches or exceeds the trip setpoint (nominally $\leq$ 105.5% of full power as noted in Reference 1, Section 15's Table 2.3-1) during plant operation as it presently is. The second, and added, high power level trip bistable would be in the shutdown bypass circuit and would be set to trip its protection channel whenever the power level reaches or exceeds the trip setpoint (nominally $\leq$ 5.0% of full power as noted in Reference 1, Section 15's Table 2.3-1) during plant shutdown (shutdown bypass circuit actuated).

2. Conditions 1 and 2 of Reference 1's Section 15.2.3 F would be met by having the four sets of high reactor coolant pressure and high power level trip bistables, one set (pressure and power) in each of the RPS's four protection channel shutdown bypass circuits, previously set to the shutdown bypass trip setpoints ($\leq$ 1720 psig and $\leq$ 5.0%).

3. When the shutdown bypass circuit is returned to normal, no manual trip setpoint adjustments are required in order to return to operation.

C. Summary of How the Proposed Modification Meets IEEE-279

See Reference 1's Section 15.2.3 F.

D. Design Bases of the Modification

See Reference 1's Section 15.2.3 F.

E. Design Bases of the RPS

See Reference 1; specifically, Sections 7.1.1, 7.1.2 and 7.3.1.1 for design basis information. See Reference 2 for qualification testing information.

IV. Summary

There is one high power level trip bistable in each protection channel of the RPS presently. It has to be adjusted to a lower trip setpoint when the shutdown bypass is used. It then has to be readjusted to the normal (higher) trip setpoint when normal operation is desired.

There would be two high power level trip bistables in each protection channel of the RPS as proposed. The first (presently installed) would be adjusted to the normal trip setpoint. The second (proposed to be installed) would be adjusted to the shutdown bypass trip setpoint. The first bistable (normal trip setpoint) would always produce a protection channel trip regardless of the presence or absence of the shutdown bypass actuation. The second bistable (shutdown bypass trip setpoint) would only produce a protection channel trip in the presence of the shutdown bypass actuation. As proposed, no adjustments need to be made to any trip setpoints when switching to or from shutdown bypass.

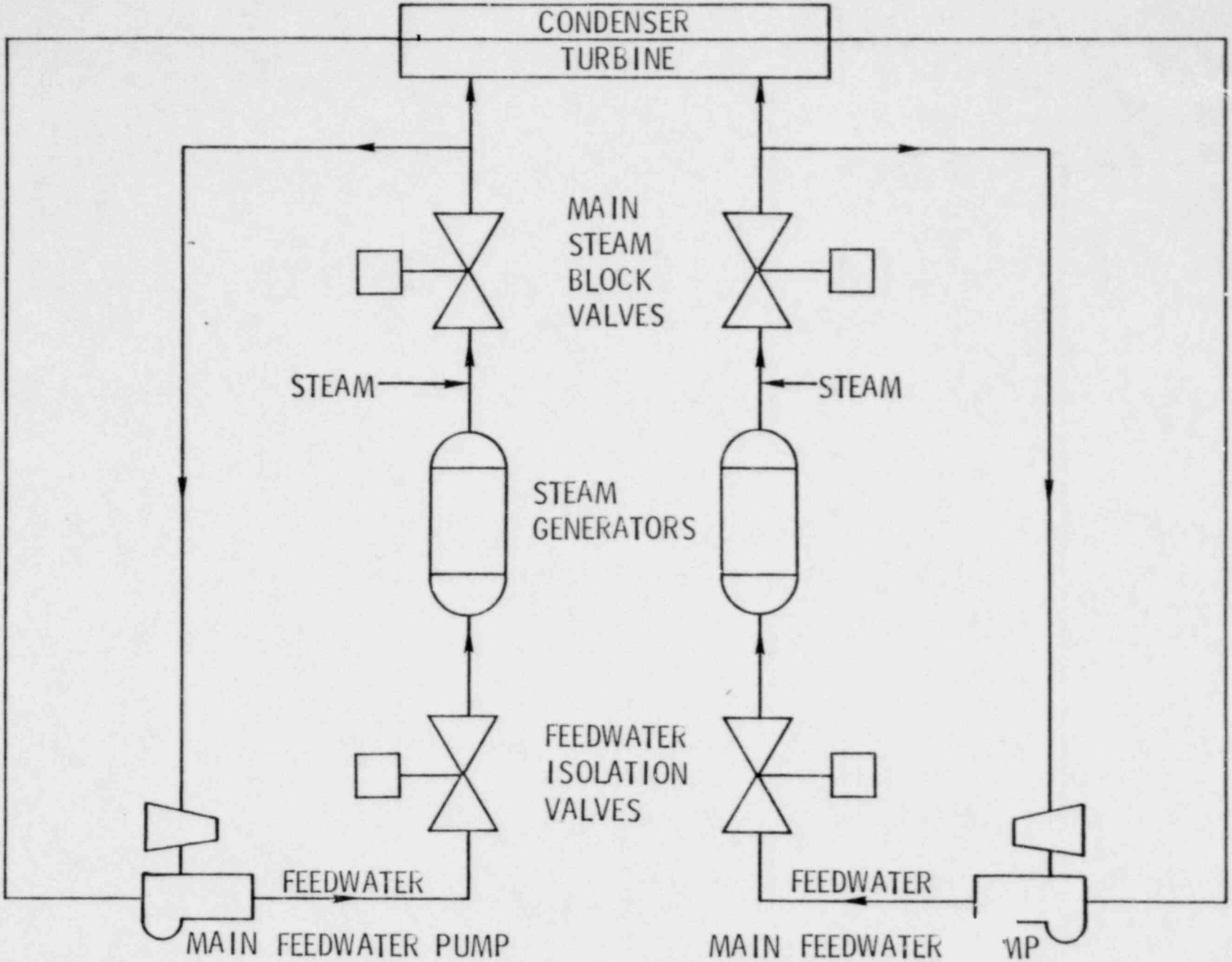
STEAM LINE BREAK INSTRUMENTATION & CONTROL

SLBIC

ARKANSAS NUCLEAR ONE - UNIT ONE

- PURPOSE
- CRITERIA
- SYSTEM DESCRIPTION
- ANALYSIS
- QUESTIONS

ELEMENTARY FEEDWATER - STEAM FLOWPATH



* PURPOSE

A. DETECT STEAM LINE RUPTURE

B. ISOLATE AFFECTED STEAM GENERATOR

C. PROVIDE TESTABILITY OF MSBV'S, FIV'S

*CRITERIA

A. CLASS 1E QUALITY

B. CATEGORY 1 SEISMIC

C. IEEE 279

*SYSTEM DESCRIPTION

A. GENERAL

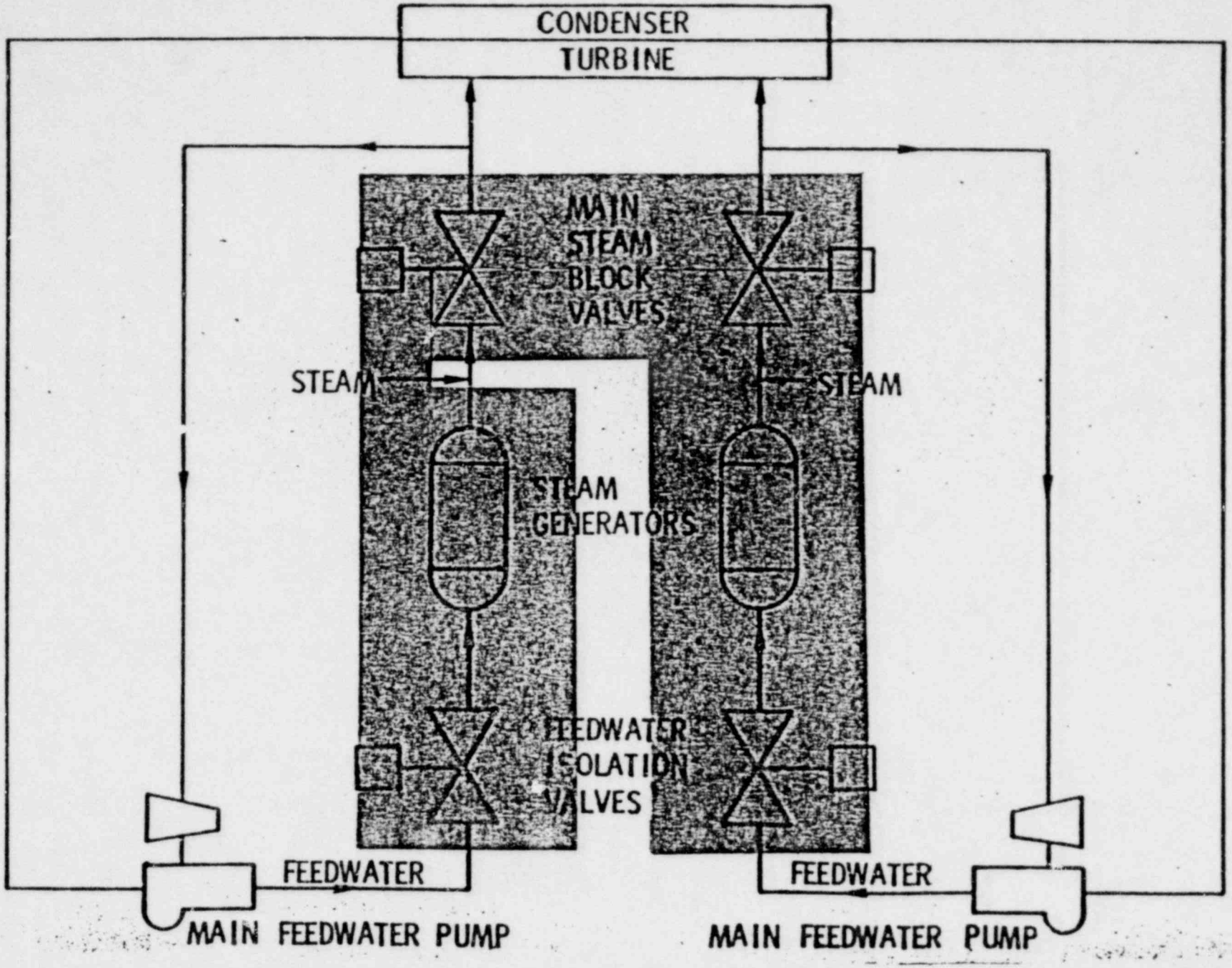
B. OPERATING LOGIC

C. TESTING LOGIC, VALVE CONTROL

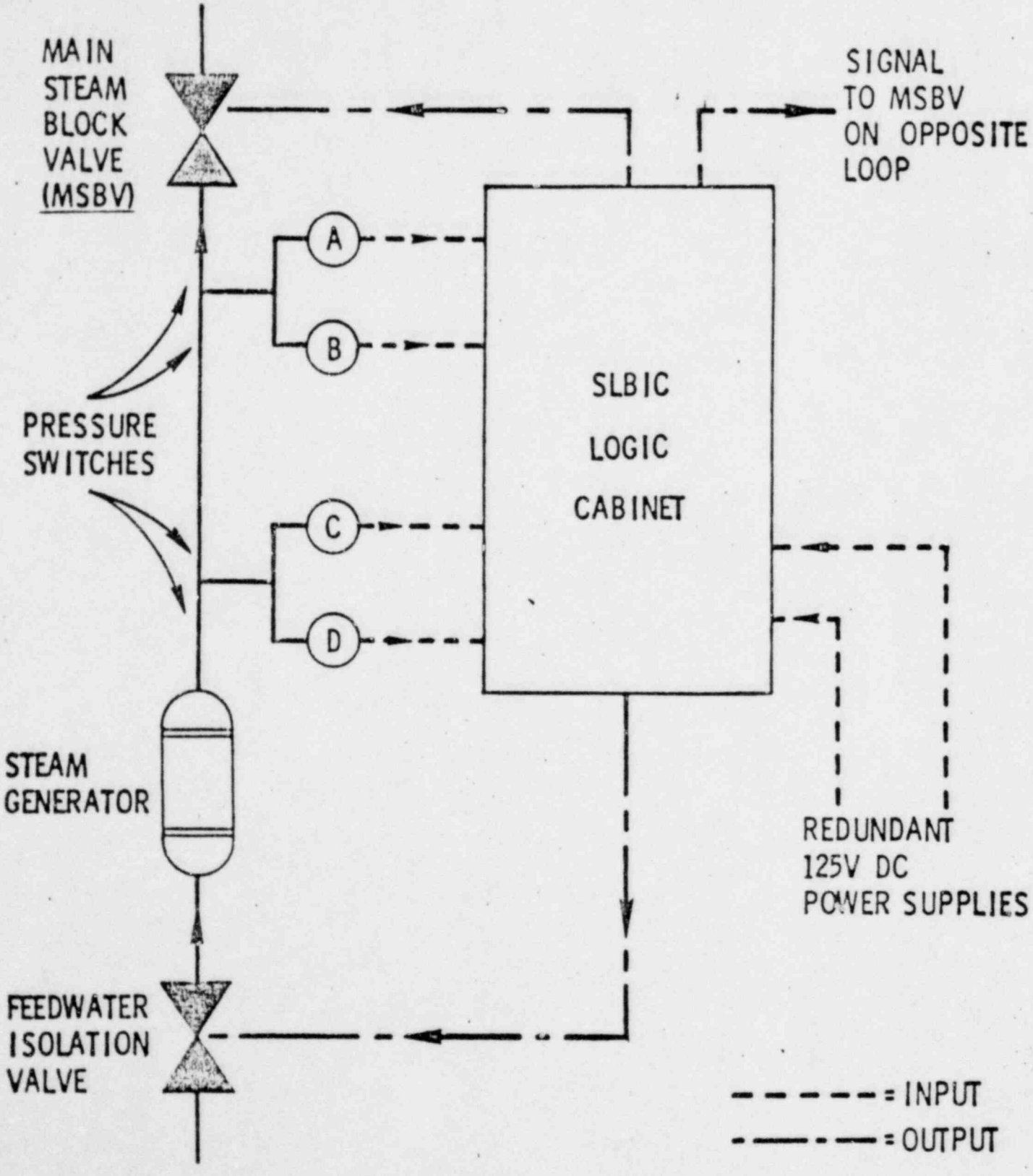
D. ALARMS & INDICATION

E. SEPARATION & INDEPENDENCE

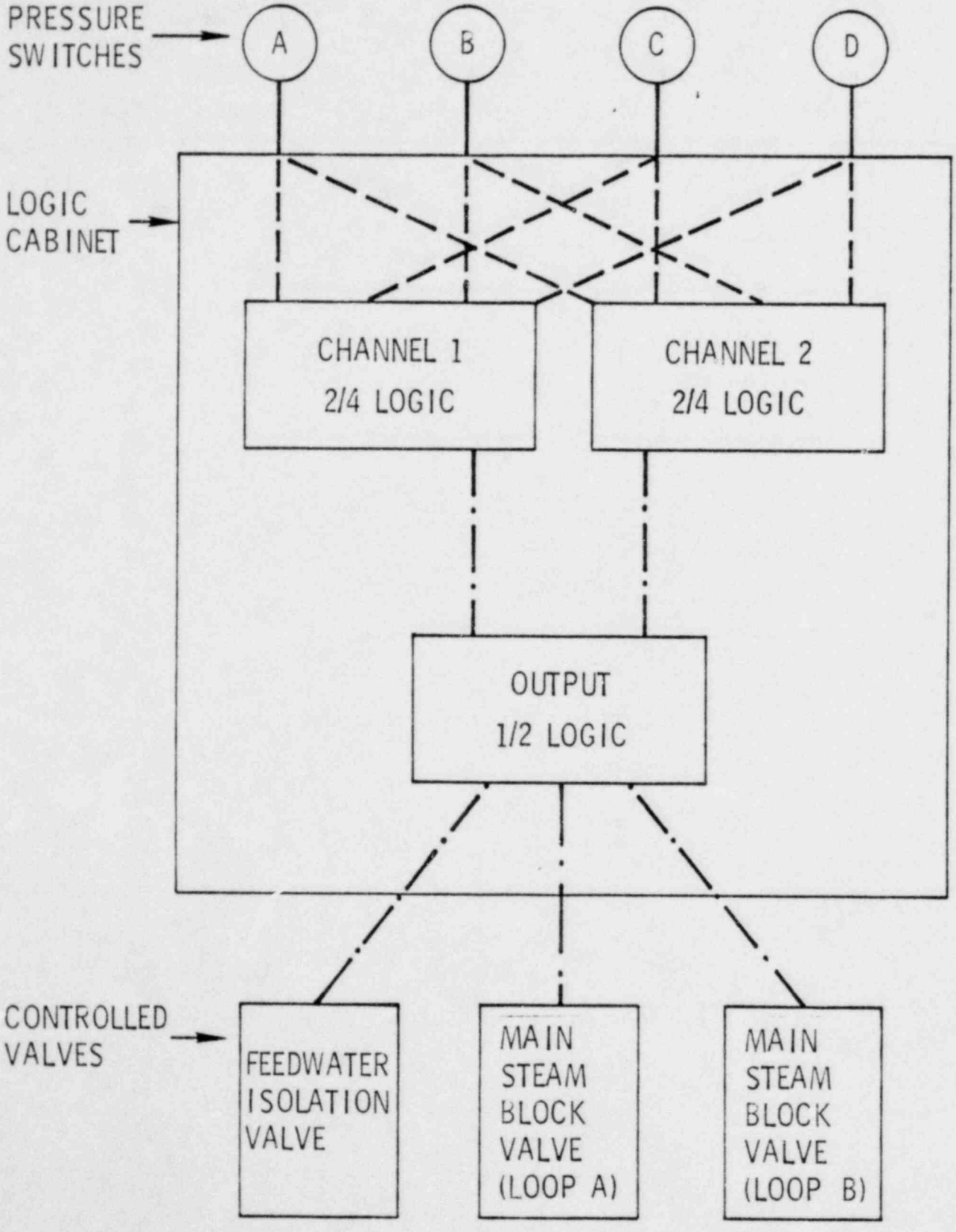
ELEMENTARY FEEDWATER - STEAM FLOWPATH



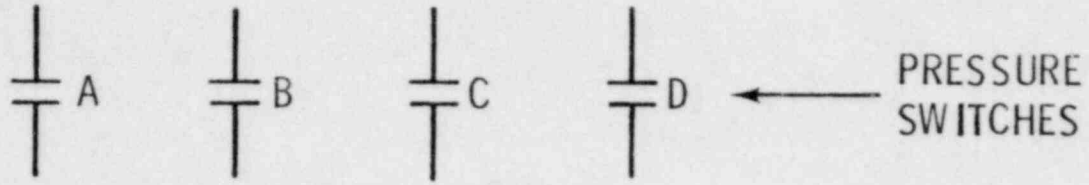
BASIC SLBIC LOGIC - RED LOOP



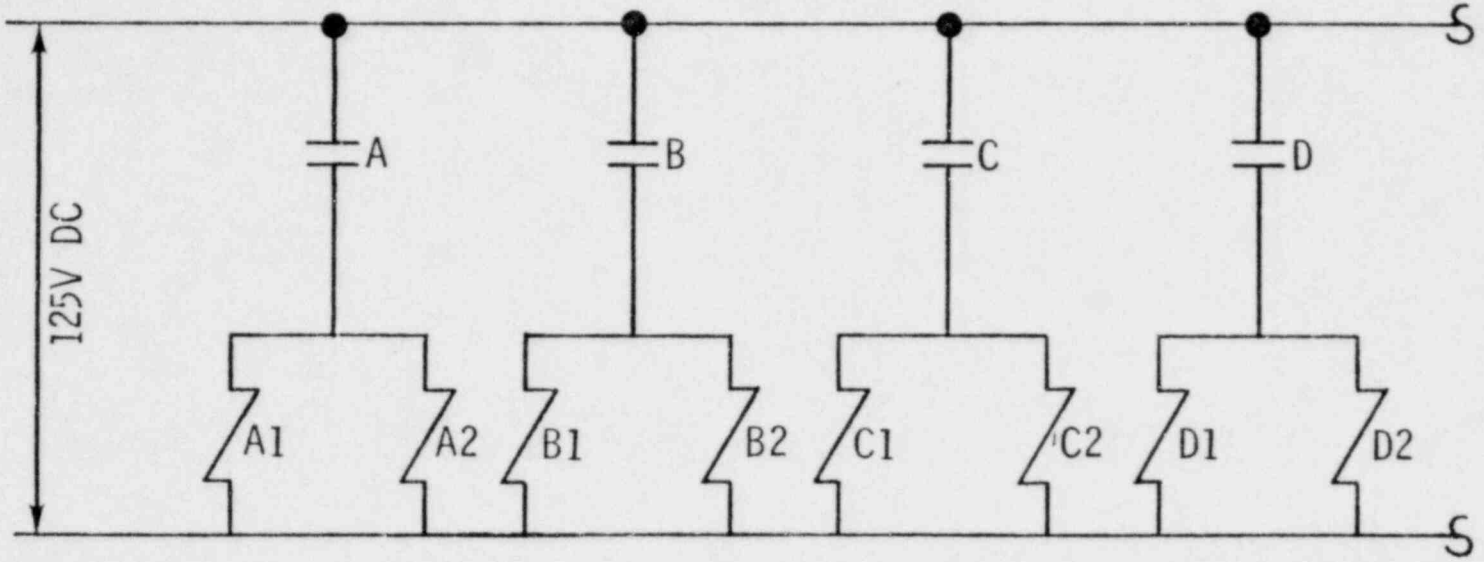
BASIC SLBIC LOGIC



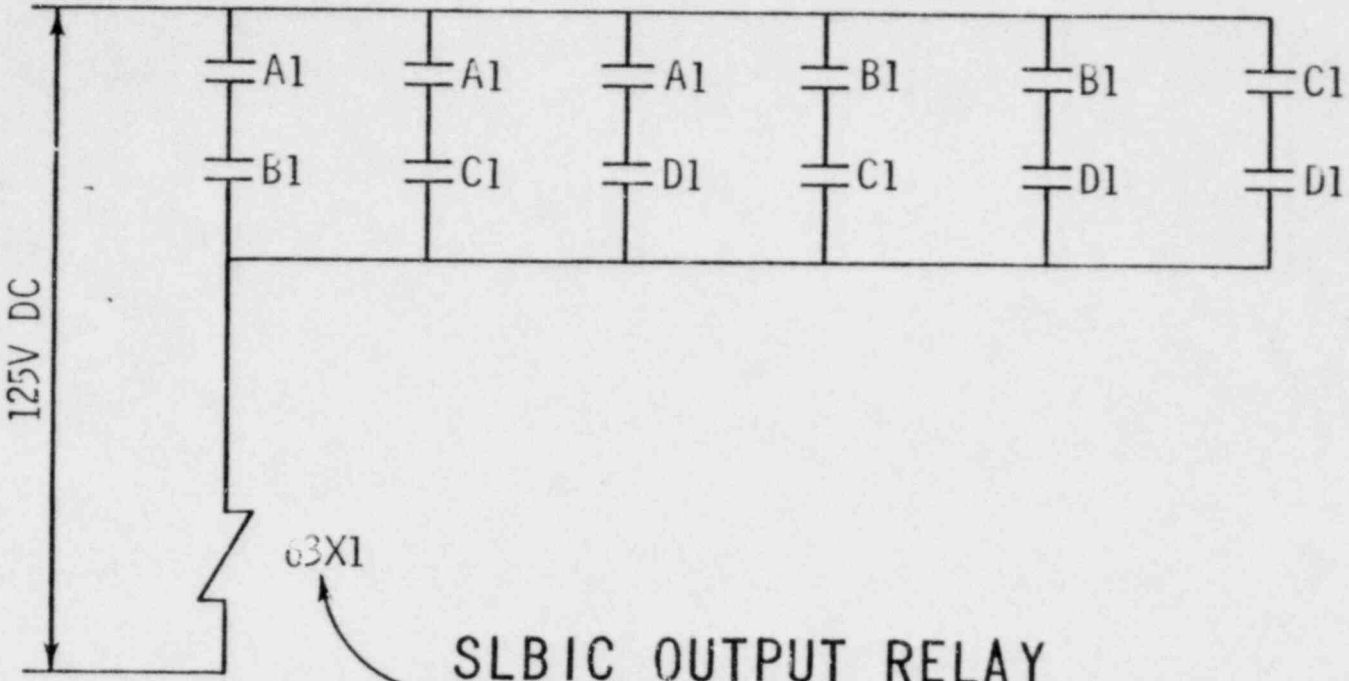
SLBIC INPUT



CONTACT MULTIPLICATION



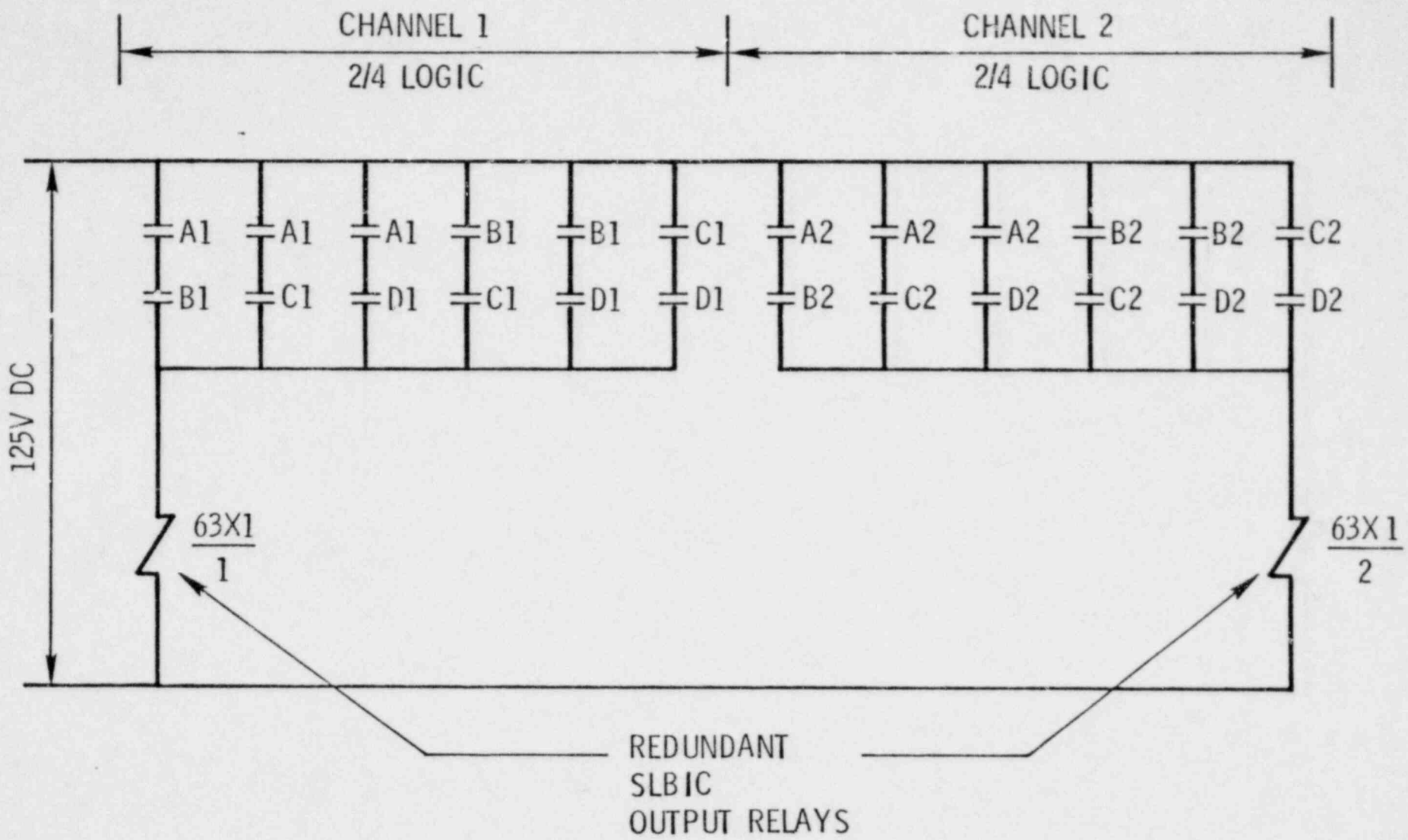
2/4 COINCIDENCE LOGIC



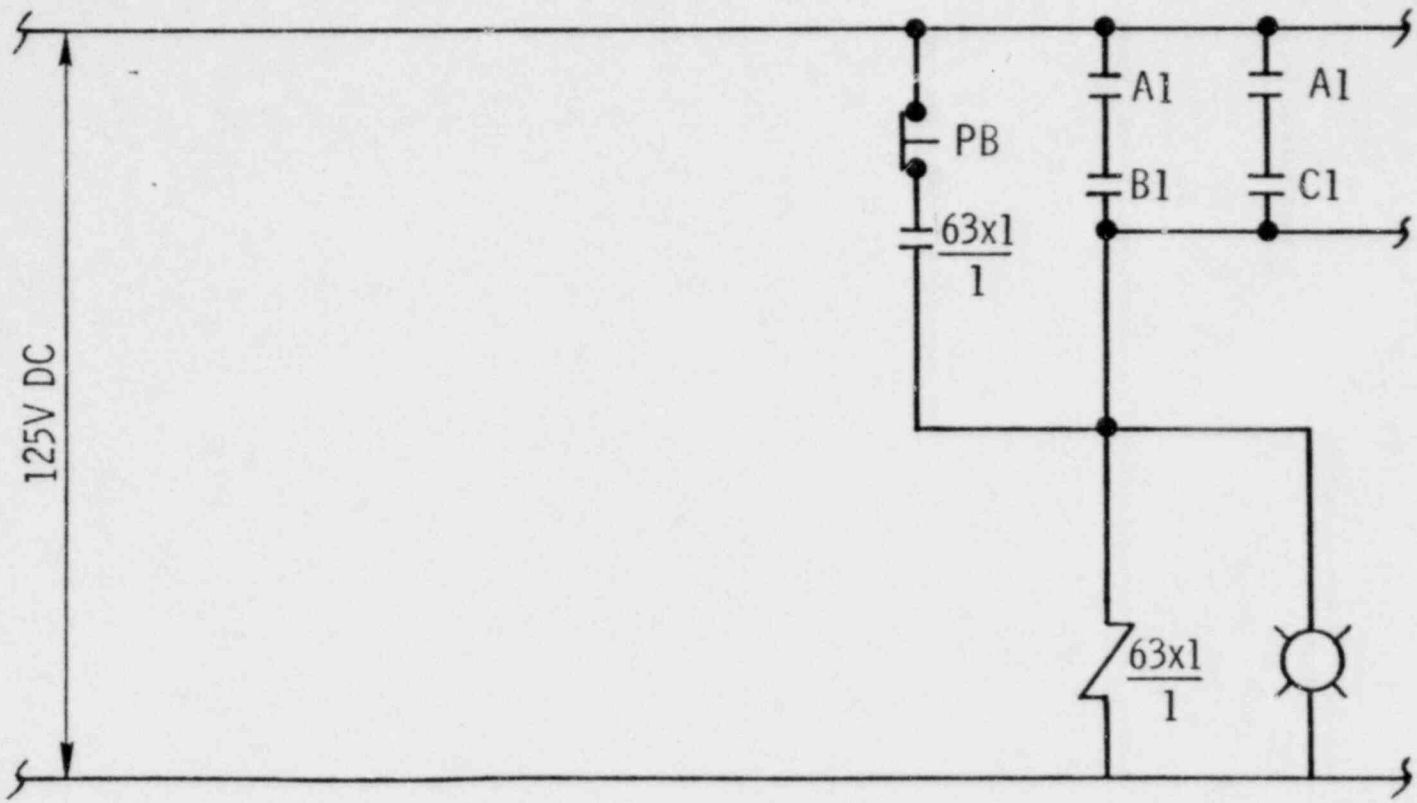
SLBIC OUTPUT RELAY

1. CLOSE FIV A LOOP
2. CLOSE FIV A LOOP
3. CLOSE MSBV A LOOP
4. CLOSE MSBV B LOOP
5. ALARM IN CONTROL ROOM
6. SEAL-IN

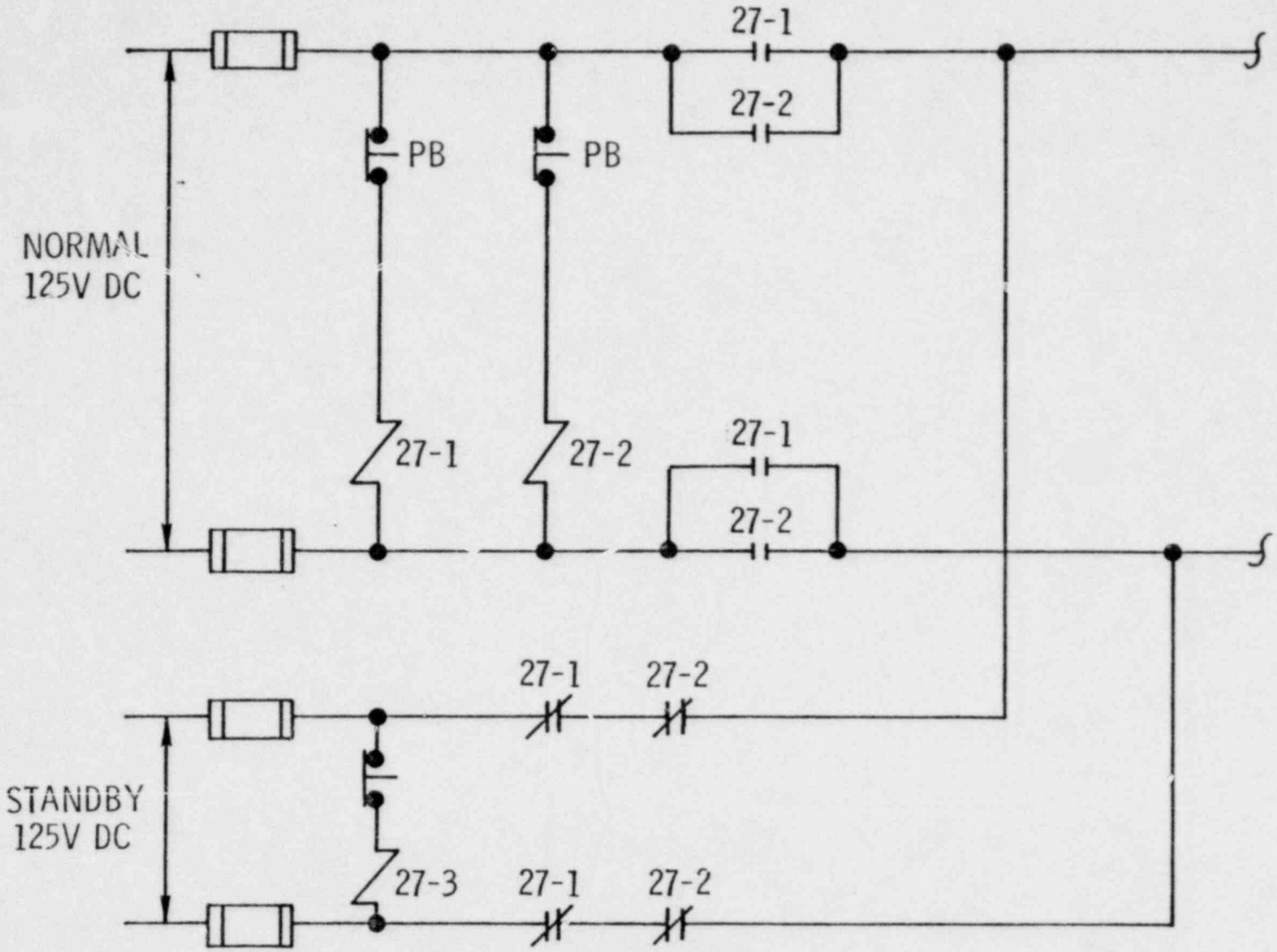
REDUNDANT CHANNELIZATION



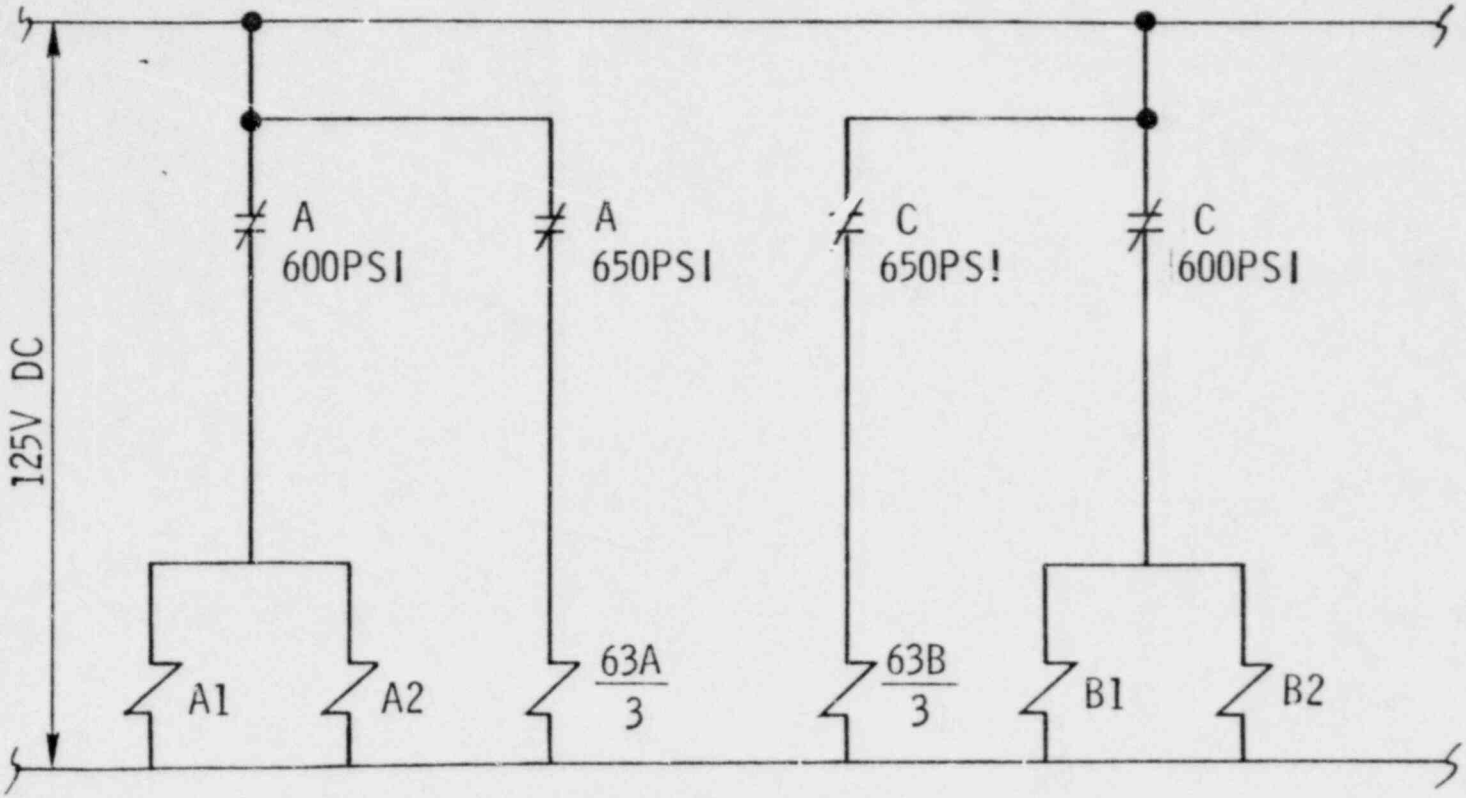
SLBIC SEAL-IN LOGIC



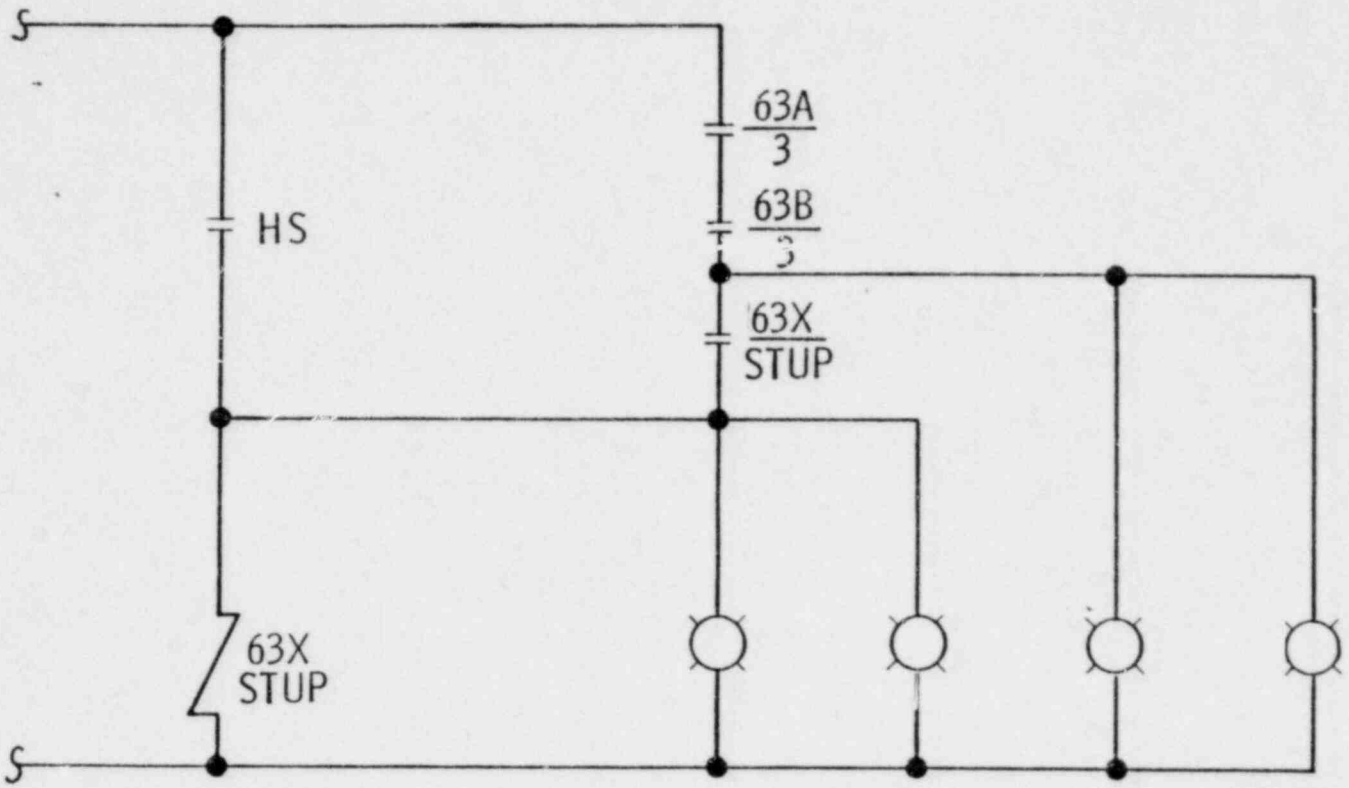
AUTOMATIC LOGIC POWER TRANSFER



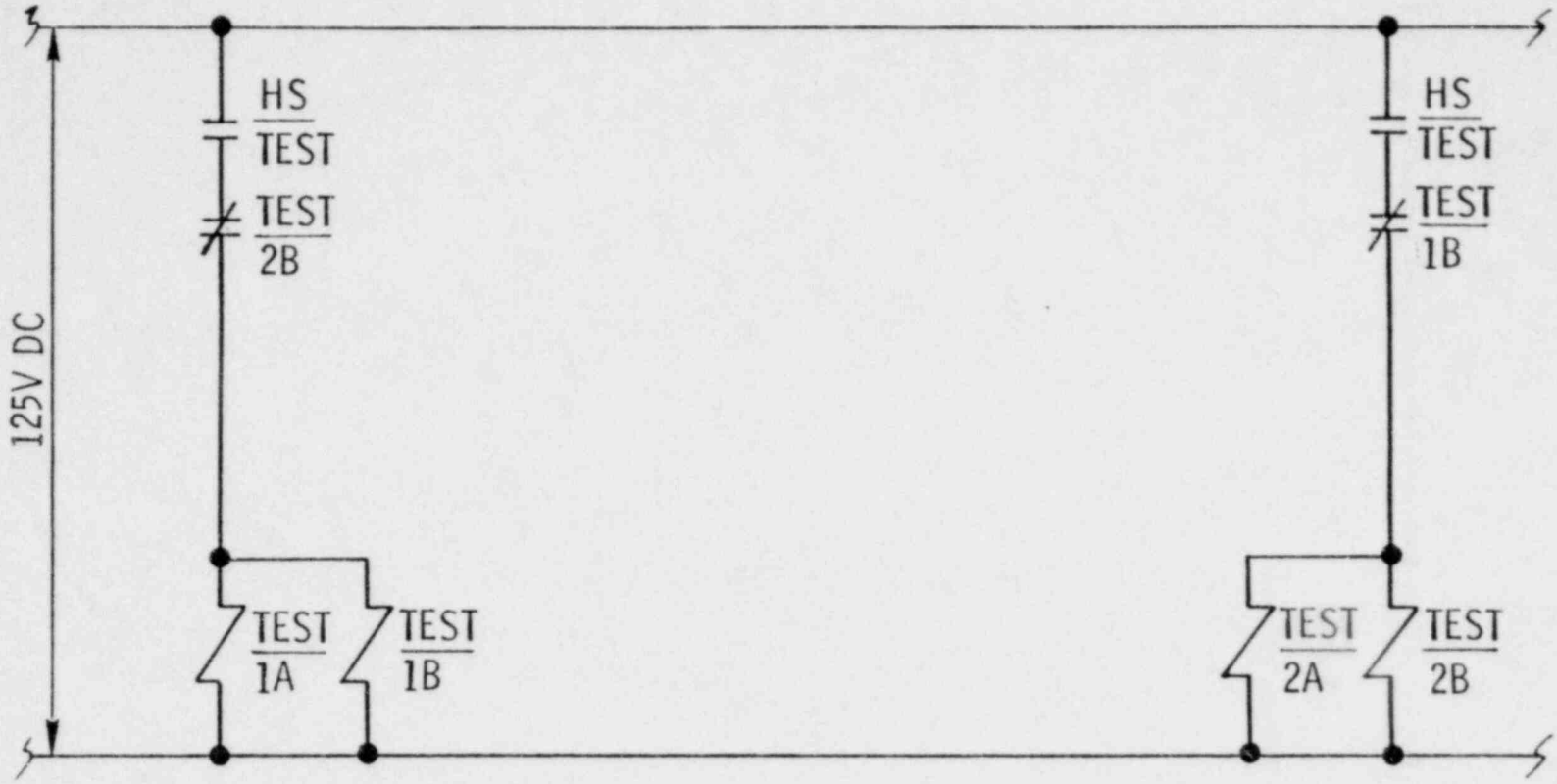
STARTUP/SHUTDOWN ACTIVATION PERMISSIVES



STARTUP/SHUTDOWN AUTO TRIP BYPASS

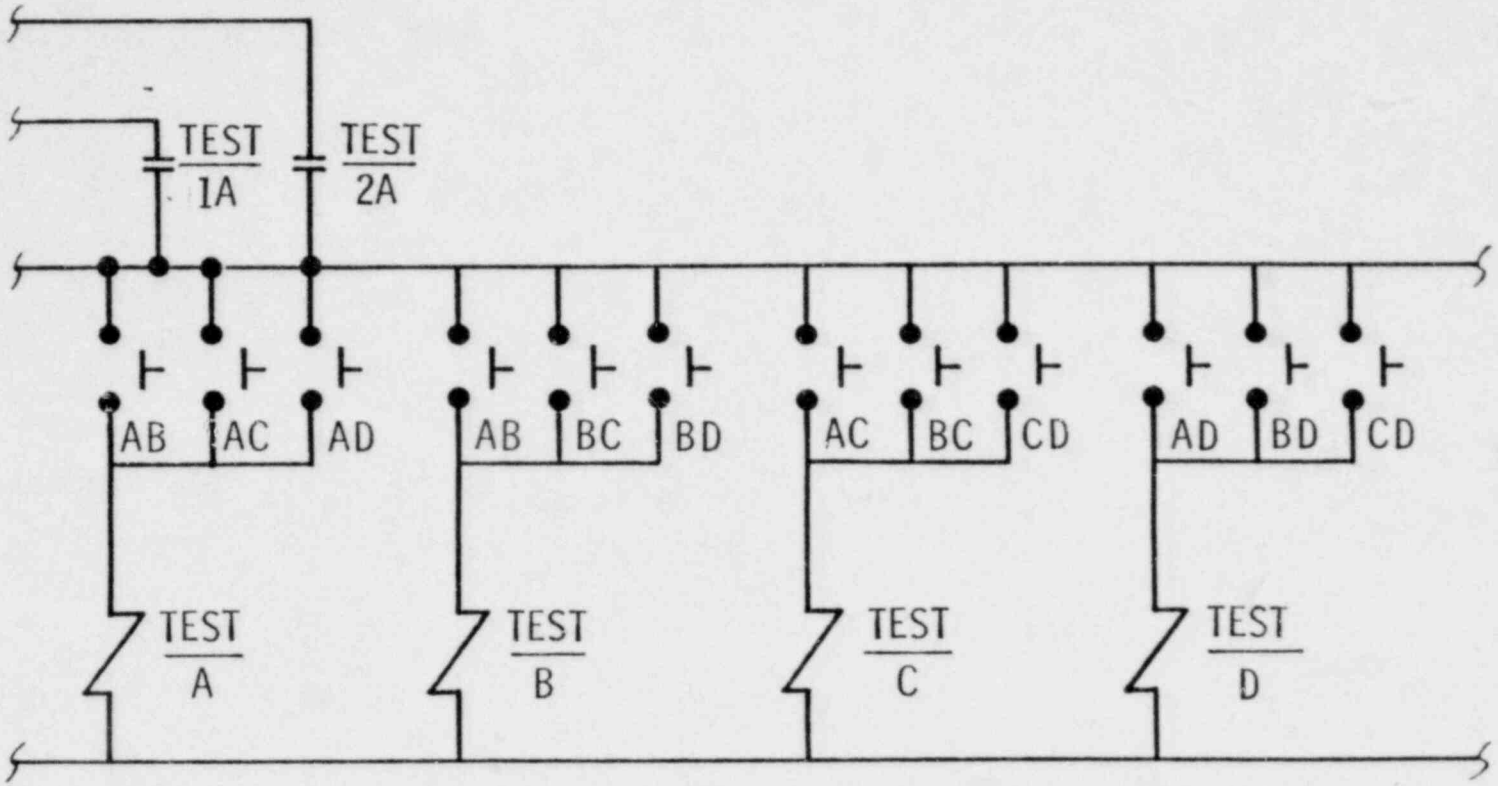


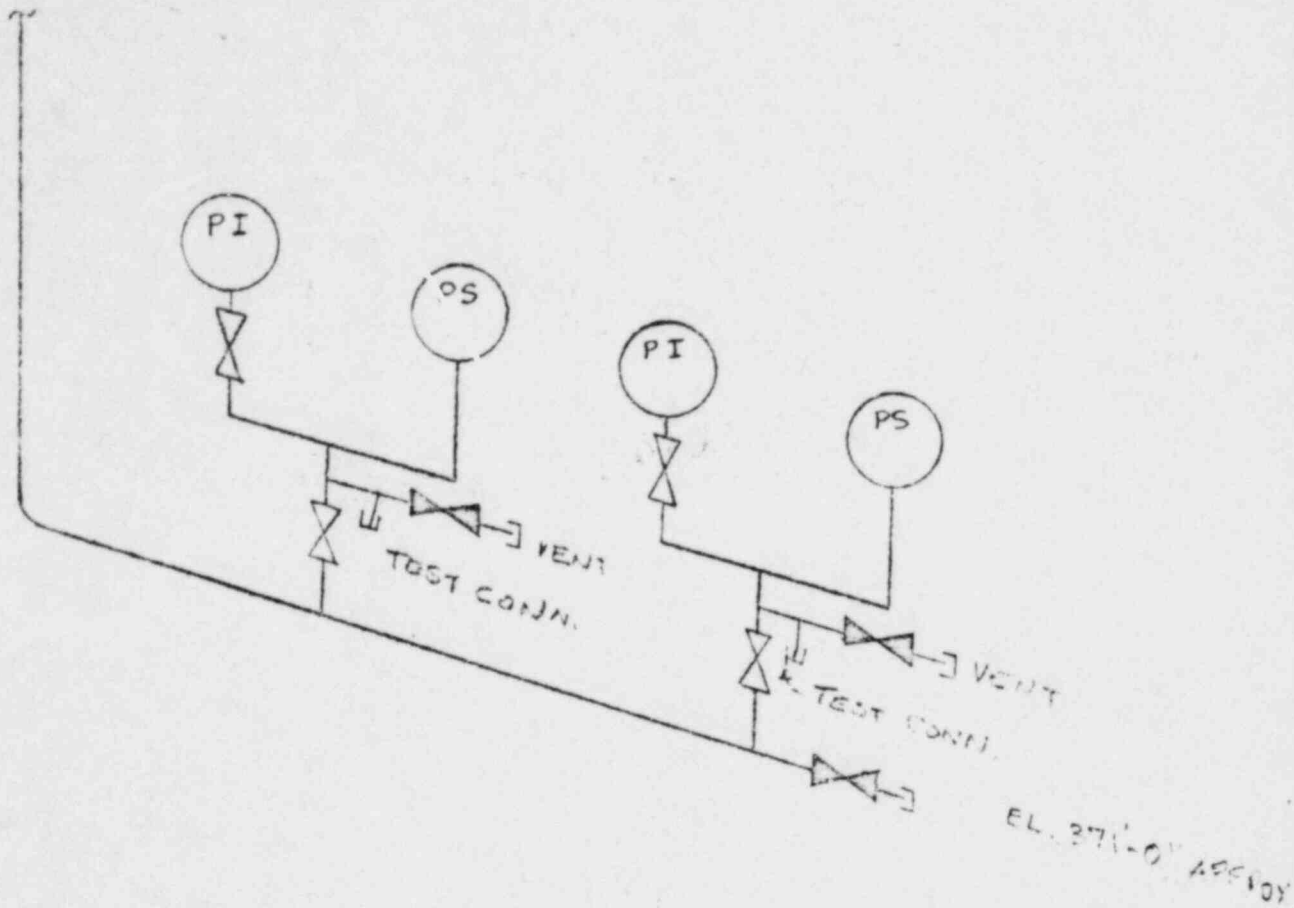
CHANNEL TEST SELECTION



BYPASS CONTACTS
ISOLATING CONTACTS
INTERLOCK CONTACTS
INDICATION CONTACTS

COINCIDENCE TEST LOGIC & CONTINUITY CHECK

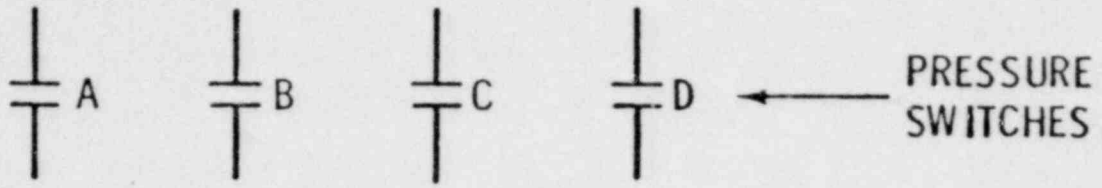




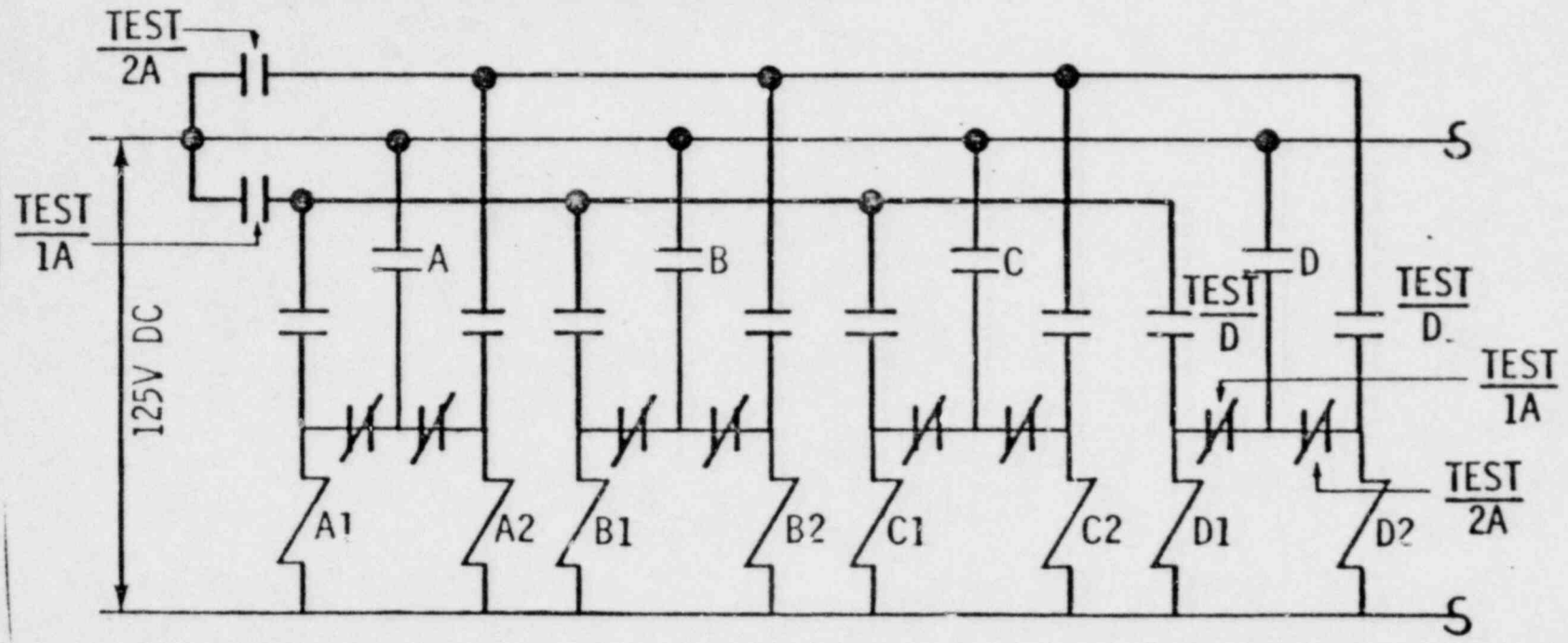
INSTRUMENT PIPE CLASS EBD

REFER TO DWG .....

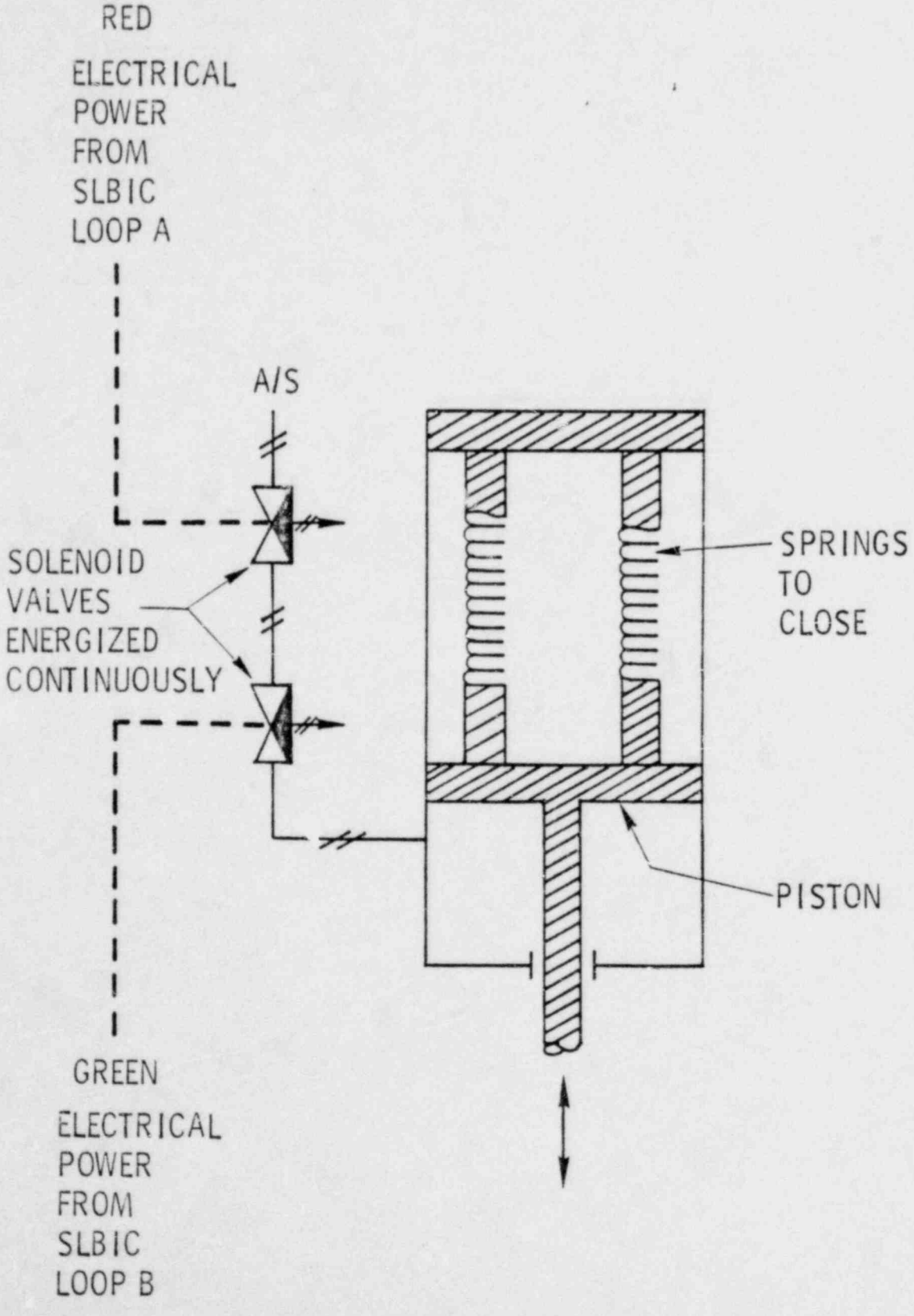
SLBIC INPUT



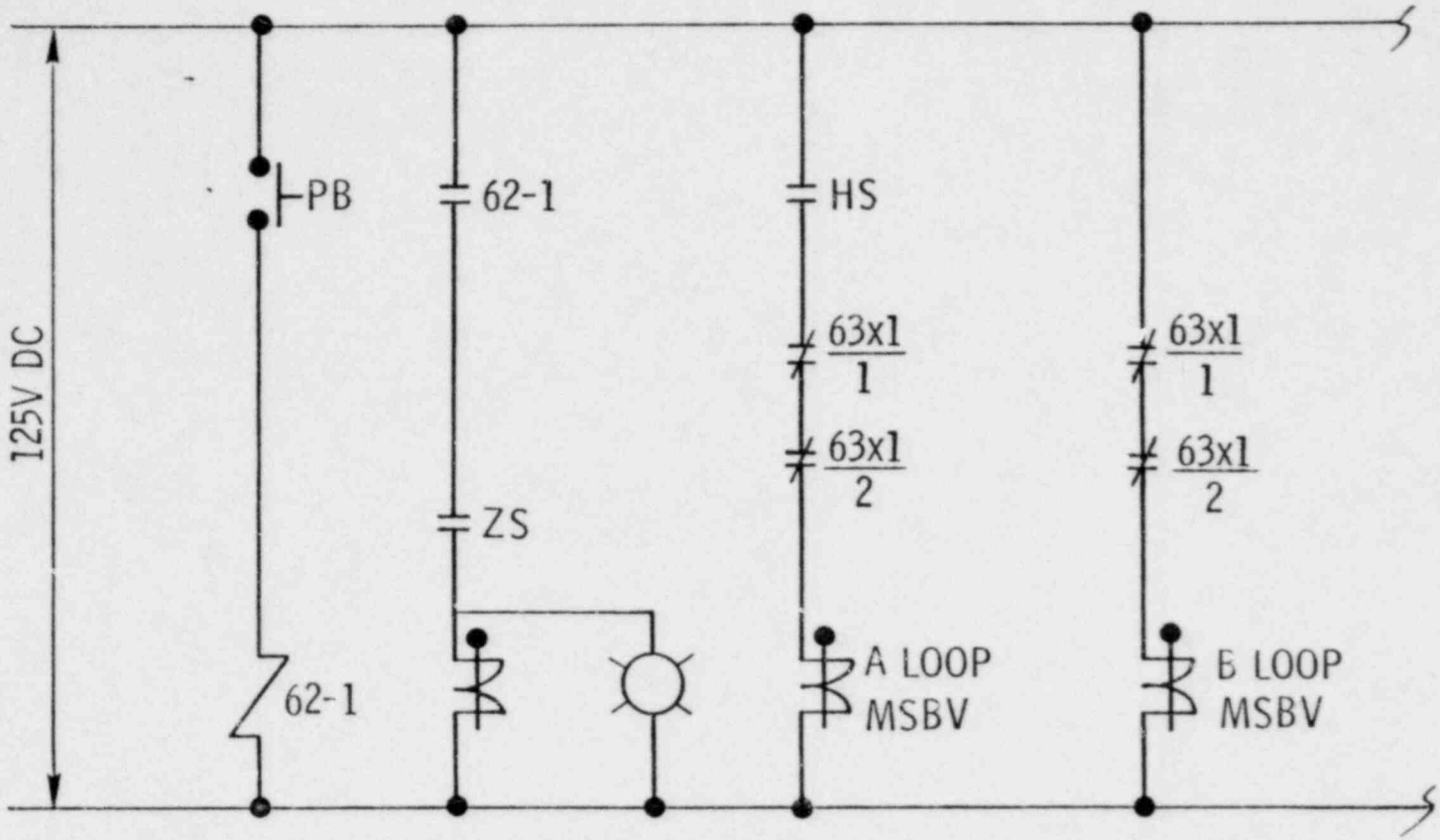
CONTACT MULTIPLICATION



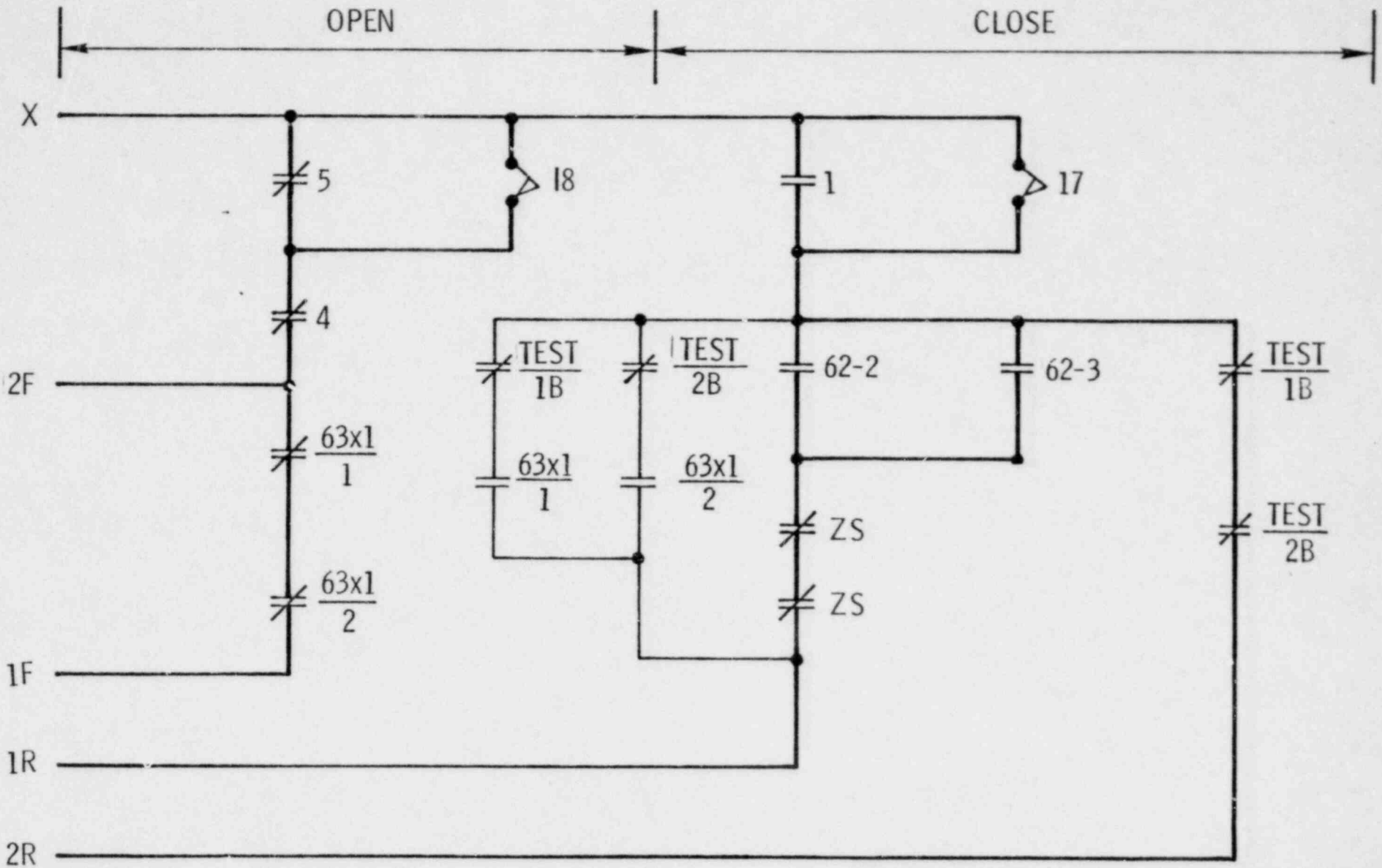
ELEMENTARY DIAGRAM
MAIN STEAM BLOCK VALVE



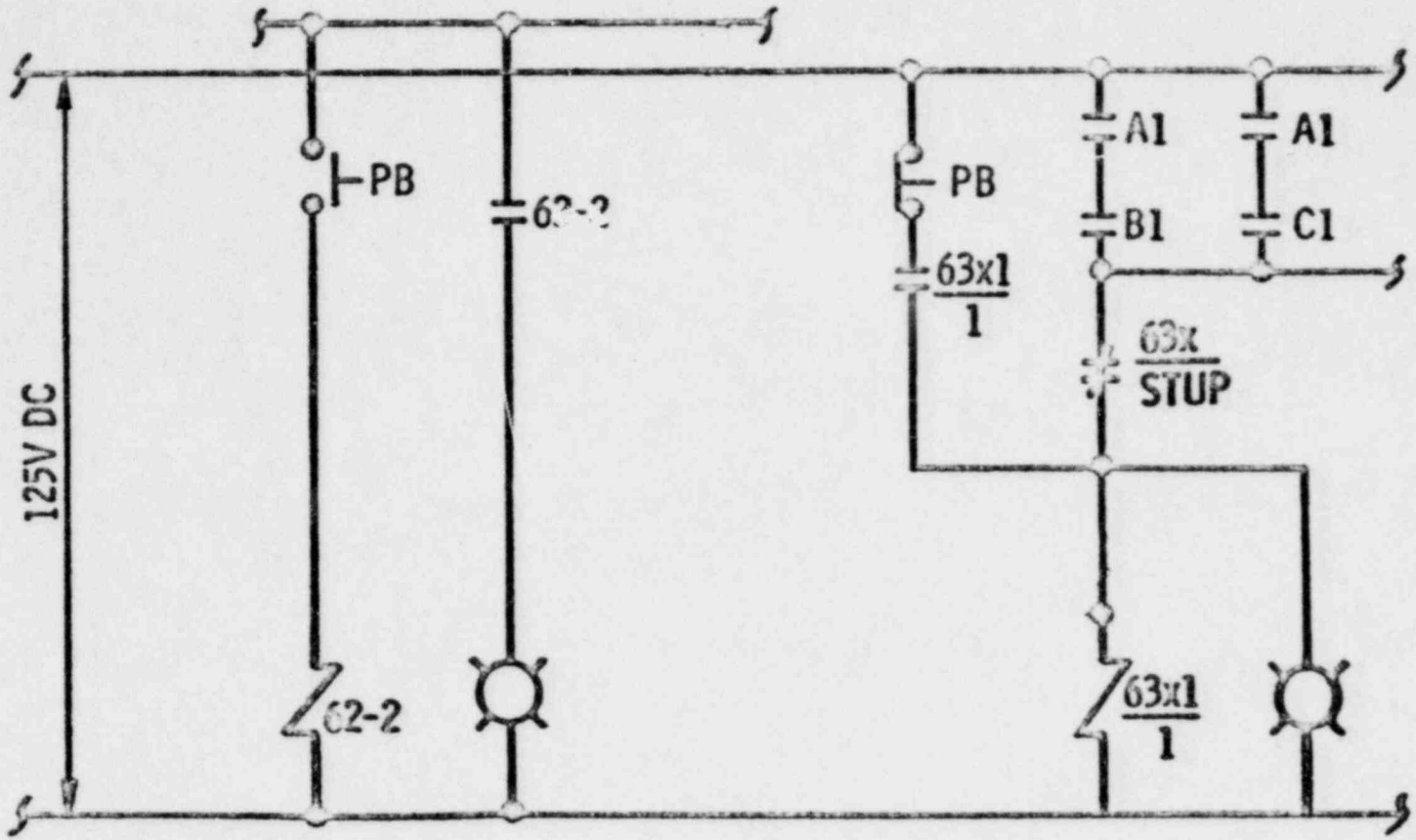
MAIN STEAM BLOCK VALVE CONTROL



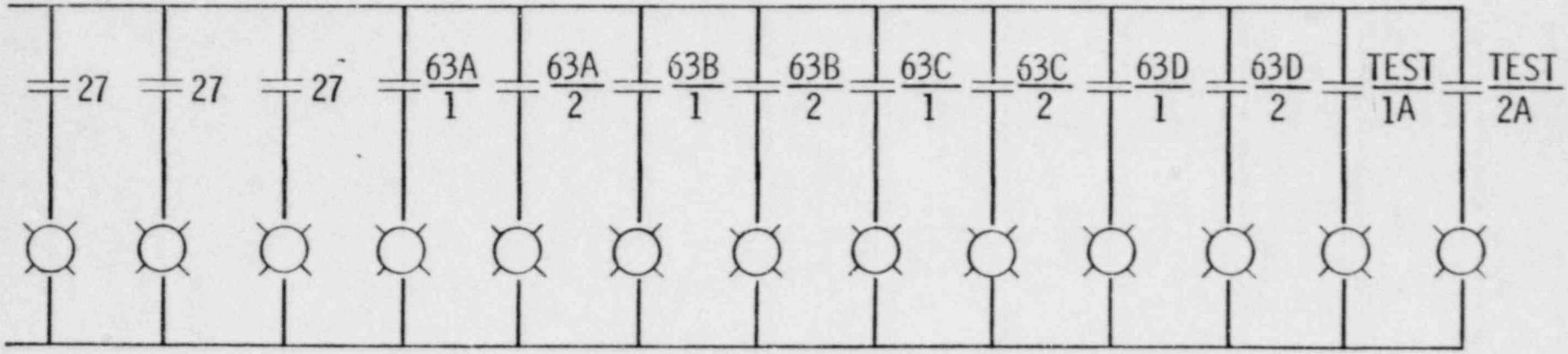
FEEDWATER ISOLATION VALVE CONTROL

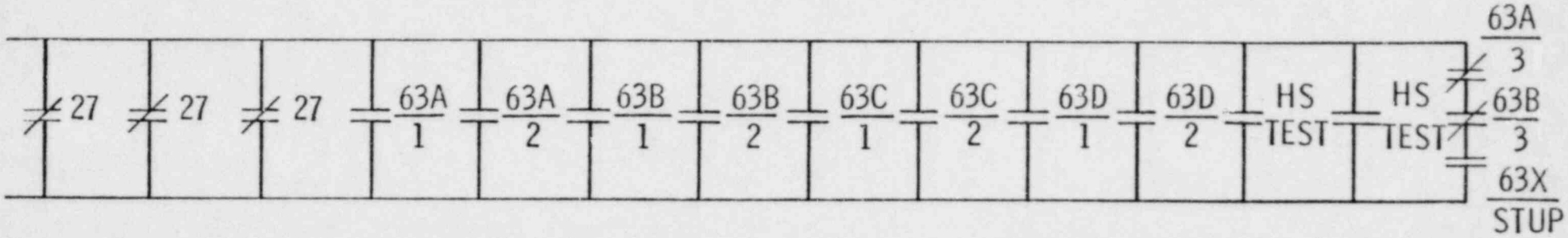


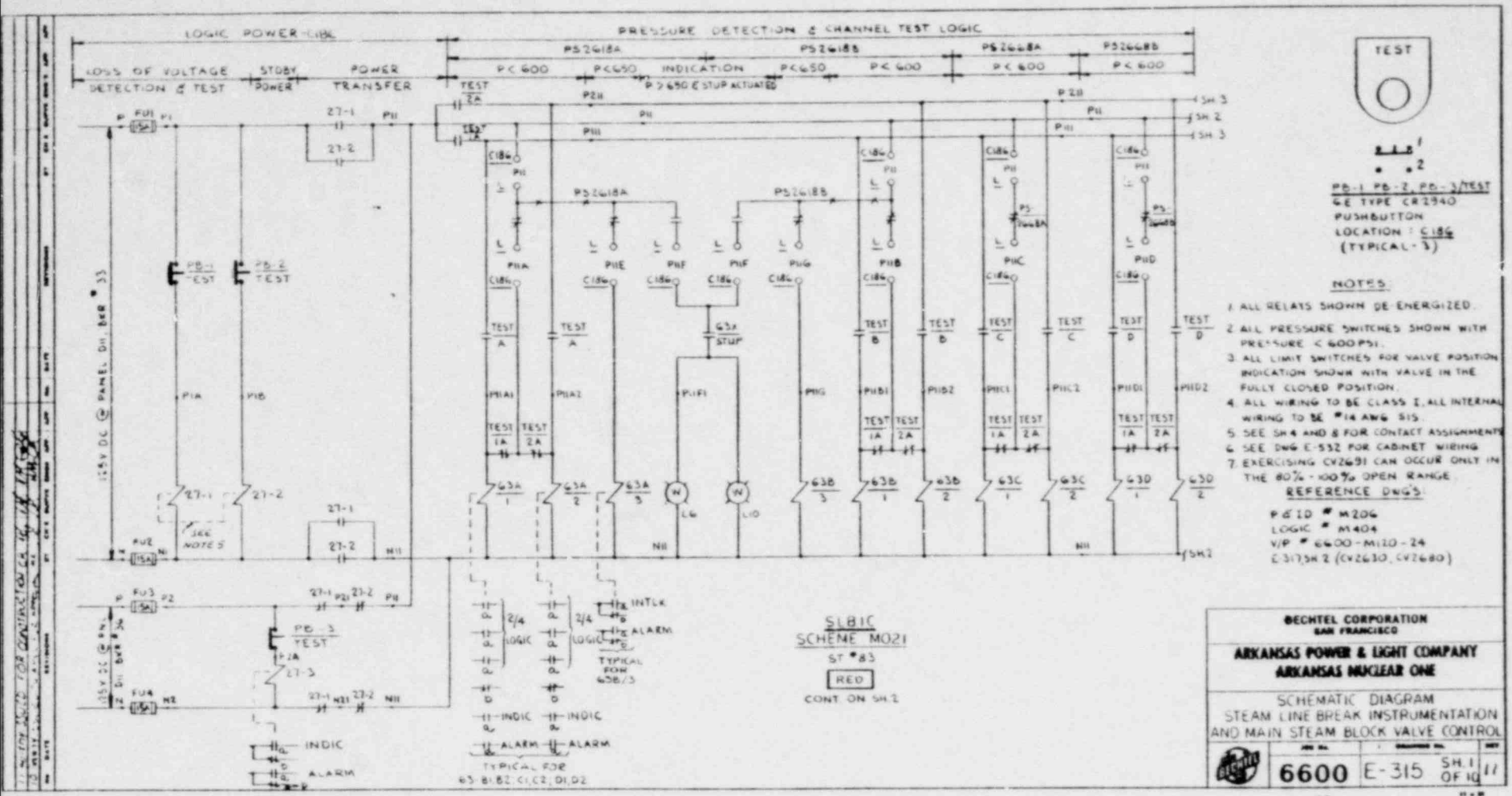
FEEDWATER ISOLATION VLV
EXERCISE LOGIC



INDICATION & ANNUNCIATION







PB-1 PB-2 PB-3/TEST
GE TYPE CR2940
PUSHBUTTON
LOCATION: C186
(TYPICAL-3)

NOTES:

1. ALL RELAYS SHOWN DE-ENERGIZED.
2. ALL PRESSURE SWITCHES SHOWN WITH PRESSURE < 600 PSI.
3. ALL LIMIT SWITCHES FOR VALVE POSITION INDICATION SHOWN WITH VALVE IN THE FULLY CLOSED POSITION.
4. ALL WIRING TO BE CLASS 1, ALL INTERNAL WIRING TO BE #14 AWG SIS.
5. SEE SH 4 AND 8 FOR CONTACT ASSIGNMENTS.
6. SEE DWG E-532 FOR CABINET WIRING.
7. EXERCISING CV2691 CAN OCCUR ONLY IN THE 80% - 100% OPEN RANGE.

REFERENCE DWGS:

P&ID # M206
LOGIC # M404
V/P # 6600-M120-24
E-317 SH 2 (CV2630, CV2680)

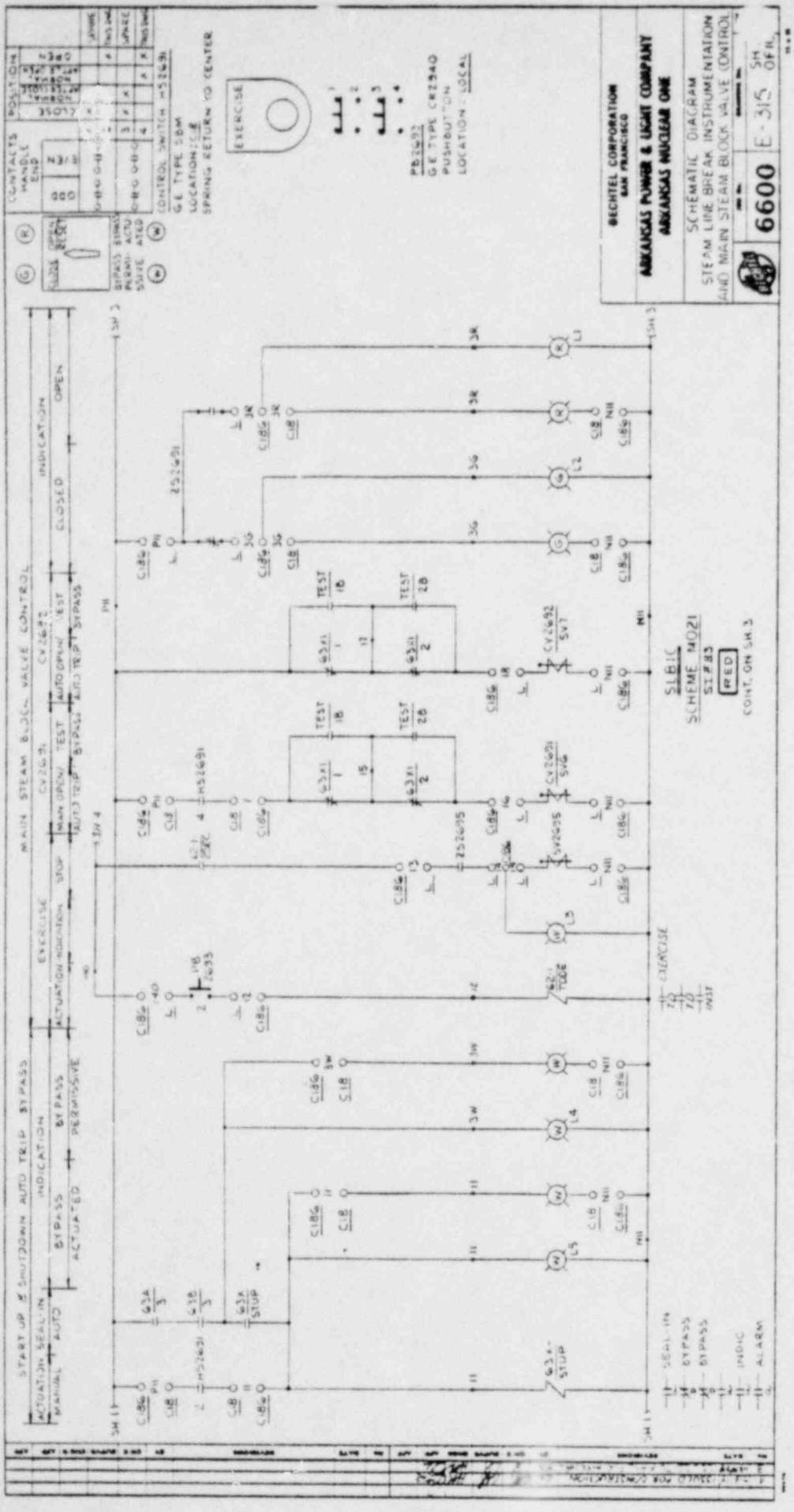
SLBIC
SCHEME M021
ST #83
RED
CONT. ON SH 2

BECHTEL CORPORATION
SAN FRANCISCO

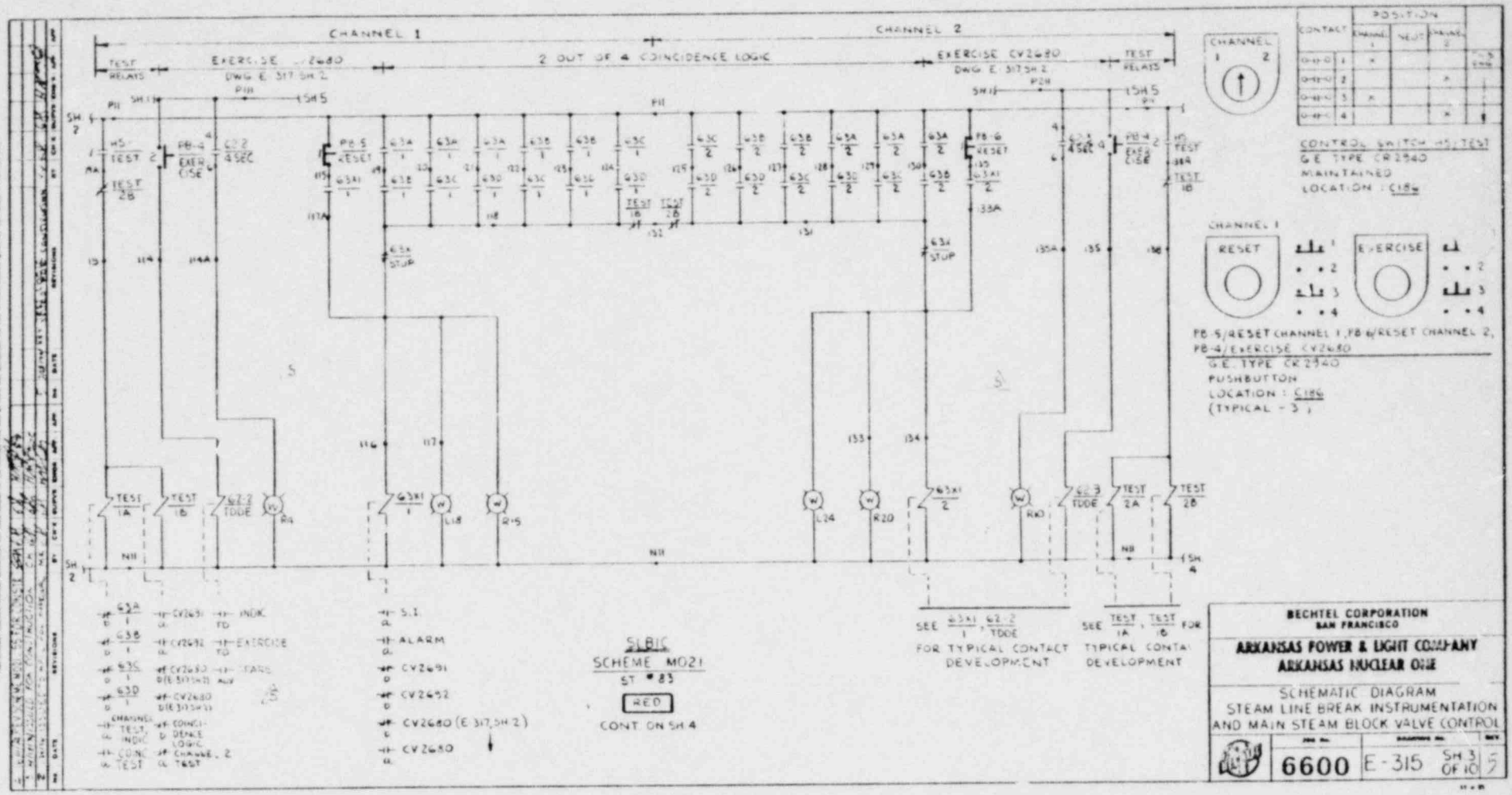
ARKANSAS POWER & LIGHT COMPANY
ARKANSAS NUCLEAR ONE

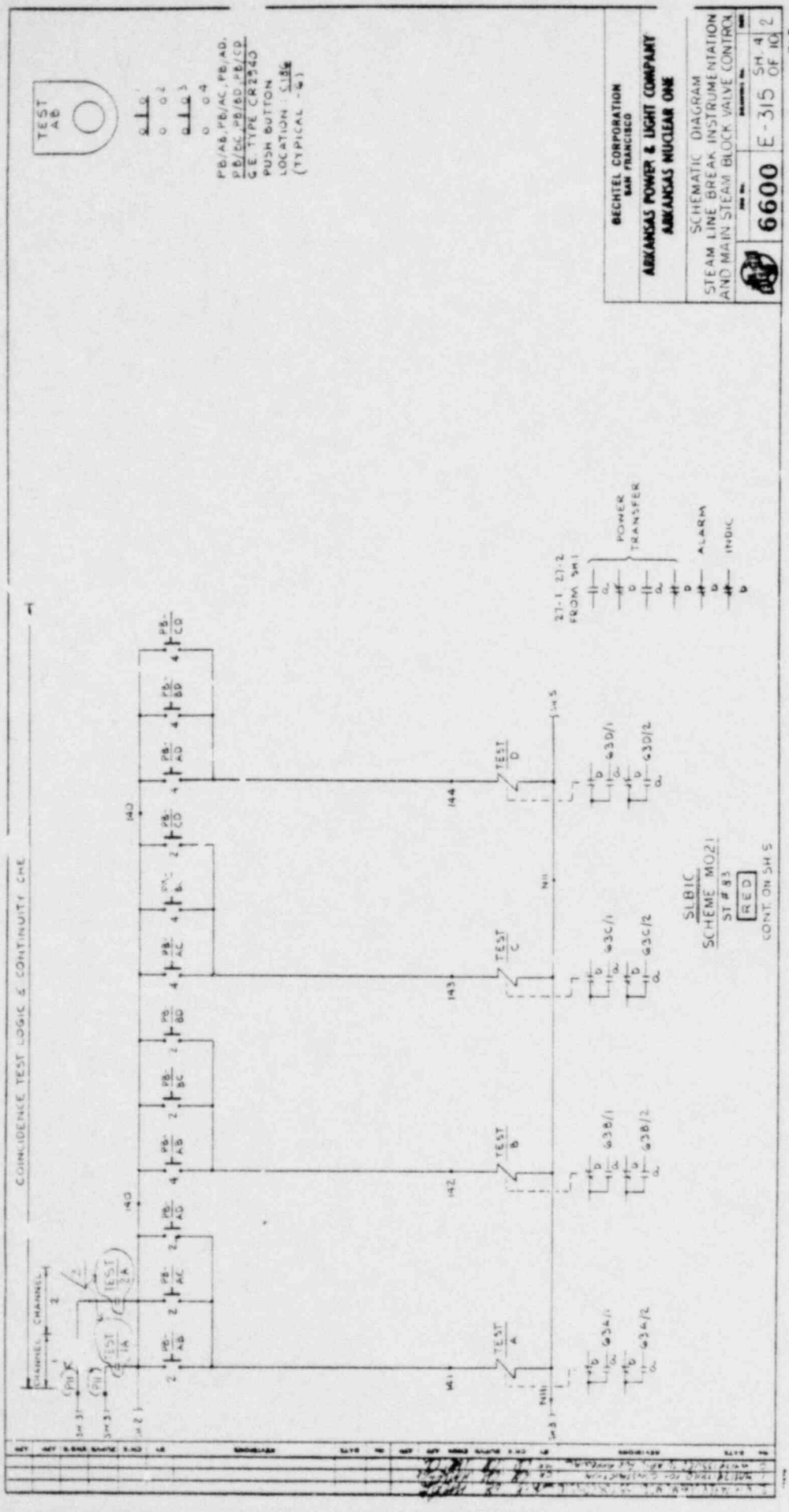
SCHEMATIC DIAGRAM
STEAM LINE BREAK INSTRUMENTATION
AND MAIN STEAM BLOCK VALVE CONTROL

	6600	E-315	SH. 1 OF 10


BECHTEL CORPORATION
SAN FRANCISCO
ARKANSAS POWER & LIGHT COMPANY
ARKANSAS NUCLEAR ONE
SCHEMATIC DIAGRAM
STEAM LINE BREAK INSTRUMENTATION
AND MAIN STEAM BLOCK VALVE CONTROL
6600
E-315
MAIN STEAM BLOCK VALVE CONTROL
CV2693
INDICATION
OPEN
CLOSED
AUTO OPEN/TEST
AUTO TRIP BYPASS
EXERCISE
MAN OPEN/TEST
ACTUATION INDICATION
STOP
BYPASS
PERMISSIVE
START UP & SHUTDOWN AUTO TRIP BYPASS
ACTUATION SEALIN
MANUAL
AUTO
ACTUATED
BYPASS
CONTROL SWITCH HS1693
GE TYPE SBM
LOCATION: C18
SPRING RETURN TO CENTER
PB1693
GE TYPE CR2940
PUSHBUTTON
LOCATION: LOCAL
EXERCISE
SLBIC
SCHEME M021
SHEET 3
RED
CONT. ON SH 3
SEAL-IN
BYPASS
BYPASS
INDIC
ALARM

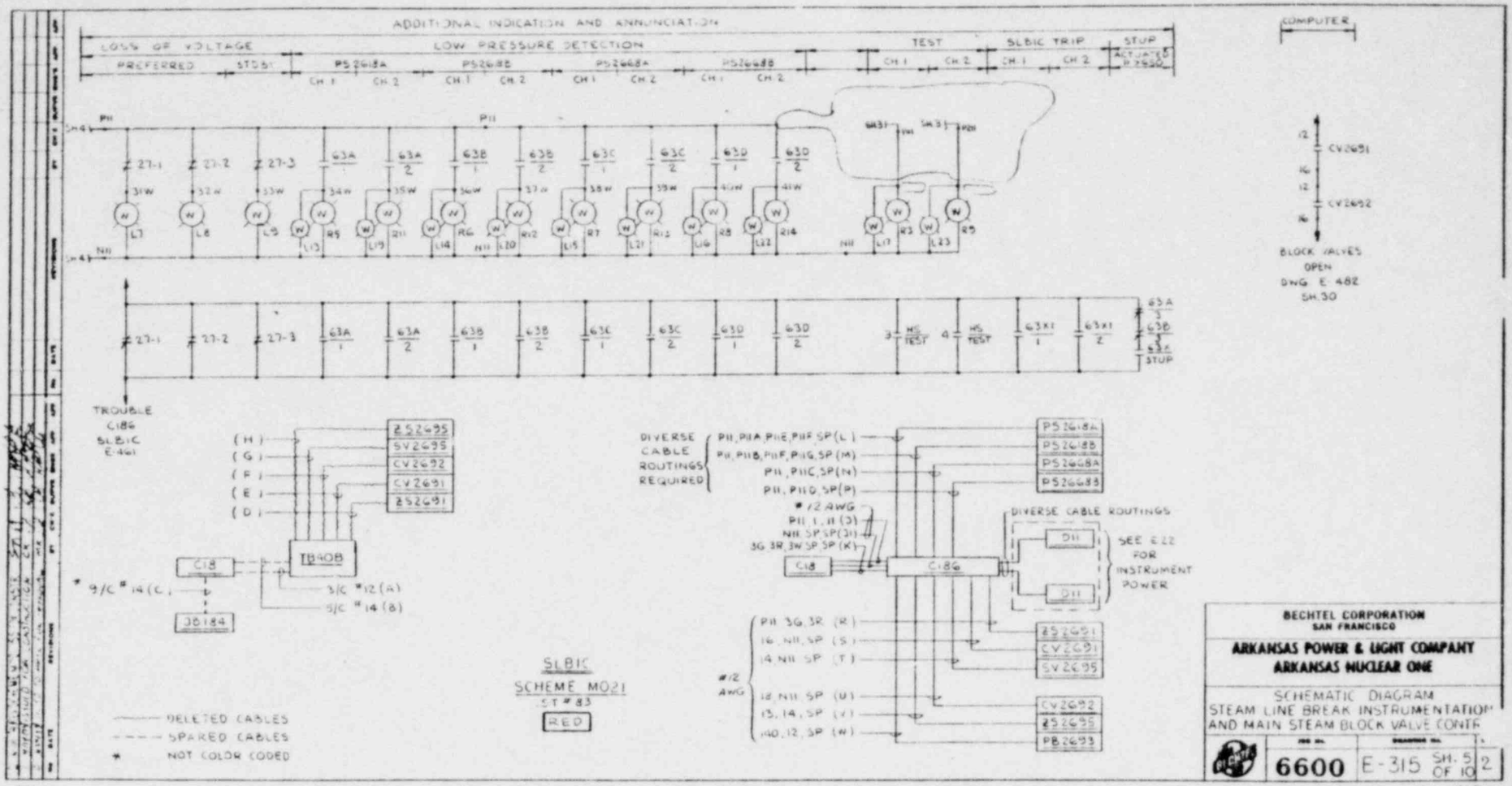
NOTES


CHANNEL 1
CHANNEL 2
2 OUT OF 4 COINCIDENCE LOGIC
TEST RELAYS
EXERCISE CV2680
DWG E-317 SH 2
HS TEST
PB-4 EXERCISE
PB-5 RESET
PB-6 RESET
TEST 1A
TEST 1B
TEST 2A
TEST 2B
63A STOP
63XI
62-2 TDDE
62-3 TDDE
R4
L18
R15
L24
R20
R10
SEE 63XI/1, 62-2/TDDE FOR TYPICAL CONTACT DEVELOPMENT
SEE TEST 1A, TEST 1B FOR TYPICAL CONTACT DEVELOPMENT
SLBIC
SCHEME M021
ST #83
RED
CONT ON SH 4
CV2691
CV2692
CV2680 (E 317,SH 2)
CV2680
S.I
ALARM
INDIC
EXERCISE
START
CONTROL SWITCH HS-TEST
G.E. TYPE CR2940
MAINTAINED
LOCATION : C186
PB-5/RESET CHANNEL 1, PB-6/RESET CHANNEL 2,
PB-4/EXERCISE CV2680
G.E. TYPE CR2940
PUSHBUTTON
LOCATION : C186
(TYPICAL - 3)
BECHTEL CORPORATION
SAN FRANCISCO
ARKANSAS POWER & LIGHT COMPANY
ARKANSAS NUCLEAR ONE
SCHEMATIC DIAGRAM
STEAM LINE BREAK INSTRUMENTATION
AND MAIN STEAM BLOCK VALVE CONTROL
6600
E-315
SH 3 OF 10


TEST AB
PB/AB, PB/AC, PB/AD, PB/BC, PB/BD, PB/CD
GE TYPE CR2940
PUSH BUTTON
LOCATION SIDE
(TYPICAL - 6)
BECHTEL CORPORATION
SAN FRANCISCO
ARKANSAS POWER & LIGHT COMPANY
ARKANSAS NUCLEAR ONE
SCHEMATIC DIAGRAM
STEAM LINE BREAK INSTRUMENTATION
AND MAIN STEAM BLOCK VALVE CONTROL
6600 E-315 SH. 4 OF 10 2
CONCIDENCE TEST LOGIC & CONTINUITY CHK
CHANNEL CHANNEL
TEST 1A
TEST 2A
TEST A
TEST B
TEST C
TEST D
141
142
143
144
138/1
138/2
634/1
634/2
63C/1
63C/2
630/1
630/2
27-1 27-2
FROM SH 1
POWER TRANSFER
ALARM
INDIC
SLBIC
SCHEME M021
ST #83
RED
CONT. ON SH 5

NOTES

NOTES

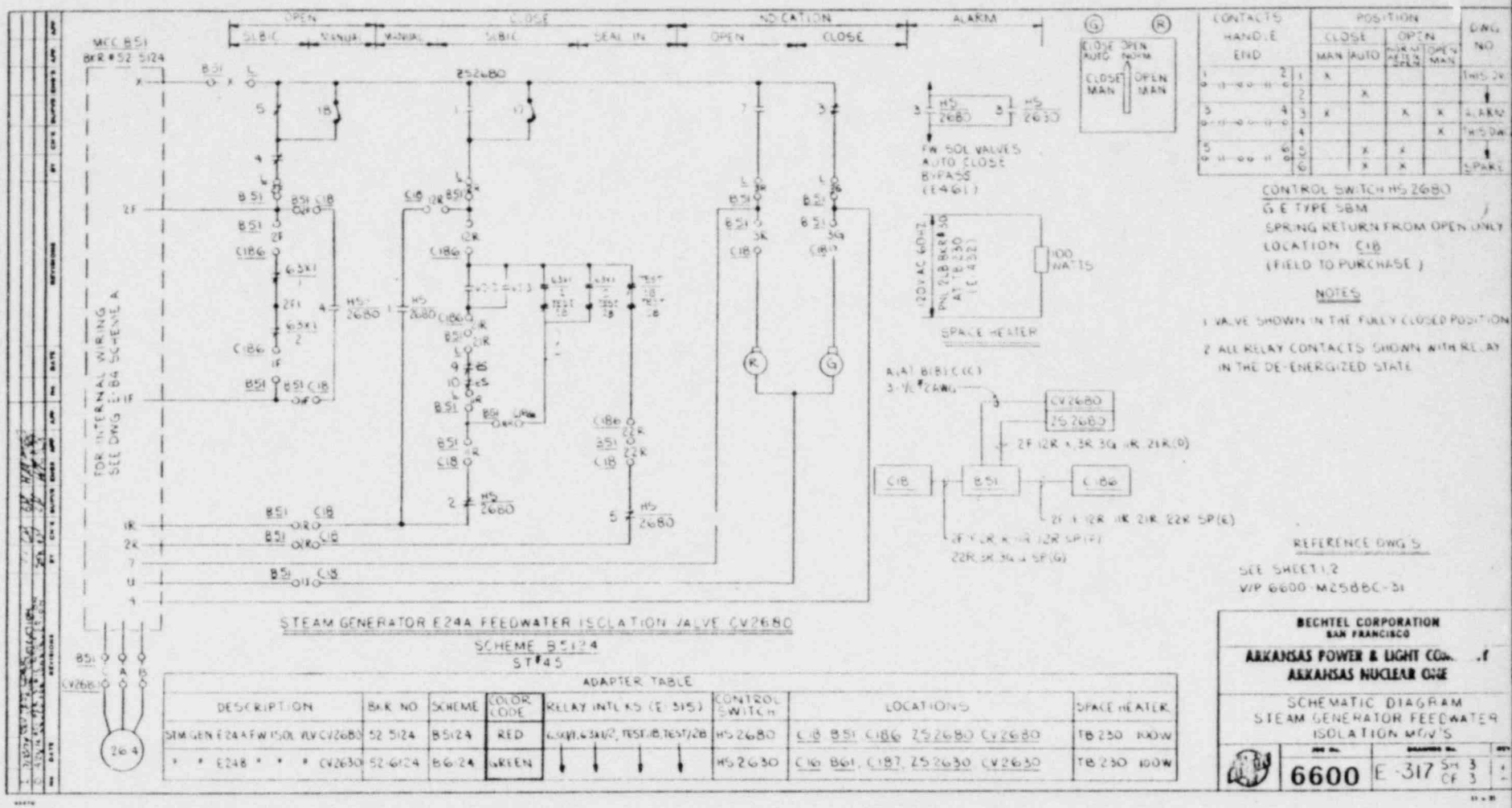


BECHTEL CORPORATION
SAN FRANCISCO

ARKANSAS POWER & LIGHT COMPANY
ARKANSAS NUCLEAR ONE

SCHEMATIC DIAGRAM
STEAM LINE BREAK INSTRUMENTATION
AND MAIN STEAM BLOCK VALVE CONTR

JOB NO.	DRAWING NO.	
6600	E-315 SH. 5 OF 10	2


OPEN
SEAL IN
MANUAL
CLOSE
SEAL IN
OPEN
CLOSE
INDICATION
ALARM
MCC B51
BKR #52 5124
FOR INTERNAL WIRING
SEE DWG E-184 SCHEME A
Z52680
HS 2680
HS 2630
FW SOL VALVES
AUTO CLOSE
BYPASS
(E-461)
CLOSE AUTO OPEN NORM
CLOSE MAN
OPEN MAN
120V AC 60HZ
PNL 2LB BKR #30
AT TB 230
(E-432)
100 WATTS
SPACE HEATER
A(A1 B(B1 C(C1
3-#12 AWG
CV2680
ZS 2680
2F 12R x 3R 3Q 4R 21R(D)
C18
B51
C186
2F 1 12R 1R 21R 22R SP(E)
2F 1 2R 1R 12R SP(F)
22R 3R 3Q 4 SP(G)
STEAM GENERATOR E24A FEEDWATER ISOLATION VALVE CV2680
SCHEME B5124
SHEET 2
CONTACTS HANDLE END
POSITION
CLOSE MAN
CLOSE AUTO
OPEN MAN NORM
OPEN MAN
DWG NO
THIS DWG
4 ARRV
THIS DWG
SPARE
CONTROL SWITCH HS 2680
G E TYPE SBM
SPRING RETURN FROM OPEN ONLY
LOCATION C18
(FIELD TO PURCHASE)
NOTES
1 VALVE SHOWN IN THE FULLY CLOSED POSITION
2 ALL RELAY CONTACTS SHOWN WITH RELAY IN THE DE-ENERGIZED STATE
REFERENCE DWG S
SEE SHEET 1,2
V/P 6600-M-2588C-31
ADAPTER TABLE
DESCRIPTION
BKR NO
SCHEME
COLOR CODE
RELAY INTLKS (E-315)
CONTROL SWITCH
LOCATIONS
SPACE HEATER
STM GEN E24A FW ISOL VLV CV2680
52 5124
B5124
RED
HS 2680
C18 B51 C186 ZS 2680 CV2680
TB 230 100W
E24B CV2630
52 6124
B6124
GREEN
HS 2630
C16 B61, C187, ZS 2630 CV2630
TB 230 100W
BECHTEL CORPORATION
SAN FRANCISCO
ARKANSAS POWER & LIGHT CO.
ARKANSAS NUCLEAR ONE
SCHEMATIC DIAGRAM
STEAM GENERATOR FEEDWATER
ISOLATION MOV'S
6600
E-317 SH 3 OF 3