



THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

P.O. BOX 97 ■ PERRY, OHIO 44081 ■ TELEPHONE (216) 259-3737 ■ ADDRESS-10 CENTER ROAD

Serving The Best Location in the Nation
PERRY NUCLEAR POWER PLANT

Al Kaplan

VICE PRESIDENT
NUCLEAR GROUP

May 27, 1988
PY-CEI/NRR-0864 L

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
Provision of Supplementary
Material for the USAR

The Cleveland Electric Illuminating Company hereby provides one (1) original and seven (7) copies of supplementary material for the Updated Safety Analysis Report (USAR) for Unit 1 of the Perry Nuclear Power Plant. The supplementary material was prepared in accordance with 10 CFR 50.71(e).

Selected logic and functional control diagrams are provided for inclusion in Chapter 7. These diagrams are updates of those that were annotated in USAR Rev. 0 as (to be supplied later) and were updated from the Final Safety Analysis Report (FSAR) as amended through Amendment 25. Additionally, one figure is provided for Chapter 9. This figure replaces a inadvertently provided figure that depicted a different system. The new figure depicts the proper system diagram.

Please feel free to contact me if you have any questions.

Very truly yours,

Al Kaplan
Vice President
Nuclear Group

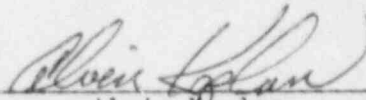
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Enclosures

cc: K. Connaughton
T. Colburn
Mr. A. Bert Davis
USNRC, Region III

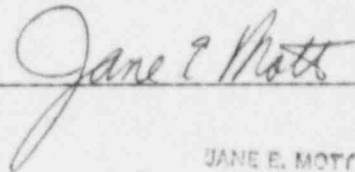
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Alvin Kaplan who, being duly sworn, deposed and said that (1) he is Vice President, Nuclear Group of The Cleveland Electric Illuminating Company, (2) he is duly authorized to execute and file this report on behalf of The Cleveland Electric Illuminating Company and as duly authorized agent for Duquesne Light Company, Ohio Edison Company, Pennsylvania Power Company and the Toledo Edison Company, and (3) the statements set forth therein are true and correct to the best of his knowledge, information and belief.



Alvin Kaplan

Sworn to and subscribed before me, this 27th day of May, 1988.



JANE E. MOTZ
Notary Public, State of Ohio
My Commission Expires February 20, 1990
(Recorded in Lake County)

The Cleveland Electric Illuminating Company
Perry Nuclear Power Plant

Licensing Document Transmittal

To: US NRC - Washington Date: 5/27/88
Manual Holder

Attached is 1 set(s) of supplementary material for the

Updated Safety Analysis Report (USAR) Set No. 1.

Please insert the supplementary material as indicated on the enclosed instruction sheet.

Please acknowledge receipt of the above identified documents by signing below and returning this sheet immediately upon receipt to:

Jane Mott
Perry Nuclear Power Plant
10 Center Road, E210
Perry, Ohio 44081

Receipt Acknowledged
(To Be Signed by Manual Holder Only)

Date

Please report any change in manual assignment or location to Jane Mott, E210, Extension 5276.

INSTRUCTION SHEET
PERRY NUCLEAR POWER PLANT
UNIT 1
UPDATED SAFETY ANALYSIS REPORT

The following listed pages of the Cleveland Electric Illuminating Company's Updated Safety Analysis Report for the Perry Nuclear Power Plant are to be removed, and replaced where applicable, with revised pages.

Remove & Destroy

Insert

Volume 17

Figure 7.2-1 (to be provided later) (1 sheet)
Figure 7.3-1 (to be provided later) (1 sheet)
Figure 7.3-3 through 7.3-7
(to be provided later) (1 sheet)

Figure 7.3-9 (to be provided later) (1 sheet)
Figure 7.3-11 (to be provided later) (1 sheet)
Figure 7.4-1 & 7.4-2
(to be provided later) (1 sheet)
Figure 7.6-2 (to be provided later) (1 sheet)
Figure 7.6-8 (to be provided later) (1 sheet)

Volume 18

Figure 7.7-1 (to be provided later) (1 sheet)
Figure 7.7-4 & 7.7-5
(to be provided later) (1 sheet)
Figure 7.7-7 (to be provided later) (1 sheet)
N/A

Volume 20

Figure 9.4-6

Figure 7.2-1 (4 sheets)
Figure 7.3-1 (3 sheets)
Figure 7.3-3 (7 sheets)
Figure 7.3-4 (2 sheets)
Figure 7.3-5 (5 sheets)
Figure 7.3-6 (1 sheet)
Figure 7.3-7 (4 sheets)
Figure 7.3-9 (1 sheet)
Figure 7.3-11 (1 sheet)
Figure 7.4-1 (5 sheets)
Figure 7.4-2 (2 sheets)
Figure 7.6-2 (7 sheets)
Figure 7.6-8 (1 sheet)

Figure 7.7-1 (7 sheets)
Figure 7.7-4 (7 sheets)
Figure 7.7-5 (1 sheet)
Figure 7.7-7 (2 sheets)
Figure 7.7-8 (1 sheet)

Figure 9.4-6 (1 sheet)
(dated 6-1-88)

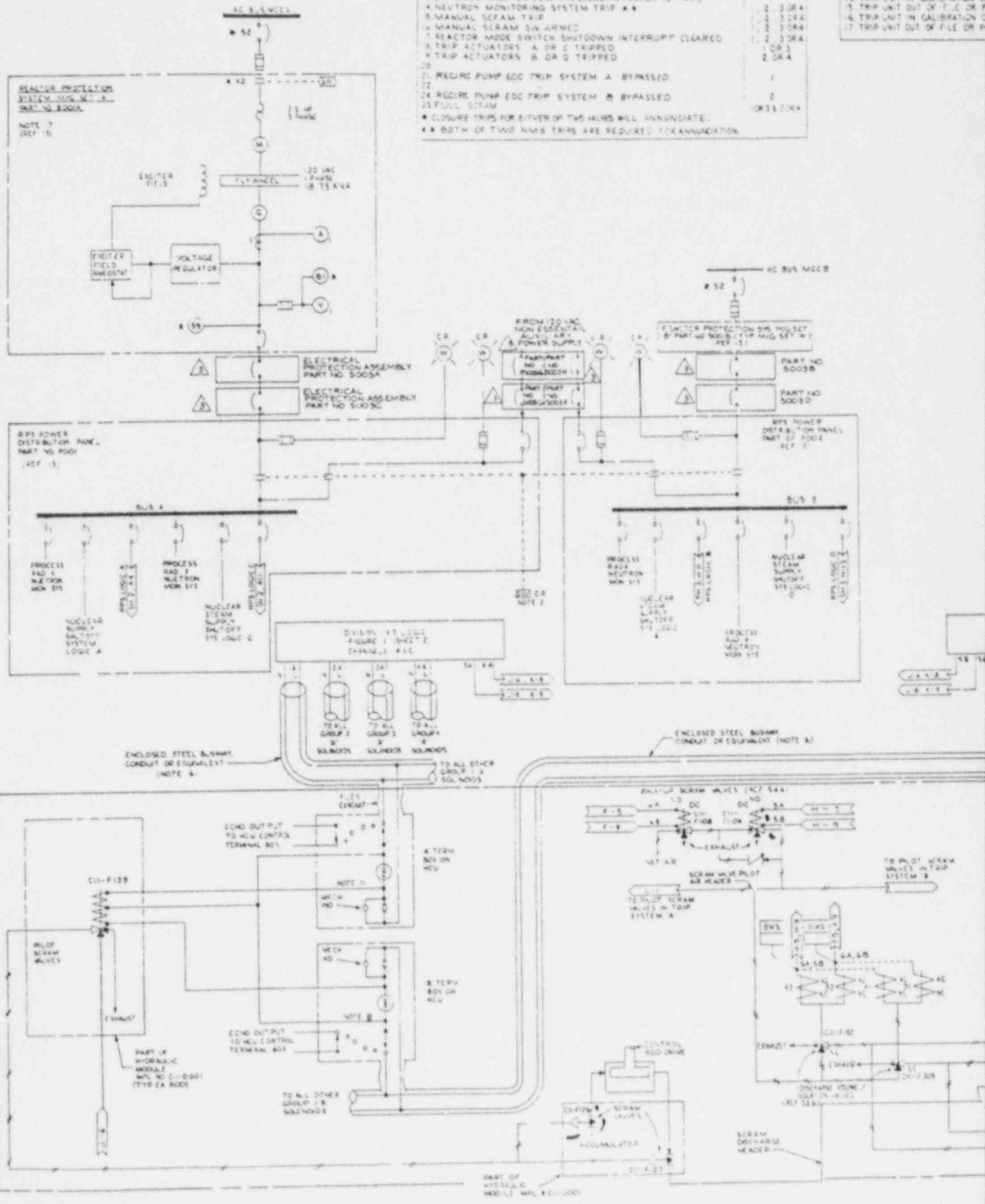
TABLE 1 ANNUNCIATION IN THE CONTROL ROOM AT TRIP LOGIC

ALARM FUNCTION	DIVISION
1 CRD SCRAM DISCHARGE VOLUME HIGH WATER LEVEL	2 3 OR 4
2 CRD DISCHARGE VOLUME HIGH WATER LEVEL TRIP BYPASS	2 3 OR 4
3 MAIN STEAM LINE ISOLATION VALVE (MSIV) CLOSURE TRIP *	2 3 OR 4
4 MSIV CLOSURE TRIP BYPASS	2 3 OR 4
5 MAIN STEAM LINE HIGH RADIATION TRIP	2 3 OR 4
6 DRYWELL HIGH PRESSURE TRIP	2 3 OR 4
7 REACTOR VESSEL HIGH PRESSURE	2 3 OR 4
8 REACTOR VESSEL LOW WATER LEVEL (R) TRIP	2 3 OR 4
9 REACTOR VESSEL HIGH WATER LEVEL (R) TRIP	2 3 OR 4
10 TURBINE CONTROL VALVE FAST CLOSURE TRIP	2 3 OR 4
11 TURBINE STOP VALVE CLOSURE TRIP *	2 3 OR 4
12 TURBINE CONTROL VALVE FAST CLOSURE AND STOP VALVE CLOSURE TRIP BYPASS	2 3 OR 4
13 DRYWELL HIGH OR LOW PRESSURE (APPROACH TO TRIP)	2 3 OR 4
14 NEUTRON MONITORING SYSTEM TRIP **	2 3 OR 4
15 MANUAL SCRAM TRIP	2 3 OR 4
16 MANUAL SCRAM SW ARMED	2 3 OR 4
17 REACTOR MODE SWITCH SHUTDOWN INTERRUPT CLEARED	2 3 OR 4
18 TRIP ACTUATORS A OR C TRIPPED	OR 3
19 TRIP ACTUATORS B OR D TRIPPED	OR 4
20	
21 REGIC PUMP EDC TRIP SYSTEM A BYPASSED	1
22	
23 REGIC PUMP EDC TRIP SYSTEM B BYPASSED	2
24 REGIC PUMP EDC TRIP SYSTEM A BYPASSED	2
25 FULL SCRAM	OR 1, 2 OR 4

* CLOSURE TRIPS FOR EITHER OF TWO HALVES WILL ANNUNCIATE.
 ** BOTH OF TWO NMS TRIPS ARE REQUIRED FOR ANNUNCIATION.

TABLE 1A ANNUNCIATION IN THE CONTROL ROOM AT TRIP LOGIC

ALARM FUNCTION	DIVISION
1 RPS SYSTEM A OUT OF SERVICE	1
2 24 VDC ISOLATOR PWR LOSS	2
3 24 VDC ISOLATOR PWR LOSS	2
4 RPS SYSTEM B OUT OF SERVICE	1
5 24 VDC ISOLATOR PWR LOSS	2
6 24 VDC ISOLATOR PWR LOSS	2
7 TRIP UNIT IN CALIBRATION	1
8 TRIP UNIT IN CALIBRATION	1
9 TRIP UNIT OUT OF FILE OR FILE	1
10 SYSTEM OUT OF SERVICE	1
11 TRIP UNIT IN CALIBRATION	1
12 TRIP UNIT OUT OF FILE OR FILE	1
13 SYSTEM OUT OF SERVICE	1
14 TRIP UNIT IN CALIBRATION	1
15 TRIP UNIT OUT OF FILE OR FILE	1
16 TRIP UNIT IN CALIBRATION	1
17 TRIP UNIT OUT OF FILE OR FILE	1



CONTROL ROOM - SYSTEM FAILURE OR OUT OF SERVICE

	DIVISION
OR 3	1
OR 4	2
OR 5	3
OR 6	4
OR 7	5
OR 8	6
OR 9	7
OR 10	8
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OR 196	194
OR 197	195
OR 198	196
OR 199	197
OR 200	198

TABLE 2 ALARM INPUTS TO COMPUTER FOR RPS

DESCRIPTION	INPUT NUMBER	CHANNEL / DIVISION			
		A	B	C	D
1. SCD DISCHARGE VOLUME HIGH WATER LEVEL	101	NC033	NC034	NC035	NC036
2. DRYWELL HIGH PRESSURE	CT	NC001	NC002	NC003	NC004
3. REACTOR VESSEL HIGH PRESSURE	82	NC001	NC002	NC003	NC004
4. REACTOR VESSEL LOW WATER LEVEL	52	NC005	NC006	NC007	NC008
5. MAIN STEAM LINE HIGH RADIATION	217	NC001	NC002	NC003	NC004
6. TURBINE CONTROL VALVE FAST CLOSURE	CT	NC007	NC008	NC009	NC010
7. MAIN STEAM LINE ISOLATOR VALVES NOT FULL OPEN	52	NC047	NC048	NC049	NC050
8. TURBINE STOP VALVE CLOSURE	CT	NC003	NC004	NC005	NC006
9. NEUTRON MONITORING SYSTEM	CS	NC091	NC092	NC093	NC094
10. REACTOR MANUAL SCRAM	CT	NC005	NC006	NC007	NC008
11. REACTOR SCRAM CHANNELS A AND C TRIPPED	CT	NC009		NC011	
12. REACTOR SCRAM CHANNELS B AND D TRIPPED	CT		NC010		NC012
13. REACTOR VESSEL HIGH WATER LEVEL	52	NC051	NC052	NC053	NC054
14. RECIRC PUMP SYSTEM A TRIPPED	CT	NC025			
15. RECIRC PUMP SYSTEM B TRIPPED	CT		NC026		
16. SCRAM DISCHARGE VOLUME VENT VALVE CLOSED F00	CT	NC064			
17. SCRAM DISCHARGE VOLUME VENT VALVE CLOSED F01	CT	NC065			
18. SCRAM DISCHARGE VOLUME DRAIN VALVE CLOSED F04	CT	NC066			
19. SCRAM DISCHARGE VOLUME DRAIN VALVE CLOSED F05	CT	NC067			

* INDICATION FOR 2 MS LINES REQUIRED PER CHANNEL
 * * CLOSURE OF 2 STOP VALVES REQUIRED PER CHANNEL
 * * * EITHER OF TWO RMS TRIPS WILL TRIP CHANNEL

REFERENCE DOCUMENTS:

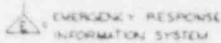
DESCRIPTION	MPL ITEM NO.
1. INSTRUMENT MAINTENANCE REQUIREMENTS	CM-400
2. NEUTRON MONITORING SYS ICD	CM-100
3. NEUTRON MONITORING SYS FCD	CM-1010
4. NUCLEAR BOILER SYS FCD	421-1010
5. CONTROL ROD DRIVE HYD SYS FCD	011-1010
6. CONTROL ROD DRIVE HYD SYS FCD	011-1010
7. NUCLEAR BOILER SYS FCD	823-1010
8. DIESEL HEAT REWIND SYS FCD	011-1010
9. PROCESS RADIATION MON SYS ICD	021-1010
10. REACTOR RECORD SYS FCD	813-1010
11. TURBINE GENERATOR & STEAM SPINNS SYS ICD	AM-4170
12. PROCESS COMP ICD	011-4030
13. RPS MGMT ELEM DIAG	CT-1060
14. RPS ELEMENTARY DIAGRAM	095-1050

ADDITIONAL DOCUMENTS:

DESCRIPTION	MPL ITEM NO.
1. RPS & INSTRUMENT SYMBOLS	442-100
2. LOGIC SYMBOLS	442-1030

LEGEND:

* TRIP/STOP DEVICE (FUNCTION NUMBER AND) SEC. C312



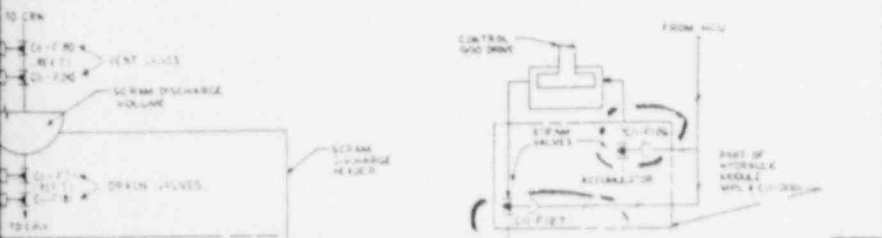
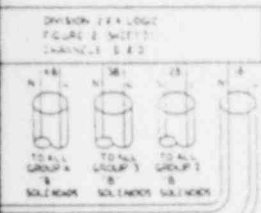
NOTES

- TRIP CHANNELS FOR THE TURBINE CONTROL VALVE FAST CLOSURE TRIP SHALL BE DERIVED FROM THOSE EVENTS CAUSING FAST CLOSURE OF THE CONTROL VALVES.
- SYSTEM SHALL BE ARRANGED SO THAT THE BUS CANNOT BE ENERGIZED FROM THE BUS SET AND ALTERNATE SOURCE SIMULTANEOUSLY.
- CLASS II ELECTRICAL PROTECTION ASSEMBLY (EPA) TRIP EPA CIRCUIT BREAKER ON OVER VOLTAGE, UNDER VOLTAGE OR UNDER FREQUENCY.
- MAIN STEAM LINE ISOLATION VALVE CLOSURE TRIP SHALL BE ARRANGED SO THAT ANY TIME ISOLATION VALVE IS SOLID ON VALVE AND THE ISOLATION VALVE FOR ANY OTHER STEAM LINE CAN BE CLOSED (FASTER THAN 10%) WITHOUT CAUSING A SCRAM.
- LOGIC FOR TURBINE STOP VALVE CLOSURE TRIP SHALL BE ARRANGED SO THAT CLOSURE OF 3 OUT OF 4 STOP VALVES WILL CAUSE A SCRAM.
- FOR ANY SINGLE ROD GROUP (U, ETC) AND 3 SOLIDNO CABLES MAY BE RUN TOGETHER IN ONE CONDUIT WITH NO OTHER WIRING.
- EQUIPMENT RATINGS ARE ESTIMATED AND PRELIMINARY. ACTUAL VALUES TO BE DETERMINED AT THE TIME OF EQUIPMENT PROCUREMENT.
- EACH MAIN STEAM LINE RADIATION MONITOR MONITORS ALL FOUR MAIN STEAM LINES.
- ALL EQUIPMENT & INSTRUMENTS ARE PREVIEWED IN SYSTEM NUMBER (CT) UNLESS OTHERWISE NOTED.
- FOR LOCATION AND IDENTIFICATION OF INSTRUMENTS SEE EODL LISTED IN THE MPL FOR EACH INSTRUMENT.
- SELENIUM THYRISTOR SUPPRESSORS (OR EQUIVALENT) SHALL BE USED TO SUPPRESS ELECTRICAL ARCS CAUSED BY THE SOCLAM SOLENOIDS.

PARTS SHOWN INSIDE THIS BOUNDARY ARE FOR REFERENCE AND ARE SHOWN ONLY TO CLARIFY THE REACTOR TRIP-IN SYSTEM.

TI APERTURE CARD

Also Available On Aperture Card



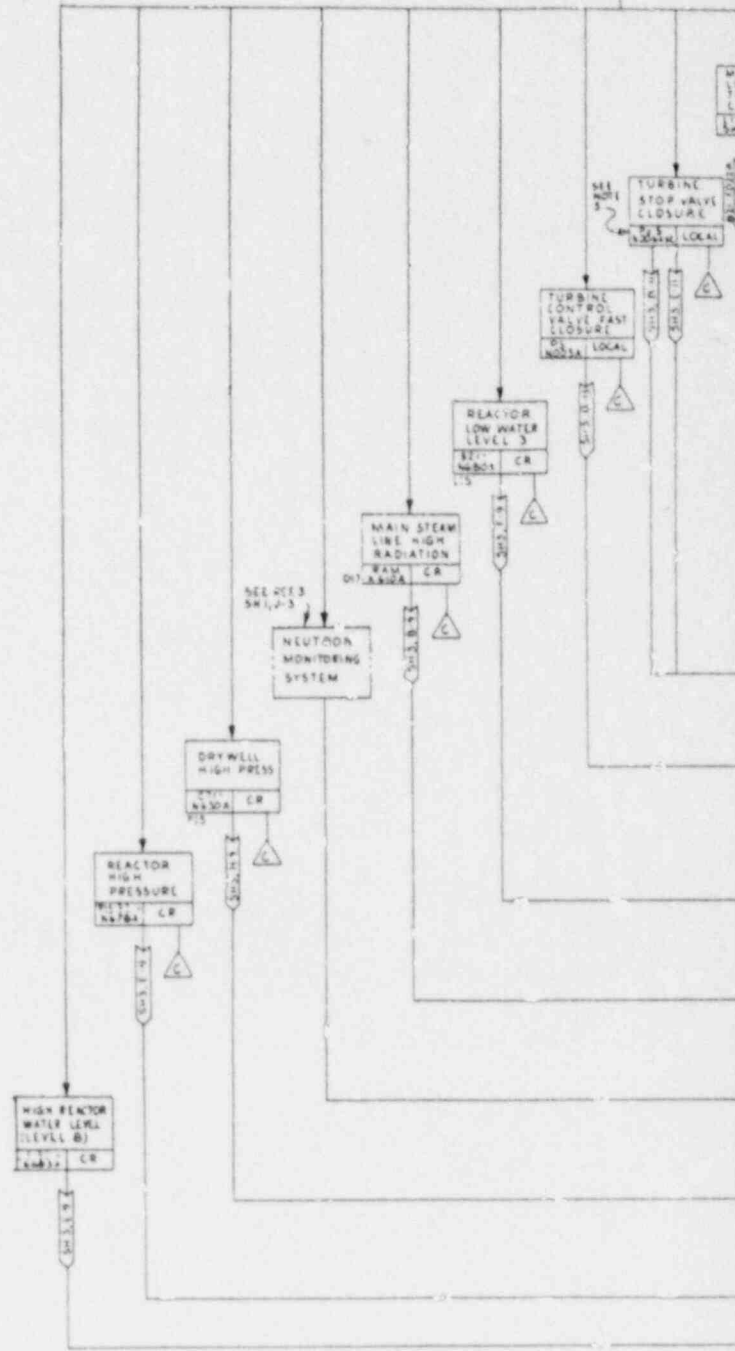
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

Reactor Protection System
Instrumentation and Electrical
Diagram

Figure 7.2-1 (Sheet 1 of 4)

A CHANNELS (AUTO) BUS A (AUTO)



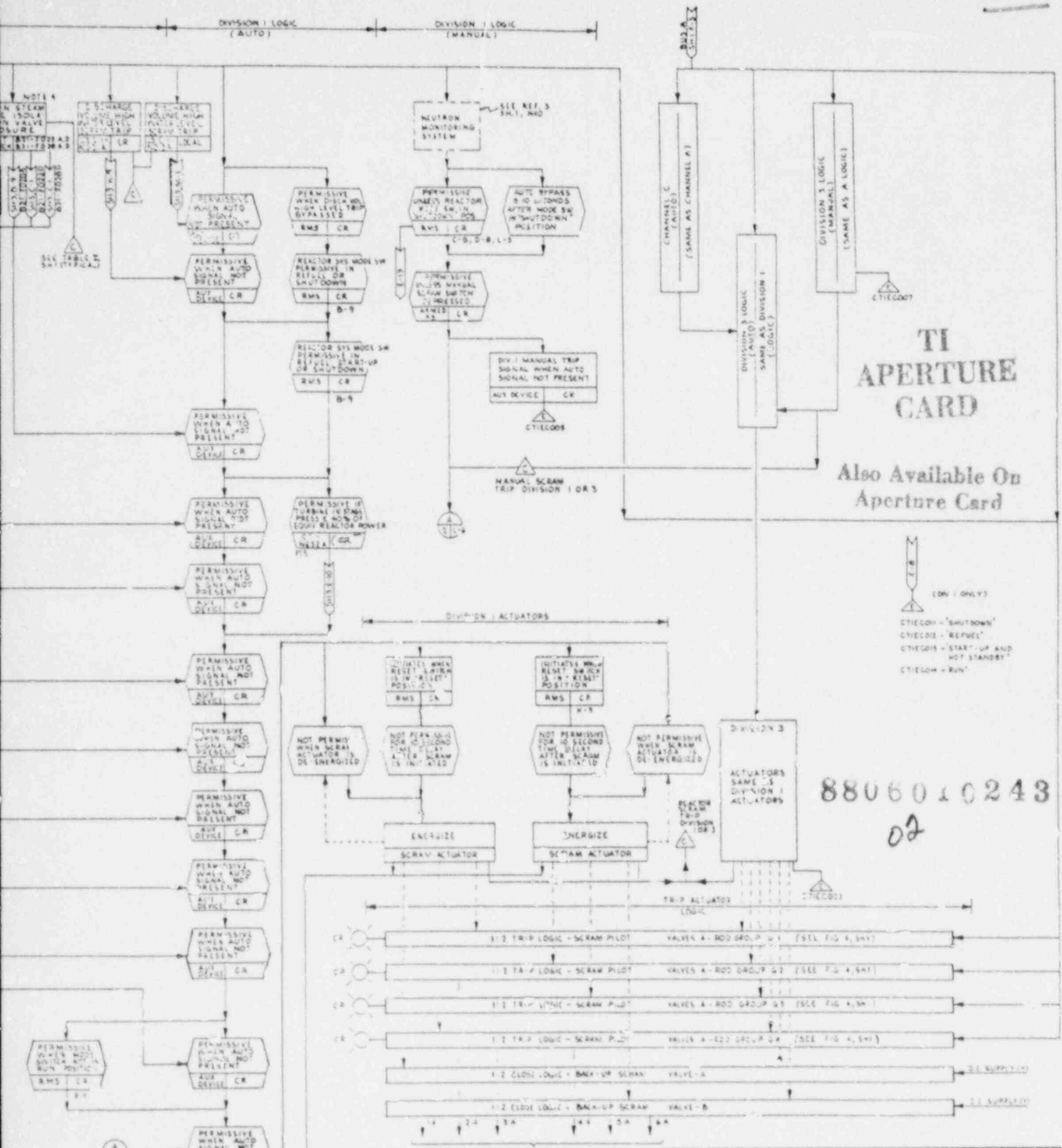

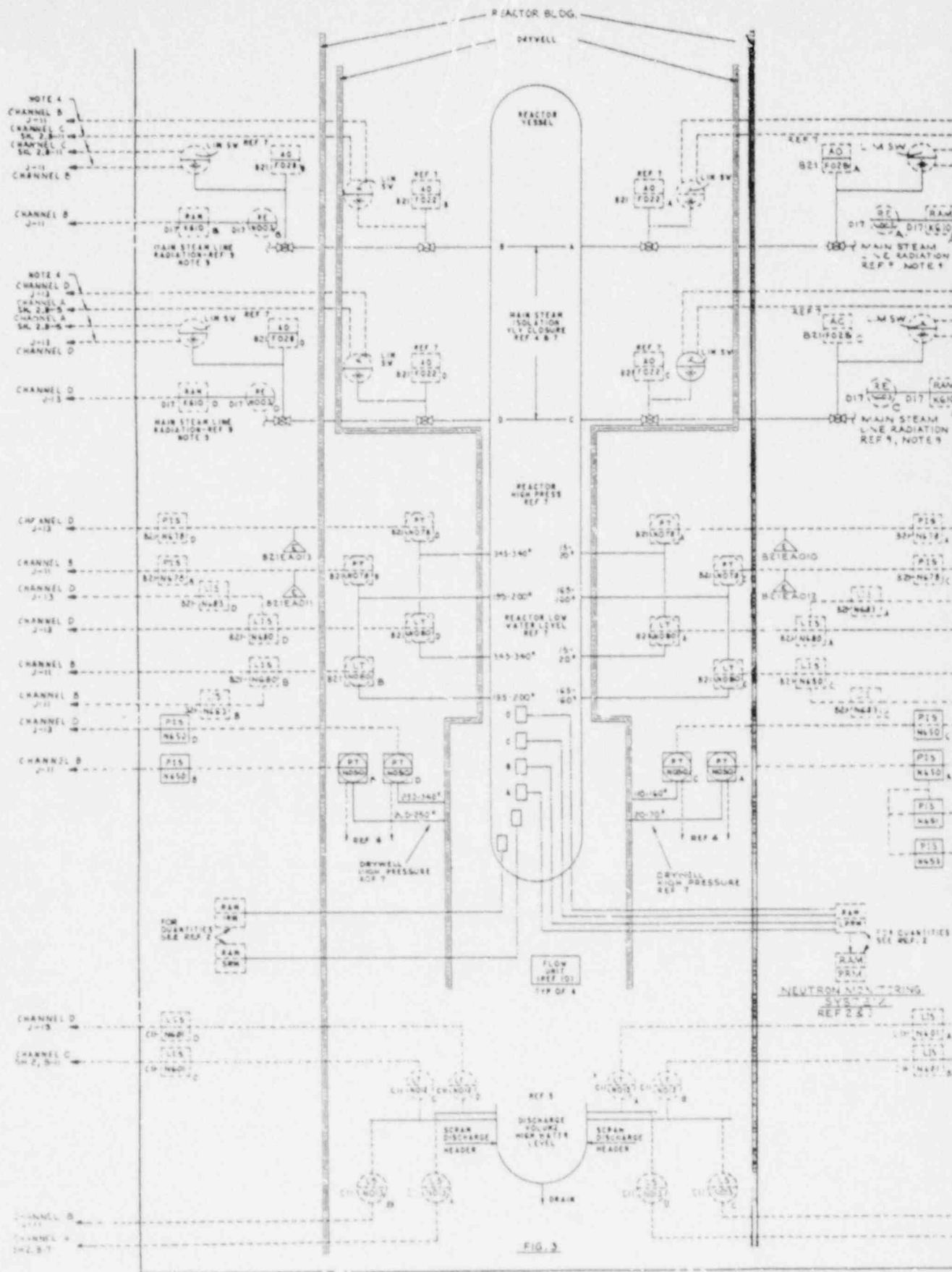


FIG. 1
 DIVISION 1 LOGIC
 (FOR SCRAM FUNCTIONS SEE TABLE 1.5M)


PERRY NUCLEAR POWER PLANT
 THE CLEVELAND ELECTRIC
 ILLUMINATING COMPANY

Reactor Protection System
 Instrumentation and Electrical
 Diagram

Figure 7.2-1 (Sheet 2 of 4)



PARTS SHOWN INSIDE THIS BOUNDARY ARE FOR REF AND ARE SHOWN ONLY TO CLARIFY THE REACTOR PROTECTION SYSTEM.

- NOTE 4 CHANNEL B J-11 SH 2.2-7 CHANNEL A SH 2.2-5 J-11 CHANNEL B
- NOTE 7 CHANNEL D J-13 SH 2.2-11 CHANNEL C SH 2.2-11 J-13 CHAN C CHANNEL D SH 2.2-11
- CHANNEL A SH 2.2-1 CHANNEL C SH 2.2-11 CHANNEL C SH 2.2-11 CHANNEL C SH 2.2-11 CHANNEL C SH 2.2-11 CHANNEL C SH 2.2-11 CHANNEL A SH 2.2-1 CHANNEL B SH 2.2-1 CHANNEL C SH 2.2-1 CHANNEL C SH 2.2-1

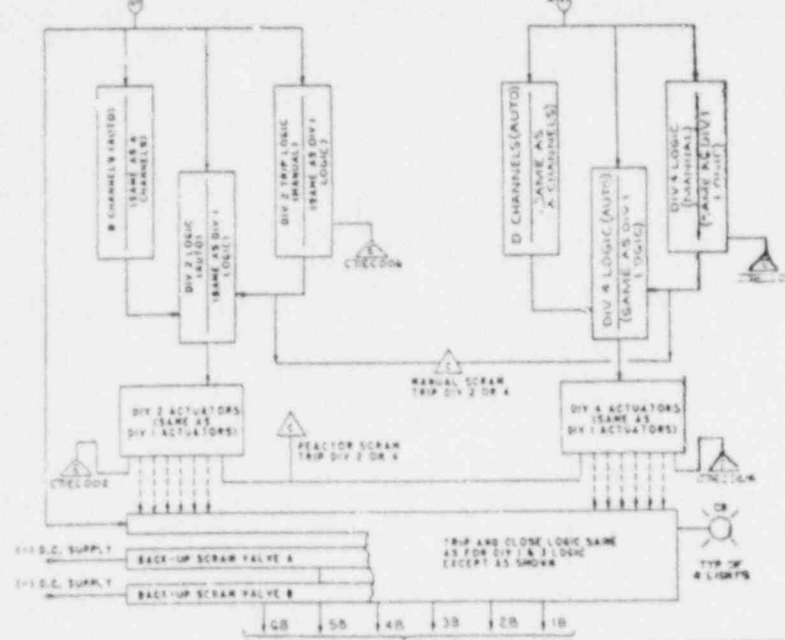
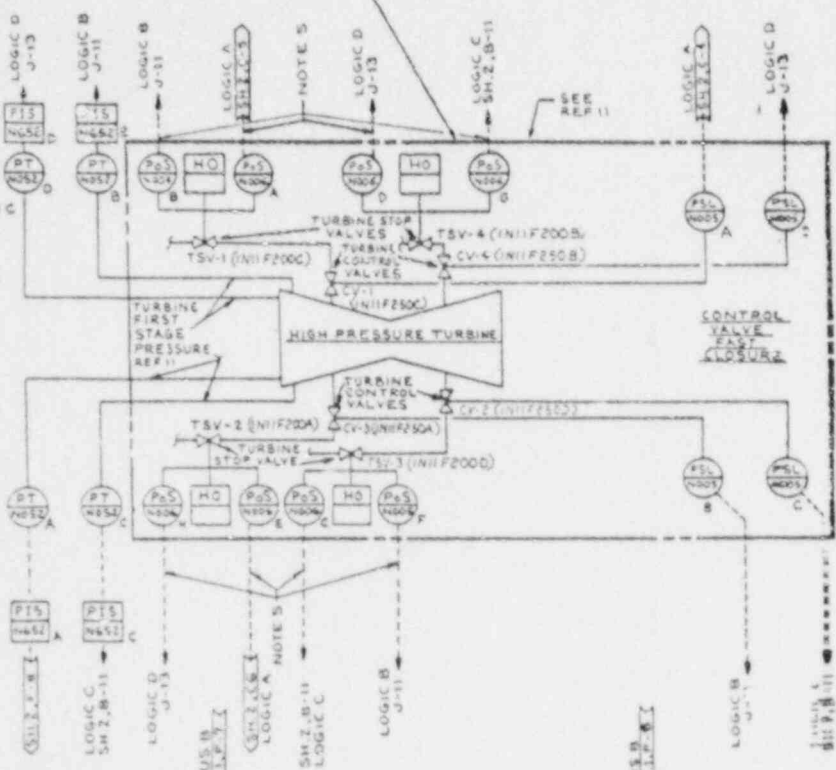


FIG. 2 DIVISION 2 & 4 LOGIC

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Also Available On Aperture Card

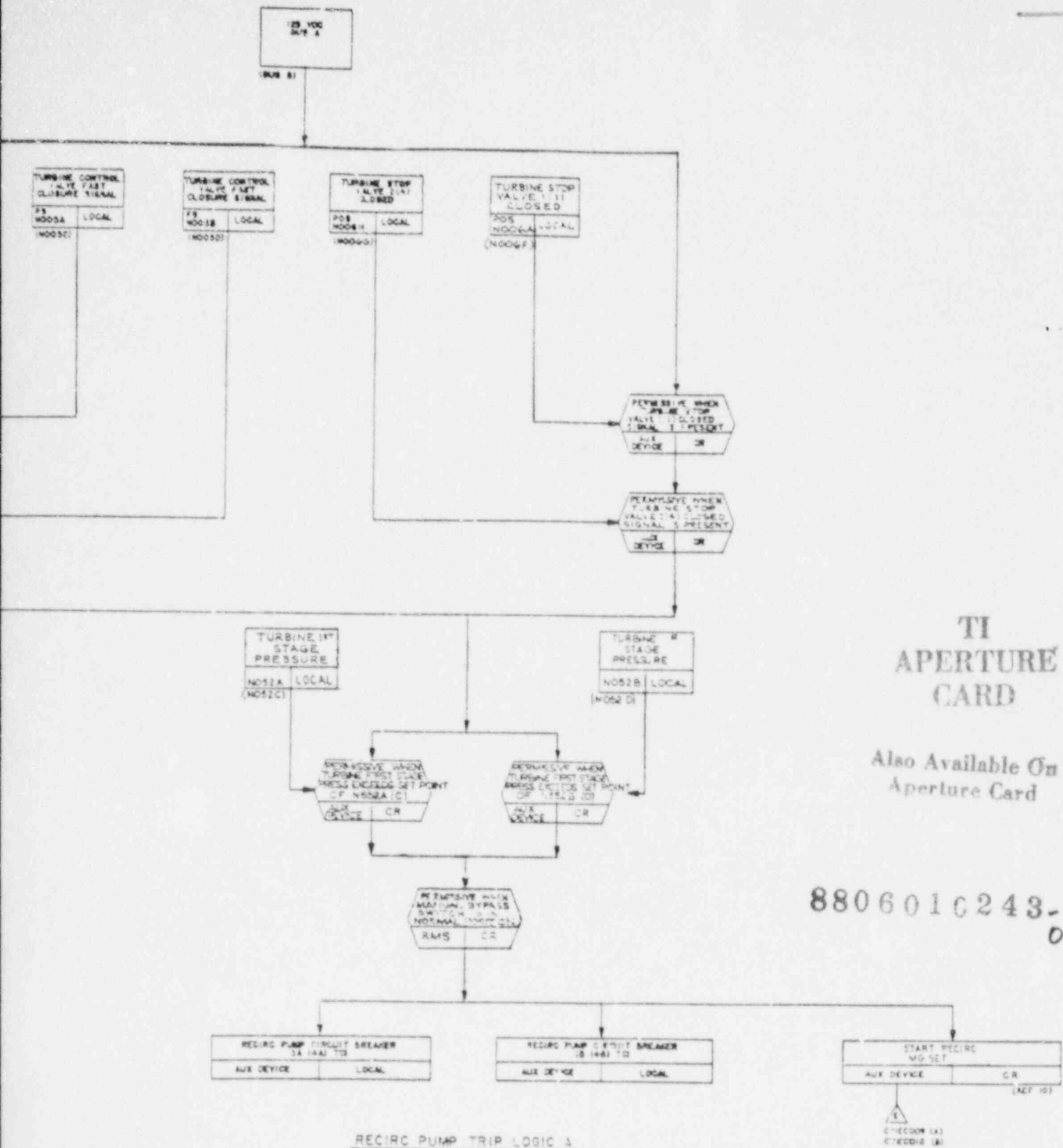
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

Reactor Protection System
Instrumentation and Electrical
Diagram

Figure 7.2-1 (Sheet 3 of 4)





TI APERTURE CARD

Also Available On Aperture Card

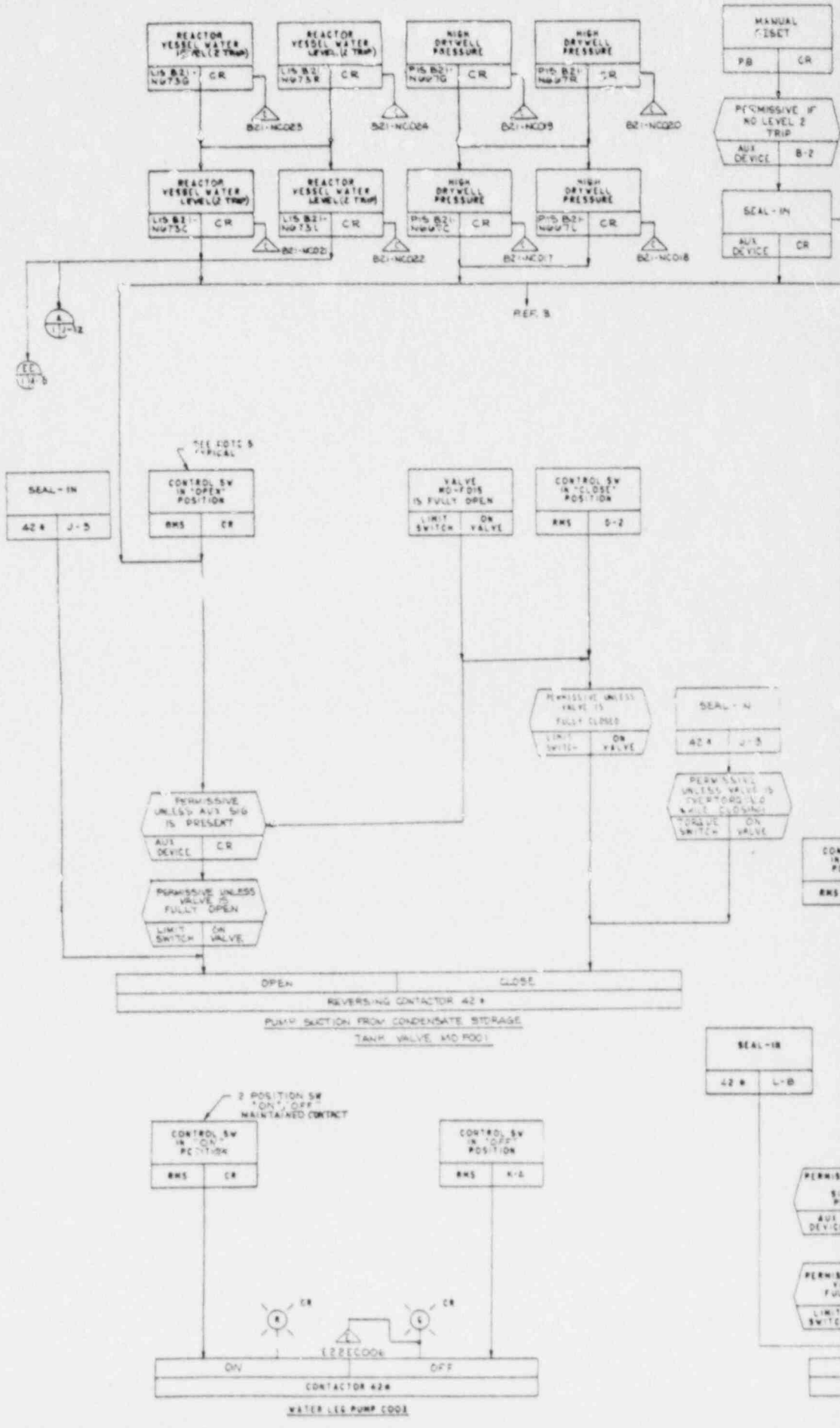
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RECIRC PUMP TRIP LOGIC A
TYPICAL FOR LOGIC B, DIFFERENCES SHOWN IN ()

PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

Reactor Protection System
Instrumentation and Electrical
Diagram

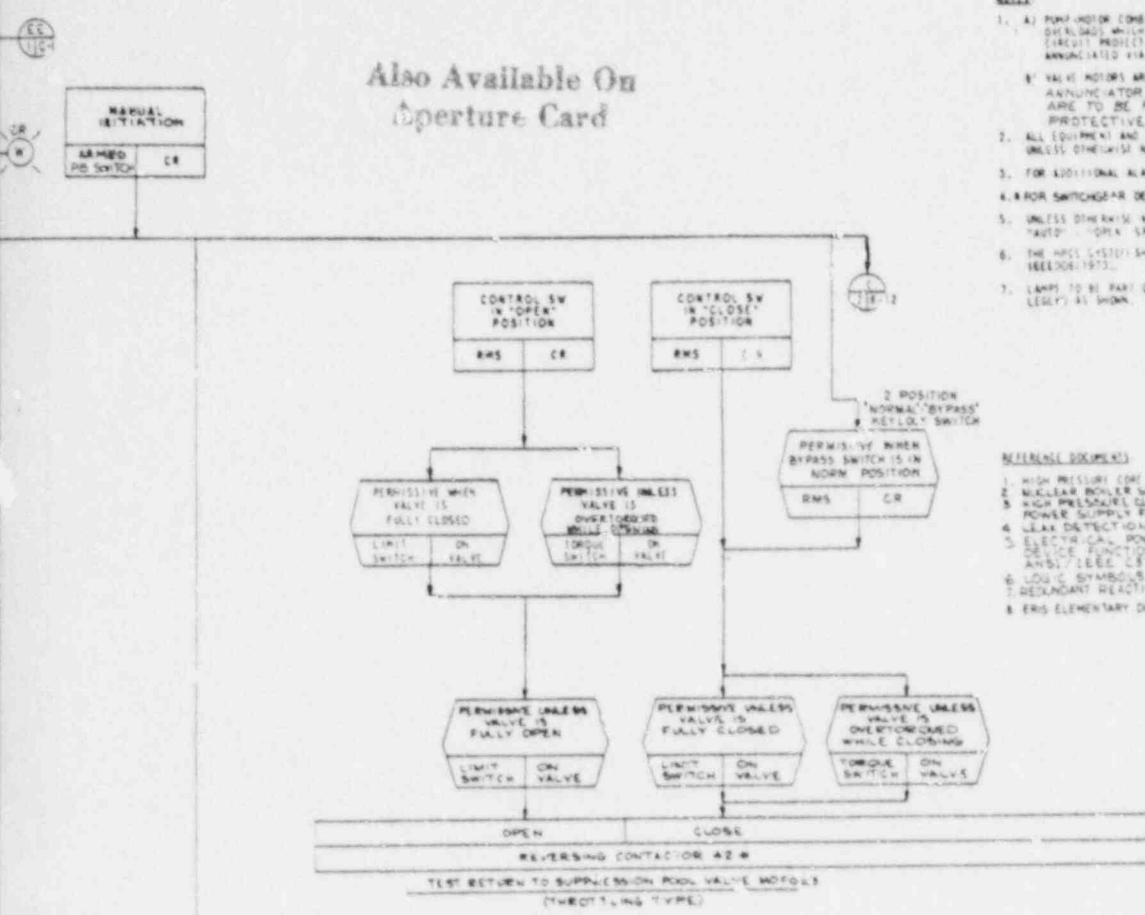
Figure 7.2-1 (Sheet 4 of 4)



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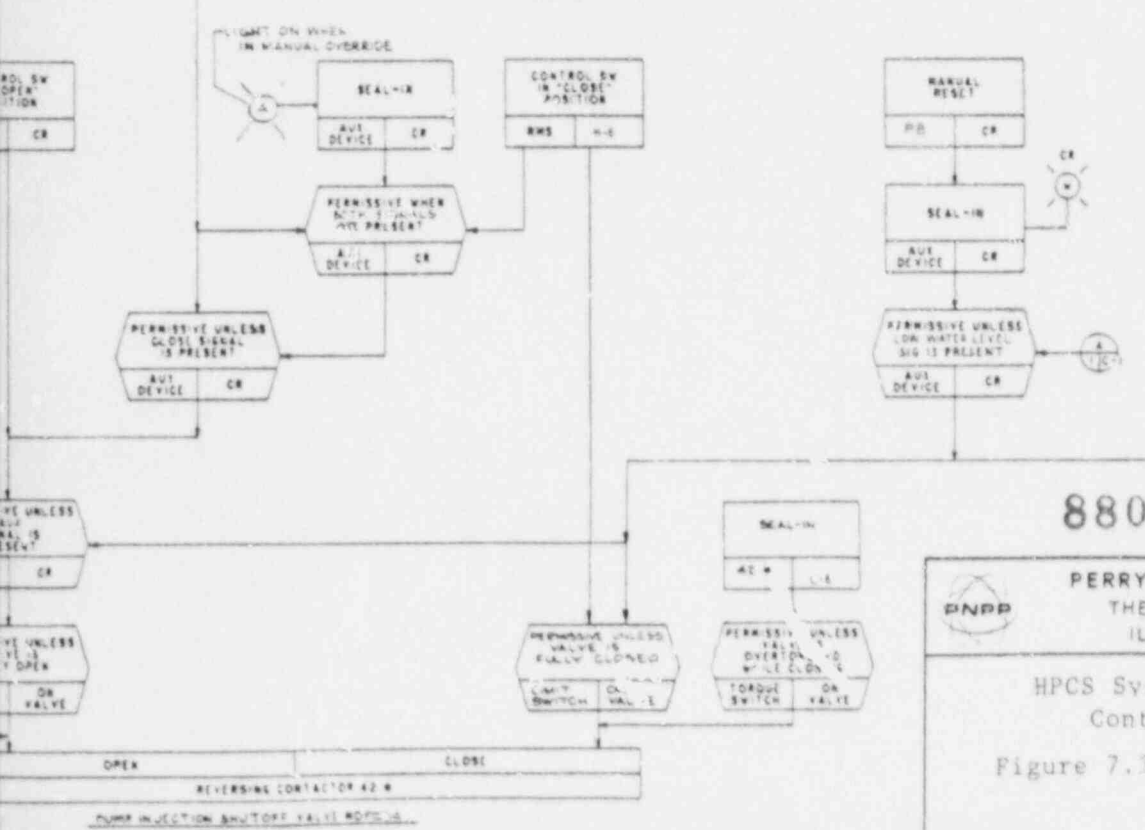
MPL NO. E22-1030

Also Available On Aperture Card

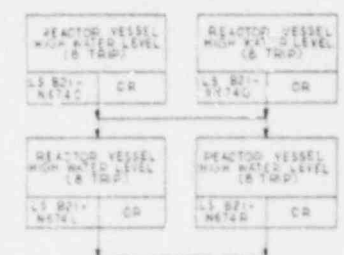


- NOTES:**
1. ALL PUMP MOTOR COMBINATION STARTERS SHALL BE PROVIDED WITH THERMAL OVERLOADS WHICH TRIP ON OVERLOAD. BREAKERS SHALL PROVIDE SHORT CIRCUIT PROTECTION. TRIPPING OF EITHER TYPE OF DEVICE IS ANNUNCIATED VIA AN ALARM RELAY.
 2. VALVE MOTORS ARE TO BE PROVIDED WITH LOSS OF POWER ANNUNCIATOR. IN ADDITION VALVE MOTOR CIRCUITS ARE TO BE PROVIDED WITH SHORT CIRCUIT CURRENT PROTECTIVE TRIPPS.
 3. ALL EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NUMBER E22 UNLESS OTHERWISE NOTED.
 4. FOR ADDITIONAL ALARMS & PROCESS INSTRUMENTATION ACT SYSTEM SEE REF. 1.
 5. FOR SWITCHGEAR DEVICE FUNCTION NUMBERS SEE REFERENCE 5.
 6. UNLESS OTHERWISE NOTED ALL RMS SHALL BE 3 POSITION SWITCHES "CLOSE" "AUTO" "OPEN" SWING RETURN TO "AUTO" FROM "CLOSE" - "OPEN".
 7. THE MPL (E22) SHALL BE DESIGNED IN ACCORDANCE WITH IEEE2001.1973 & IEEE2001.1975.
 8. LAMP TO BE PART OF LIGHT BOX LOCATED BELOW REGULAR HPCS ANNUNCIATOR (LEG 1) AS SHOWN.


- REFERENCE DOCUMENTS:**
- | REF. NO. | DOC. TITLE | MPL ITEM NO. |
|----------|---|------------------|
| 1. | HIGH PRESSURE CORE SPRAY PFD | E22-1010 |
| 2. | NUCLEAR ROILER SYSTEM PFD | B2-1010 |
| 3. | HIGH PRESSURE CORE SPRAY POWER SUPPLY PFD | BY A/E |
| 4. | LEAK DETECTION SYS PFD | E2-1010 |
| 5. | ELECTRICAL POWER SYSTEM DEVICE FUNCTION NUMBERS AND SYMBOLS LIST 1-1978 | N/A |
| 6. | LOGIC SYMBOLS | AA-1050/A42-1050 |
| 7. | REDUNDANT REACTIVITY CONTROL SYS | C2-1030 |
| 8. | ERG ELEMENTARY DIAGRAM | C9-1050 |



- LEGEND:**
- MCC - MOTOR CONTROL CENTER
 - CR - CONTROL ROOM
 - PB - PUSH BUTTON
 - RMS - REMOTE MANUAL SWITCH
 - G - GREEN
 - R - RED
 - △ - EMERGENCY RESPONSE INFORMATION SYSTEM

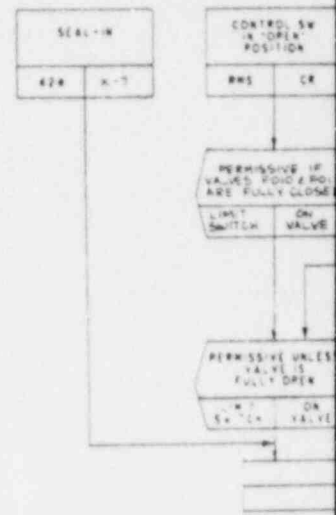
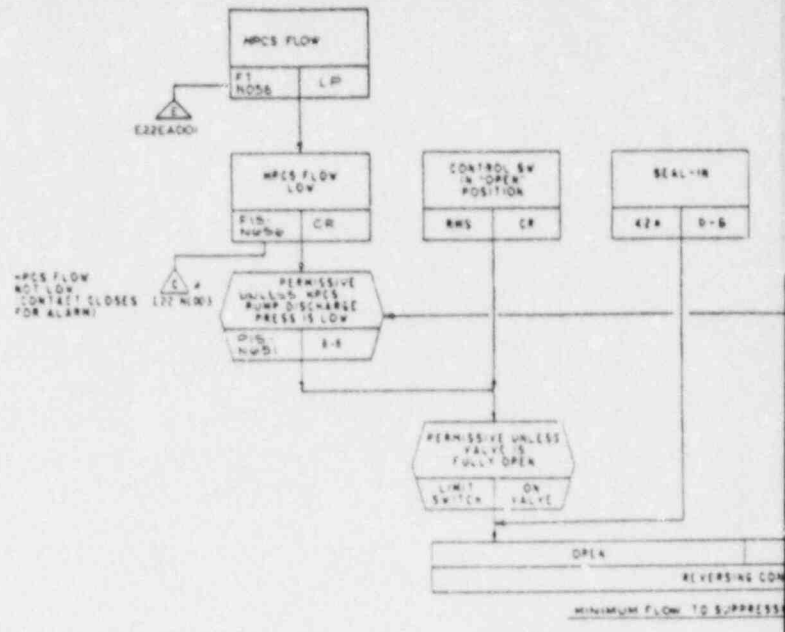


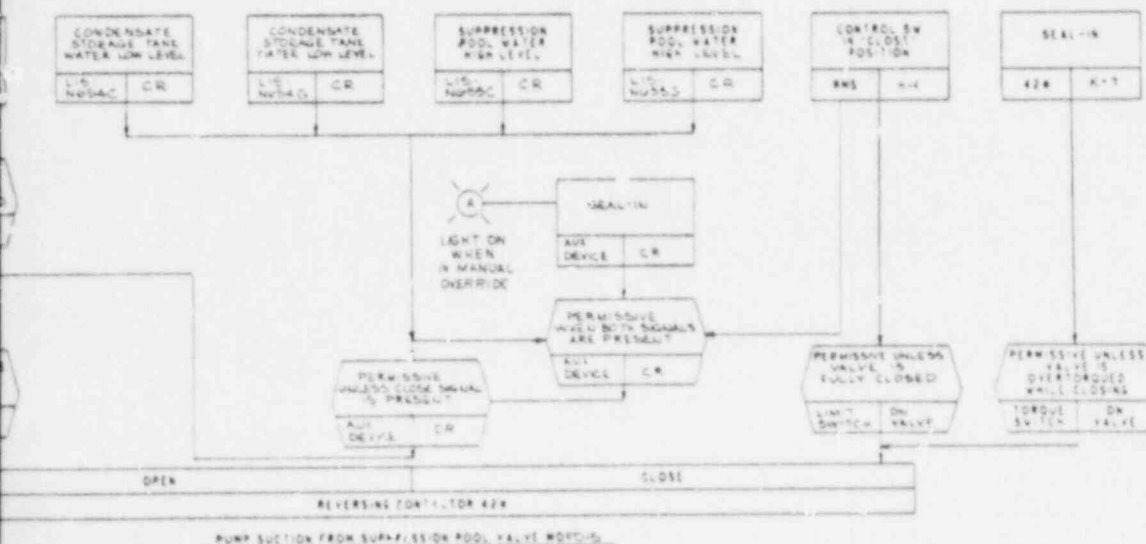
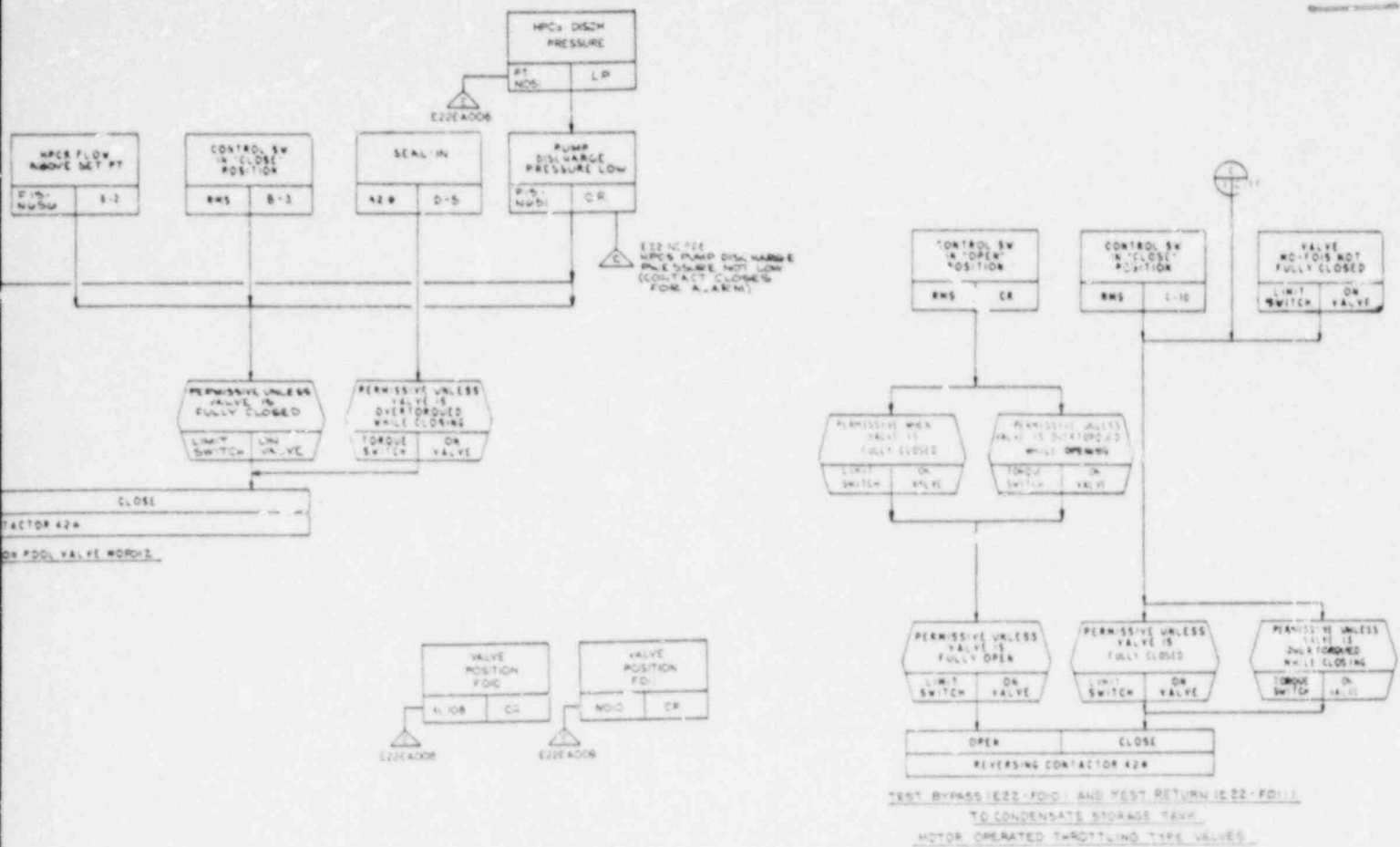
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

HPCS System Functional Control Diagram
Figure 7.3-1 (Sheet 1 of 3)





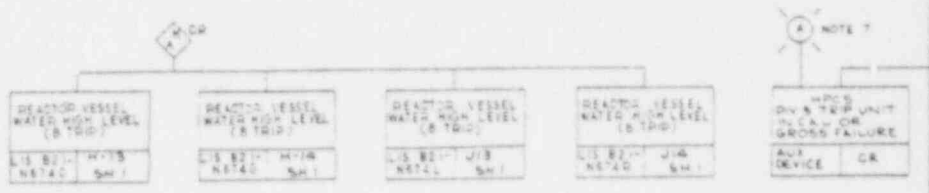
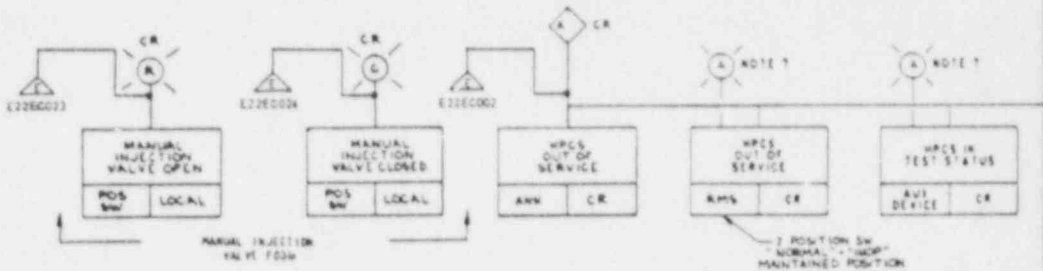
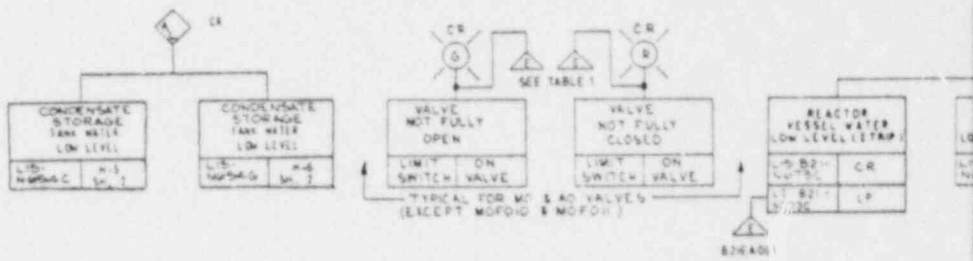
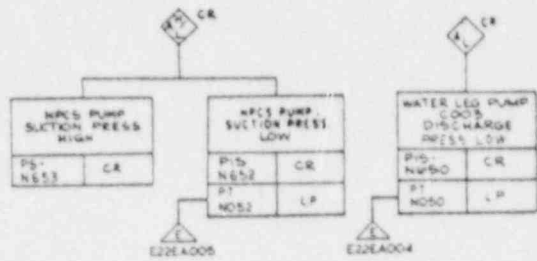
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

HPCS System Functional
Control Diagram
Figure 7.3-1 (Sheet 2 of 3)



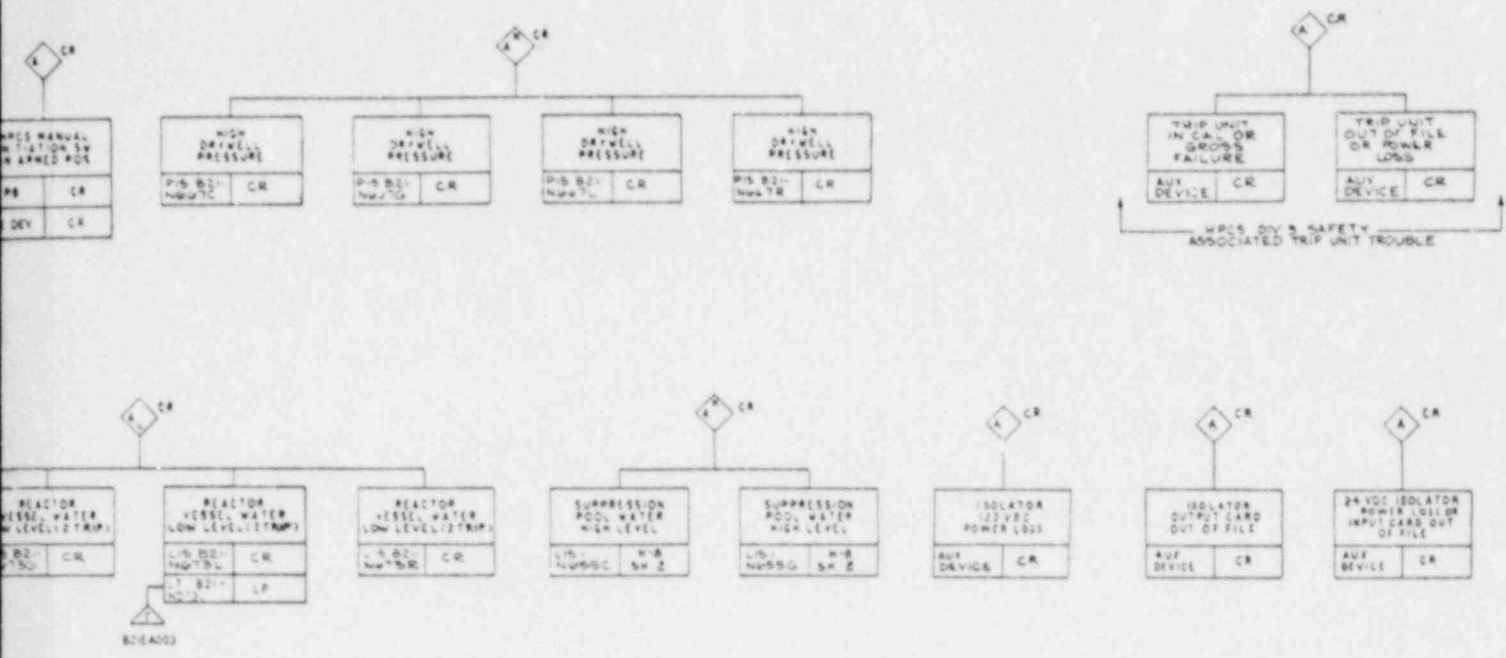
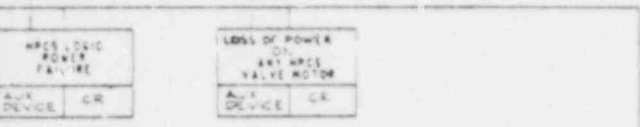


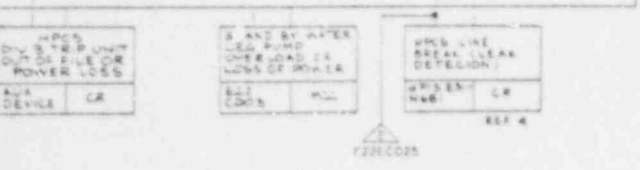
TABLE 1 (TRIP SIGNALS)

TRIP SIGNAL	TRIP SIGNAL	TRIP SIGNAL
F004	F005	F006
F007	F008	F009
F010	F011	F012
F013	F014	F015
F016	F017	F018
F019	F020	F021

NOTE 1



NOTE 7



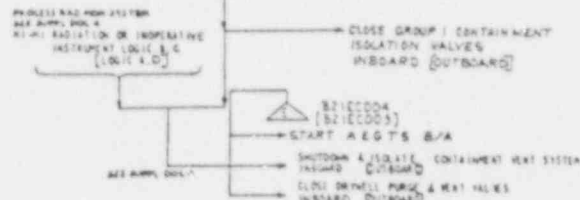
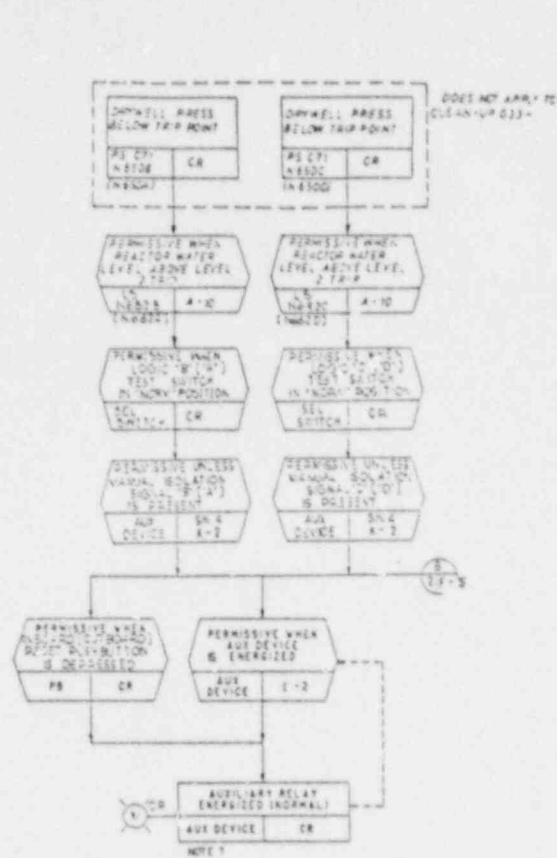
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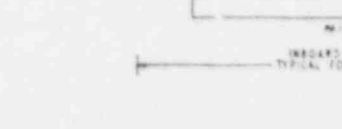
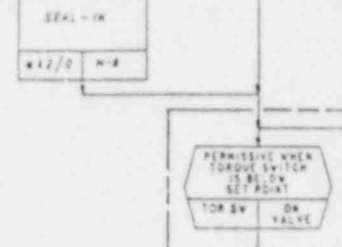
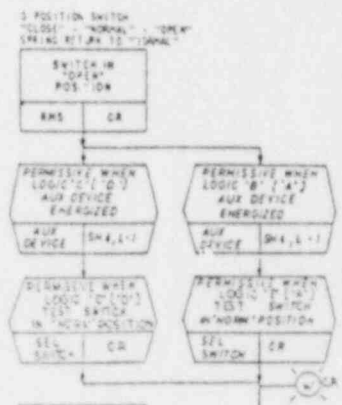
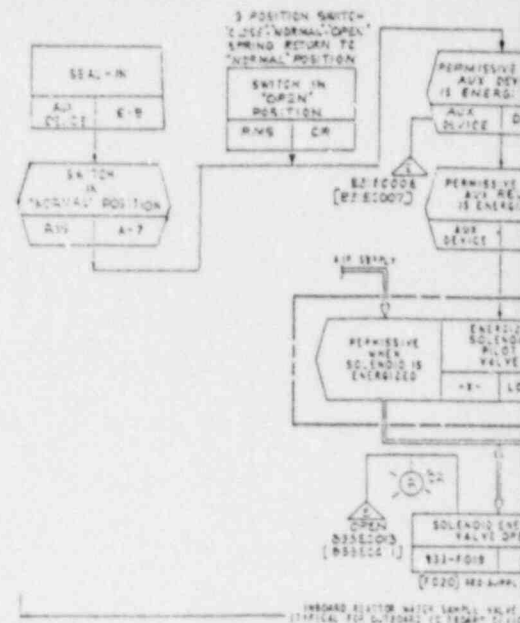
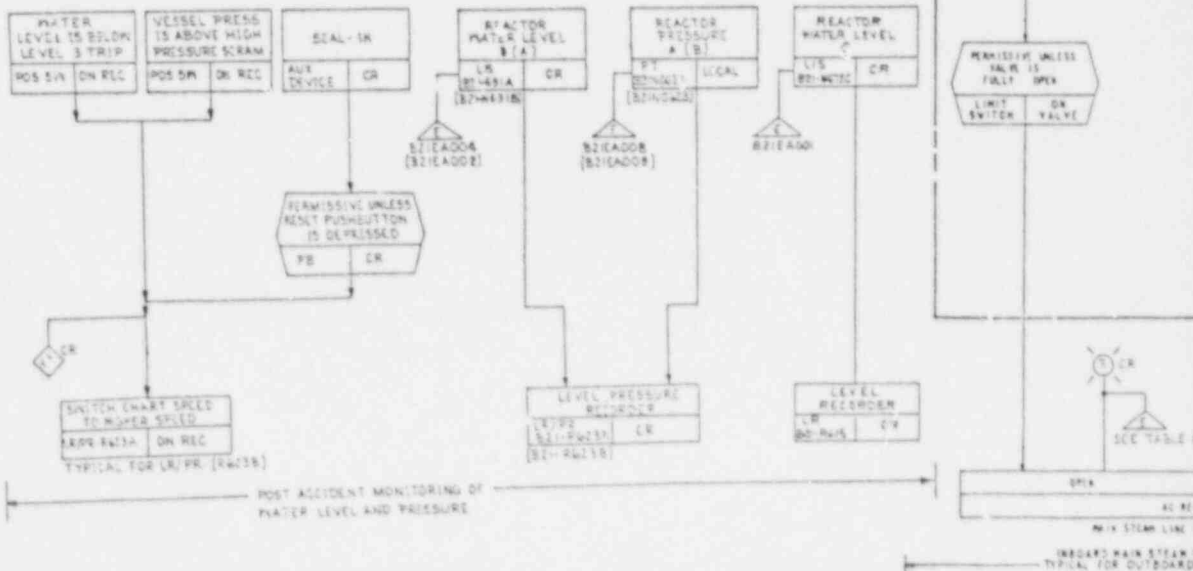
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

HPCS System Functional Control Diagram
Figure 7.3-1 (Sheet 3 of 3)



INBOARD ISOLATION LOGIC (EXCEPT MAIN STEAM) (TYP FOR OUTBOARD WITH MESSAGES SHOWN IN C-2)



NUCLEAR SAFETY RELATED

NOTES

1. WHEN TEST SIGNALS FIRST IS ENCOUNTERED, THE MAIN STEAM ISOLATION VALVE OPERATOR IS ALARMED EXHAUSTED (NOT IN CLOSURE TIME) WHILE VALVE IS CLOSED BY ACTION OF THE VALVE SIGNAL WITHOUT AID OF AIR PRESSURE.
2. THE SIGNALS AND VALVE INDICATING LIGHTS SHOWN ON THE P&ID ARE SYSTEM REQUIREMENTS IN ADDITION TO THOSE SHOWN ON THE STEAM P&ID. ADDITIONAL INFORMATION ON ALARMS IN 1-1 POSITION, INDICATING LIGHTS, AND TRIP/TEST FUNCTIONS IN 1-1 NOT SHOWN ON THIS P&ID IS LEFT WHERE REQUIRED TO CLARIFY FUNCTION.
3. ALL EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NO. B21 UNLESS OTHERWISE NOTED.
4. UNEXPECTEDLY STOPPING RUNNING PERMISSIVE IS USED IN LOGIC A & B ONLY.
5. EACH SAFETY RELATED VALVE & AID DEPRESSURIZATION CONTROL LOGIC CIRCUIT SHALL HAVE REDUNDANT POWER SUPPLY (EITHER TWO OR THREE) & SINGLE FAILURE SHALL NOT DISTURB THE AID DEPRESSURIZATION FUNCTION.
6. THE ROTARY BOILER VALVE SHALL BE DESIGNED IN ACCORDANCE WITH "PROPOSED CRITICAL ROTARY BOILER POWER PLANT PROTECTION SYSTEM (SEE 270) AS APPLICABLE TO THE CONTROL SYSTEMS".
7. ISOLATION LOGIC SHALL BE "FAILSAFE", I.E., LOGIC SHALL BE DESIGNED TO INITIATE ISOLATION FUNCTIONS WHEN IN "ENDEZIGED".
8. DELETED.
9. THE DEVICES IN THIS AREA, AS WELL AS OTHER DEVICES IN THIS LOGIC ARE ESSENTIAL AND MUST MEET THE REQUIREMENTS OF TEST 270.
10. DELETED.
11. ALARM FROM ROTARY CONTACT.
12. DELETED.
13. THE SRVs RECEIVE OVERPRESSURE TRIPS FROM VARIOUS TRIP UNITS. FOR THE TRIP UNIT ASSIGNMENT FOR EACH SRV SEE TABLE 3 OF SUPPLEMENTAL DOCUMENT 1.
14. SRV MONITOR SHALL CAUSE ANNUNCIATION IF ANY SRV LINE DISCHARGE PRESSURE EXCEEDS SETPOINT.
15. SEE REF 1 FOR REMOTE SHUTDOWN REQUIREMENTS.
16. SEL SWITCH IS 2 POSITION "NORM" - "TEST", MAINTAINED CONTACTS, KEY REMOVABLE IN "NORM" POSITION.

SUPPLEMENTAL DOCUMENTS

- | | |
|---|-----------------------|
| 1. LOGIC SYMBOLS | REFERENCE DESIGNATION |
| 2. S&I LAYOUT SEPARATION FOR PROTECTION SYS | B21-1050 |
| 3. DELETED | B21-1050 |

SUPPLEMENTAL DOCUMENTS

- | | |
|---------------------------------------|-----------------------|
| 1. NUCLEAR BOILER P&ID | REFERENCE DESIGNATION |
| 2. DELETED | B21-1050 |
| 3. REACTOR PROTECTION SYS P&ID | C1-1050 |
| 4. PROTECT ADAPTOR SYS P&ID | D1-1050 |
| 5. DELETED | |
| 6. REACTOR ROOM SYS P&ID | B43-1050 |
| 7. R&A SYS P&ID | E1-1050 |
| 8. LEAK DETECTION SYS P&ID | E3-1050 |
| 9. ISOLATION VALVES P&ID | B21-1050 |
| 10. LOW PRESSURE LOCK BRNRY P&ID | B21-1050 |
| 11. REMOTE SHUTDOWN SYSTEM P&ID | C6-1050 |
| 12. STANDBY LOGIC CONTROL SYSTEM P&ID | C4-1050 |
| 13. REACTOR WATER CLEANUP SYS P&ID | U33-1050 |
| 14. R&A SYS P&ID | E4-1050 |
| 15. DELETED | |
| 16. ERIC ELEMENTARY DIAGRAM | C95-1050 |

LEGEND

- IEEE INSTITUTE OF ELECTRICAL & ELECTRONICS ENGINEERS
- ADP AUTO DEPRESSURIZATION SYSTEM
- RPS REACTOR PROTECTION SYSTEM
- F APPLIES IF IN SC. SCOPE OF SUPPLY
- * SWITCHING DEVICE FUNCTION NO. 1 AS SPEC. EST. 2
- R&M RADIATION MONITOR
- ERT EMERGENCY RESPONSE INFORMATION SYSTEM

M FOR 033-FOUR ONLY

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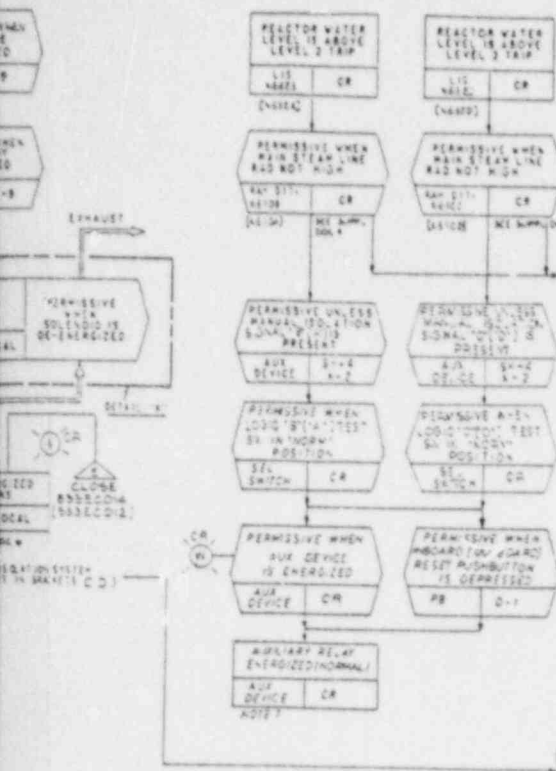
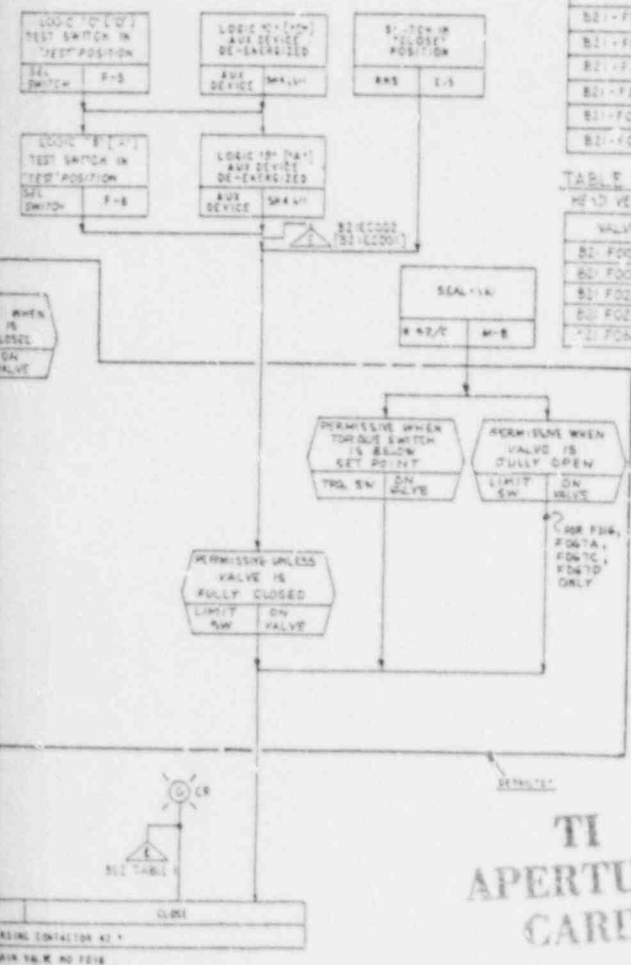


TABLE I - ERIC SIGNALS
MAIN STEAM LINE DRAIN ISOL VALVE

VALVE	OPEN	CLOSE
B21-FO04	B21EC103	B21EC104
B21-FO04	B21EC093	B21EC094
B21-FO04A	B21EC095	B21EC096
B21-FO04B	B21EC097	B21EC098
B21-FO04C	B21EC099	B21EC100
B21-FO04D	B21EC101	B21EC102

TABLE V - ERIC SIGNALS
HEAD VENT - MAIN STEAM LINE DRAIN VALVES

VALVE	OPEN	CLOSE
B21-FO01	B21EC105	B21EC106
B21-FO02	B21EC107	B21EC108
B21-FO03	B21EC109	B21EC110
B21-FO04	B21EC109	B21EC110
B21-FO05	B21EC111	B21EC112



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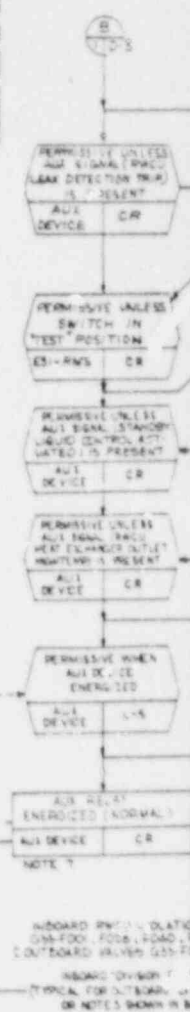
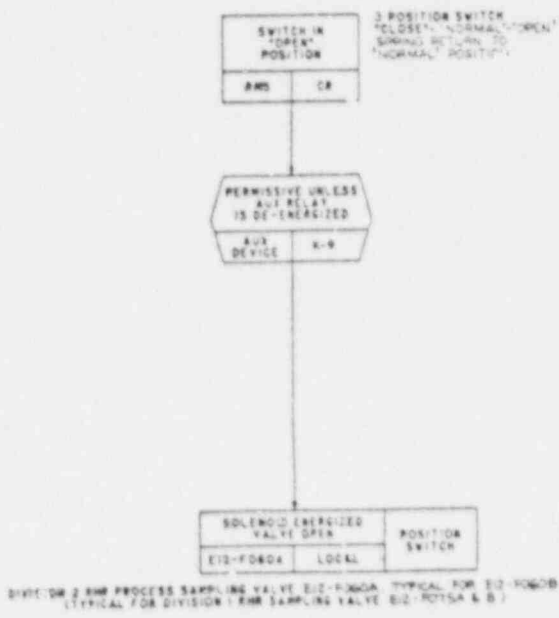
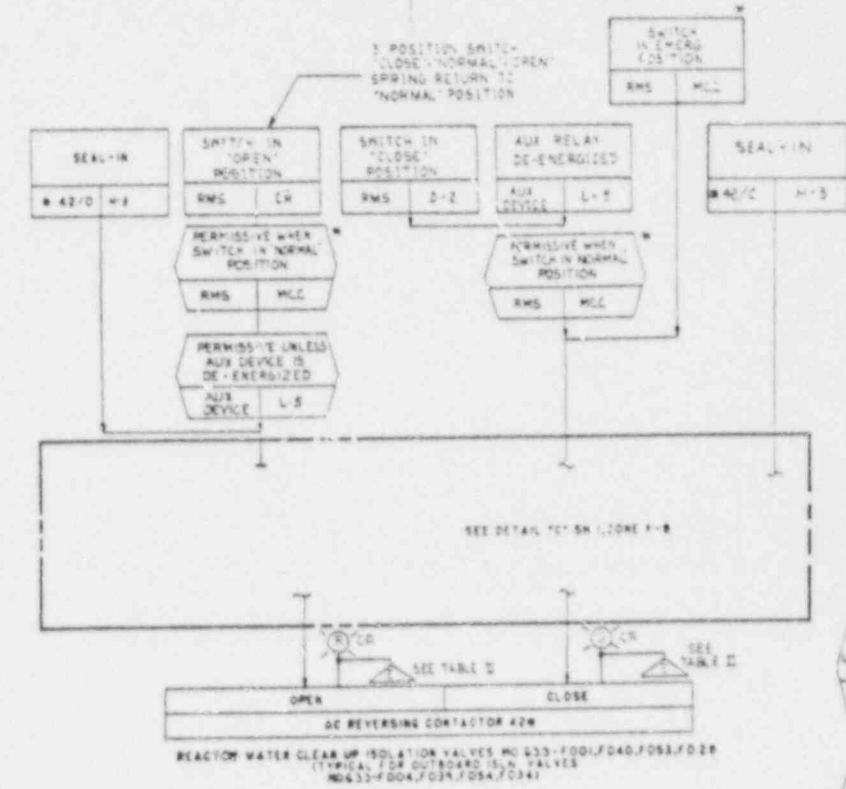
PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

Nuclear Boiler System Functional
Control Diagram

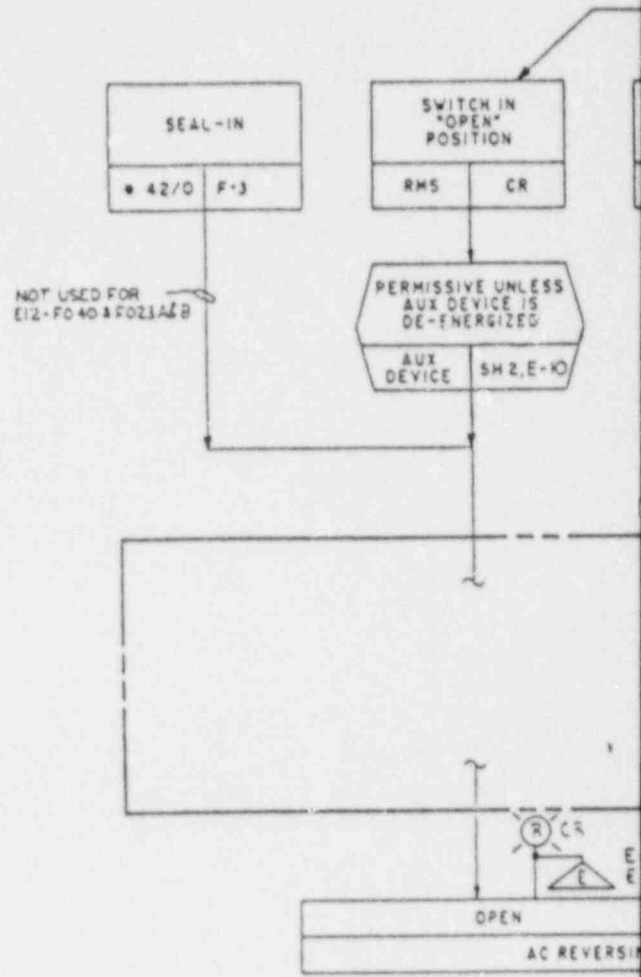
Figure 7.3-3 (Sheet 1 of 7)

TABLE II - IRIS SIGNALS
 REACTOR WATER CLEANUP ISLN VALVES

VALVE	OPEN	CLOSE
G33F001	G33FC01	G33FC03
G33F040	G33FC04	G33FC06
G33F003	G33FC08	G33FC09
G33F004	G33FC04	G33FC05
G33F004	G33FC04	G33FC06
G33F009	G33FC06	G33FC07
G33F014	G33FC04	G33FC01
G33F034	G33FC06	G33FC07

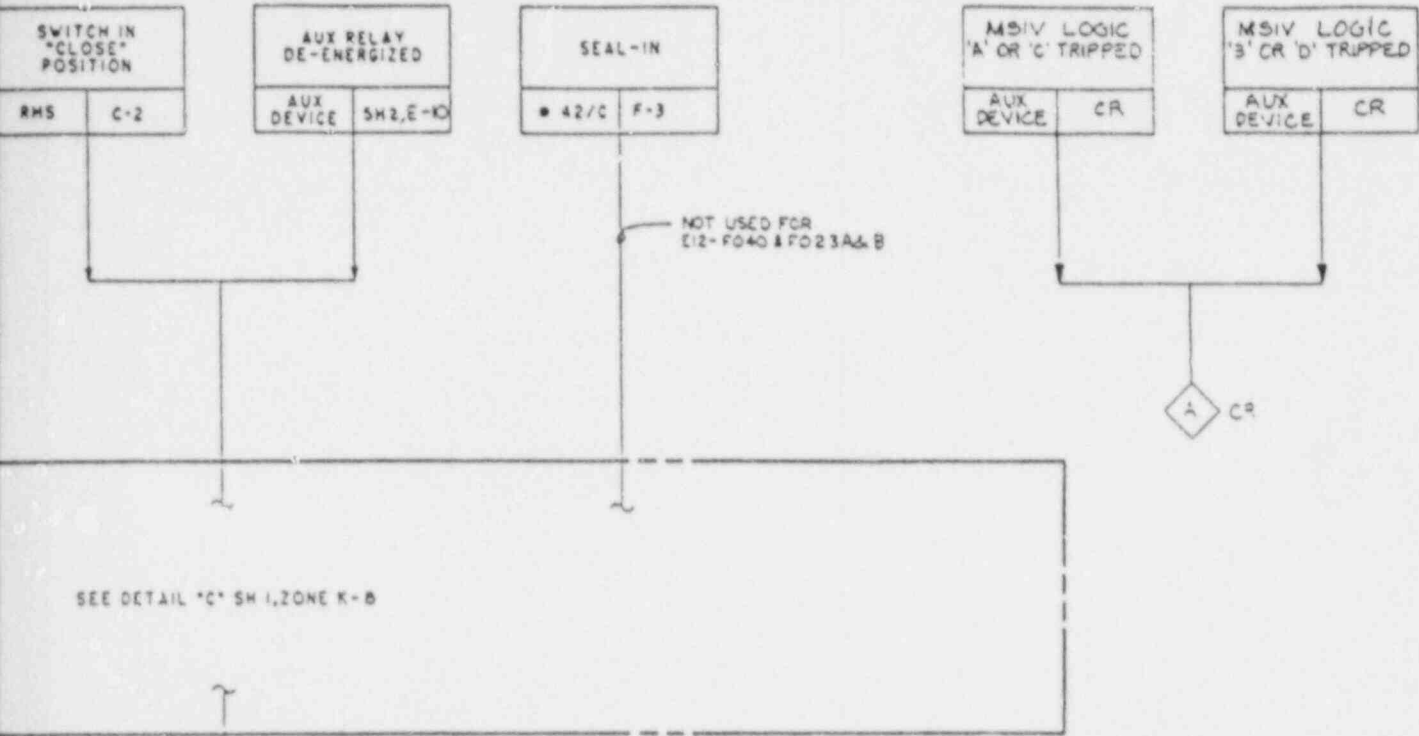


INBOARD PIVOT ISOLATION VALVE (G33-F001, F003, F040, F053)
 OUTBOARD VALVES (G33-F004, F009, F034, F039, F054)
 INBOARD DIVISION 1
 (TYPICAL FOR OUTBOARD VALVES)
 OR NOTE 5 (RWR) IN B



INBOARD "DIVISION 2" RHR SUCTION & RAD
 (TYPICAL FOR OUTBOARD "DIVISION 1" RHR
 ISOLATION VALVES)

3 POSITION SWITCH
 "CLOSE" "NORMAL" "OPEN"
 SPRING RETURN TO
 "NORMAL" POSITION



NOT USED FOR
 E12-F040 & F023A&B

SEE DETAIL "C" SH 1, ZONE K-B




CONTACTOR 42*

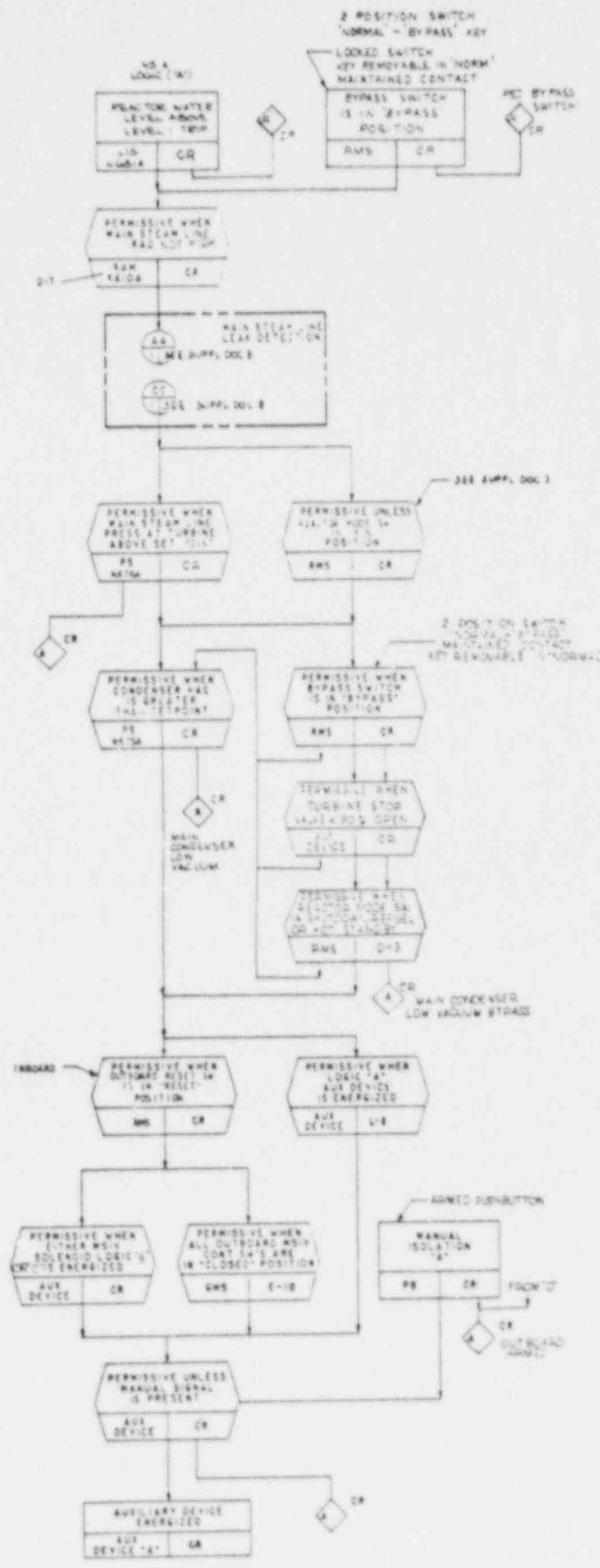
WASTE DISCHARGE ISLN VALVES MOE12-F009 (15), F049,
 RHR SUCTION, RADWASTE DISCHARGE & HEAD SPRAY
 MOE12-F008 (15), F040 (15) & F023 (15)

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	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	Nuclear Boiler System Functional Control Diagram Figure 7.3-3 (Sheet 3 of 7)



MAIN STEAM LINE ISOLATION LOGIC (A)
 TYPICAL FOR LOGS B, C & D EXCEPT FOR
 LETTERS SUFFIXES WHICH SHALL BE B, C
 & D RESPECTIVELY (SEE NOTE 3)

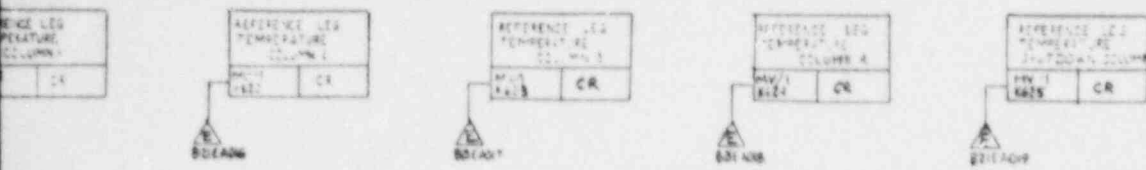
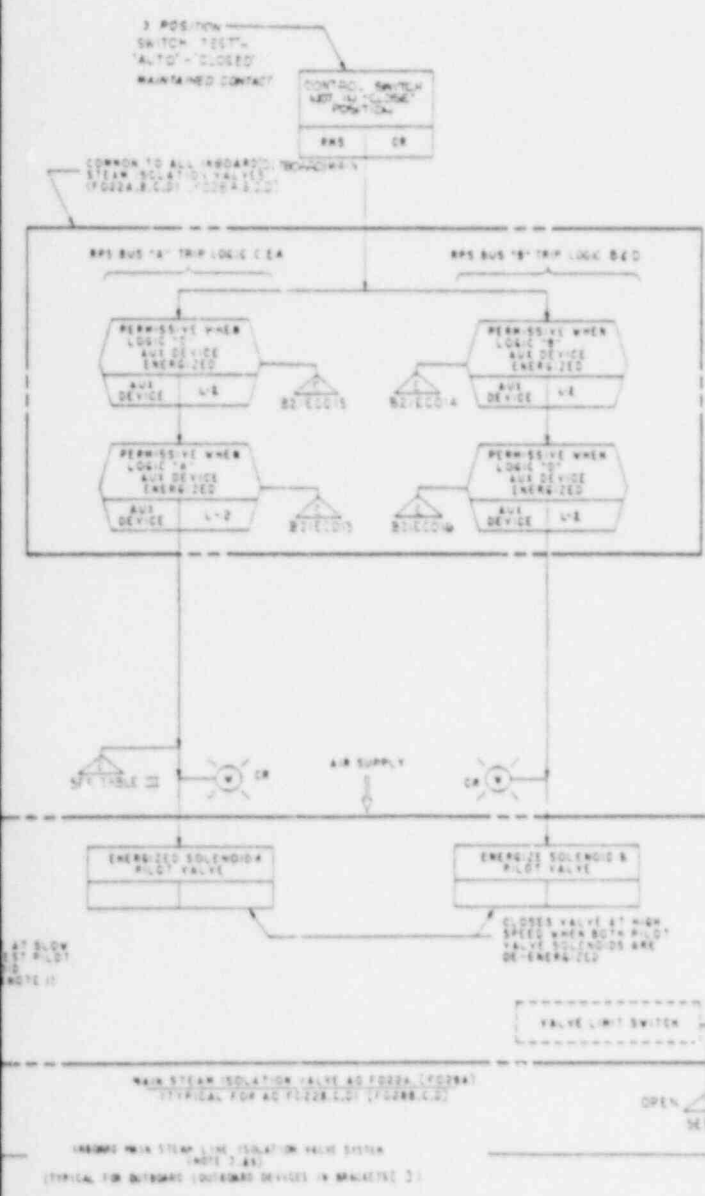


TABLE III - TRIP LOGIC


TRIP	TRIP LOGIC	TRIP LOGIC	TRIP LOGIC	TRIP LOGIC
TRIP 1	B1-70014	B1-70017	B1-70015	B1-70016
	B1-70019	B1-70020	B1-70018	B1-70014
	B1-70021	B1-70016	B1-70017	B1-70017
	B1-70022	B1-70016	B1-70017	B1-70016
TRIP 2	B1-70014	B1-70017	B1-70015	B1-70016
	B1-70019	B1-70020	B1-70018	B1-70014
	B1-70021	B1-70016	B1-70017	B1-70017
	B1-70022	B1-70016	B1-70017	B1-70016



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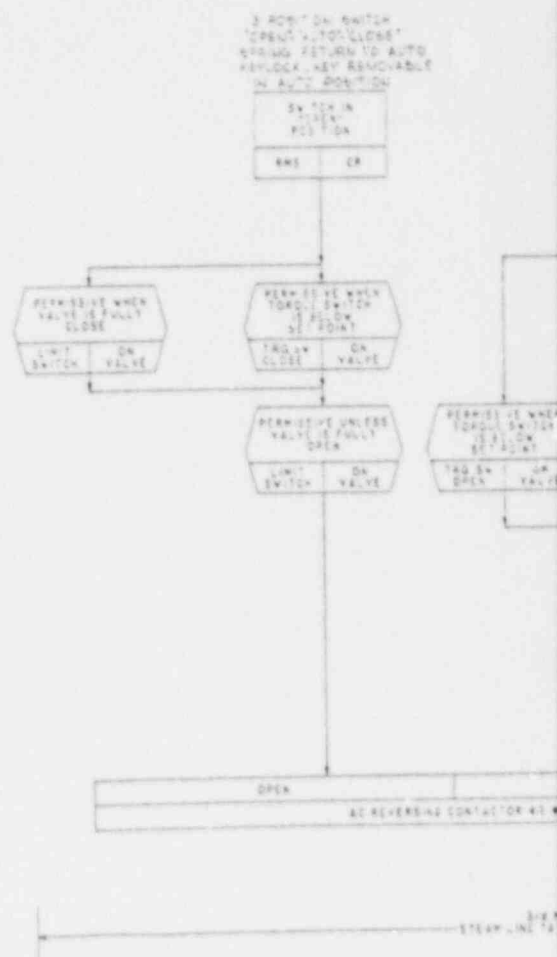
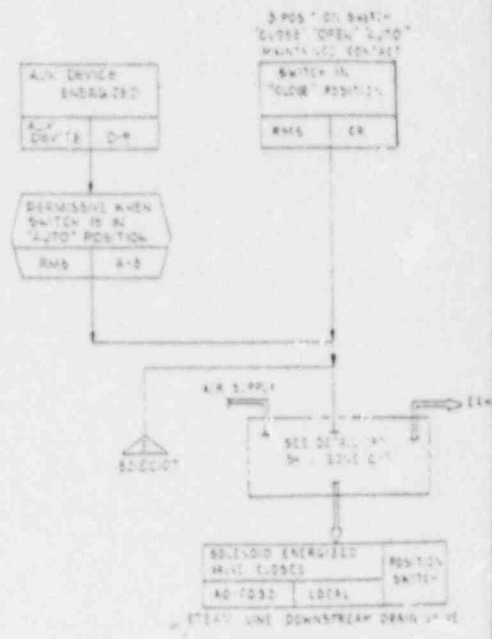
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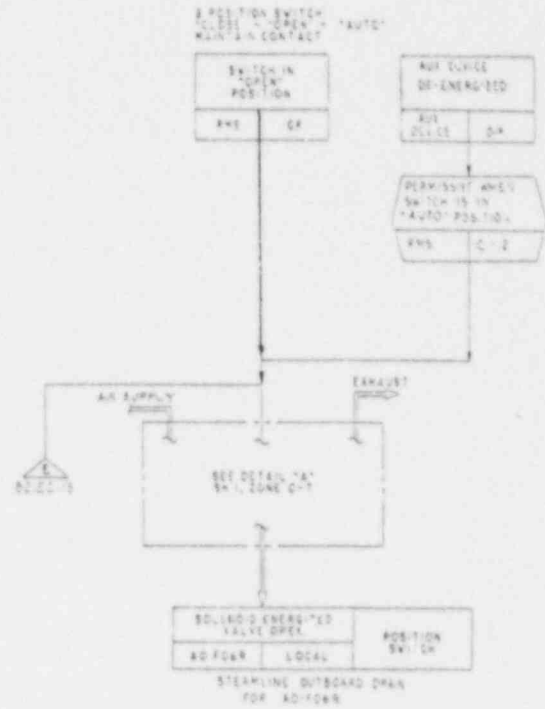
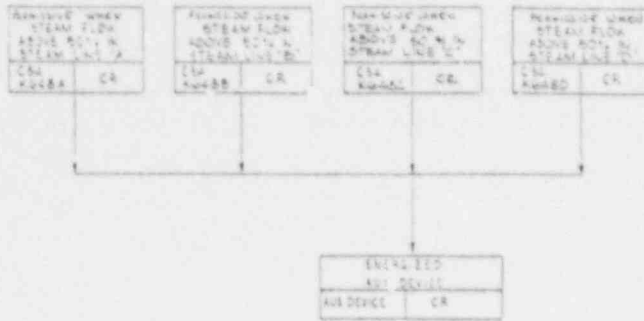
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

Nuclear Boiler System Functional Control Diagram
Figure 7.3-3 (Sheet 4 of 7)

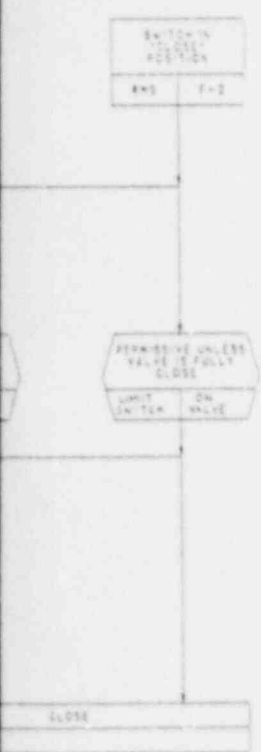




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INSTEAD LINE SHUTOFF VALVE TO AD FOUR
FOR STEAM LINE B, C & D SUPPLY & WILL
BE ADJUSTED AS NECESSARY.

	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
Nuclear Boiler System Functional Control Diagram Figure 7.3-3 (Sheet 5 of 7)	

ALL LOGIC (THIS SHEET) SHALL BE ENERGIZED TO ACTIVATE

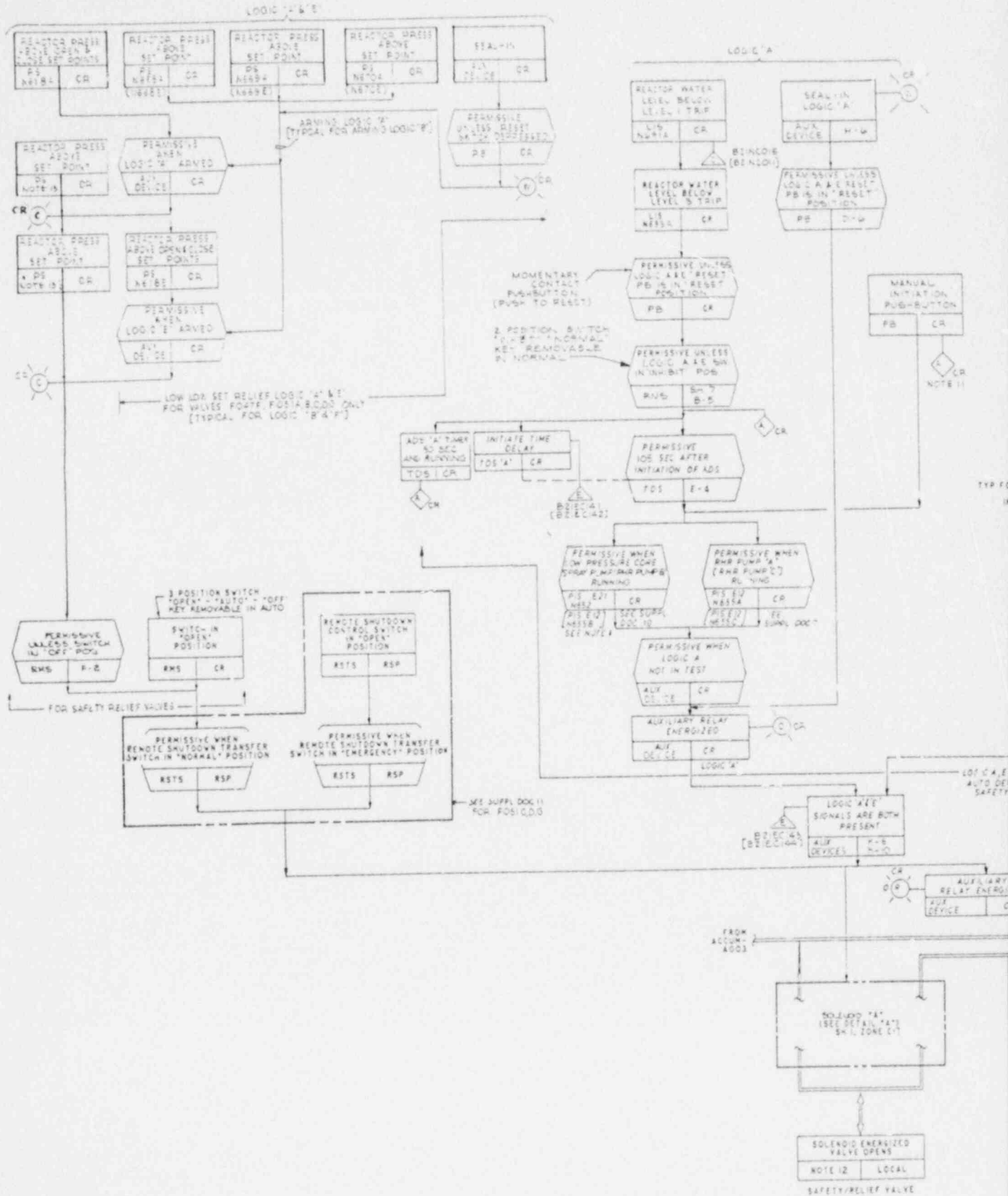
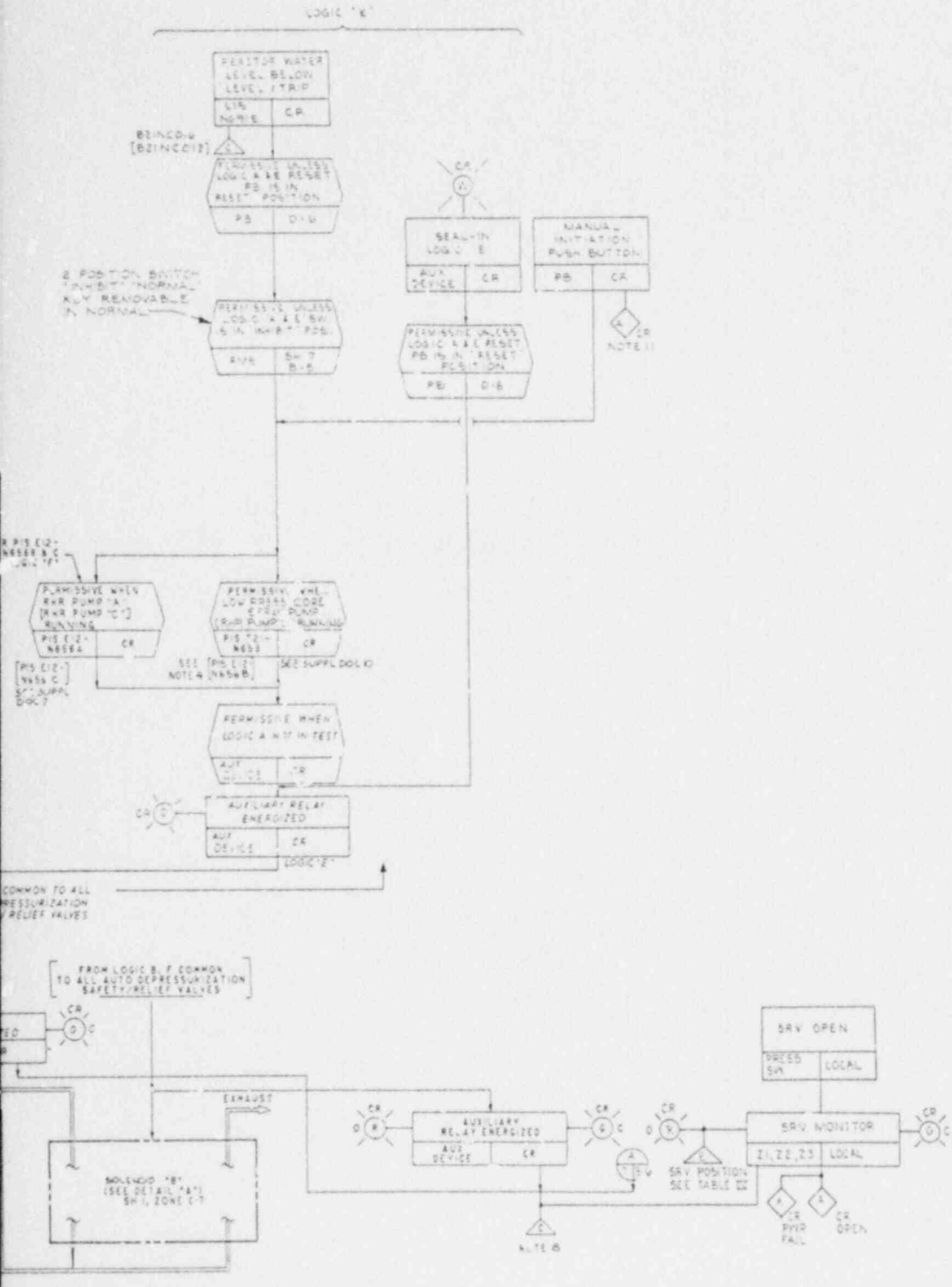


TABLE IV - ERIS SIGNAL
AUTO DEPRESSURIZATION

SRV NO.	INITIATION	POSITION
FO41A	B21EC021	B21EC042
FO41B	B21EC022	B21EC043
FO41C	B21EC023	B21EC044
FO41D	B21EC024	B21EC045
FO41E	B21EC025	B21EC046
FO41F	B21EC026	B21EC047
FO41G	B21EC027	B21EC048
FO41H	B21EC028	B21EC049
FO41I	B21EC029	B21EC050
FO41J	B21EC030	B21EC051
FO41K	B21EC031	B21EC052
FO41L	B21EC032	B21EC053
FO41M	B21EC033	B21EC054
FO41N	B21EC034	B21EC055
FO51A	B21EC035	B21EC056
FO51B	B21EC036	B21EC057
FO51C	B21EC037	B21EC058
FO51D	B21EC038	B21EC059
FO51E	B21EC039	B21EC060

ERIS UN I POWER LOGIC A & E
DIVISION I POWER LOGIC B & F
SEE REF 15




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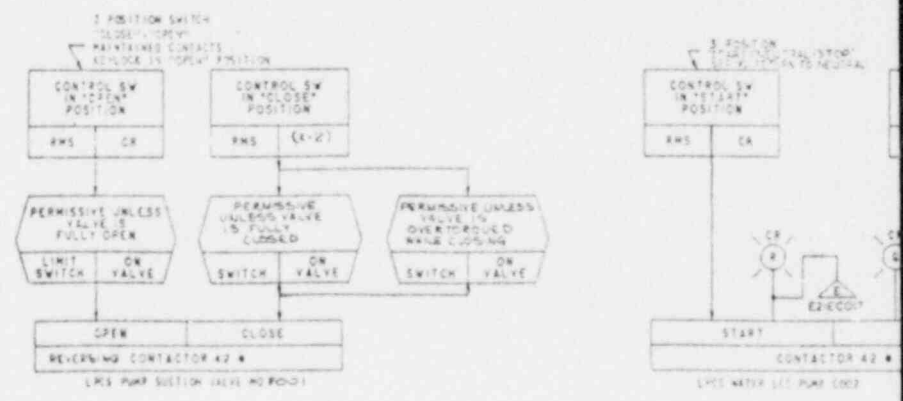
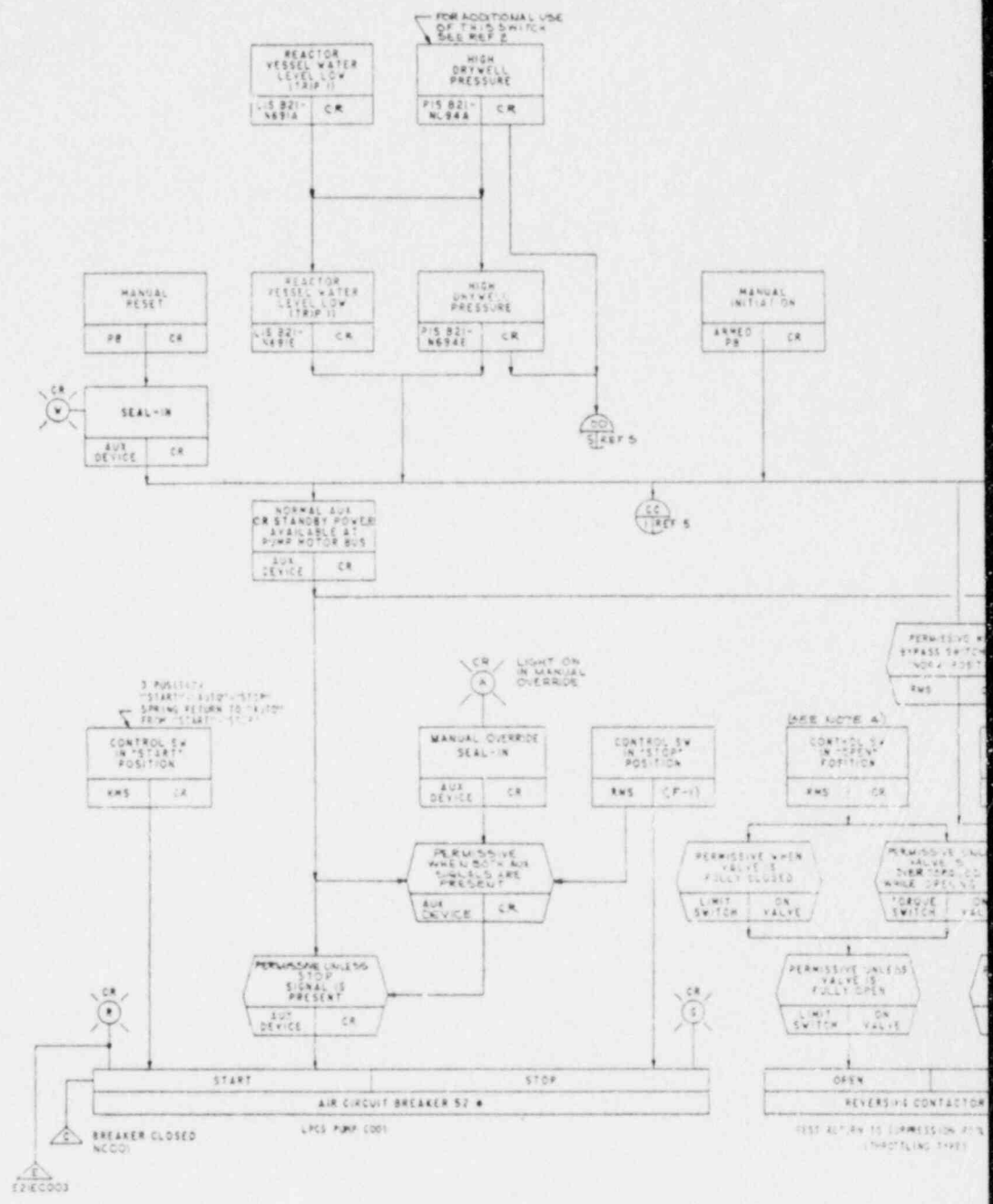
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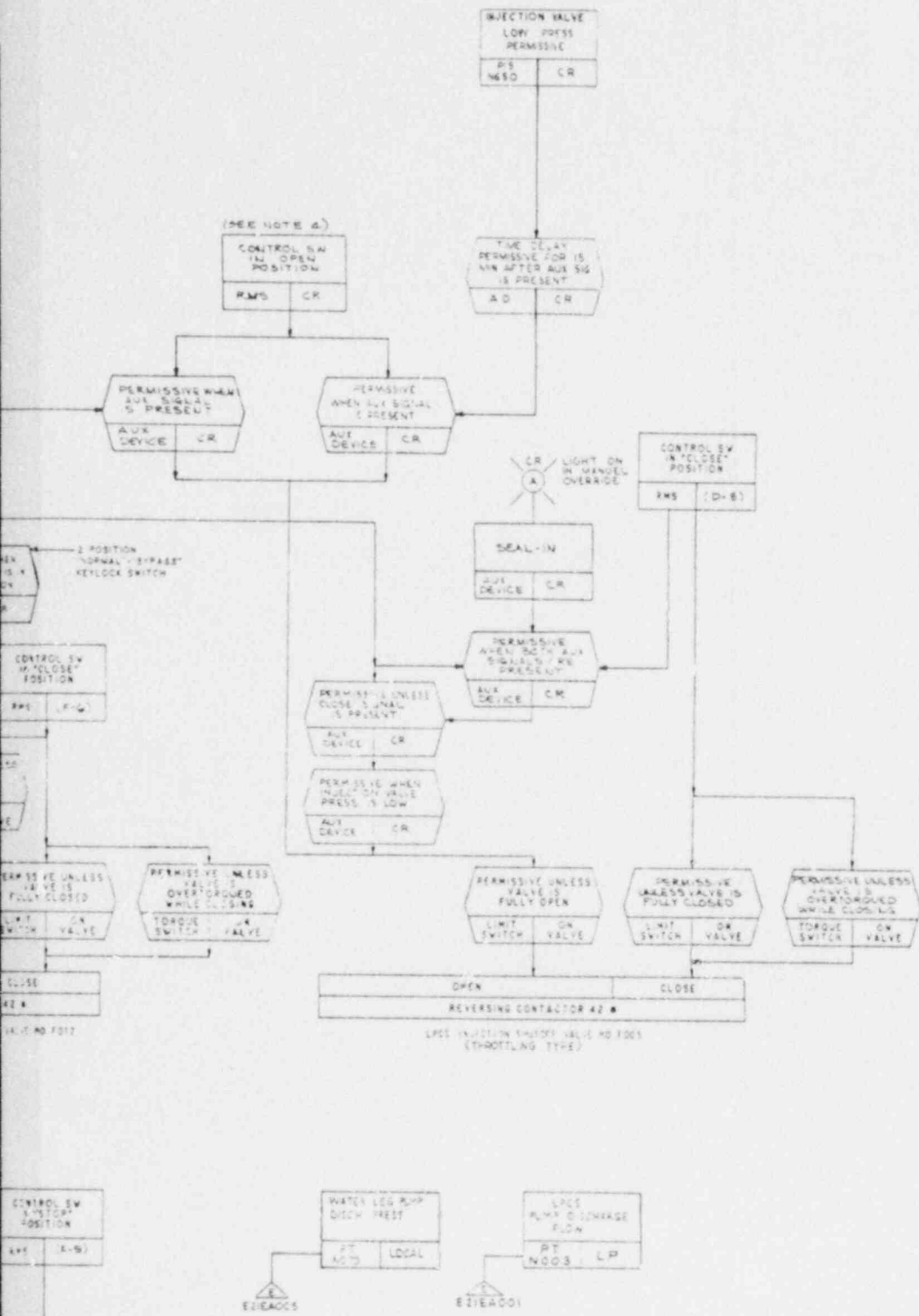
AUTO DEPRESSURIZATION SEE SUPPL. DOC. 1, TABLE 1 FOR ADS VALVES ASSIGNMENT LOGIC B & F SAME AS LOGIC A & E RESPECTIVELY EXCEPT FOR LETTER SUFFIXES OR AS NOTED



PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

Nuclear Boiler System Functional
Control Diagram
Figure 7.3-3 (Sheet 6 of 7)





NOTE

1. PUMP MOTOR SHALL BE PROTECTED WITH OVERLOAD PROTECTION. PROTECTIVE RELAYS ARE TO BE APPLIED TO ALL TO MAIN AIR POWER TO THE MOTOR AS LONG AS POSSIBLE TO AVOID IMMEDIATE DAMAGE TO EMERGENCY SYSTEM.
2. VALVE MOTORS ARE TO BE PROVIDED WITH SHORT-CIRCUIT CURRENT PROTECTIVE TRIPS.
3. FOR ADDITIONAL PROCESS INSTRUMENTATION NOT SHOWN SEE REF. 1.
4. UNLESS OTHERWISE NOTED, ALL RMS SHALL BE IN POSITION SAFTONES "CLOSE" OR "OPEN" SPRING RETURN TO "AUTO" FROM "CLOSE" OR "OPEN".
5. CONTROL AND PROTECTIVE POWER FOR LPCS SHALL BE FROM SAME SOURCE AS THE PWR LOOP "A" EQUIPMENT/RELAY, E.
6. THE LPCS SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH IEEE 299-1977 AND IEC 7.

REFERENCE DOCUMENTS

- | REFERENCE DOCUMENTS | REV. (ITEM NO.) |
|---|-----------------|
| 1. LOW PRESSURE (LPC) SYSTEM FIELD | 031-1010 |
| 2. PRESSURE (LPC) SYSTEM FCD | 031-1010 |
| 3. NUCLEAR POWER SYSTEM FCD | 021-1010 |
| 4. RESIDUAL HEAT REMOVAL SYSTEM FCD | 012-1030 |
| 5. RESIDUAL HEAT REMOVAL SYSTEM FCD | 012-1030 |
| 6. NUCLEAR BOILER SYS FCD | 021-1030 |
| 7. ELECTRICAL EQUIPMENT SEPARATION FOR SAFEGUARD SYSTEM | 061-4050 |
| 8. LEAK DETECTION SYS (LEDS) | 031-1040 |
| 9. EMS ELEMENTARY DIAGRAM | 035-1050 |

LEGEND

- = SAFTONER DEVICE (FUNCTION NO. ANSI 115C, 031C)
- IEEE = INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
- E = EMERGENCY RESPONSE INFORMATION SYSTEM

MPL NO. 021-1030

"NUCLEAR SAFETY RELATED"

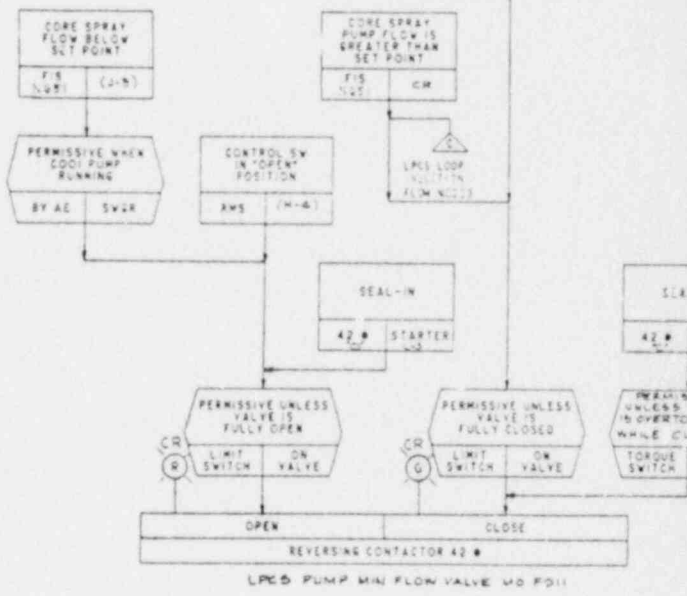
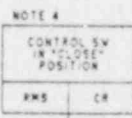
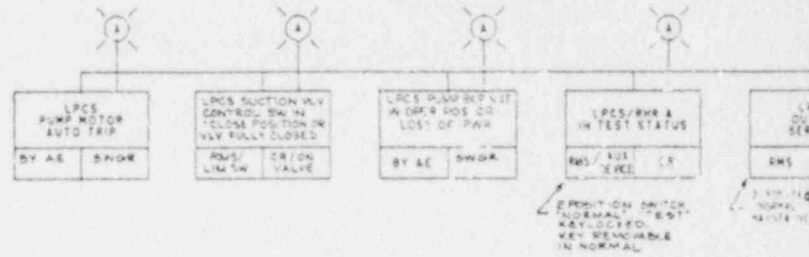
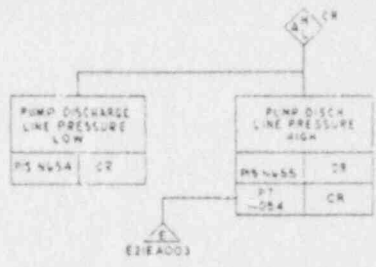
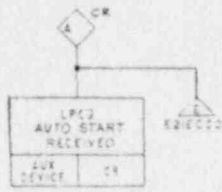
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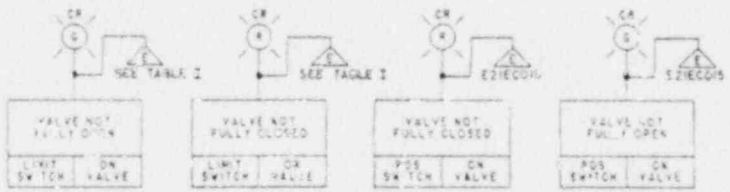
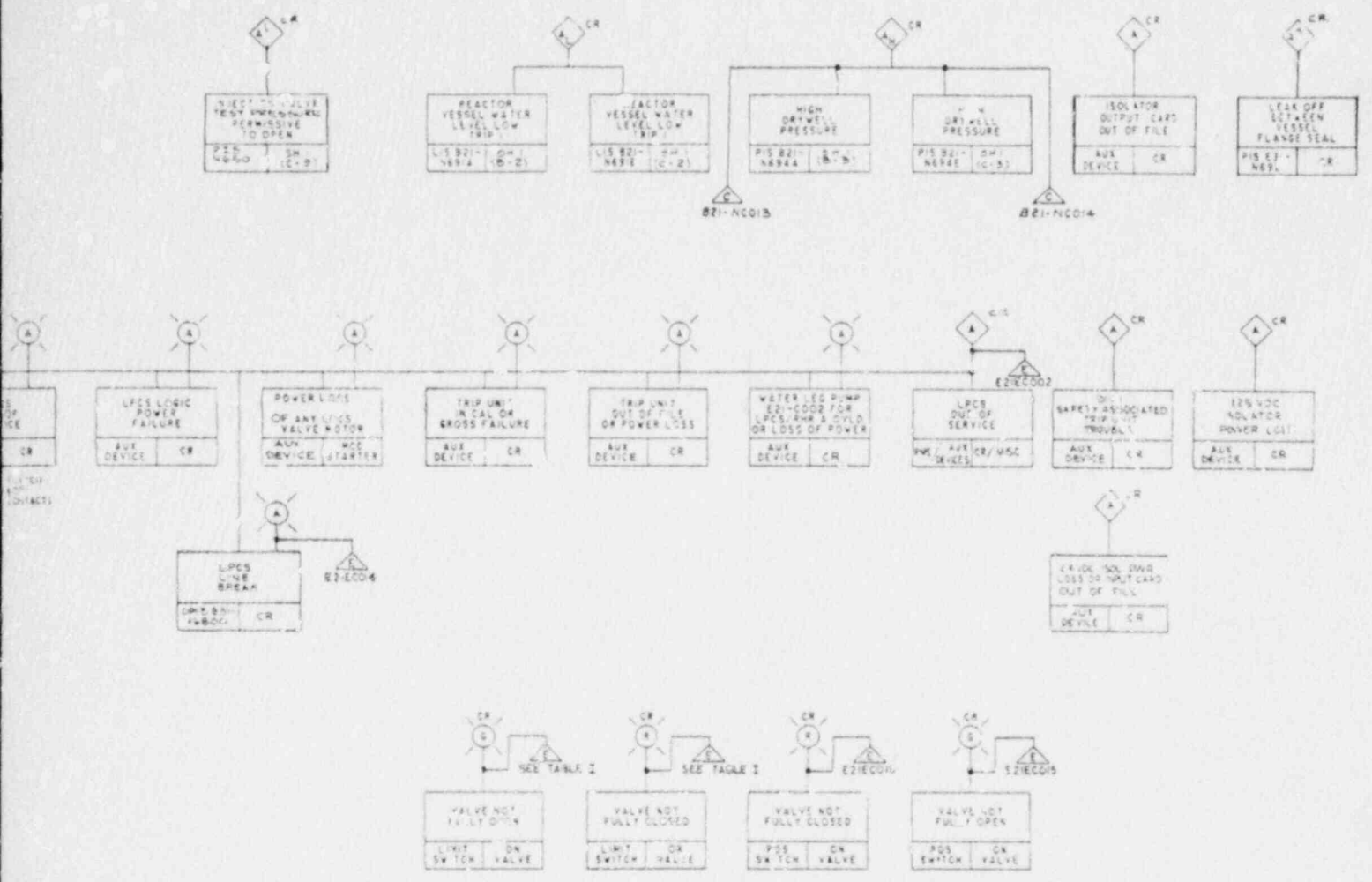
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

LPCS System Functional
Control Diagram

Figure 7.3-4 (Sheet 1 of 2)





TYPICAL FOR NO. 1 & 2 VALVES

MANUAL OPERATION VALVES

TABLE I
ERIS SIGNALS

VALVE	OPEN	CLOSE
F005	E2IEC004	E2IEC005
F006	E2IEC006	E2IEC007
F001	E2IEC008	E2IEC009
F011	E2IEC010	E2IEC011
F012	E2IEC012	E2IEC013

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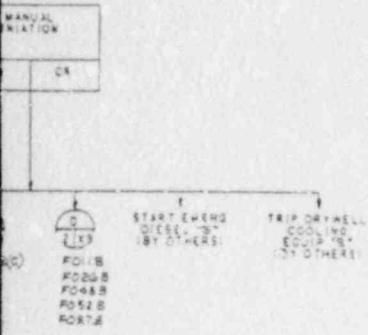
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THE CLEVELAND ELECTRIC
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LPCS System Functional
Control Diagram

Figure 7.3-4 (Sheet 2 of 2)



NOTES:

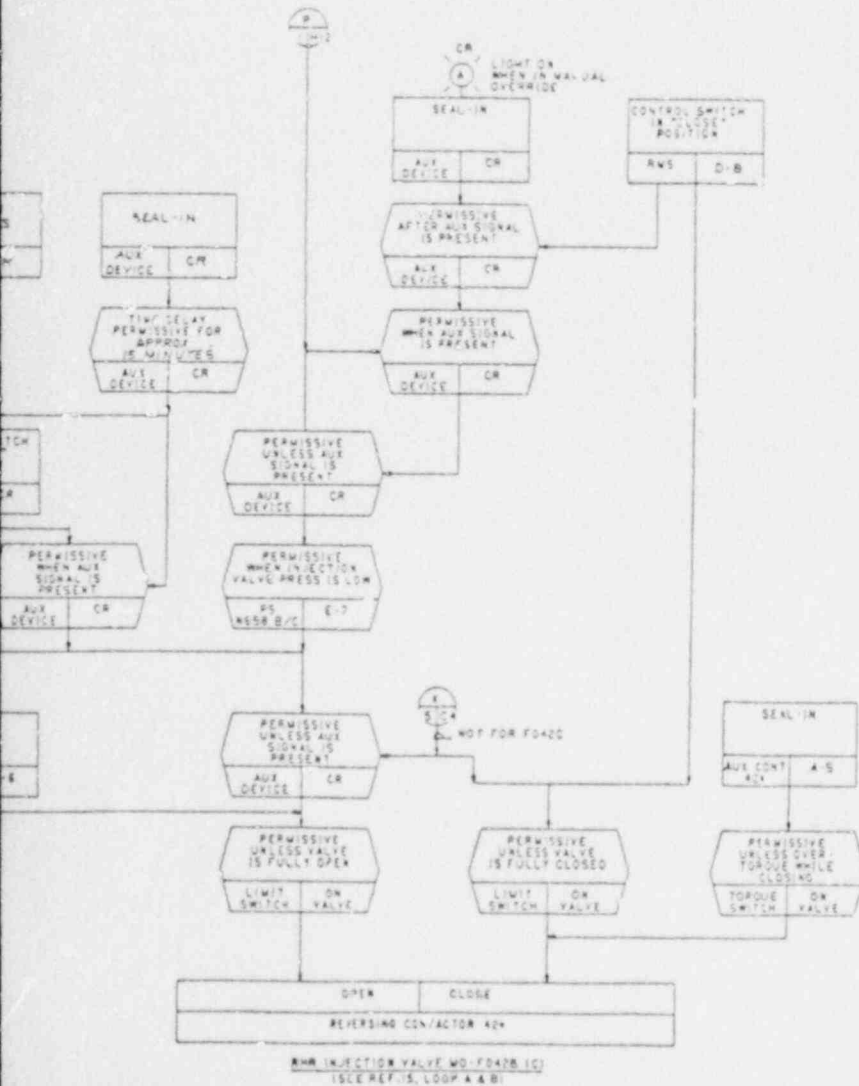
1. RHR LOOPS TO 1 TO LOGIC AND EQUIPMENT ARE SHOWN. RHR LOGIC IS IDENTICAL TO 70 EXCEPT LOGIC MOTIVE POWER SHALL BE FROM THE SAME SOURCE AS THE LOGIC SYS-2W. REF 71, AND AS NOTED.
2. PUMP MOTORS SHALL BE PROTECTED WITH OVERLOAD PROTECTION. PROTECTIVE RELAYS ARE TO BE APPLIED SO AS TO MAINTAIN POWER ON THE MOTOR AS LONG AS POSSIBLE WITHOUT IMMEDIATE DAMAGE TO EMERGENCY POWER SYSTEM.
3. VALVE MOTORS ARE TO BE PROVIDED WITH LOSS OF POWER ANNUNCIATION.
4. UNLESS OTHERWISE NOTED, ALL RWS SHALL BE 3 POSITION SWITCHES "CLOSE", "AUTO", "OPEN", SPRING RETURN TO "AUTO" FROM "CLOSE" "OPEN".
5. THE RHR SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH PROPOSED CRITERIA FOR NUCLEAR POWER PLANT PROTECTION SYSTEMS (CEC 279) AS APPLICABLE TO THE CONTROL CIRCUITRY.
6. THE RHR SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH REF. 11.
7. A.C. MOTOR OPERATED VALVES SHALL BE OPERATED FROM 480 OR CONTROL CENTERS HAVING GROUNDED CONTROL TRANSFORMERS.
8. UNLESS OTHERWISE NOTED ALL INSTRUMENT NUMBERS ARE PREFIXED BY E12.

REFERENCE DOCUMENTS:

1. E31-1030 LEAK DETECTION SYSTEM FCD
2. B21-1010 NUCLEAR BOILER SYSTEM PAID
3. B21-1030 NUCLEAR BOILER SYSTEM FCD
4. E51-1010 REAC CORE ISLN CLG SYSTEM PAID
5. E51-1070 REAC CORE ISLN CLG SYSTEM FCD
6. E21-1010 LOW PRESS. CORE SPRAY SYS PAID
7. E21-1030 LOW PRESS. CORE SPRAY SYS FCD
8. E31-1010 LEAK DETECTION SYSTEM FCD
9. E13-1010 REACTOR RECIRCULATION SYS PAID
10. B33-1030 REACTOR RECIRCULATION SYS FCD
11. 467-4050 ELECTRICAL EQUIPMENT SEPARATION FOR PROTECTION SYSTEMS.
12. 442-1030 LOGIC SYMBOLS
13. 023-1050 CONTAINMENT ATM WOH SYS
14. C95-1050 ERIS ELEMENTRY DIAGRAM
15. 051-1030 REMOTE SHUTDOWN SYSTEM FCD

LEGEND:

EMERGENCY RESPONSE INFORMATION SYSTEM



T1 APERTURE CARD

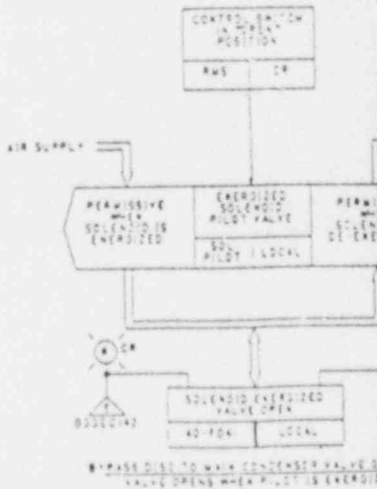
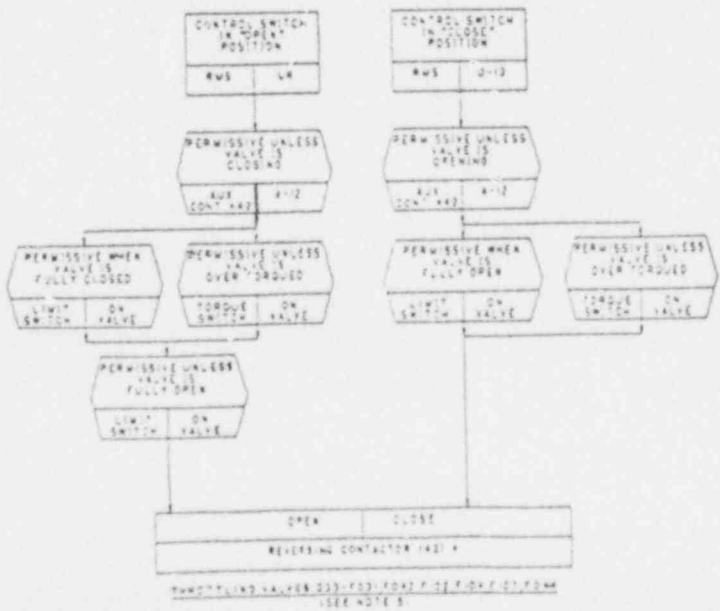
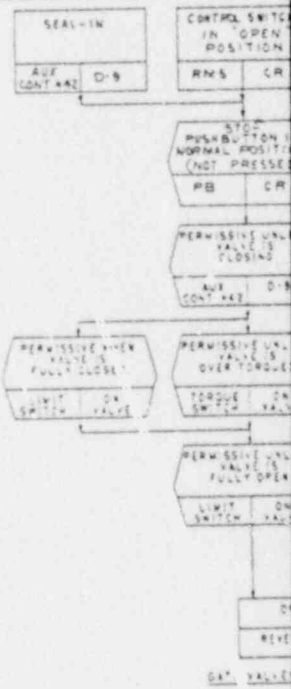
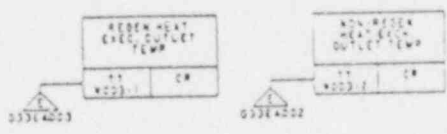
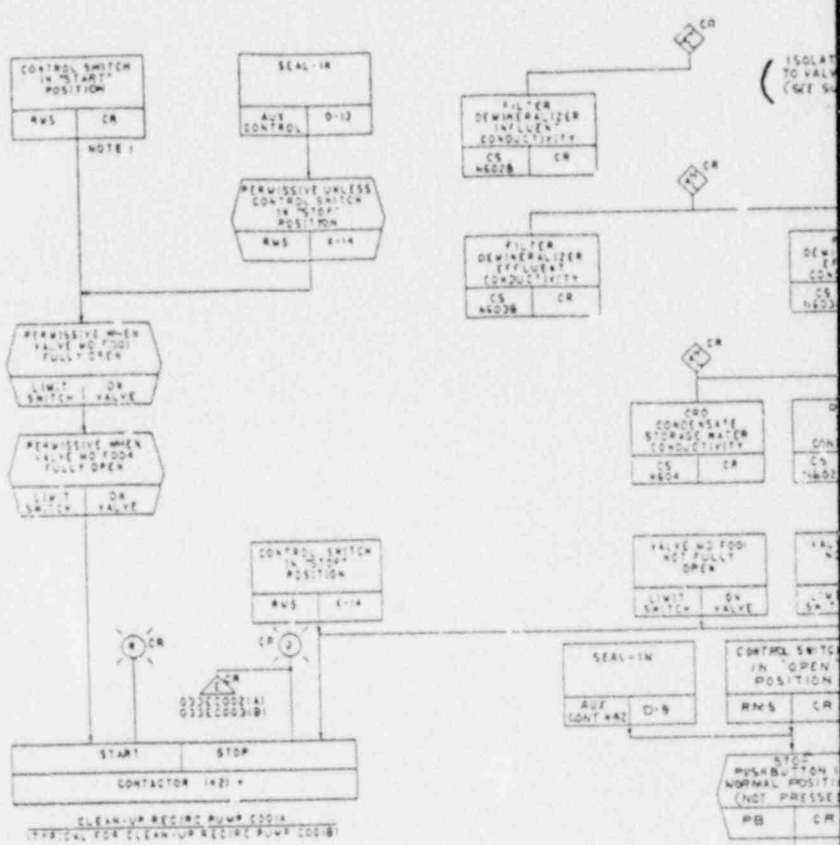
Also Available On Aperture Card

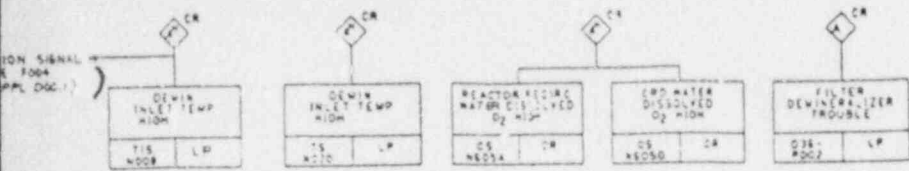
8806010243-17

MPL NO: E12-1030

PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

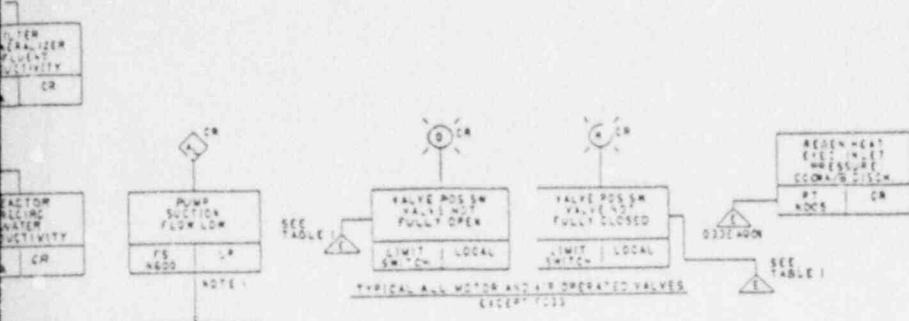
RHR System Functional
Control Diagram
Figure 7.3-5 (Sheet 1 of 5)



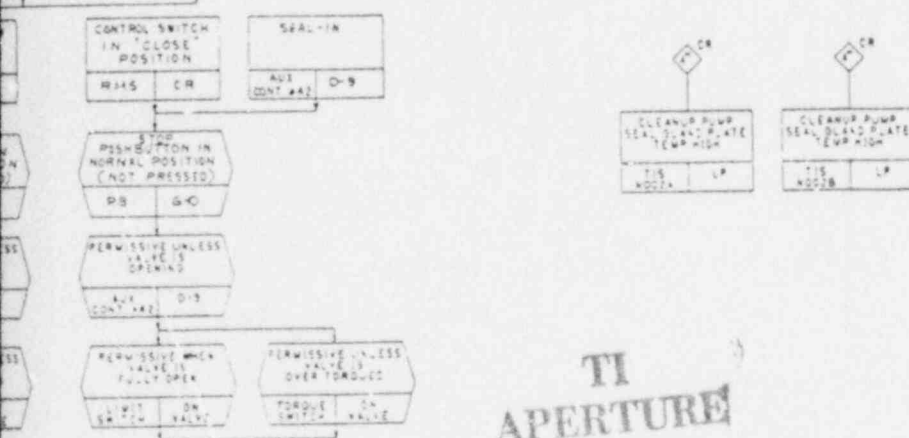


NOTES:

1. INTERLOCK PUMP START-UP CIRCUIT WITH PUMP SUCTION LOW FLOW SWITCH TO PREVENT PUMP TO BE STARTED. PUMP IS TO RUN OFF AFTER START IF FLOW IS NOT ESTABLISHED AFTER A TIME DELAY.
2. EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NO. 833 UNLESS NOTED.
3. ALL PUMP MOTORS SHALL HAVE THERMAL OVERLOAD TRIP.
4. FOR REACTOR WATER CLEAN-UP ISOLATION VALVES AND CONTROL LOGIC SEE SUPPL DOC 1.
5. ALL MOTOR OPERATED GATE VALVES REQUIRE SEAL-IN MOTOR OPERATED GLOBE TYPE VALVES DO NOT REQUIRE SEAL-IN.
6. DELETE



- SUPPLEMENTAL DOCUMENTS:**
 UNDER THE FOLLOWING IDENTITIES ARE TO BE USED IN CONJUNCTION WITH THIS DRAWING.
- MR. ITEM NO.**
1. 82-1030 NUCLEAR BOILER SYSTEM FCO
 2. 855-1050 ERIS ELEM DIAG (85A)
 3. DELETE



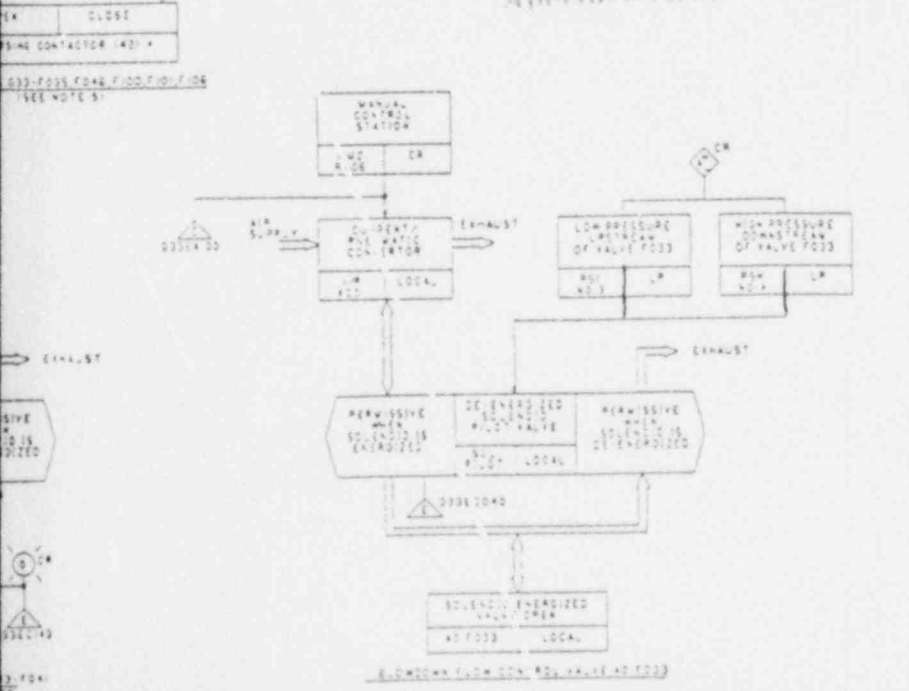
- LEGEND:**
- * SWITCH/GEAR DEVICE FUNCTION NUMBERS ANSI SPEC C57.2
 - ▲ ERIS COMPUTER INPUT

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Also Available On Aperture Card

TABLE I

VALVE IDENT	ERIS SIGNAL	
	OPEN	CLOSE
F031	033EC026	033EC027
F035	033EC020	033EC021
F046	033EC014	033EC028
F044	033EC028	033EC029
F100	033EC030	033EC031
F101	033EC032	033EC033
F102	033EC034	033EC035
F106	033EC036	033EC037
F107	033EC038	033EC039



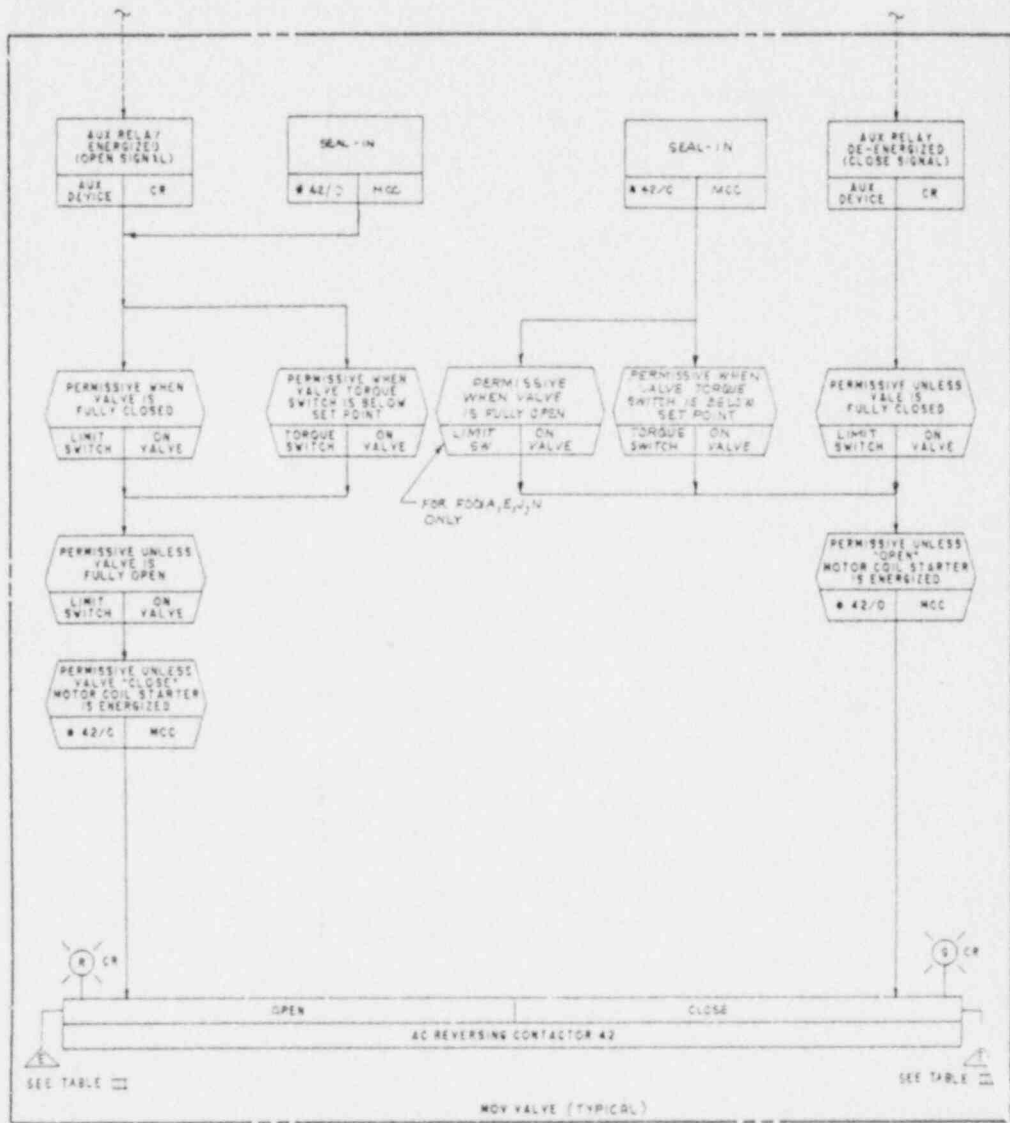
MPL NO: G33-1020

8806010243-18

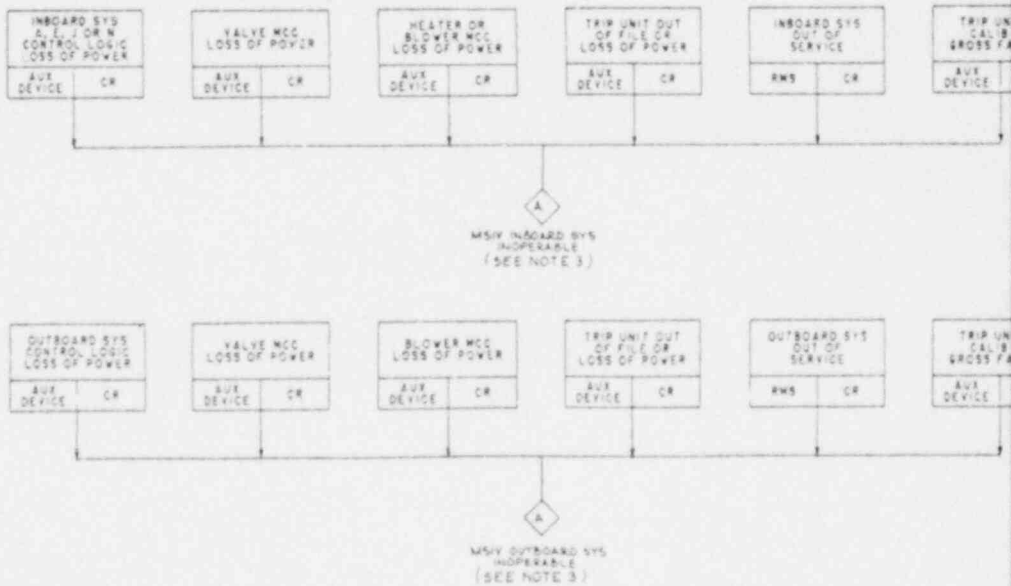
PERRY NUCLEAR POWER PLANT
 THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

RWCU System Functional Control Diagram

Figure 7.3-6



DETAIL I

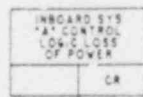
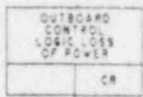


NOTES:

1. POWER SUPPLY FOR ALL EQUIPMENT IN THIS SYSTEM TO BE "AC EMERGENCY POWER".
2. ALL DEVICES ARE E32- UNLESS OTHERWISE SPECIFIED.
3. CR INDICATORS ALSO EXIST FOR INDIVIDUAL FUNCTIONS. (SEE SH-1 ZONE C-B AND C-1 AND SH-3 TABLE 1)

REFERENCE DOCUMENTS:

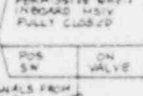
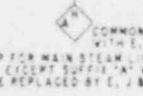
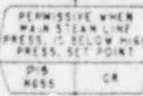
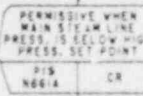
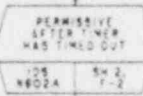
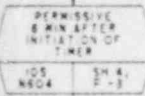
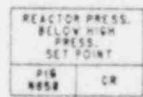
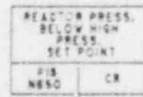
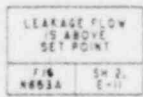
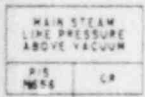
- MS-1115-00
- | | |
|-------------|--------------------------------------|
| 1. E32-1050 | MSIV LEAKAGE CONTROL FLW DIAG |
| 2. E42-1030 | LOGIC SYMBOLS |
| 3. E32-1010 | MSIV LEAKAGE CONTROL PSID |
| 4. E32-4010 | MSIV LEAKAGE CONTROL SYS DESIGN SPEC |
| 5. E42-1070 | HON & MCC STANDARDS |
| 6. E32-3050 | INSTRUMENT DATA SHEETS |
| 7. C30-050 | ERS ELEMENTARY DIAGRAM |



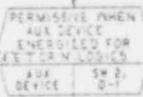
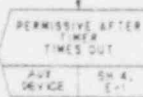
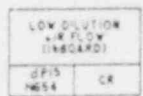
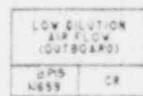
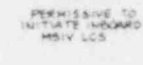
INBOARD MSIV-LCS INITIATED



ITTP FOR SYS E, J & N EXCEPT SUFFIX "A" WILL BE REPLACED BY SUFFIX E, J & N

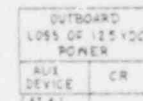
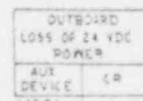
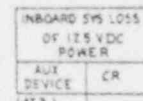
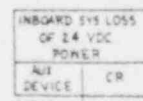


SIGNALS FROM LOGIC E, J & N REQUIRED



LEGEND:

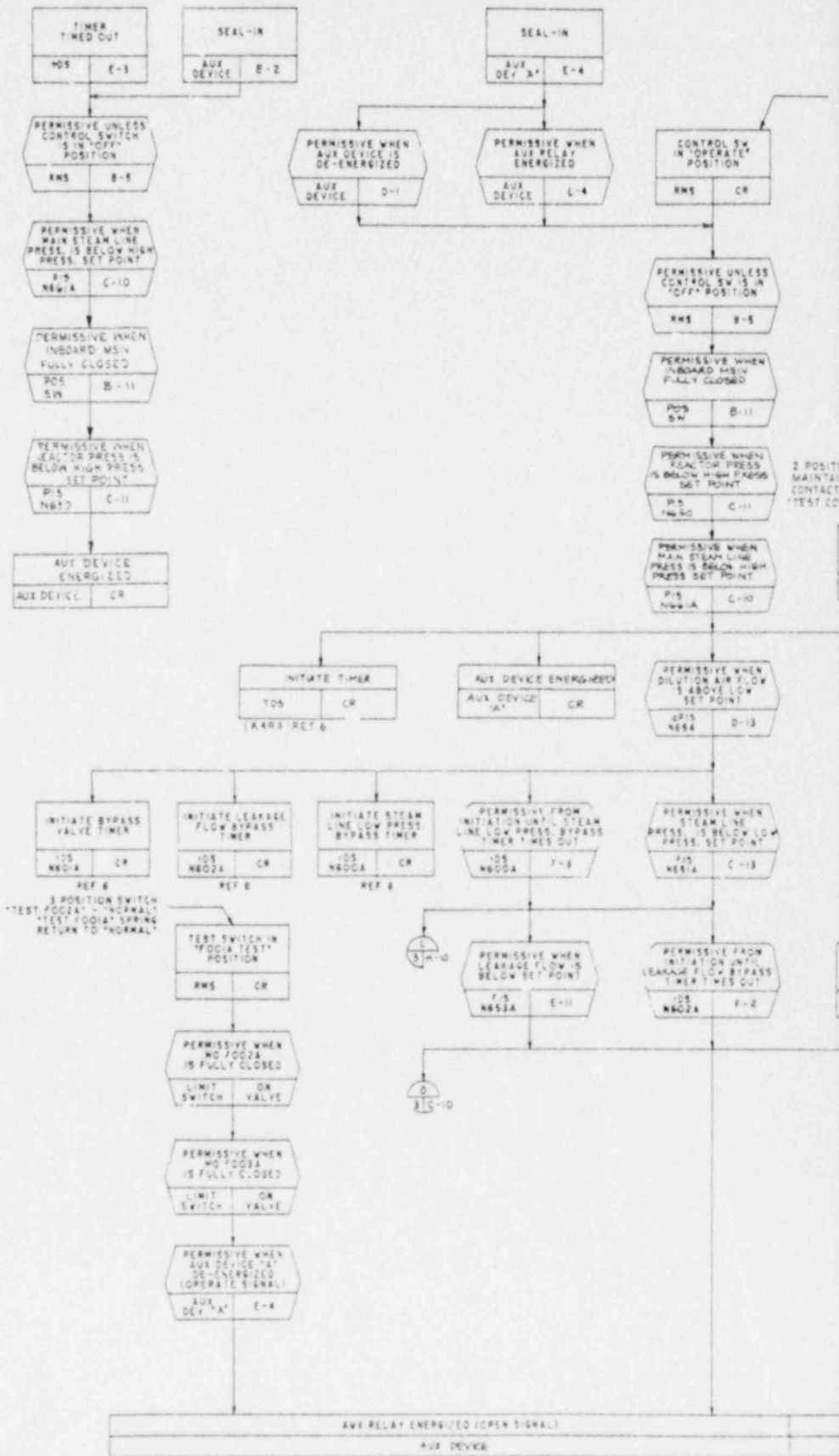
- SWITCHGEAR DEVICE B-5 ANSI SPEC C37.2
- MATCH LETTER
- ZONE
- SHEET NUMBER
- MATCH CIRCLE
- EMERGENCY RESPONSE INFORMATION SYSTEM



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	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	MSIV Leakage Control System Functional Control Diagram Figure 7.3-7 (Sheet 1 of 4)



SEE DETAIL 1 SH

INBOARD VALVE MO
 TYPICAL FOR VALVES NO FOGA, FOGI, B
 REPLACED WITH CORRESPONDING LETTER

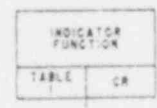
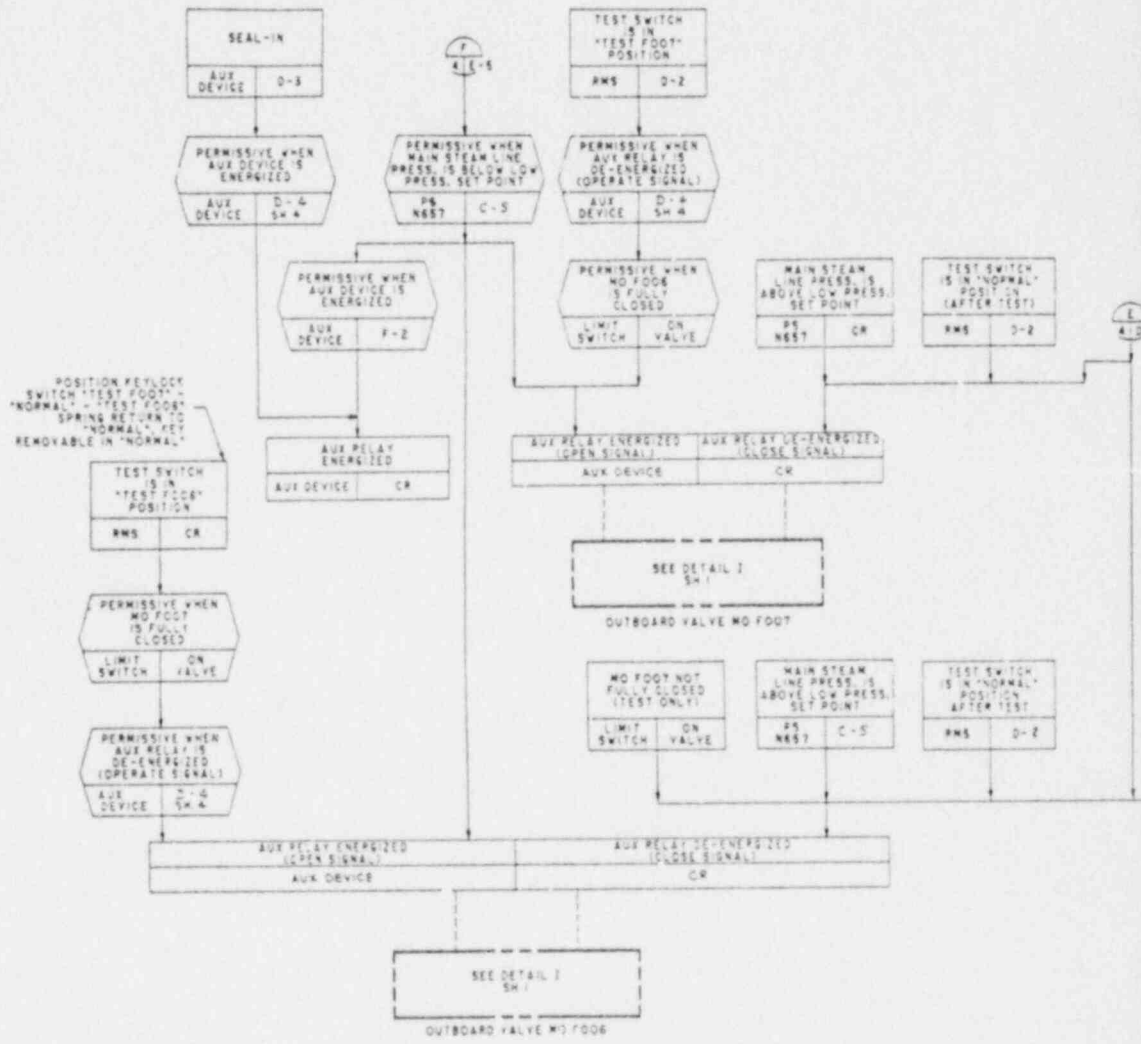
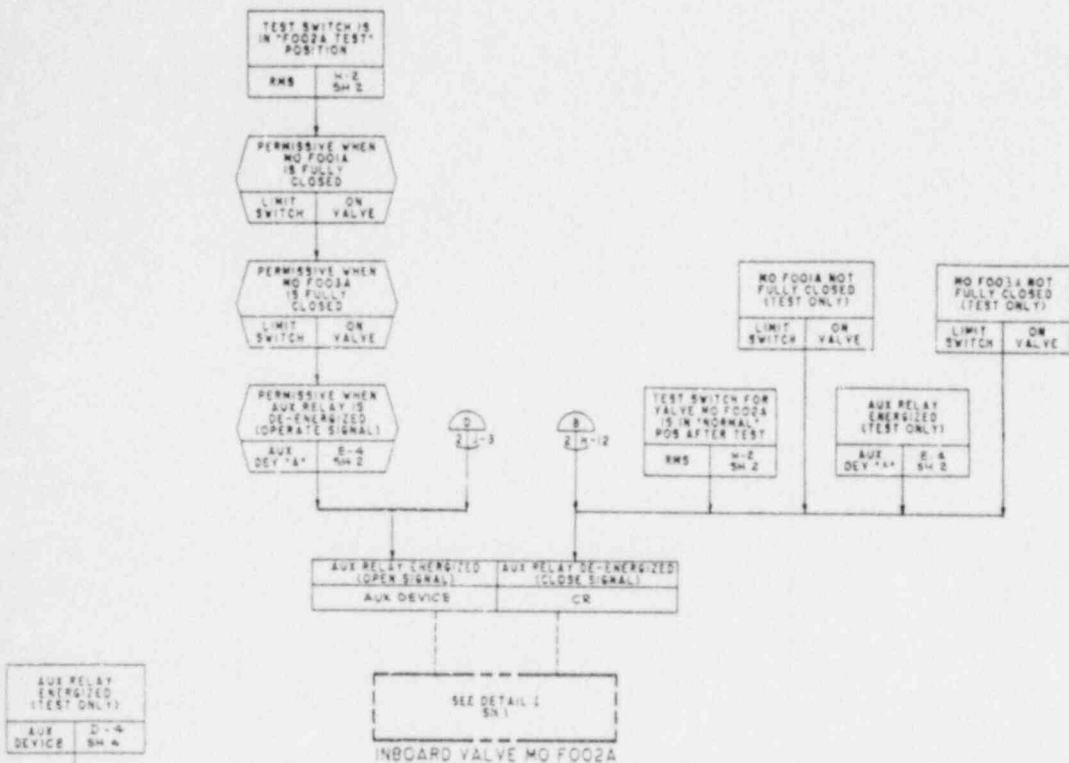


TABLE 1

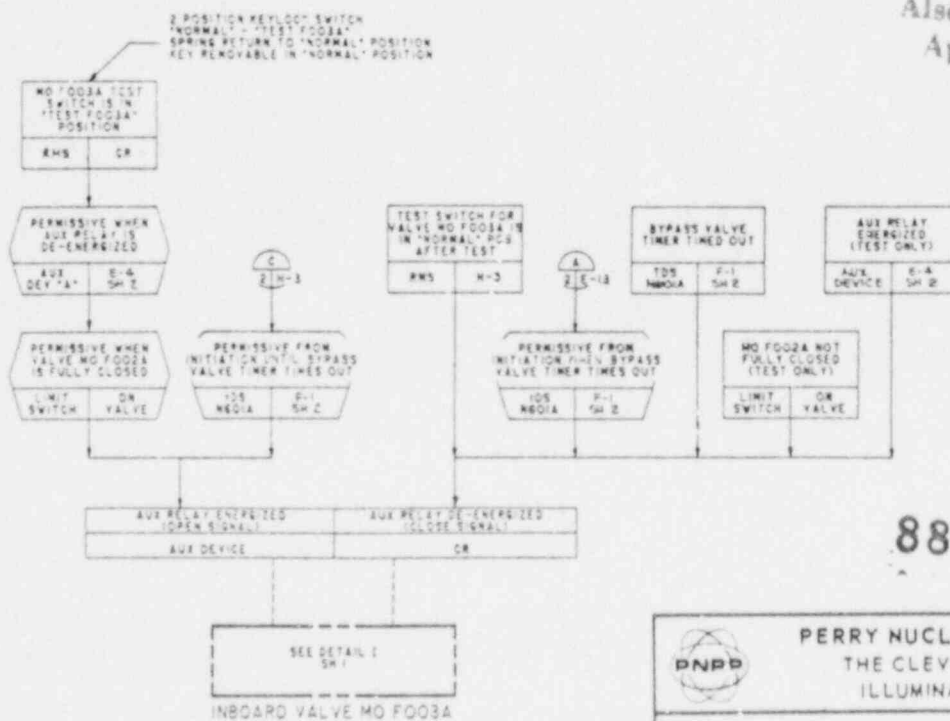
INDICATORS	TRIPPING DEVICE
1. INBOARD (OUTBOARD) TRIP UNIT IN O.A.B OR GROSS FAILURE	EXICE (VICE)
2. INBOARD (OUTBOARD) TRIP UNIT OUT OF FILE OR POWER FAILURE	AL (AU) (CS)
3. INBOARD (OUTBOARD) SYSTEM OUT OF SERVICE	AUX DEVICE TEST SWITCH (AUX DEVICE TEST SWITCH)
4. INBOARD (OUTBOARD) VALVE MCC LOSS OF POWER	MCC AUX DEVICE (MCC AUX DEVICE)
5. INBOARD (OUTBOARD) BLOWER MCC LOSS OF POWER OR OVERLOAD	MCC AUX DEVICE (MCC AUX DEVICE)
6. INBOARD HEATER MCC LOSS OF POWER	MCC AUX DEVICE
7. PERMISSIVE TO INITIATE SYS 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z'	1 AUX DEVICE FOR EACH SYSTEM



(TYPICAL FOR VALVES MO FOO2E, FOO2J & FOO2N EXCEPT SUFFIX 'A'
REPLACED WITH CORRESPONDING LETTERS FOR EACH VALVE AND DEVICE)

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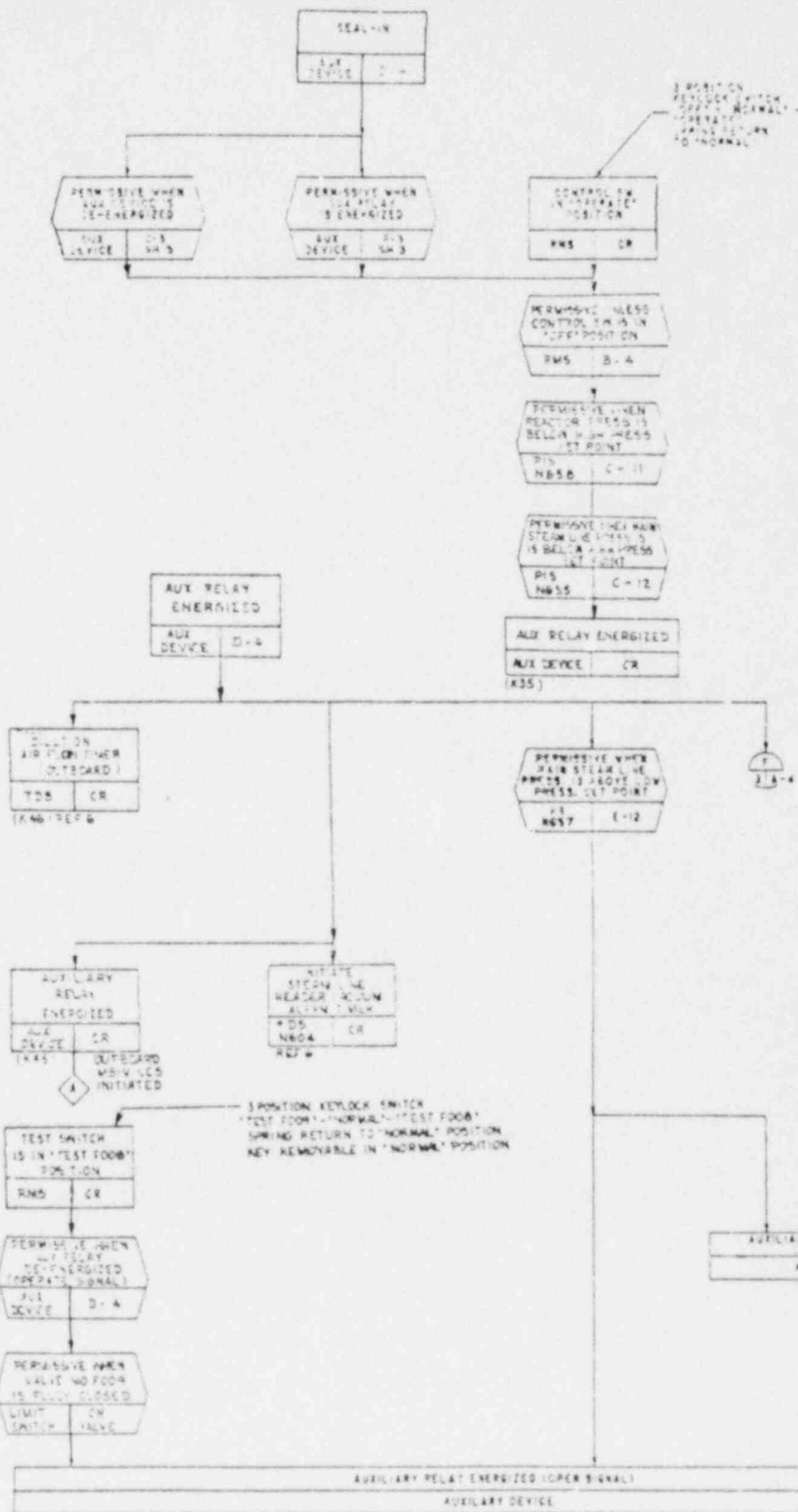
(TYPICAL FOR VALVES MO FOO3E, FOO3J & FOO3N EXCEPT SUFFIX 'A'
REPLACED WITH CORRESPONDING LETTERS FOR EACH VALVE AND DEVICE)

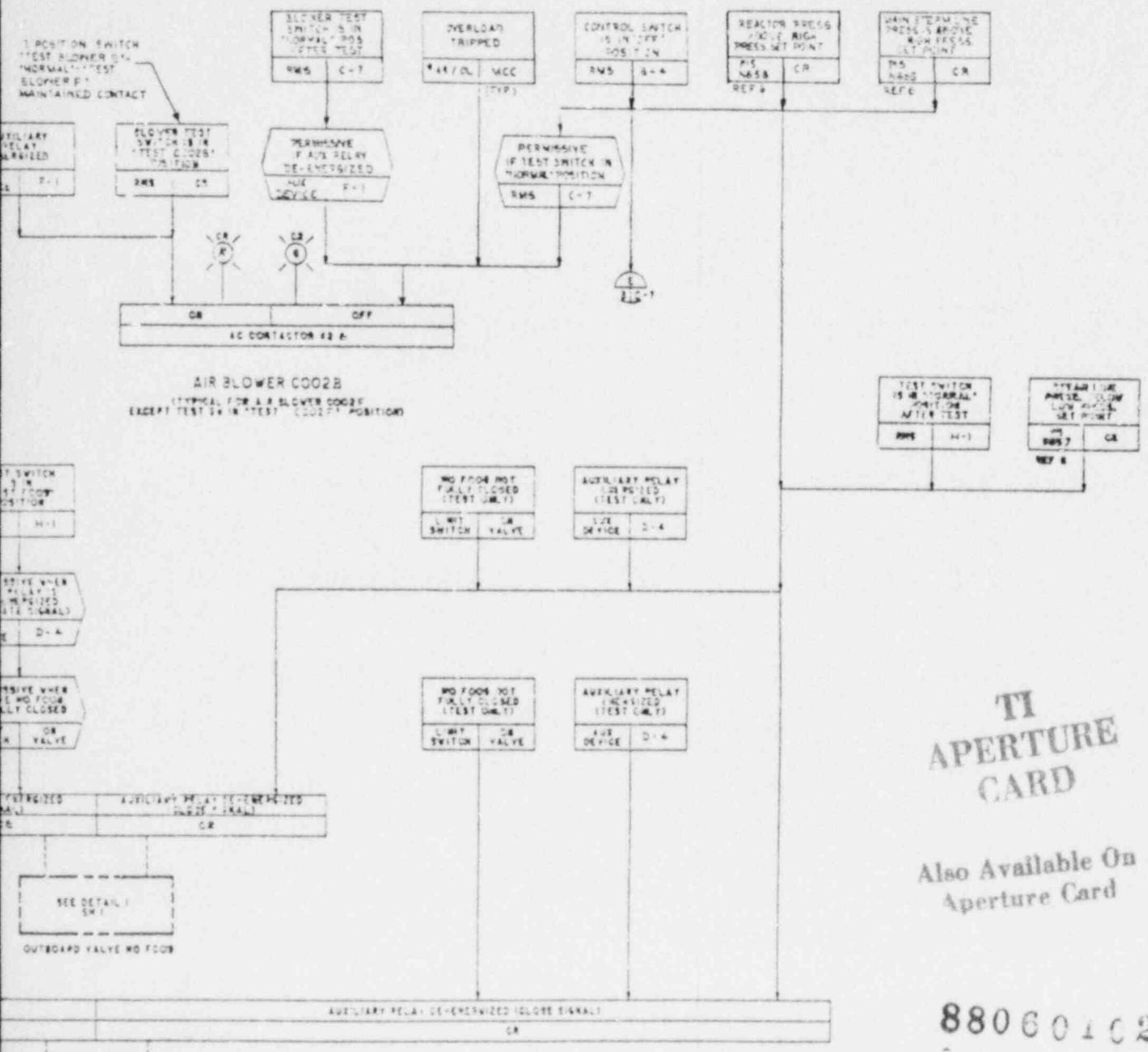
8806010243 -21



PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

MSIV Leakage Control System
Functional Control Diagram
Figure 7.3-7 (Sheet 3 of 4)






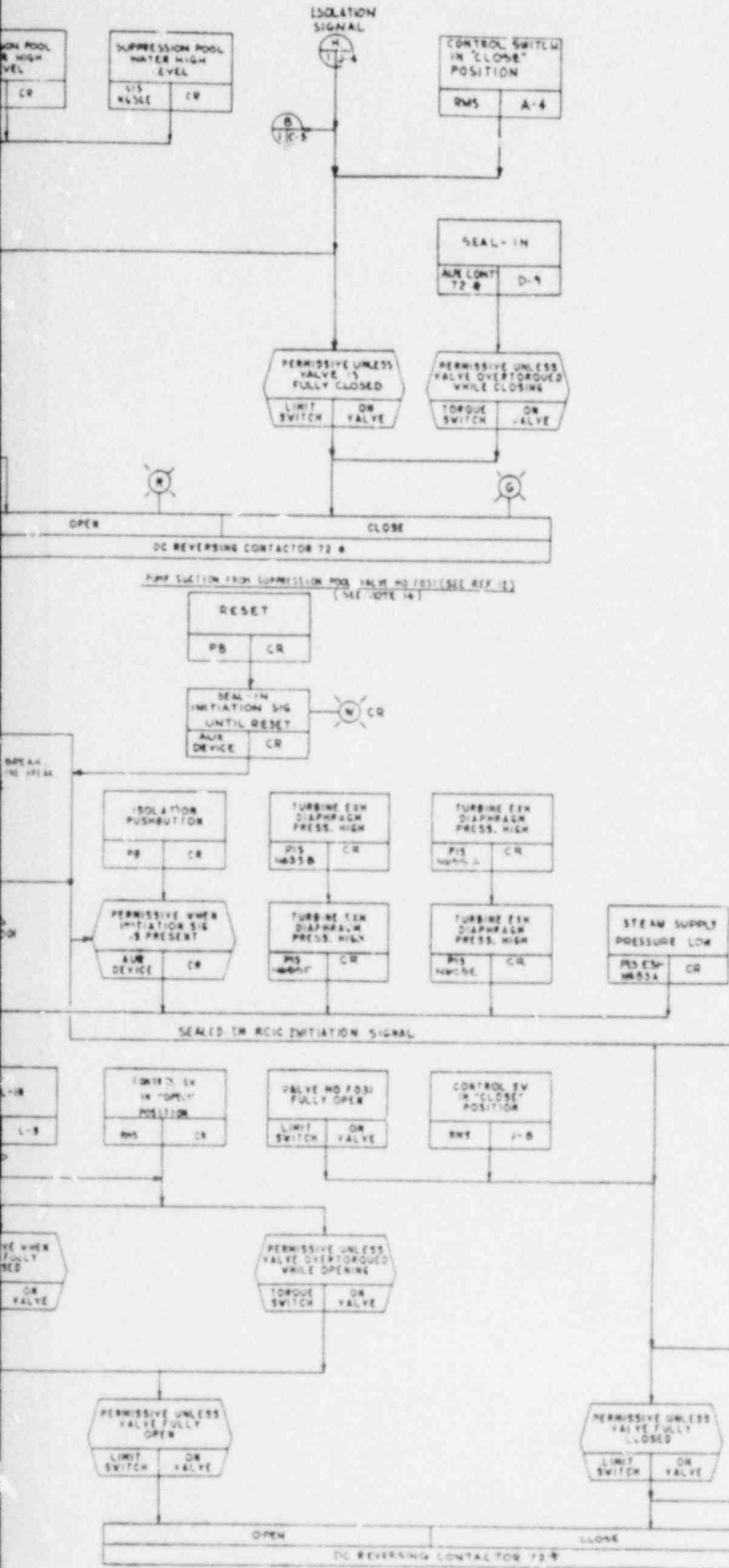
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	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	MSIV Leakage Control System Functional Control Diagram Figure 7.3-7 (Sheet 4 of 4)

NUCLEAR SAFETY RELATED



NOTES:

1. THE RCIC SYS IS ARRANGED FOR TEST OF PUMP AT FULL FLOW & ALL VALVES FOR OPEN & CLOSE CAPABILITY AT ANY TIME (EXCEPT WHEN INITIATION SIGNAL OR AUTO ISOLATION SIGNAL IS ACTIVATED OR STEAM LINE ISOLATION VALVES ARE RELOCATED CLOSED TO EVENT FOR ISOLATION SIGNAL OCCURS WHILE TEST IS UNDERWAY. THE SYS AUTOMATICALLY RETURNS TO STARTUP MODE.
2. ALL POWER FOR OPERATION OF D.C. VALVE MOTORS SHALL ORIGINATE FROM A PLANT D.C. BUS. POWER FOR A.C. OPERATED VALVES AND FULL LINE PUMP SHALL ORIGINATE FROM A STRANDBY A.C. BUS.
3. ALL EQUIPMENT & INSTRUMENT PREFIXED BY SYS NO. (151) UNLESS OTHERWISE NOTED.
4. ISOLATION SIGNAL SWITCHES SHALL BE OF THE TYPE THAT CLOSE CONTACTS FOR THE SPECIFIED ISOLATION EVENT. WHERE AUXILIARY RELAYS ARE USED IN THE ISOLATION CHANNELS THEY SHALL BE POWERED FROM STATION BATTERIES. (REF. 97)
5. AUXILIARY RELAYS & DEVICES NOT SHOWN ON FUNCTIONAL CONTROL DIAGRAMS EXCEPT WHERE REQUIRED TO CLARIFY FUNCTION.
6. FURNISHED WITH TURBINE.
7. THE RCIC SYS SHALL BE DESIGNED IN ACCORDANCE WITH REF. 9.
8. RCIC PUMP MOTOR COMBINATION STARTERS SHALL BE PROVIDED WITH THERMAL OVERLOADS WHICH TRIP ON OVERLOAD. BREAKERS SHALL PROVIDE SHORT CIRCUIT PROTECTION, TRIPPING OF EITHER TYPE OF DEVICE IS ANNUNCIATED VIA AN ALARM RELAY.
9. THE RCIC SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH CRITERIA FOR PROTECTION SYSTEMS FOR NUCLEAR POWER GENERATING PLANTS (IEEE 270).
10. LIGHTS TO BE PART OF LIGHT BOX LOCATED BELOW REGULAR RCIC ANNUNCIATOR LIGHTING AS SHOWN.
11. AC MOTOR OPERATED VALVES SHALL BE OPERATED FROM MOTOR CONTROL CENTERS HAVING GROUNDING FOR POWER TRANSFORMERS.
12. VALVE MOTORS ARE TO BE PROVIDED WITH LOSS OF POWER ANNUNCIATOR. VALVE MOTOR CIRCUITS ARE TO BE PROVIDED WITH SHORT CIRCUIT PROTECTIVE TRIPS.
13. TIME DELAY FOR GOING STEAM LINE OVF PRESSURE OR INSTRUMENT LINE BREAK AND FOR AMBIENT AND DIFF. TEMPERATURES.
14. THE REMOTE SHUTDOWN SYSTEM PROVIDES CAPABILITY FOR DIRECT REMOTE MANUAL CONTROL OF THIS COMPONENT. (REF 16)

REFERENCE EQUIPMENT:

REFERENCE EQUIPMENT	MPL ITEM NO.
1. NUCLEAR BOILER SYSTEM FCD	821-1010
2. NUCLEAR BOILER SYSTEM FCD	821-1030
3. SW SYSTEM FCD	112-1030
4. LEAK DETECTION SYSTEM DESIGN SPEC	121-1010
5. HPS SYSTEM FCD	122-1030
6. LEAK DETECTION SYSTEM FCD	131-1030
7. LEAK DETECTION SYSTEM DESIGN SPEC	121-4010
8. LOW PRESSURE LOW SPRAY SYSTEM FCD	171-1030
9. ELECTRICAL EQUIP. SEPARATION FOR PROTECTION SYSTEMS	462-4050
10. TURBINE CONTROL SYS & ELECTRIC WIRING	442-1030
11. LOGIC SYMBOLS	181-3622-10-1, 3622-10-4, 3622-10-2
12. REMOTE SHUTDOWN SYSTEM FCD	122-1030
13. HDV & HCL STANDARDS	342-1010
14. REDUNDANT REACTIVITY CONT SYS FCD	122-1030
15. ERIS ELEMENTARY DIAGRAM	105-1050
16. REMOTE SHUTDOWN SYS FCD	122-1030

LEGEND:

- 1. SWITCHGEAR DEVICE FUNCTION NUMBERS AND SPEC CBT 3.
- 2. EMERGENCY RESPONSE INFORMATION SYSTEM.

TI APERTURE CARD

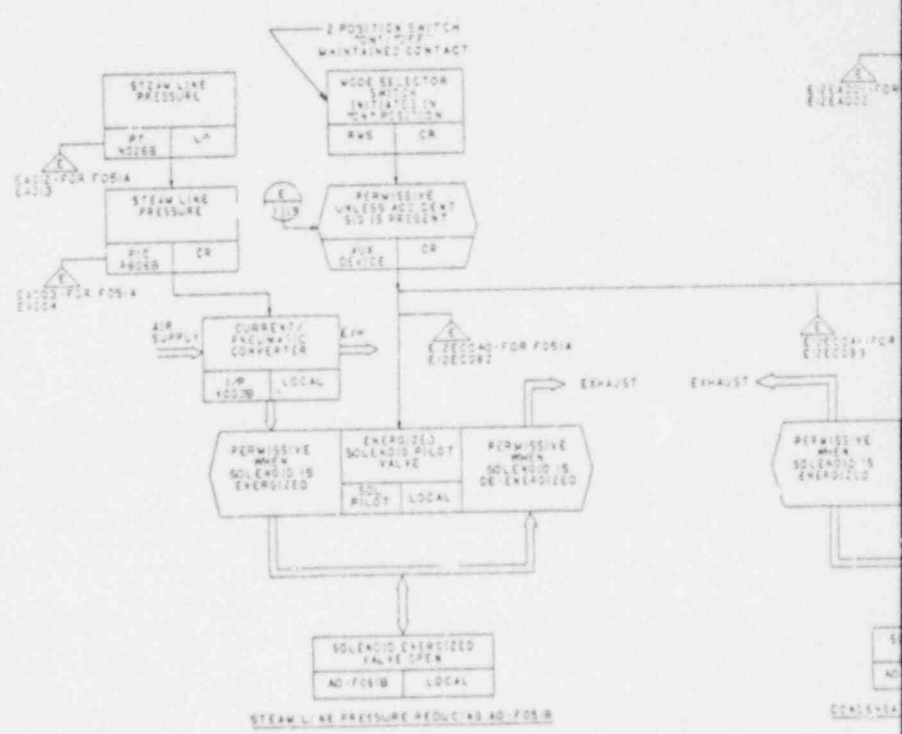
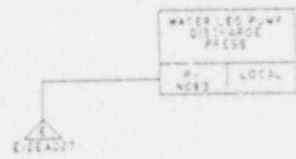
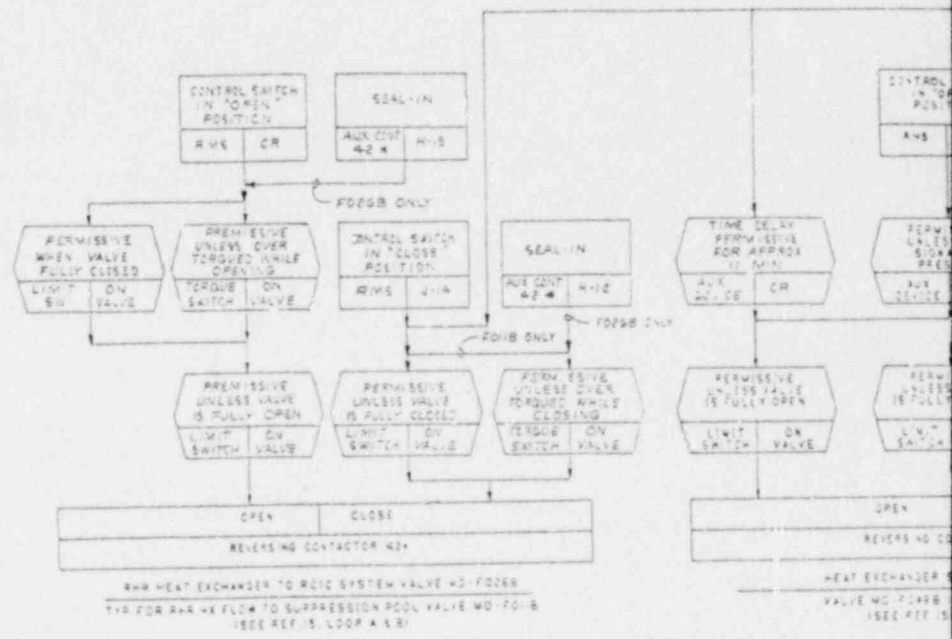
Also Available On Aperture Card

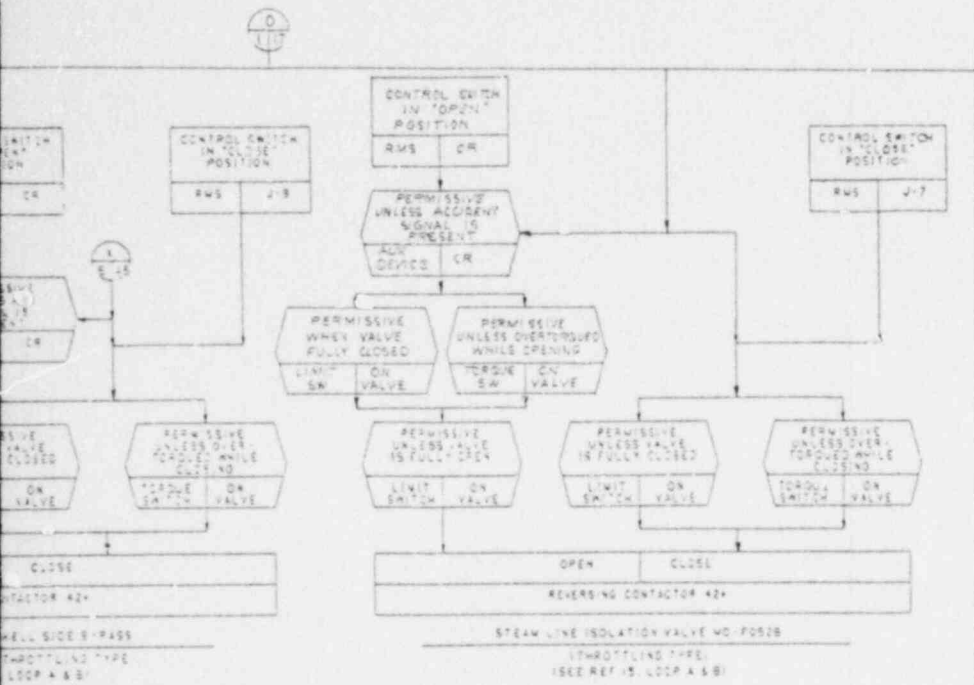
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

RCIC System Functional Control Diagram
Figure 7.4-1 (Sheet 1 of 5)

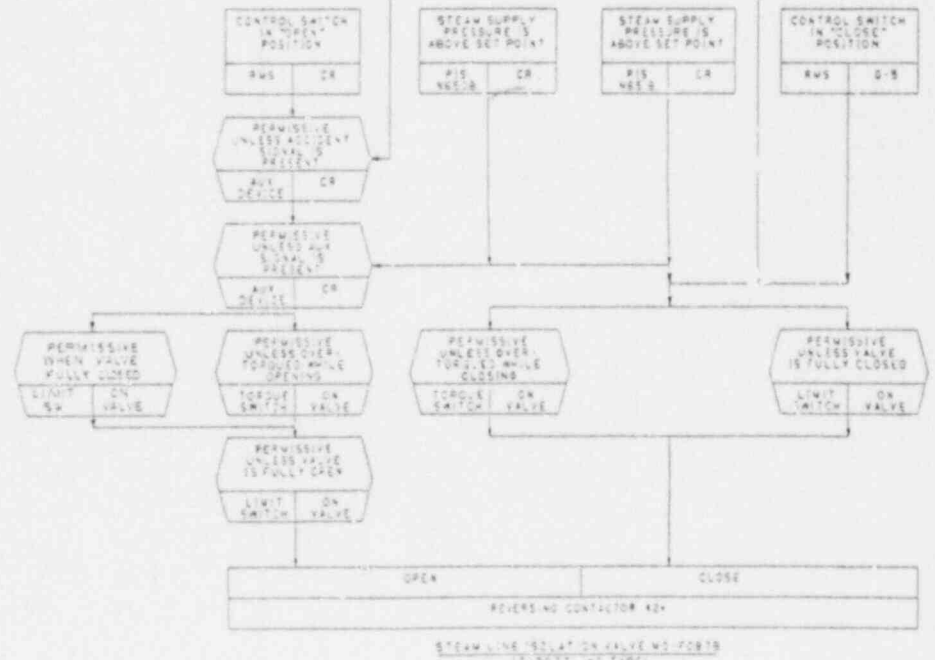
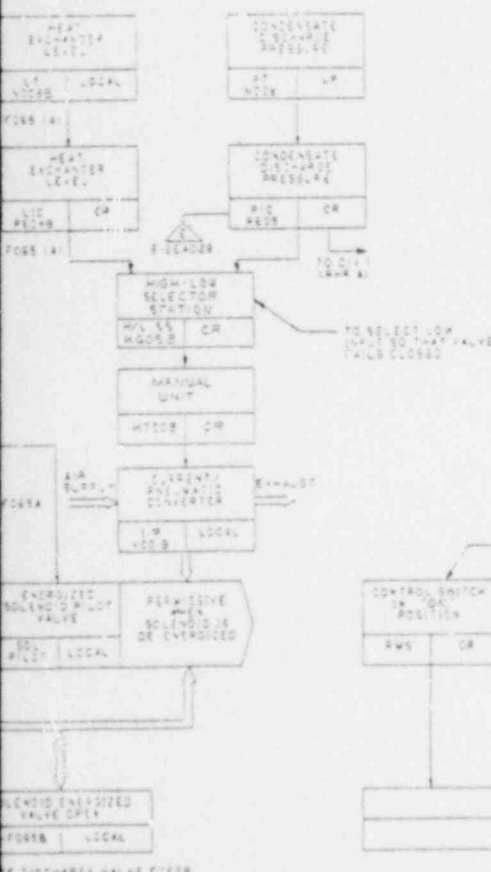
VALVE NO FOSI TEST FLY TO CONDENSATE STORAGE TANK (SEE REF 12)
(THROTTLING TYPE VALVE) (TYPICAL FOR MD FOSI EXCEPT NON-THROTTLING)
(SEE NOTE 14)





TI APERTURE CARD

Also Available On Aperture Card

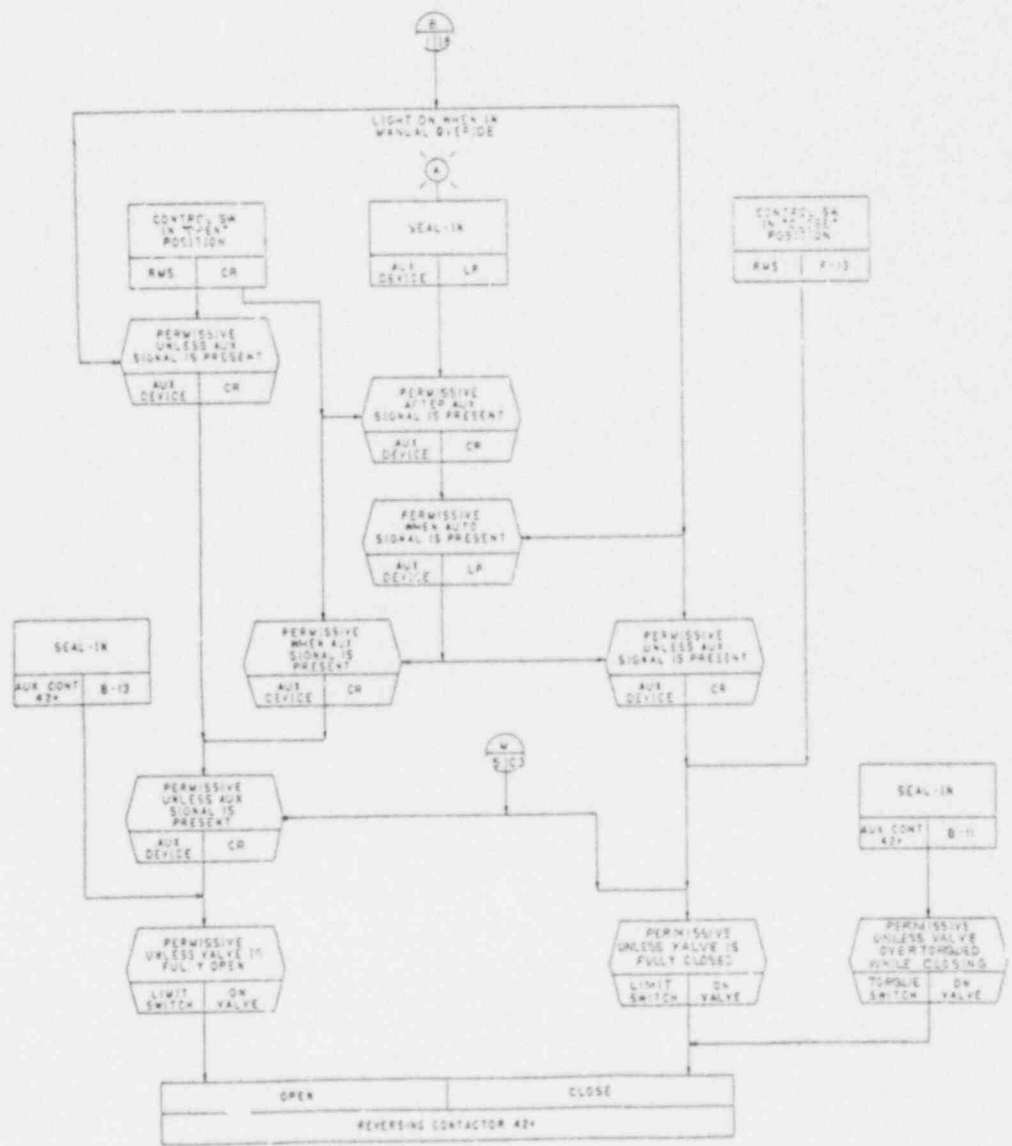


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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

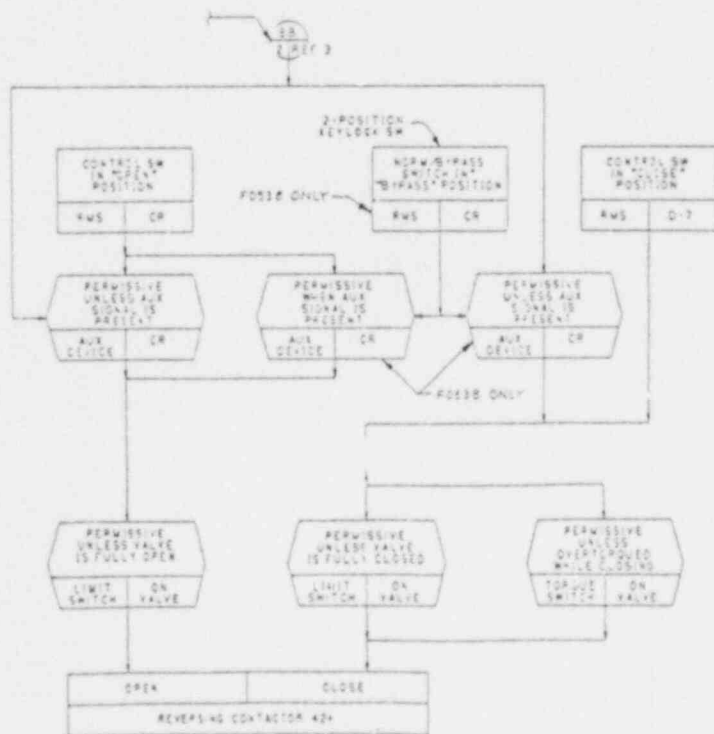
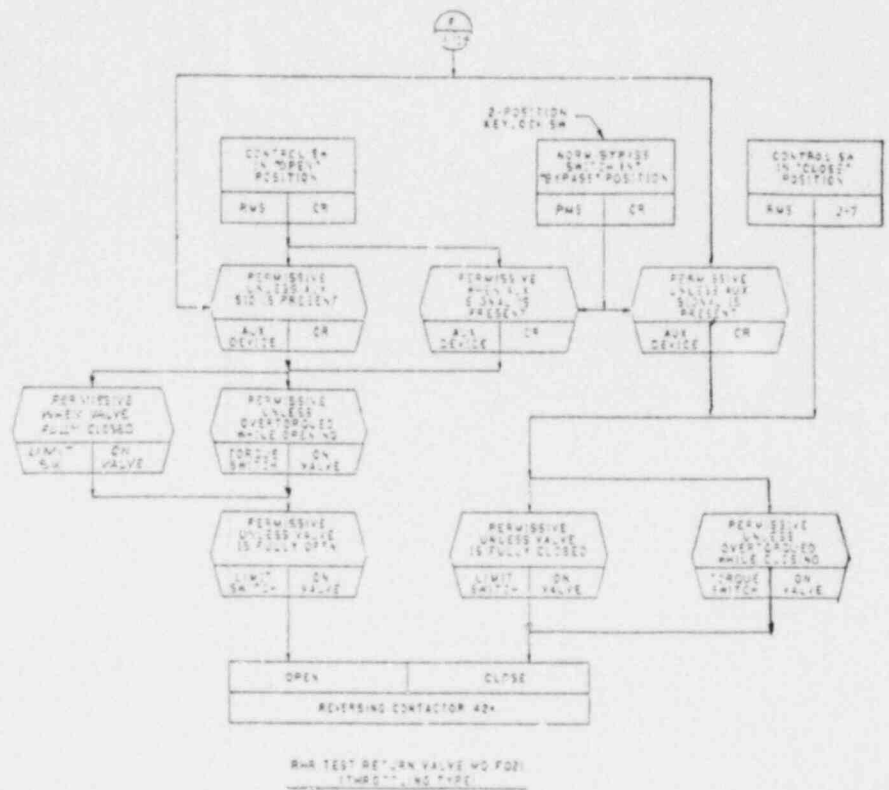
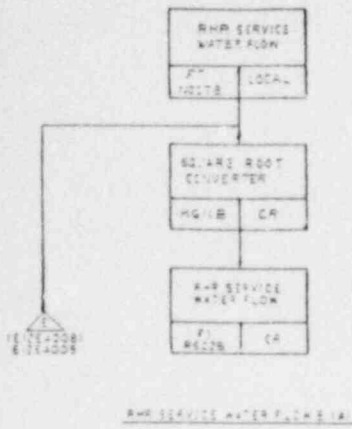
RHR System Functional
Control Diagram

Figure 7.3-5 (Sheet 2 of 5)



BWR SYSTEM TEST RETURN VALVE WC-7024B

(SEE REF. IS LOOP A AND B)



SHUTDOWN RETURN VALVE W/ FDSI
 TYPICAL FOR UPPER PDSI, CLOSING VALVE W/ FDSI
 (THROTTLING TYPE)

(SEE REF. IS, LOOP A AND B)

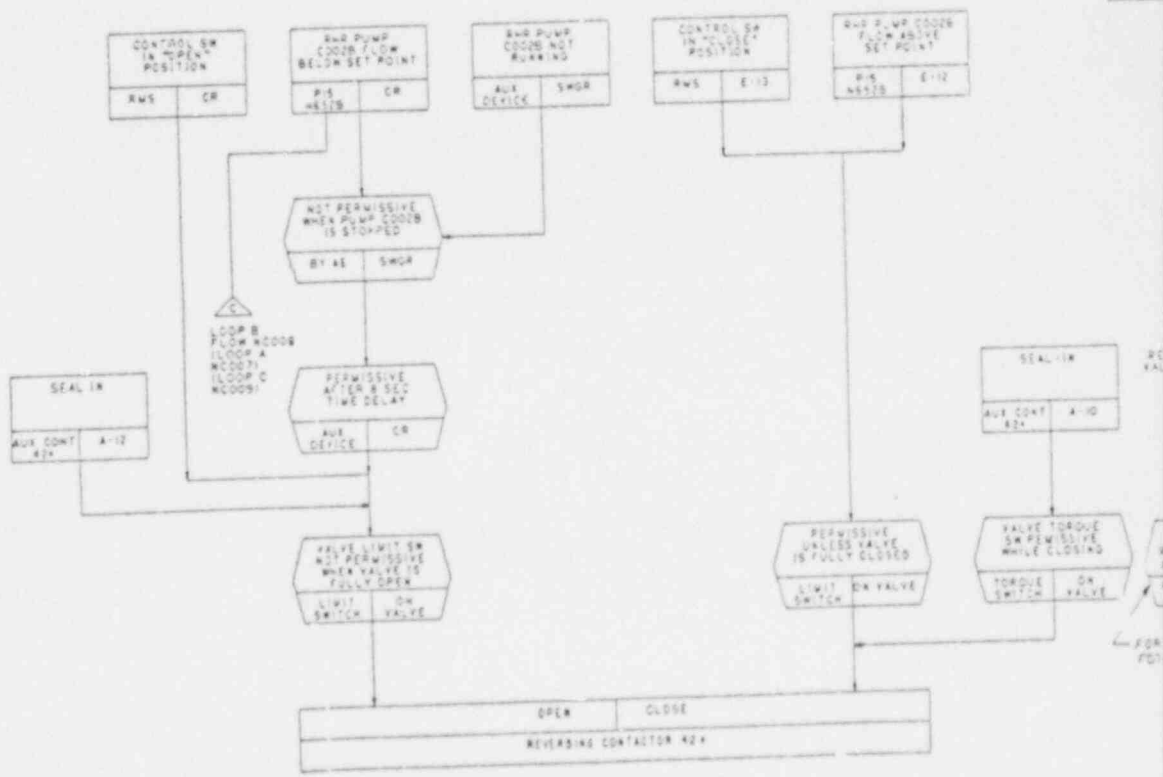
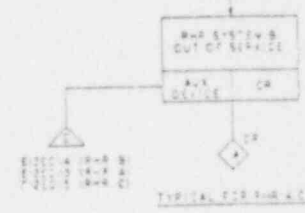
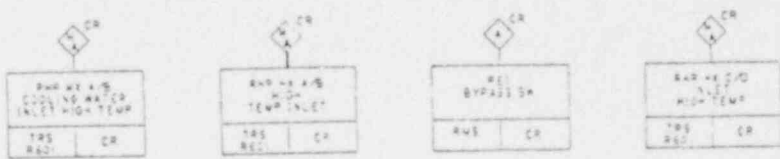
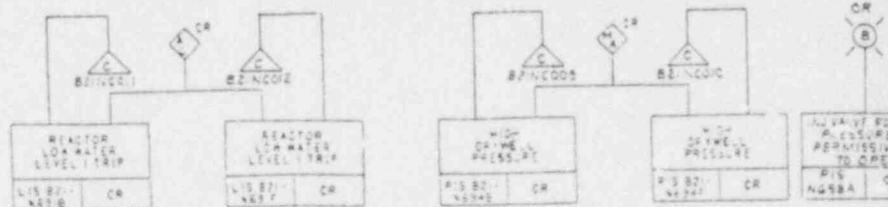
TI APERTURE CARD

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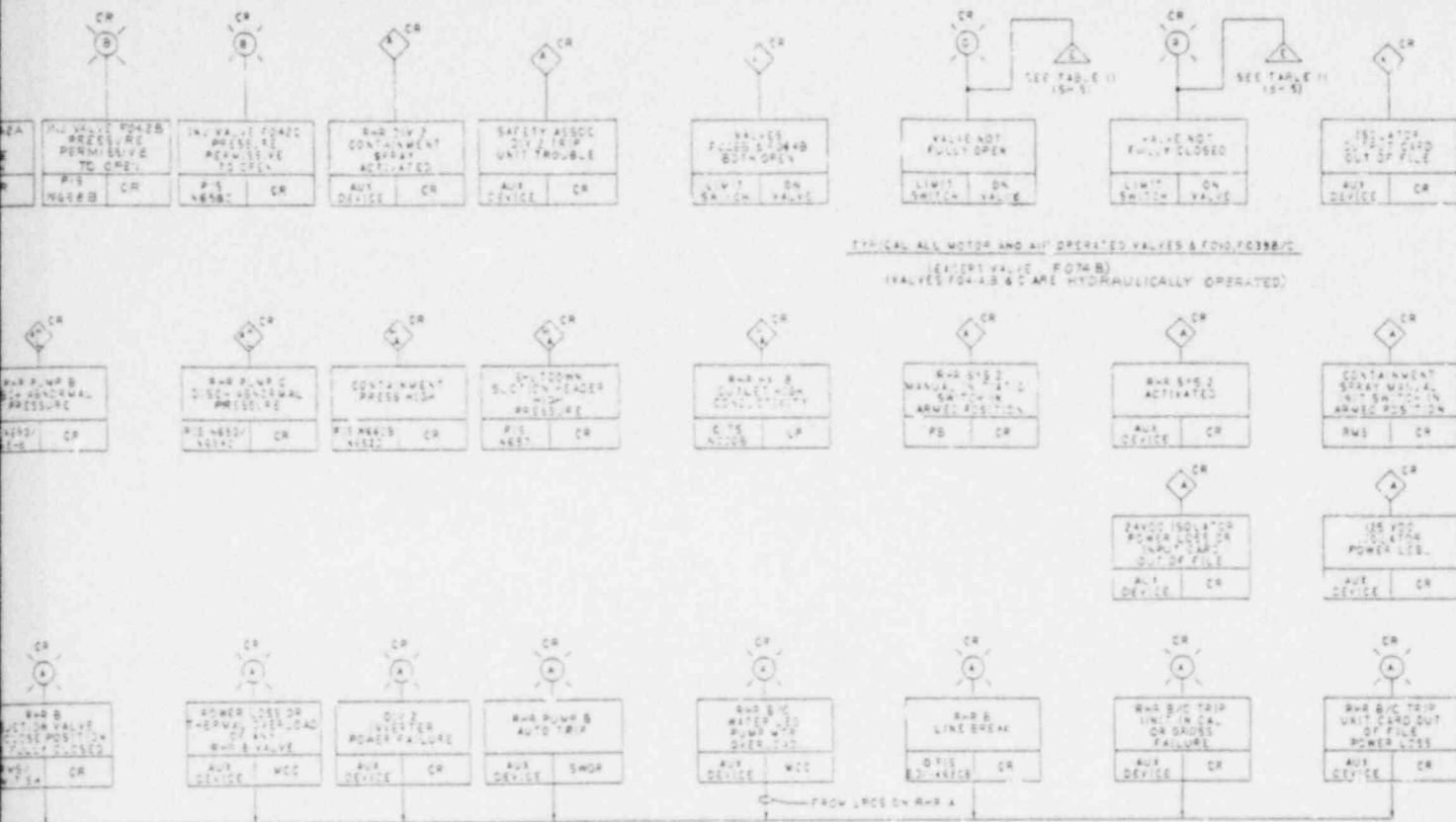
6806010243-25

PNPP PERRY NUCLEAR POWER PLANT
 THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

RHR System Functional Control Diagram
 Figure 7.3-5 (Sheet 3 of 5)



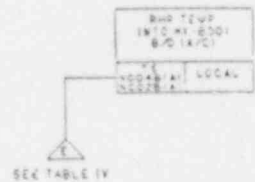
RWR MIX FLOW VALVE W2-7084B
TYPICAL FOR W2-7084C
ISCC REF. IS. LOOP A AND B



TYPICAL ALL MOTOR AND AIR OPERATED VALVES & F004, F0398/C
(EXCEPT VALVE F074B)
VALVES F04, A, B & C ARE HYDRAULICALLY OPERATED

DESCRIPTION	VALVE NUMBER	SWITCH DESCRIPTION	NOTE
VALVES	F 738 & F074B	3 POS. SW "CLOSE" "NORMAL" "CLOSE" SPRING RETURN TO "NORMAL"	
COOLING SECTION VALVE	F006B	2 POSITION SW "CLOSE" "OPEN" MAINTAINED CONTACTS	SEE REF. IS. LOOP A AND B
R SECTION VALVES VALVE	F004B & F005 F047B	2 POSITION SW "CLOSE" "OPEN" MAINTAINED CONTACTS. 1 NO KEY LOCK ON F047B	SEE REF. IS. LOOP A AND B
ET VALVE	F003B	3 POSITION SW "CLOSE" "NORMAL" "OPEN", SPRING RET TO "NORMAL"	

TI APERTURE CARD



Also Available On Aperture Card

TABLE III
ERIS SIGNALS

INSTRUMENT NO.	ERIS SIGNAL NO.
K0004	ERIS000
K0005	ERIS001
K0006	ERIS002
K0007	ERIS003
K0008	ERIS004
K0009	ERIS005
K0010	ERIS006
K0011	ERIS007
K0012	ERIS008
K0013	ERIS009
K0014	ERIS010
K0015	ERIS011
K0016	ERIS012
K0017	ERIS013
K0018	ERIS014
K0019	ERIS015
K0020	ERIS016
K0021	ERIS017
K0022	ERIS018
K0023	ERIS019
K0024	ERIS020
K0025	ERIS021
K0026	ERIS022
K0027	ERIS023
K0028	ERIS024
K0029	ERIS025
K0030	ERIS026
K0031	ERIS027
K0032	ERIS028
K0033	ERIS029
K0034	ERIS030
K0035	ERIS031
K0036	ERIS032
K0037	ERIS033
K0038	ERIS034
K0039	ERIS035
K0040	ERIS036
K0041	ERIS037
K0042	ERIS038
K0043	ERIS039
K0044	ERIS040
K0045	ERIS041
K0046	ERIS042
K0047	ERIS043
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K0050	ERIS046
K0051	ERIS047
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K0054	ERIS050
K0055	ERIS051
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K0057	ERIS053
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K0060	ERIS056
K0061	ERIS057
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K0063	ERIS059
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K0065	ERIS061
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K0101	ERIS097
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K0114	ERIS110
K0115	ERIS111
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K0123	ERIS119
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K0125	ERIS121
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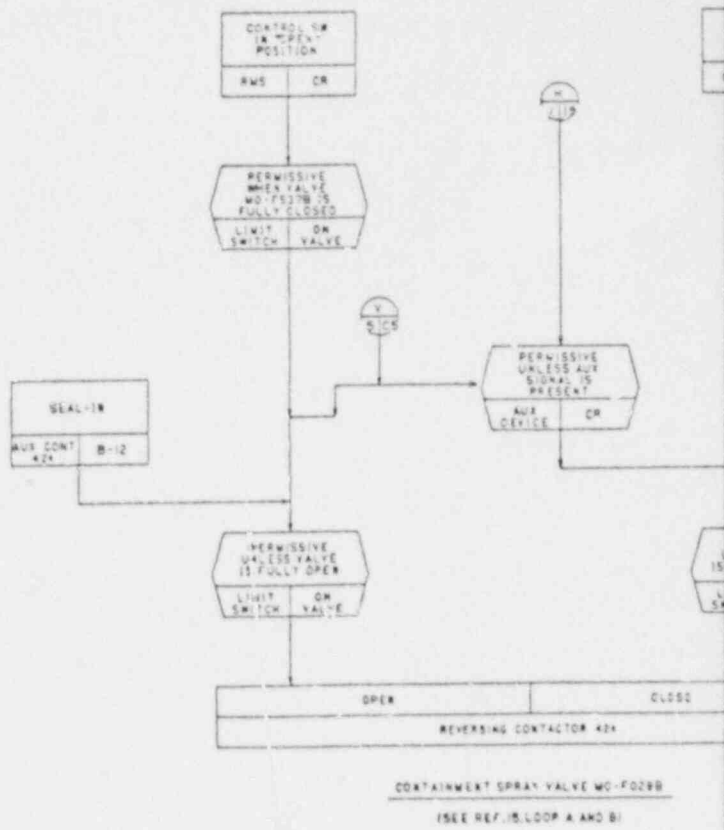
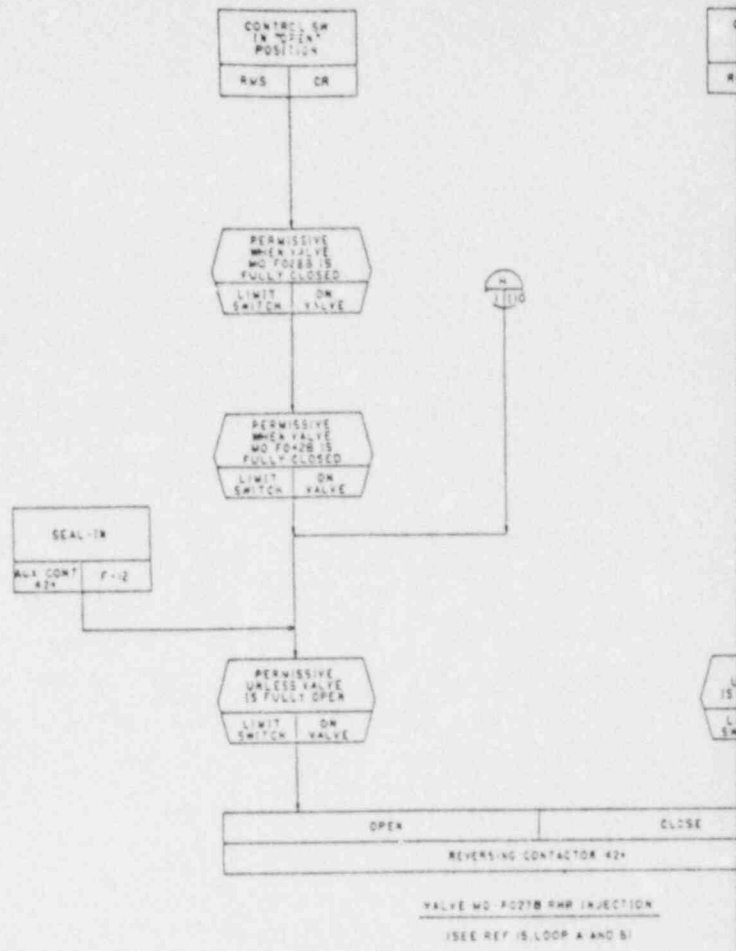
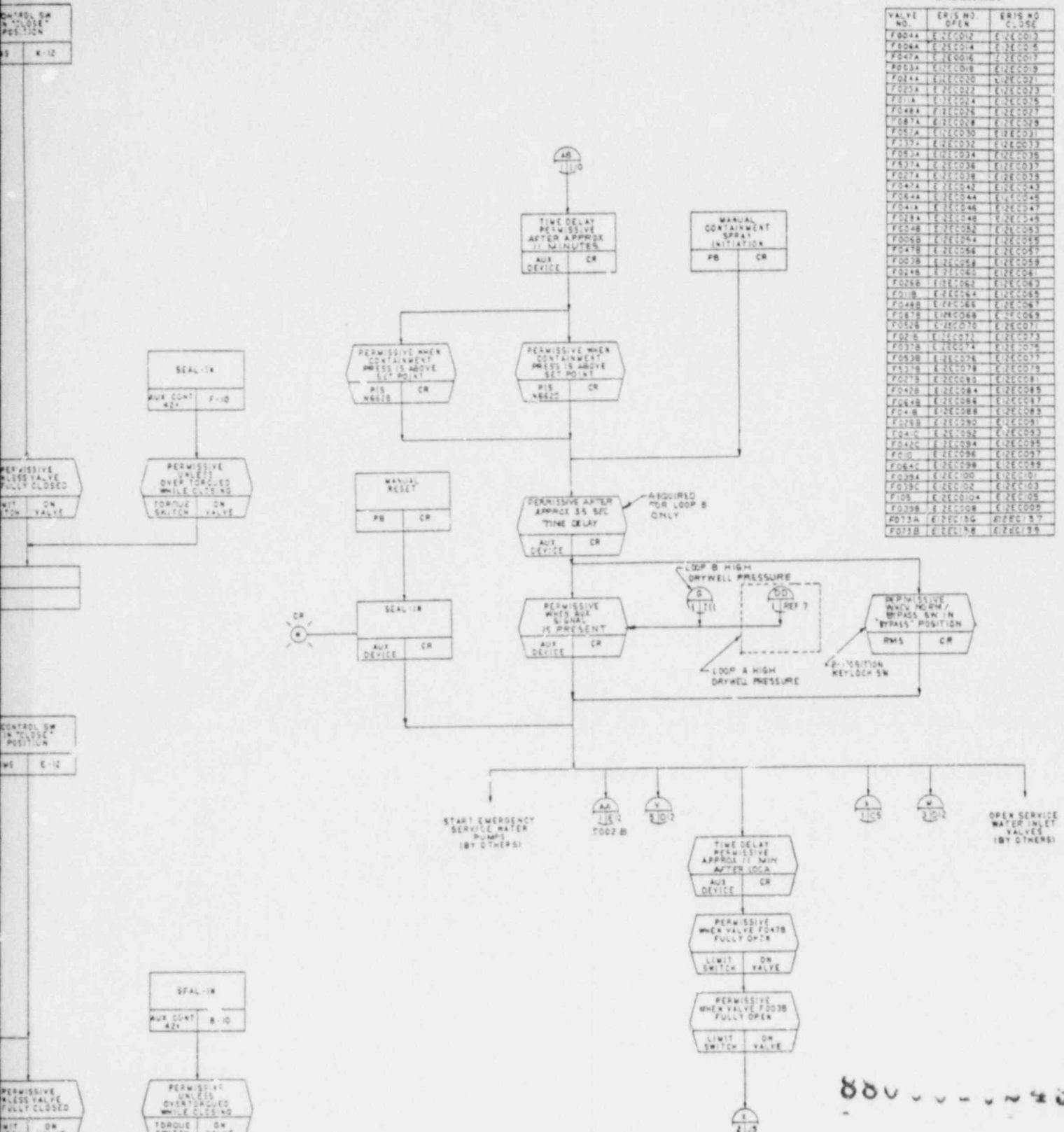


TABLE II
ERIS SIGNALS

VALVE NO.	ERIS NO. OPEN	ERIS NO. CLOSE
FD04A	E 2E0012	E 2E0013
FD06A	E 2E0014	E 2E0015
FD07A	E 2E0016	E 2E0017
FD03A	E 2E0018	E 2E0019
FD04A	E 2E0020	E 2E0021
FD05A	E 2E0022	E 2E0023
FD01A	E 2E0024	E 2E0025
FD08A	E 2E0026	E 2E0027
FD07A	E 2E0028	E 2E0029
FD07A	E 2E0030	E 2E0031
FD07A	E 2E0032	E 2E0033
FD02A	E 2E0034	E 2E0035
FD07A	E 2E0036	E 2E0037
FD07A	E 2E0038	E 2E0039
FD07A	E 2E0040	E 2E0041
FD04A	E 2E0042	E 2E0043
FD04A	E 2E0044	E 2E0045
FD04A	E 2E0046	E 2E0047
FD08A	E 2E0048	E 2E0049
FD04B	E 2E0052	E 2E0053
FD06B	E 2E0054	E 2E0055
FD07B	E 2E0056	E 2E0057
FD02B	E 2E0058	E 2E0059
FD04B	E 2E0060	E 2E0061
FD06B	E 2E0062	E 2E0063
FD08B	E 2E0064	E 2E0065
FD04B	E 2E0066	E 2E0067
FD07B	E 2E0068	E 2E0069
FD02B	E 2E0070	E 2E0071
FD02B	E 2E0072	E 2E0073
FD07B	E 2E0074	E 2E0075
FD02B	E 2E0076	E 2E0077
FD07B	E 2E0078	E 2E0079
FD07B	E 2E0080	E 2E0081
FD02B	E 2E0082	E 2E0083
FD04B	E 2E0084	E 2E0085
FD04B	E 2E0086	E 2E0087
FD08B	E 2E0088	E 2E0089
FD02B	E 2E0090	E 2E0091
FD04B	E 2E0092	E 2E0093
FD04B	E 2E0094	E 2E0095
FD02B	E 2E0096	E 2E0097
FD04B	E 2E0098	E 2E0099
FD04B	E 2E0100	E 2E0101
FD04B	E 2E0102	E 2E0103
FD05B	E 2E0104	E 2E0105
FD02B	E 2E0106	E 2E0107
FD02A	E 2E0108	E 2E0109
FD02B	E 2E0110	E 2E0111

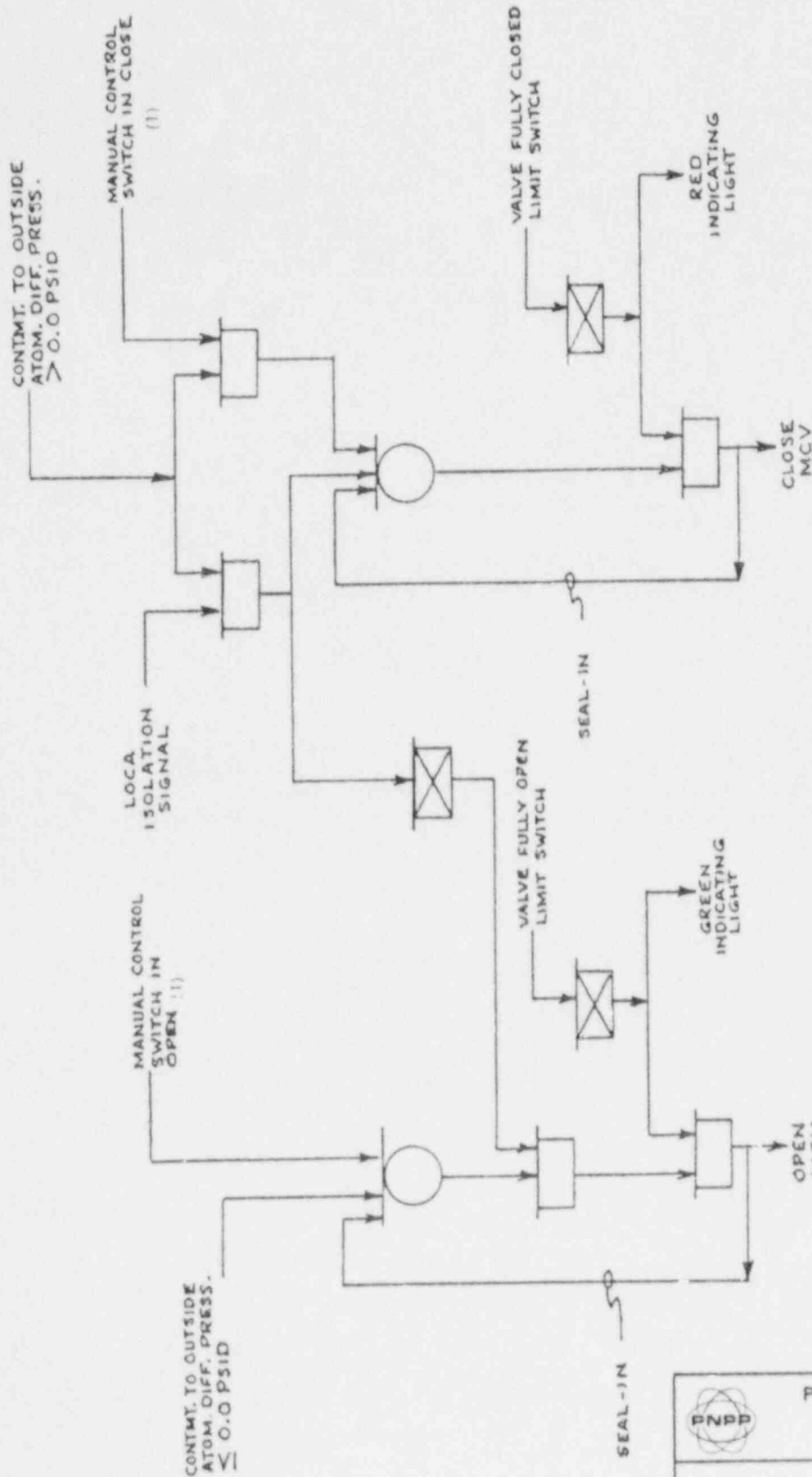


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PERRY NUCLEAR POWER PLANT
 THE CLEVELAND ELECTRIC
 ILLUMINATING COMPANY

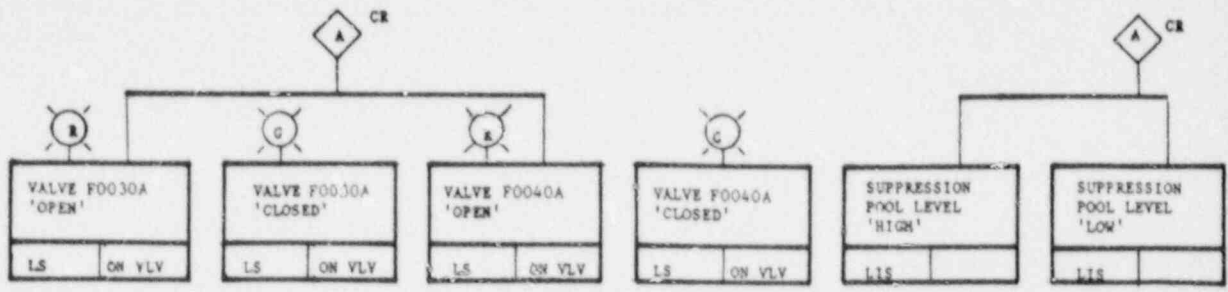
RHR System Functional
 Control Diagram
 Figure 7.3-5 (Sheet 5 of 5)



NOTE:
 (1) MANUAL CONTROL SWITCHES ARE SPRING RETURN
 TO NEUTRAL OR CENTER POSITION.

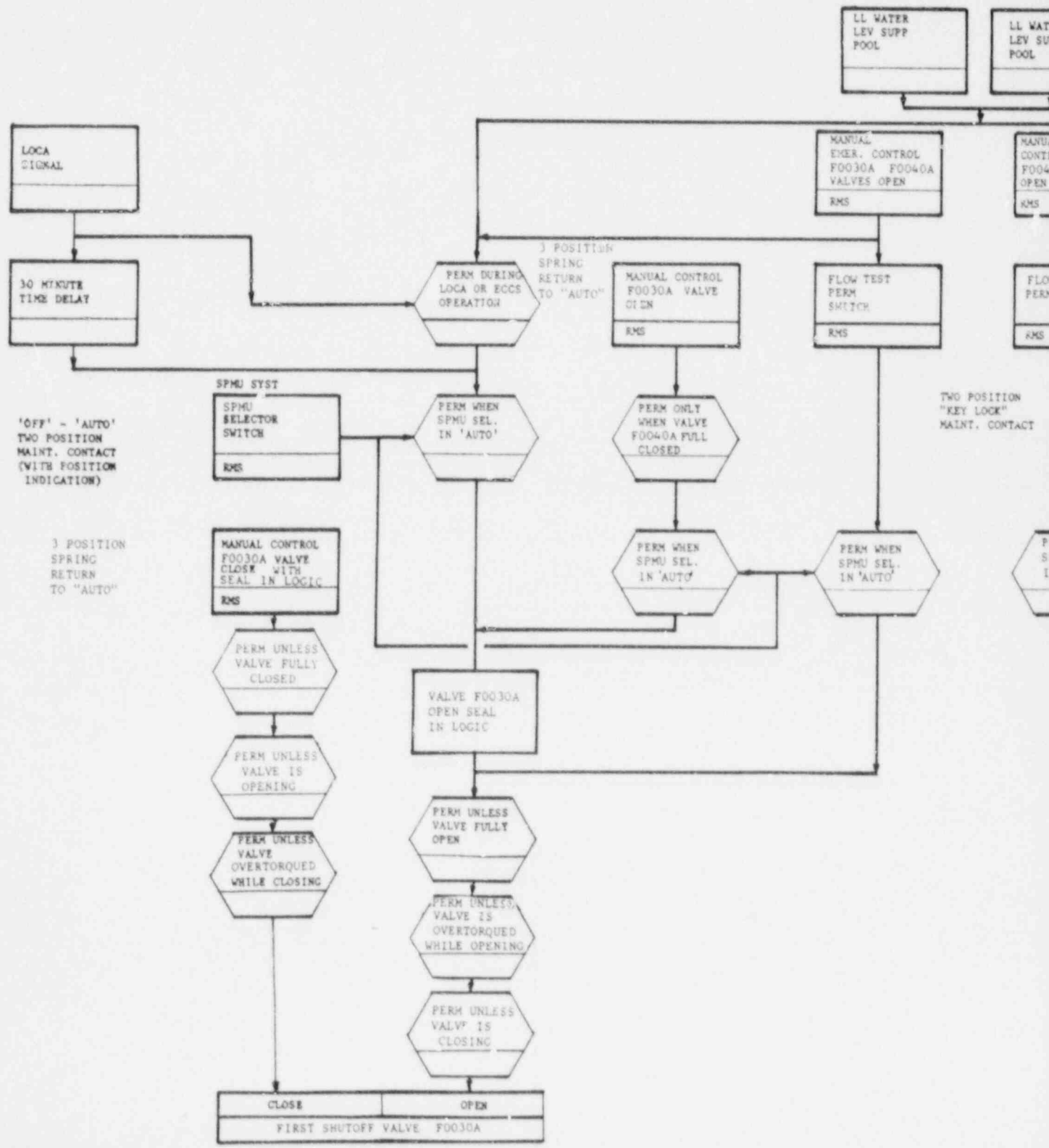
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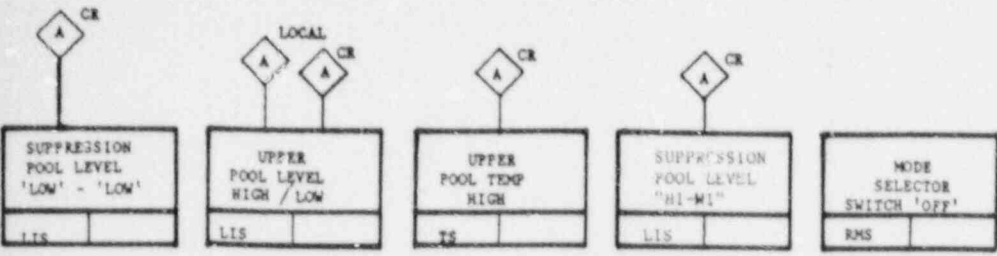
	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	Containment Vacuum Relief System Control Logic Figure 7.3-11



ALARMS AND INDICATORS FOR DIVISION 1 (DIVISION 2 SIMILAR)

INITIATED BY SUPPRESSION POOL LOW LOW



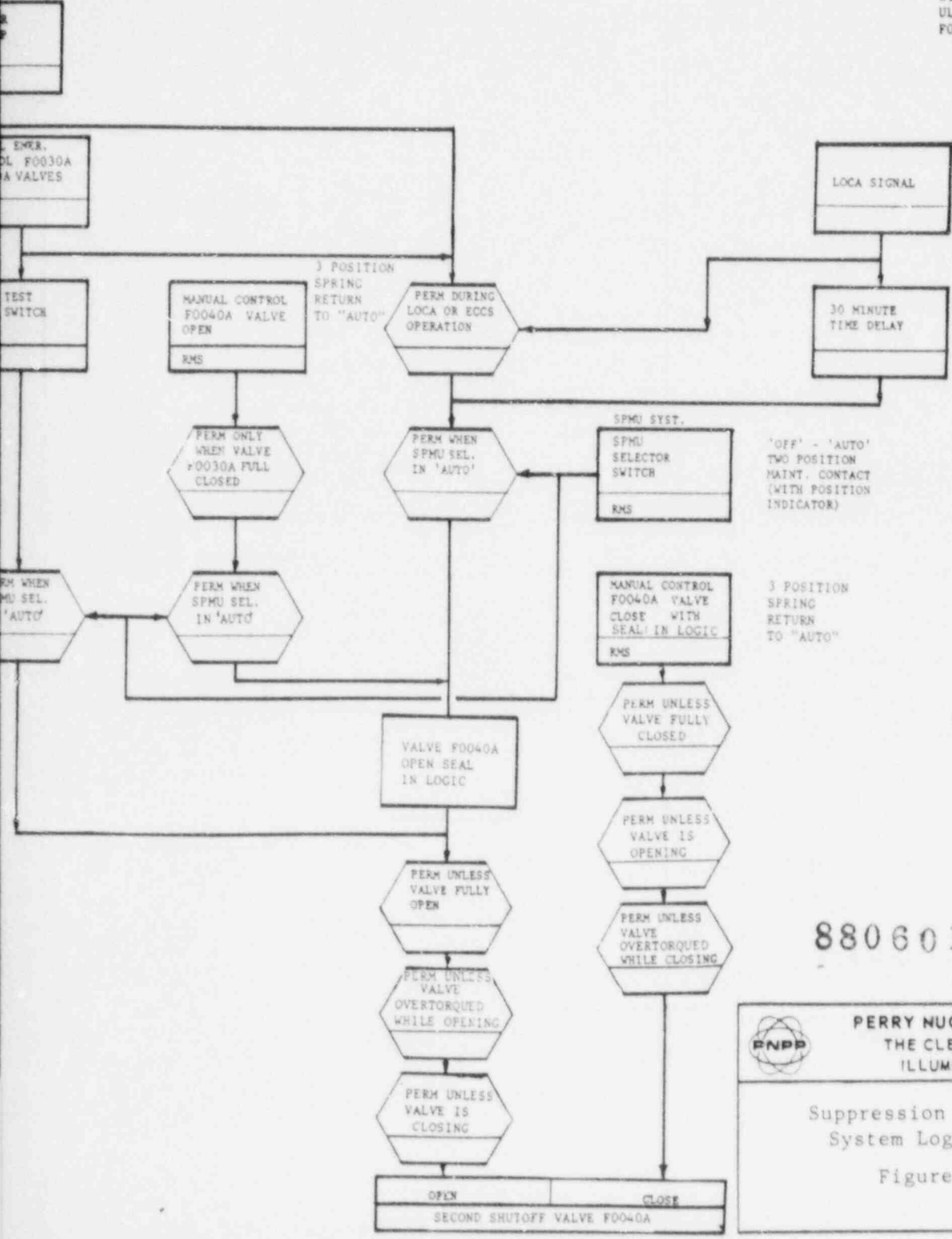


NOTES:

1. IN ADDITION TO REQUIREMENTS FOR SEPARATION AND INDEPENDENCE BETWEEN DIVISION 1 AND DIVISION 2, SEPARATION REQUIREMENTS APPLY BETWEEN SUBSYSTEMS ASSOCIATED WITH VALVE F0030 AND F0040 IN EACH DIVISION. THIS SEPARATION IS TO INSURE THAT NO SINGLE FAULT WITHIN A DIVISION WILL SIMULTANEOUSLY OPEN VALVES F0030 AND F0040.

ALARMS AND INDICATORS COMMON FOR DIVISION 1 AND FOR DIVISION 2


WATER LEVEL

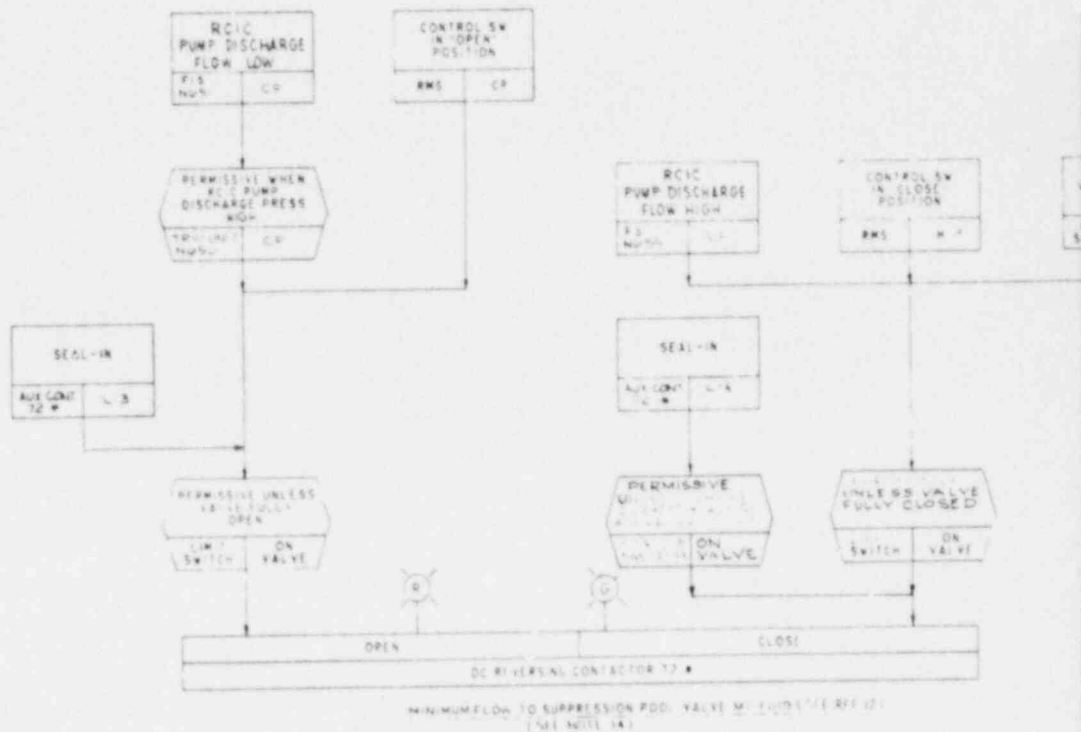
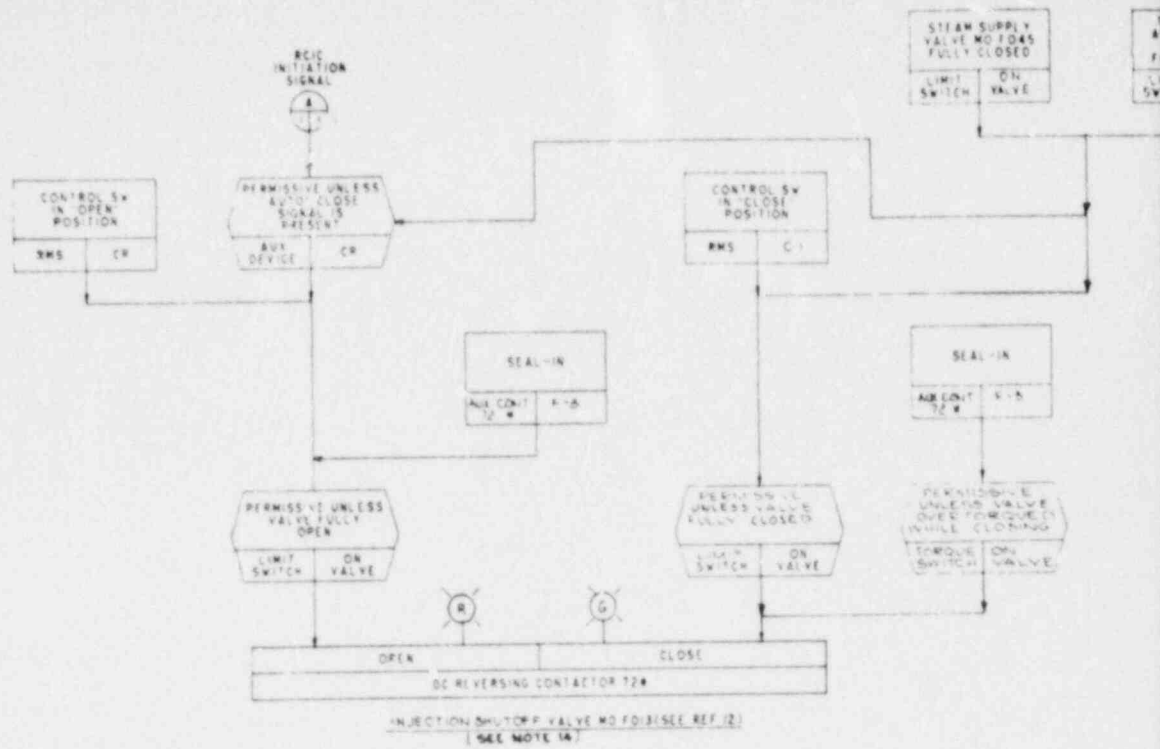


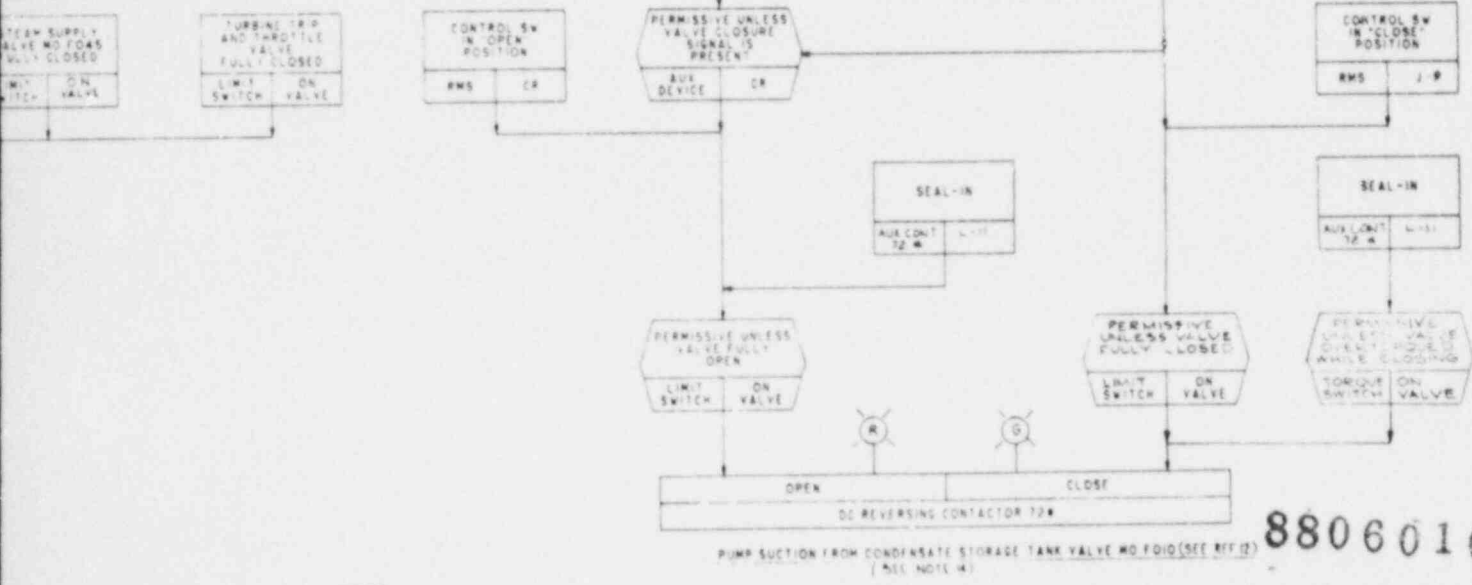
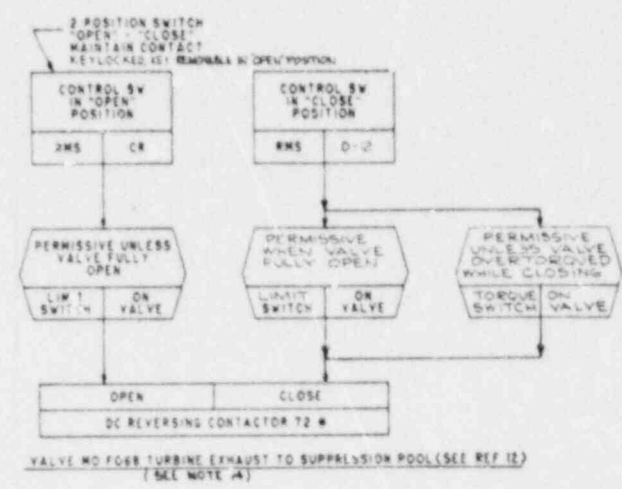
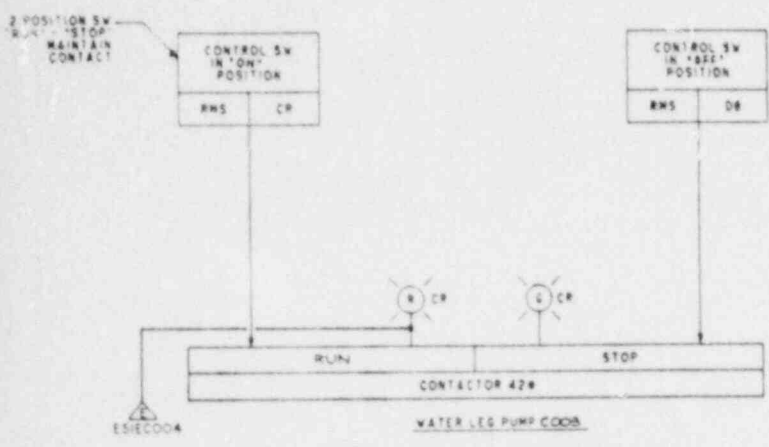
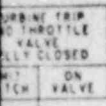
TI APERTURE CARD

Also Available On Aperture Card

8806010243-28


PERRY NUCLEAR POWER PLANT
 THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
 Suppression Pool Makeup System Logic Diagram
 Figure 7.3-9





8806010243

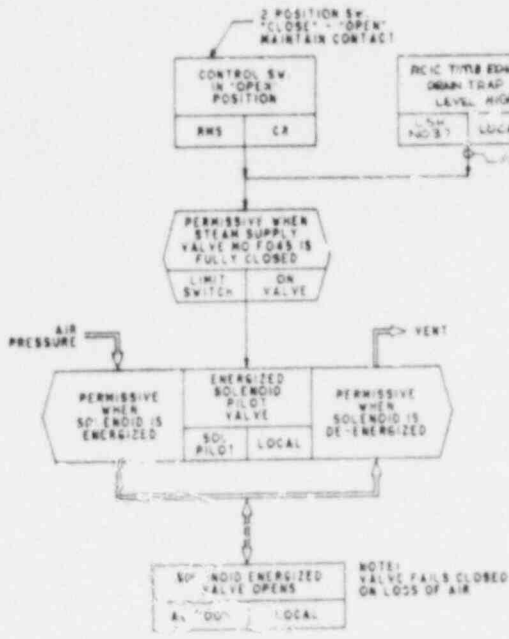
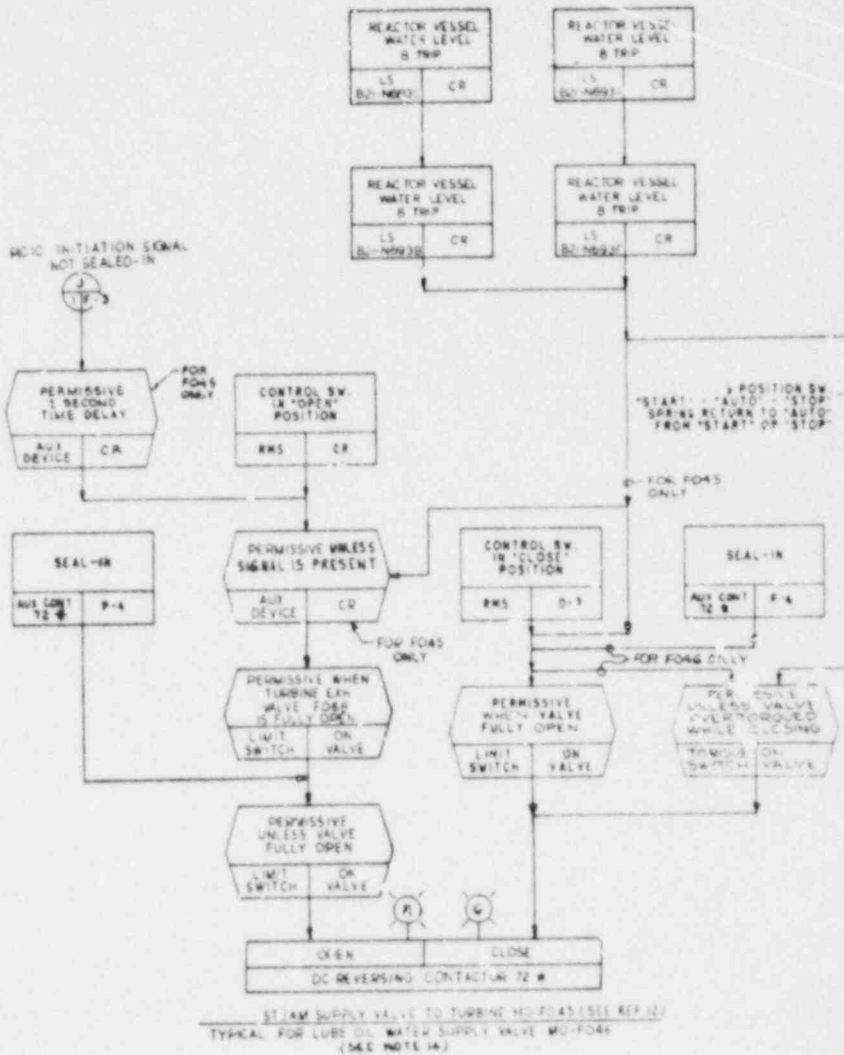
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APERTURE
CARD

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Aperture Card

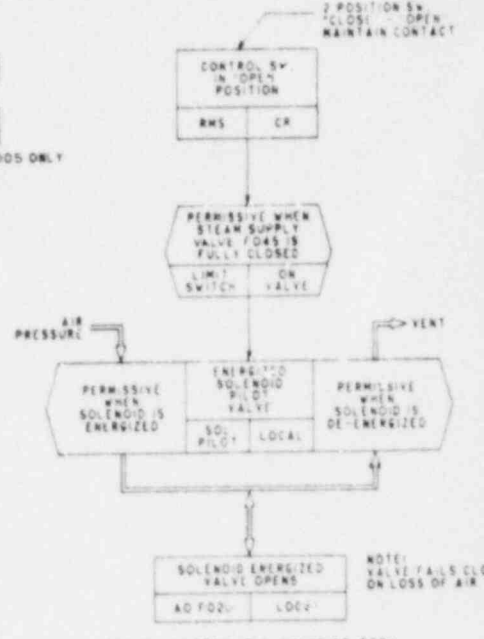
-29

PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

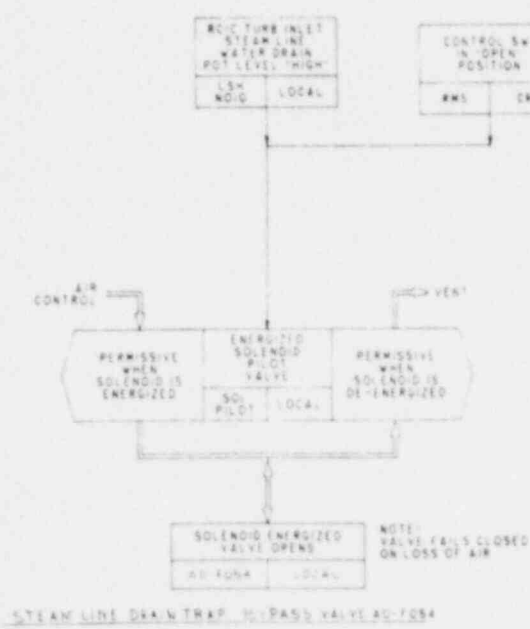
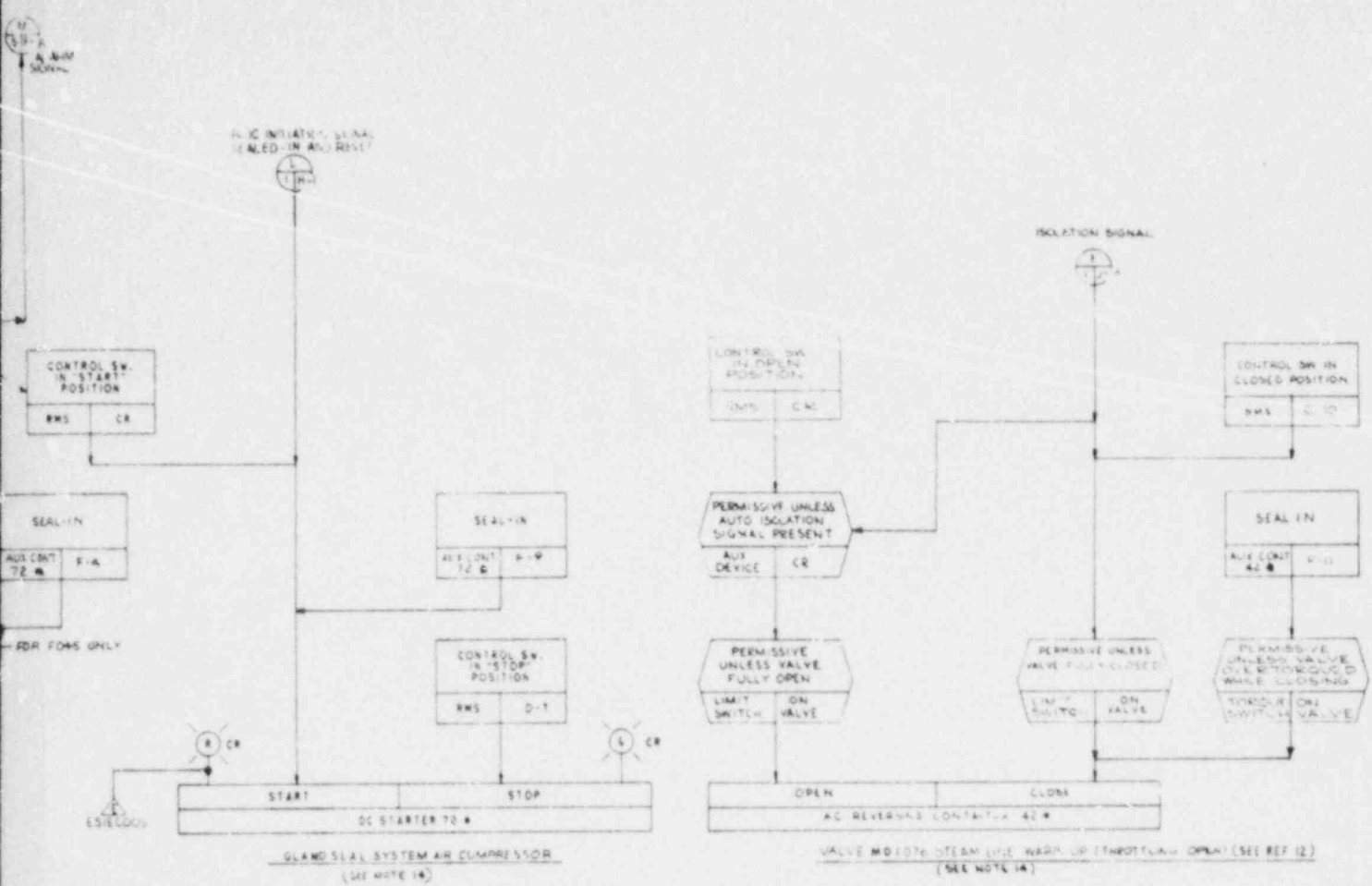
RCIC System Functional
Control Diagram
Figure 7.4-1 (Sheet 2 of 5)



TURBINE DRAIN VALVE AD-F025
(TYPICAL FOR F024, 1 - F027 F044 - 0 & 1, UNLESS OTHERWISE SPECIFIED)




STEAM LINE DRAIN VALVE AD-F026
(TYPICAL FOR F025)



TI APERTURE CARD

Also Available On Aperture Card

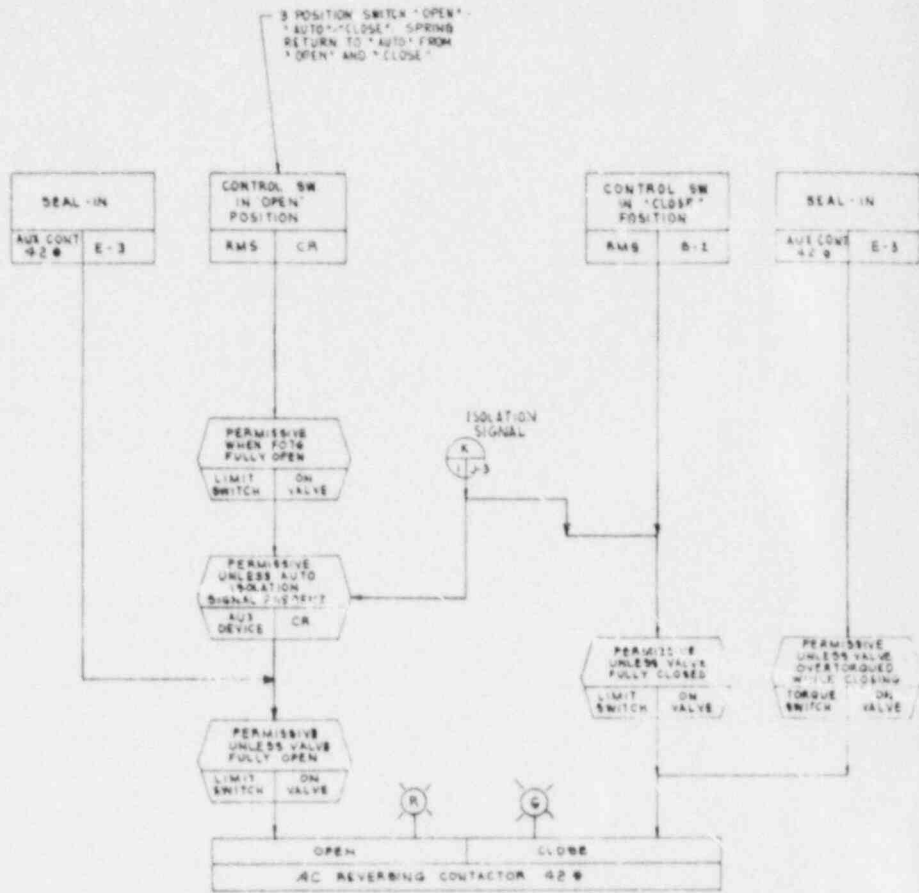
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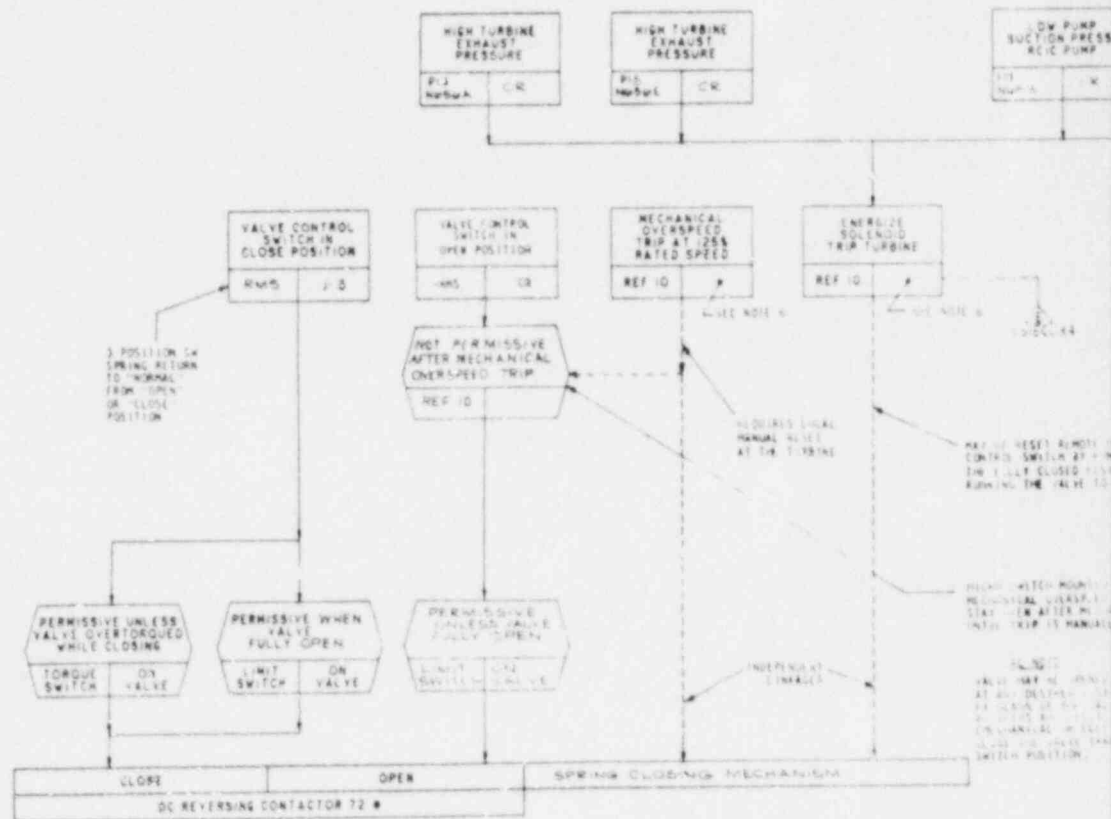
PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

RCIC System Functional Control Diagram

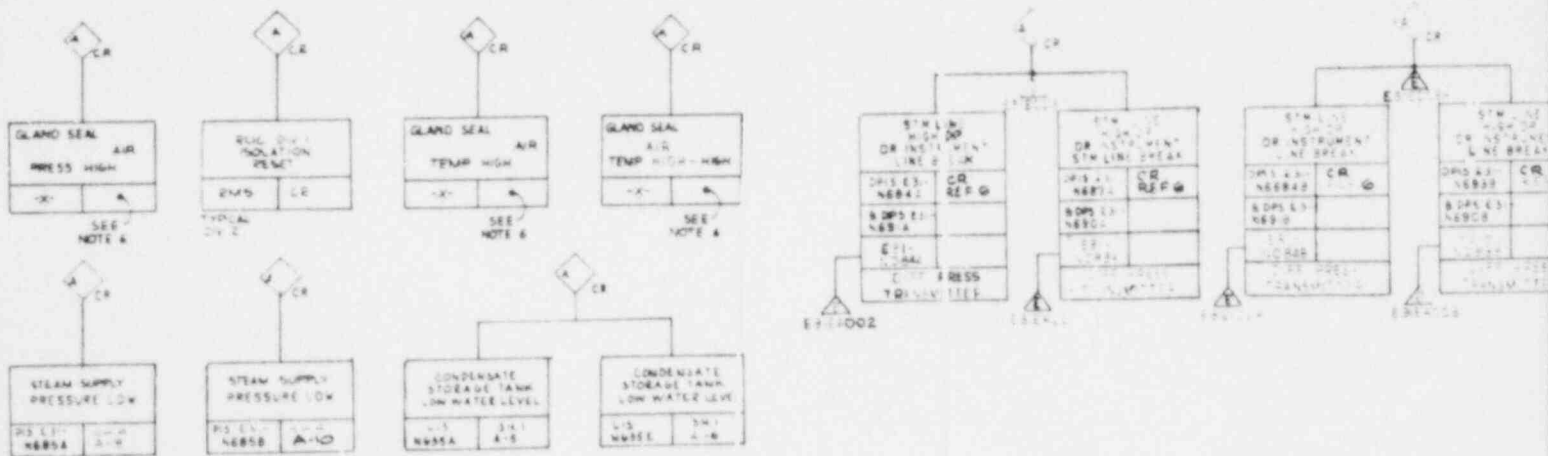
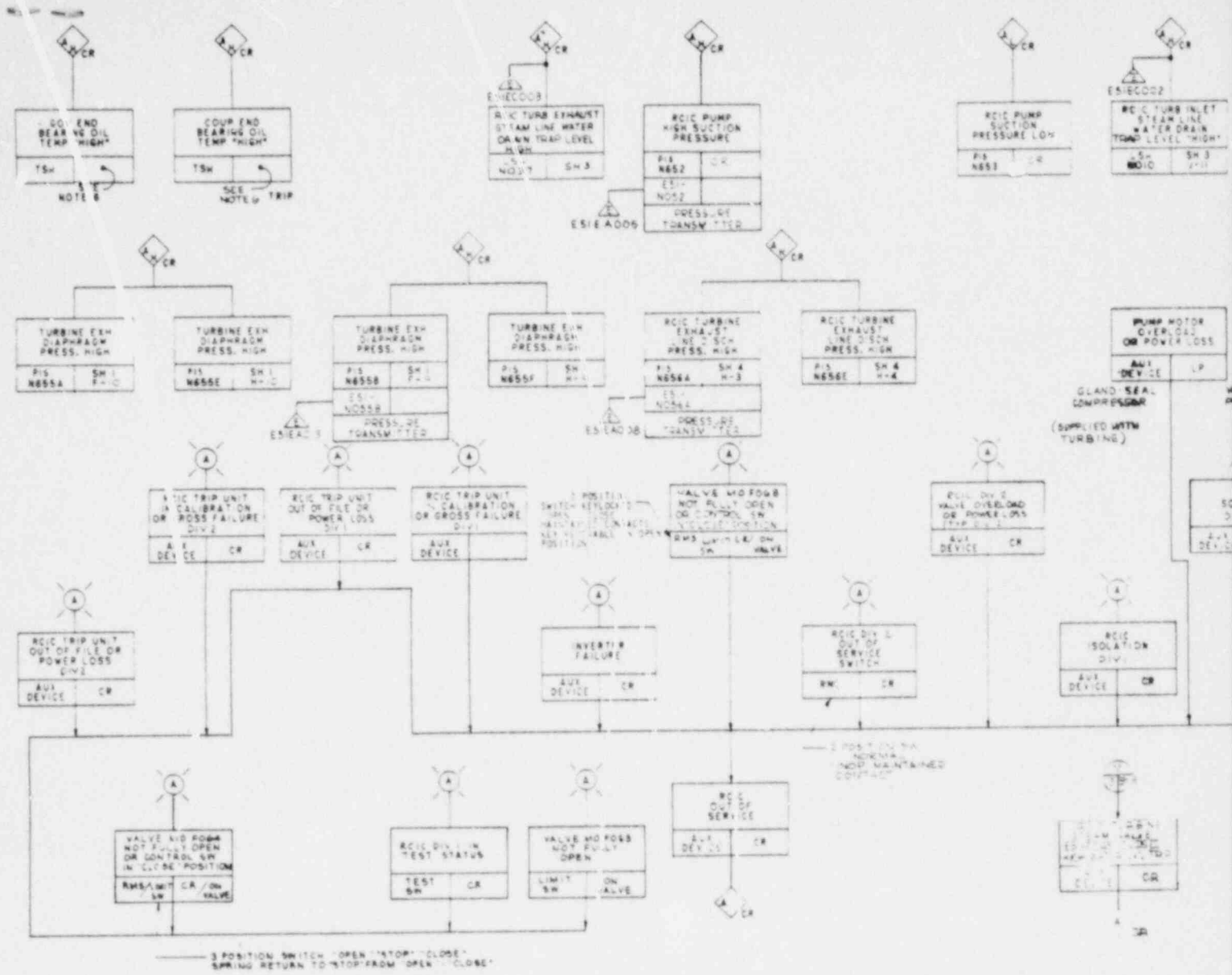
Figure 7.4-1 (Sheet 3 of 5)



VALVE MD F026 STEAM SUPPLY LINE ISOLATION VALVE INBOARD (SEE REF 22)



NOTE: OPERATED (PAIN) STOP CONTROL VALVE MD F026 (SEE REF 22)
FURNISHED AS PART OF TURBINE ASSEMBLY (REC. 10)
(SEE NOTE 14)



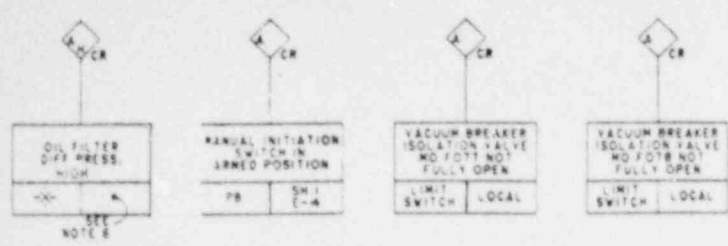


TABLE I

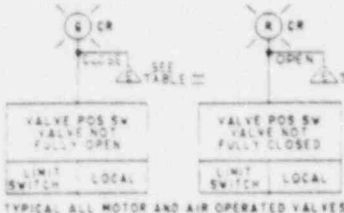
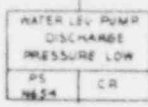
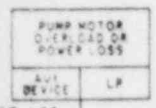
TRIP FUNCTION	INITIAL POSITION	RESET POSITION	TRIP ALARM
TURBINE OIL OIL PRESSURE LOW	PS 14	SEE NOTE 6	LOW
TURBINE OIL OIL PRESSURE HIGH	PS 14	SEE NOTE 6	LOW
TURBINE OIL OIL PRESSURE LOW	PS 14	SEE NOTE 6	LOW

TURBINE ADDITIONAL OPERATING ALARMS

TABLE II

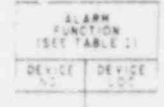
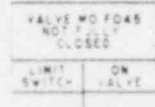
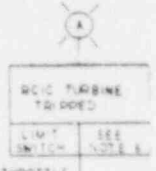
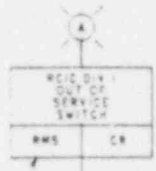
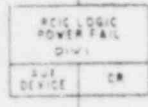
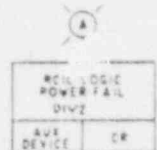
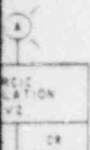
TRIP FUNCTION	INITIAL POSITION	TRIP ALARM
TURBINE OIL OIL PRESSURE LOW	PS 14	LOW
TURBINE OIL OIL PRESSURE HIGH	PS 14	LOW
TURBINE OIL OIL PRESSURE LOW	PS 14	LOW

TURBINE INDICATING LIGHTS



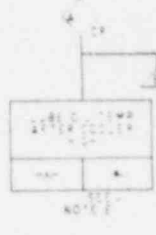
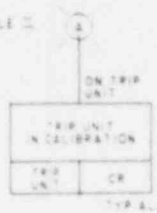
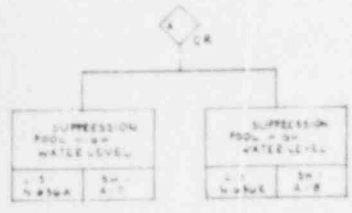
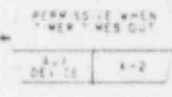
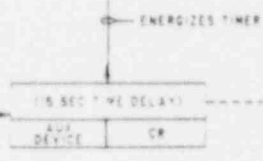
TYPICAL ALL MOTOR AND AIR OPERATED VALVES

WATER LEG PUMP LOSS



2 POSITION IN NORMAL AND MAINTAINED POS.

TIMER 15 SEC TIME DELAY



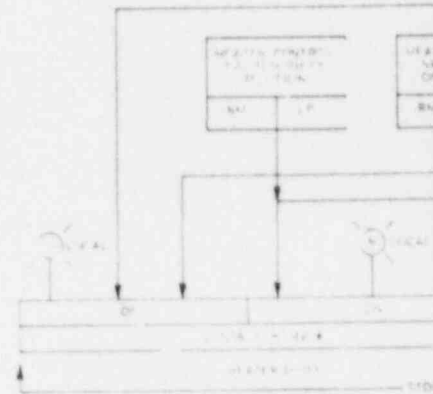
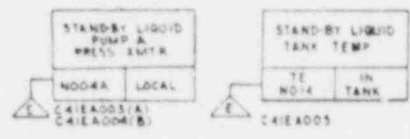
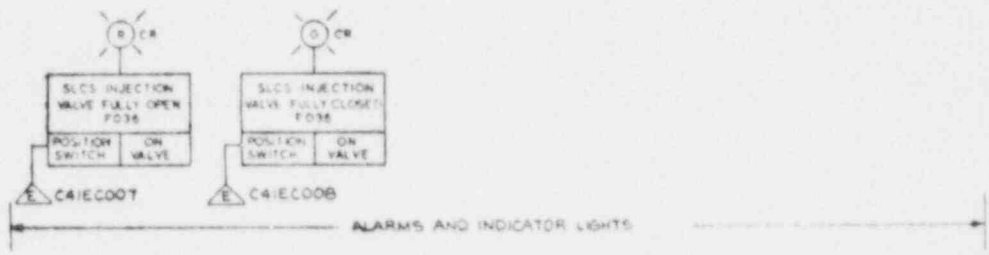
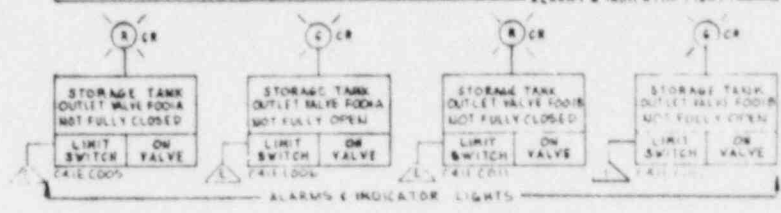
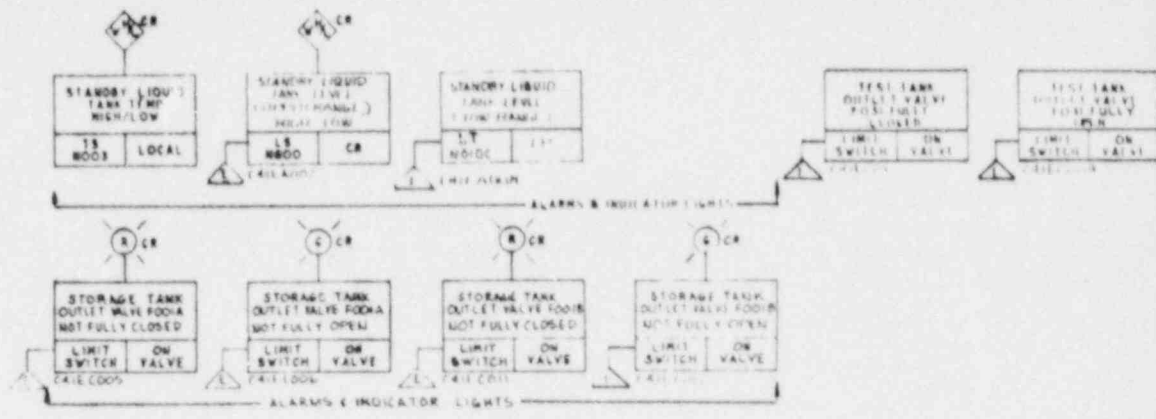
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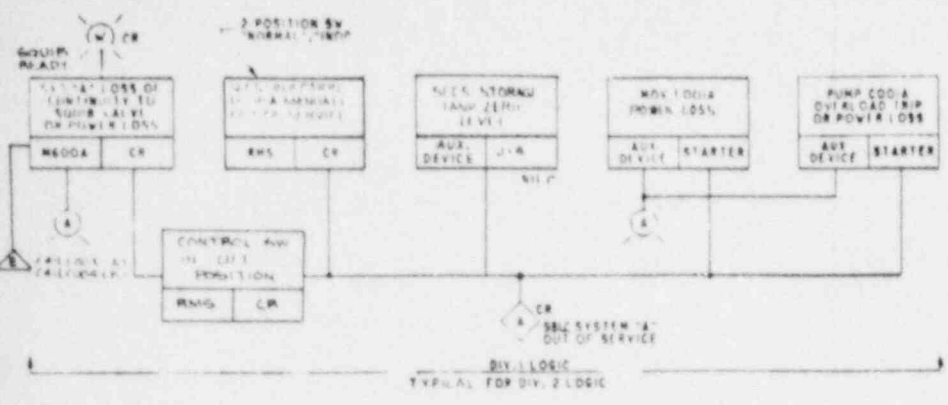
Also Available On Aperture Card

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PNPP PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

RCIC System Functional Control Diagram
Figure 7.4-1 (Sheet 5 of 5)





ILLUMINATING APERTURE RELATED

- NOTES:
1. EACH SYSTEM CONTROL SWITCH IS REYLOCKED IN OFF POSITION.
 2. CONTINUOUS MONITOR SHALL BE CURRENT LIMITED AND WIRED TO PREVENT ACCIDENTAL FUSES OR EXPLODED VALVES.
 3. APERTURE RELAYS AND RELAY TEST SIGNALS.
 4. STORAGE TANK OUTLET VALVES (100% A) ARE INTERLOCKED WITH THE TEST TANK OUTLET VALVE (100% B) TO PREVENT INJECTION OF CONTROL SOLUTION WHEN THE BALANCE IN THE SYSTEM IS TESTED DURING THE SYSTEM CONTROL SWITCH TO INJECT TEST TANK WATER INTO THE REACTOR.
 5. SYSTEM ELECTRICAL POWER SHALL BE PROVIDED FROM DIV. 2 & DIV. 3 BUSES WITH PUMP CAS LOGIC VALVE CAS LOGIC AND VALVE CAS LOGIC IN A DIFFERENT BUS THAN PUMP CAS LOGIC VALVE CAS LOGIC AND VALVE CAS LOGIC.
 6. MIXING AND OPERATING RELAYS ARE NOT FUNCTIONALLY REDUNDANT AND THIS APPLIES TO DIVISIONAL LOGIC & POWER.
 7. TEST TANK OUTLET VALVE SHALL HAVE TWO IDENTICAL LIMIT SWITCH CONFIGURATIONS: A & B IN A COMMON DIV. 1, DIV. 2 LOGIC.

- LEGEND:
- SWITCHGEAR DEVICE FUNCTION NUMBER ANSI SPEC CAT. 2.
 - △ EMERGENCY RESPONSE INFORMATION SYS.

SUPPLEMENTAL DOCUMENTS UNDER THE FOLLOWING IDENTIFIERS ARE TO BE USED IN CONJUNCTION WITH THIS DOCUMENT:

- 1. 441-1030 LOGIC SYMBOLS
- 2. 821-1030 NUCLEAR BOILER SYS FCD
- 3. C22-1030 RRCS FCD
- 4. C95-1030 ERIS ELEM DIAG

TI APERTURE CARD

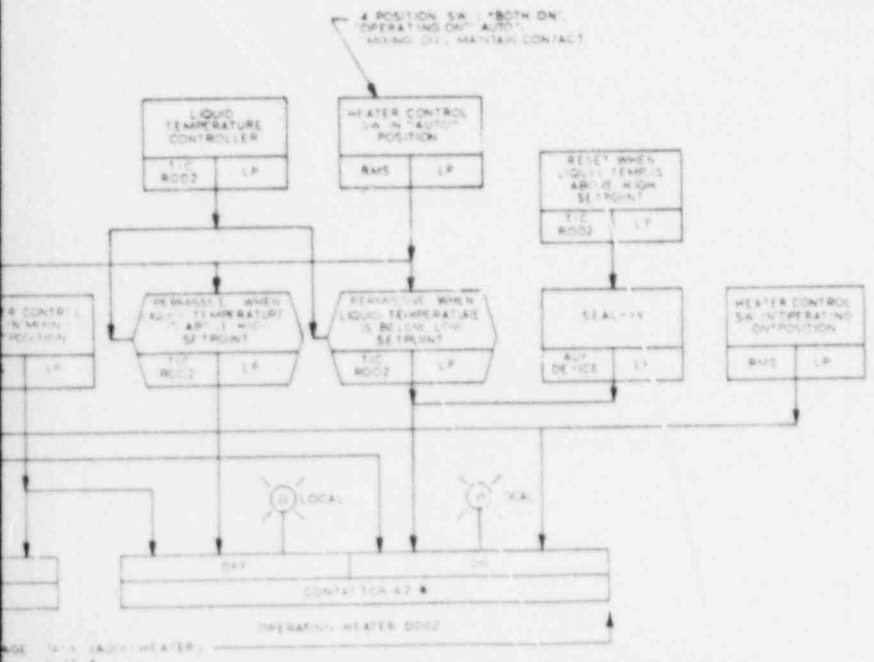
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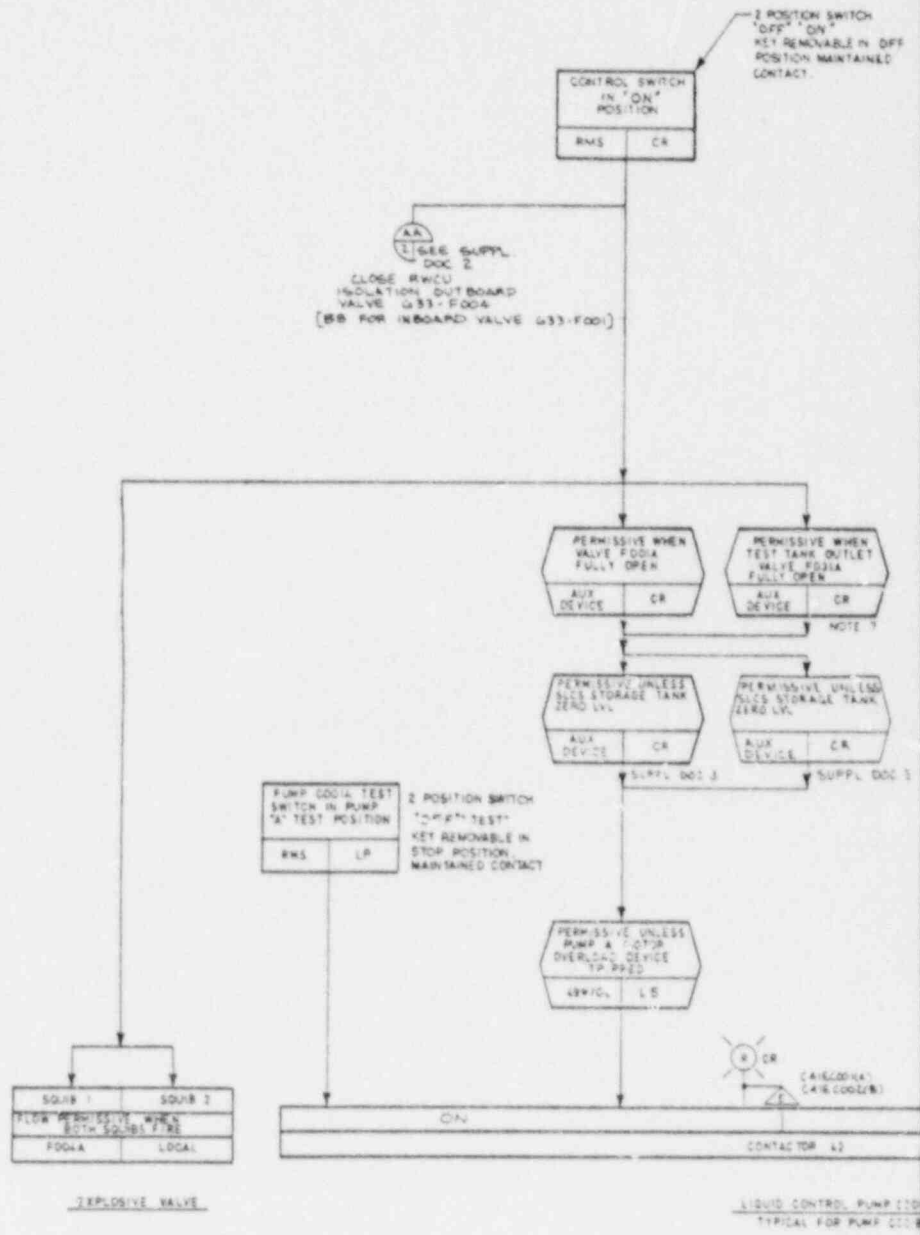
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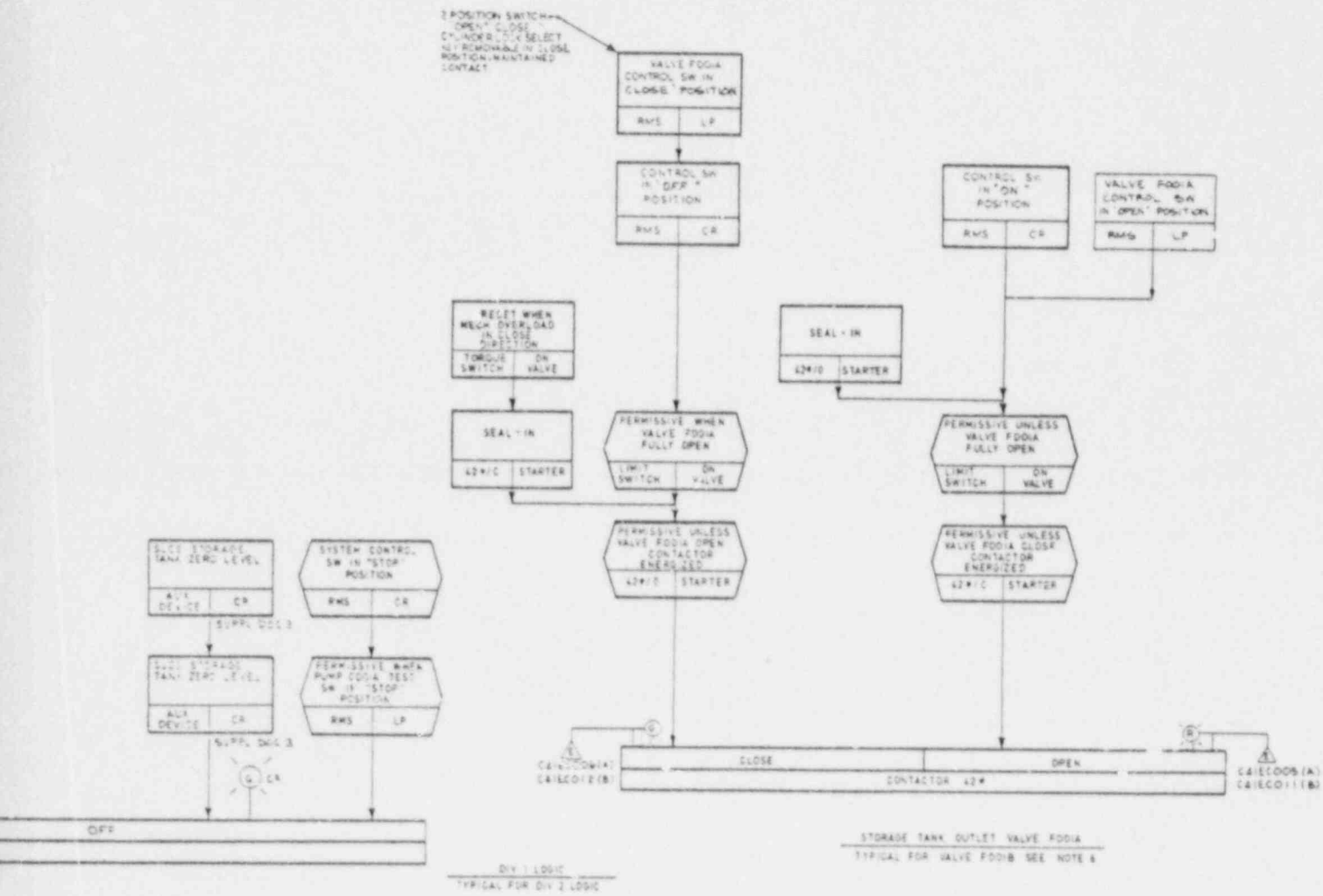
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PERRY NUCLEAR POWER PLANT
 THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

SLCS Functional Control Diagram
 Figure 7.4-2 (Sheet 1 of 2)







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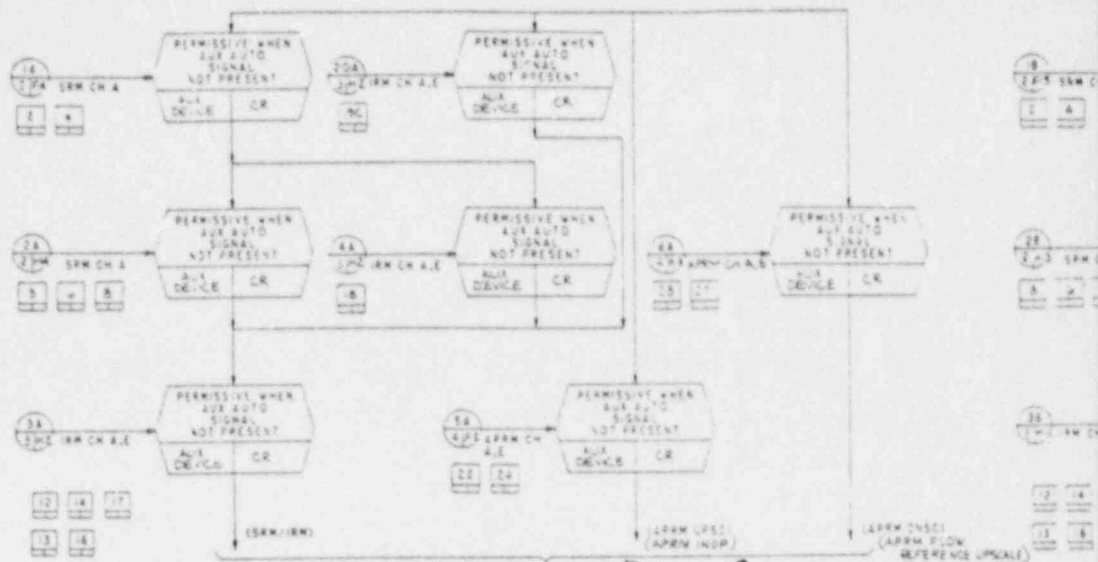
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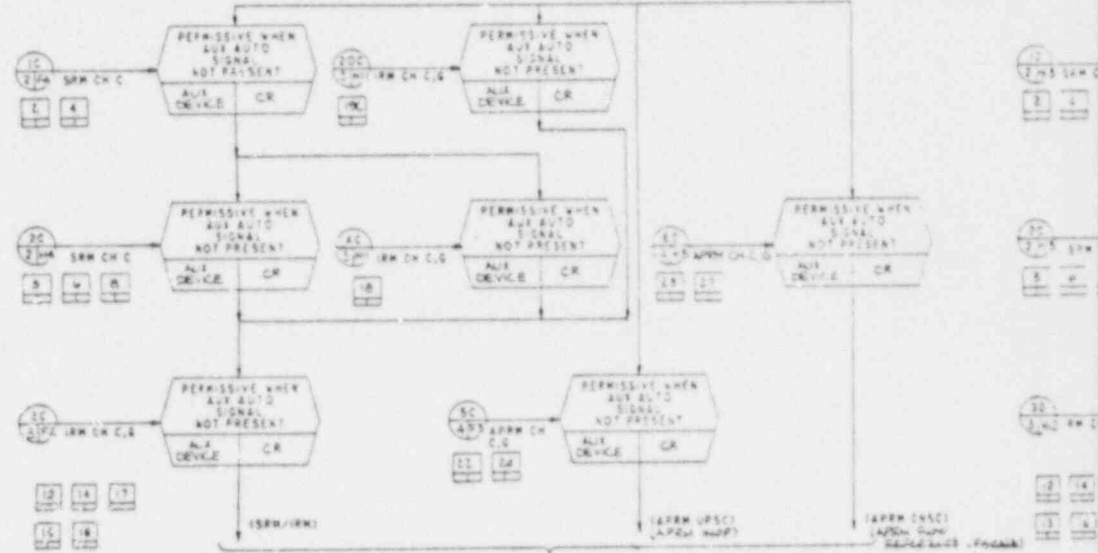


PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

SLCS Functional Control Diagram
Figure 7.4-2 (Sheet 2 of 2)



TO REF 2-CONTROL ROD WITHDRAWAL PERMITTED BY THESE FUNCTIONS IF SIGNAL PRESENT AT THIS POINT
 ROD WITHDRAWAL BLOCK B



TO REF 2-CONTROL ROD WITHDRAWAL PERMITTED BY THESE FUNCTIONS IF SIGNAL PRESENT AT THIS POINT
 ROD WITHDRAWAL BLOCK B

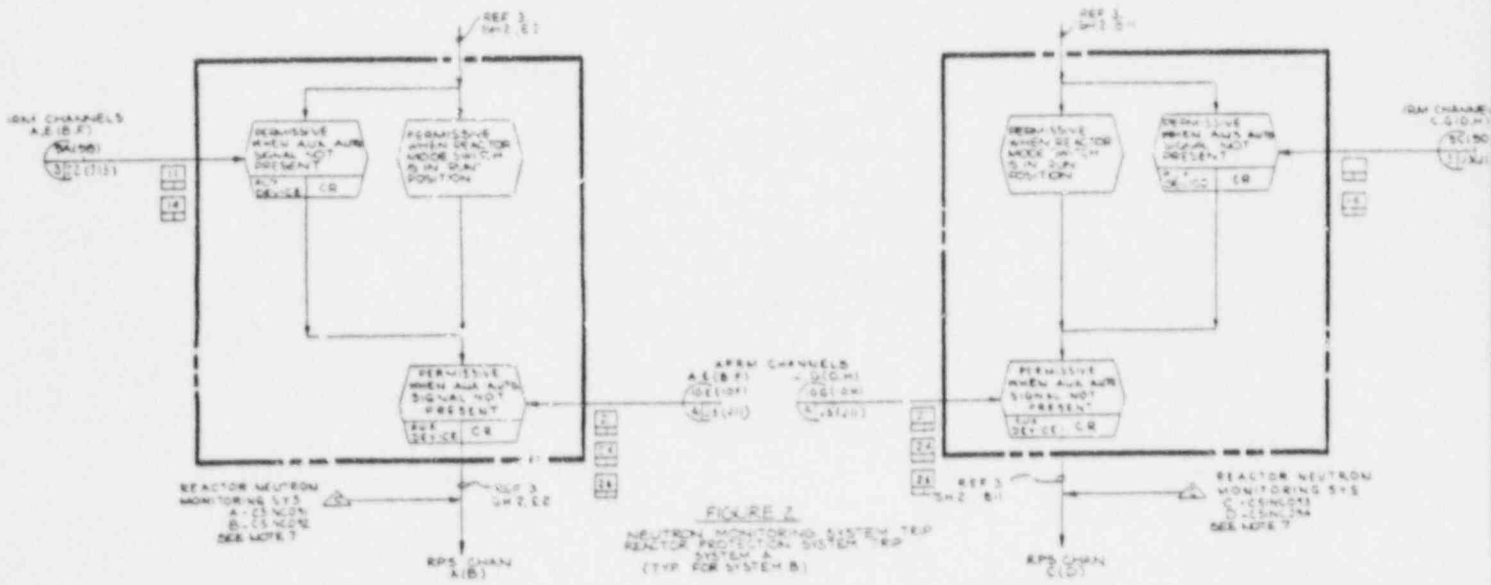
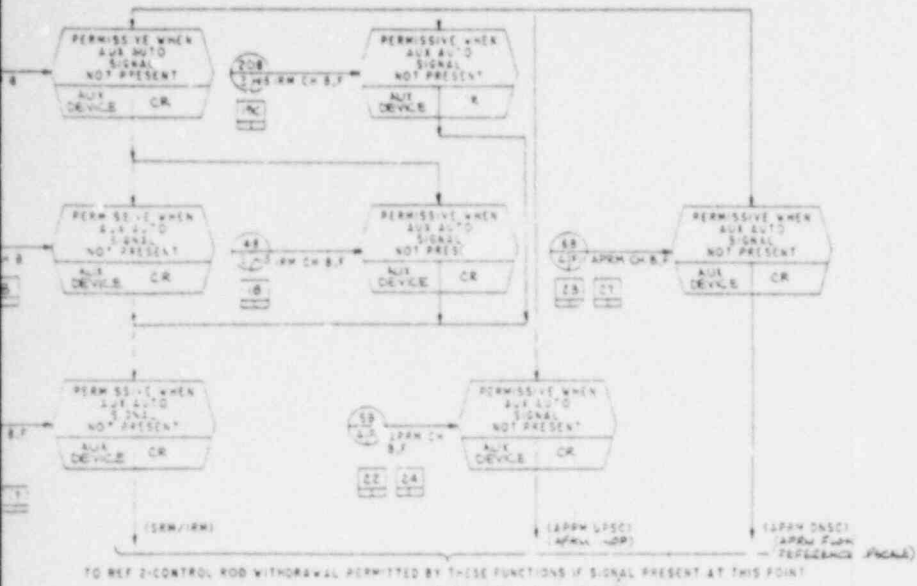


FIGURE 2
 NEUTRON MONITORING SYSTEM TRIP
 REACTOR PROTECTION SYSTEM TRIP
 (TRIP FOR SYSTEM B)



- NOTES:**
1. INPUTS TO COMPUTER ARE ISOLATED CLOSE TO ALARM CONTACTS.
 2. IN THE EVENT THAT POWER IS LOST, THE FOLLOWING ACTIONS WILL BE INITIATED AFTER POWER IS RESTORED:
 - A. IN AUTOMATIC MODE, DETECTOR RETURN TO 100% VIA AUTOMATIC MODE PATH. DETECTOR MUST THEN BE RETURNED TO STORAGE POSITION TO REPROGRAM DETECTOR.
 - B. IN MANUAL MODE, MUST RETURN VIA MANUAL SWITCH IN REVERSE AND RETURN TO STORAGE POSITION TO REPROGRAM DETECTOR.
 3. THE TIME DURATION OF THE PERMISSIVES ASSOCIATED WITH COMPUTER INTERFACE SHALL BE COMPATIBLE WITH THE ASSOCIATED COMPUTER.
 4. THE ENTIRE NEUTRON MONITORING SYSTEM IS A FULLY AUTOMATIC SYSTEM EXCEPT FOR MANUAL OPERATED SWITCHES.
 5. ALL EQUIPMENT & INSTRUMENTS ARE PREFIXED BY CS UNLESS OTHERWISE NOTED.
 6. CHANNELS A, C, E & G ARE FOR TRIP SYSTEM A. CHANNELS B, D, F & H ARE FOR TRIP SYSTEM B.
 7. CROSS REFERENCE CHART FOR PERFORMANCE MONITORING SYSTEM (PMS) COMPUTER INPUT/OUTPUT NUMBERS FOR PMS INPUT/OUTPUT LIST CS-14030. NOT ALL PMS I/O POINTS INCLUDED. REFER TO CS-14030 FOR COMPLETE LISTING (PMS Dyn. 9/1/69)

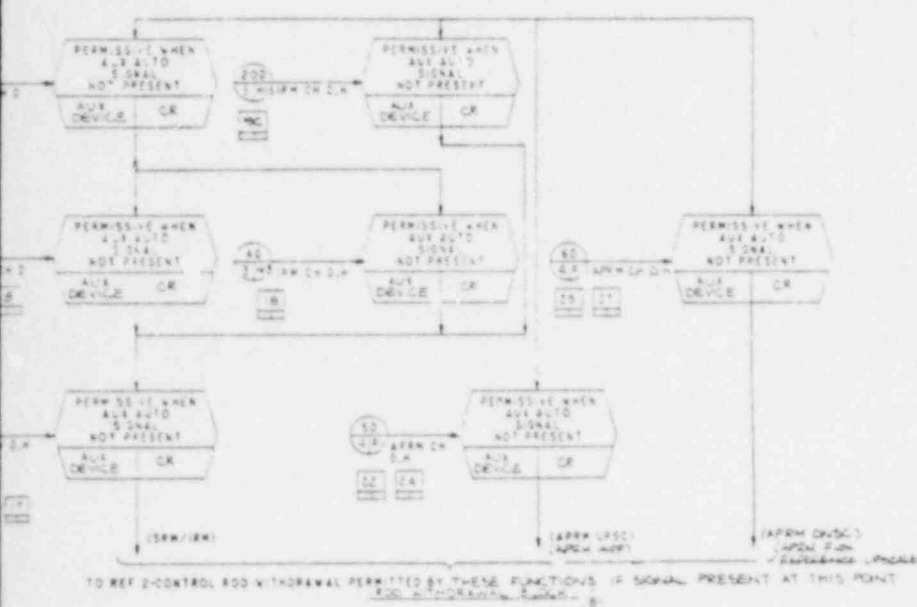
△ ROD WITHDRAWAL BLOCKING SUBJECT TO BYPASSING AT SUBSYSTEM LEVEL - SEE SHEETS 2, 3, 4 & 5.

- LEGEND**
- - INITIATOR BLOCK (SEE DETAILS CORRESPONDING WITH NUMBERS)
 - IRM - INTERMEDIATE RANGE MONITOR
 - APRM - AVERAGE POWER RANGE MONITOR
 - SRM - SOURCE RANGE MONITOR
 - LPRM - LOCAL POWER RANGE MONITOR
 - TRP - TRAVELING WINDING PROBE
 - MOC - MULTIPLE OUTPUT CONTROLLER
 - RPV - REACTOR PRESSURE VESSEL
 - △ - EMERGENCY RESPONSE INFORMATION SYSTEM

- REFERENCE DOCUMENTS**
- | | |
|--|----------|
| 1. PERFORMANCE MONITORING SYSTEM DESIGN SPEC | CS-14010 |
| 2. CONTROL ROD DRIVE HYD SYS FCD | CS-14020 |
| 3. REACTOR PROTECTION SYS RES | CS-14030 |
| 4. REDUNDANT REACTIVITY CONTROL SYS FCD | CS-14030 |
| 5. ERS ELEMENTARY DIAGRAM | CS-1000 |
| 6. PERFORMANCE MONITORING SYS I/O LIST | CS-14030 |

- SUPPORTING DOCUMENTS**
- 1. LOGIC SYMBOLS - CS-1000

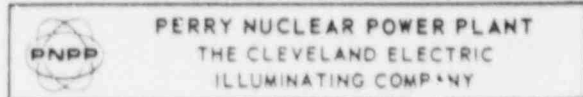
- LEGEND (CONT)**
- DCU - DRIVE CONTROL UNIT
 - △ - COMPUTER INPUT



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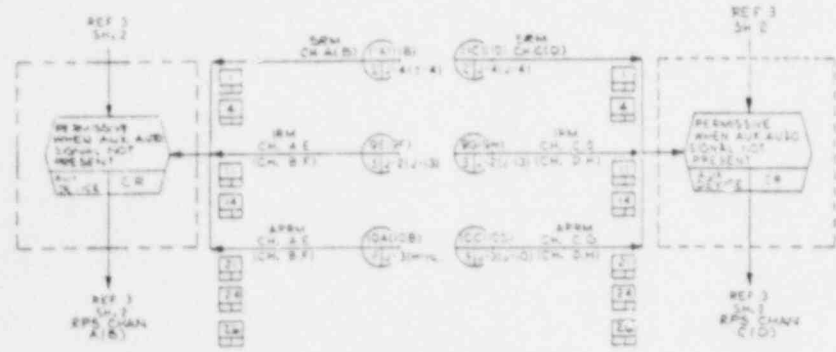
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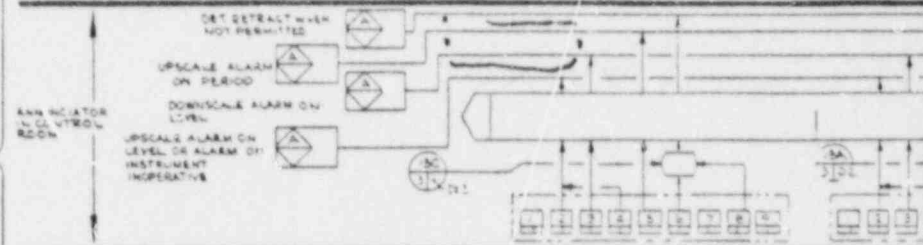
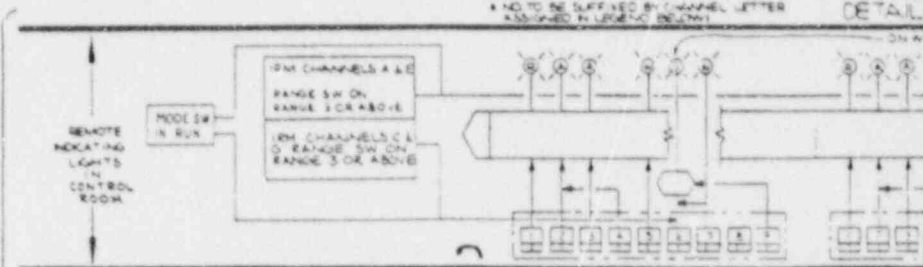
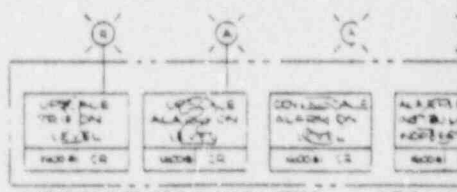
Neutron Monitoring System Functional Control Diagram

Figure 7.6-2 (Sheet 1 of 7)

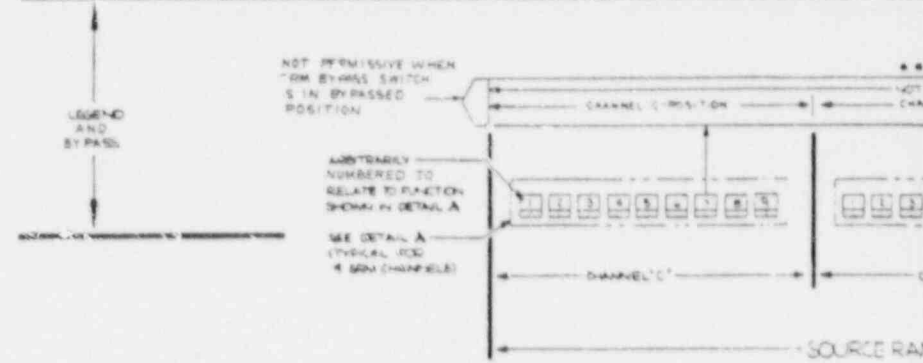
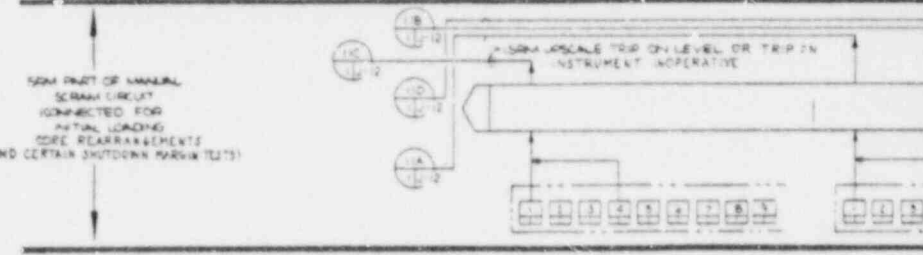
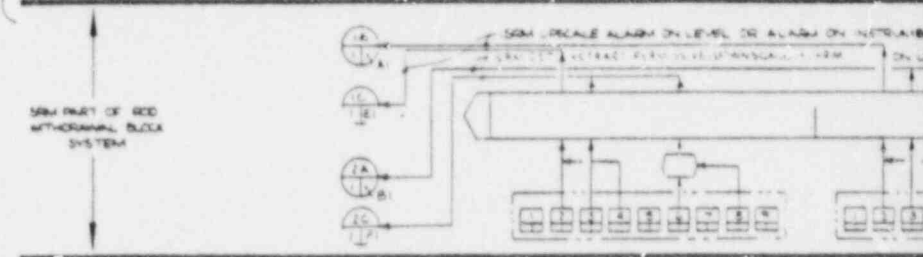
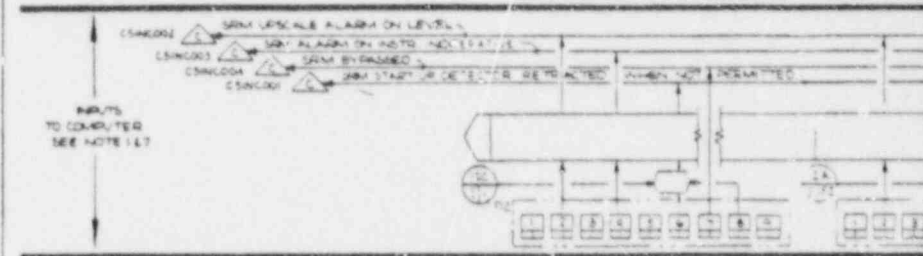


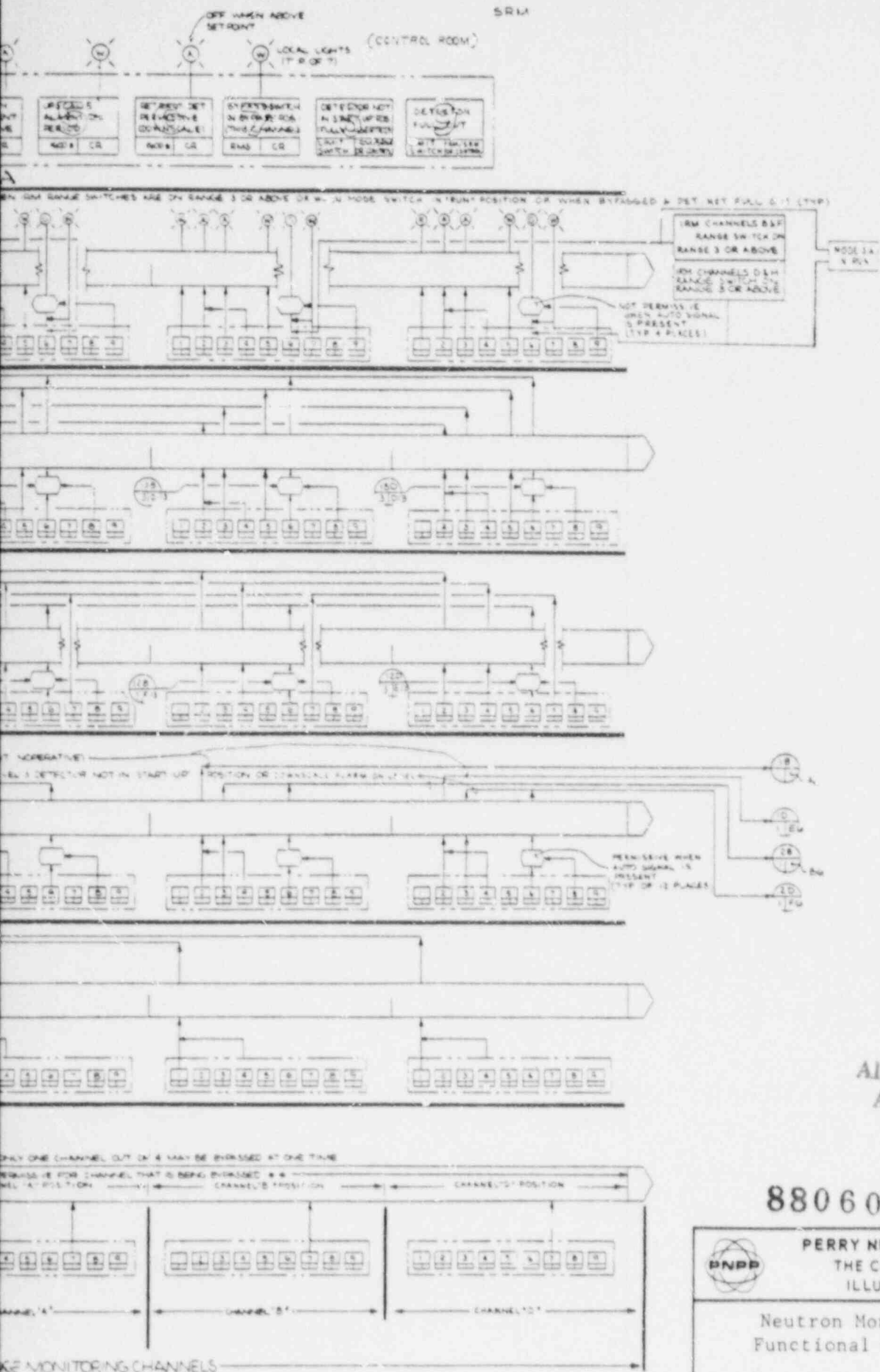
NEUTRON MONITORING SYSTEM NON-COINCIDENT TRIP SIGNALS (PMS) ARE PLANNED FOR THE REACTOR PROTECTION SYSTEM (RPS) (TRIP SYSTEM A) (TRIP SYSTEM B)

FIGURE 3



NOT PERMISSIVE WHEN REACTOR MODE SW IN 'RUN' POSITION





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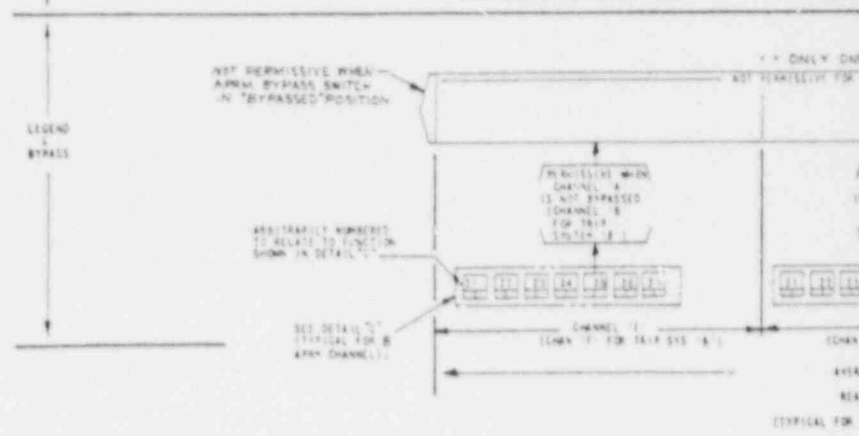
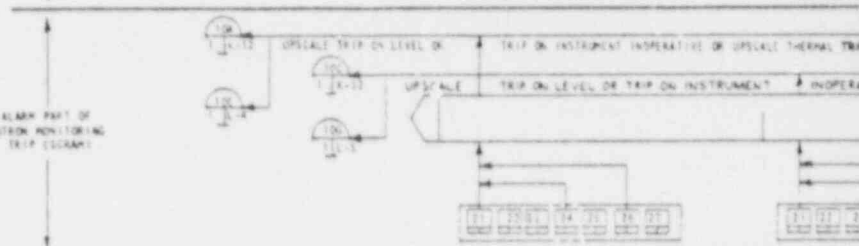
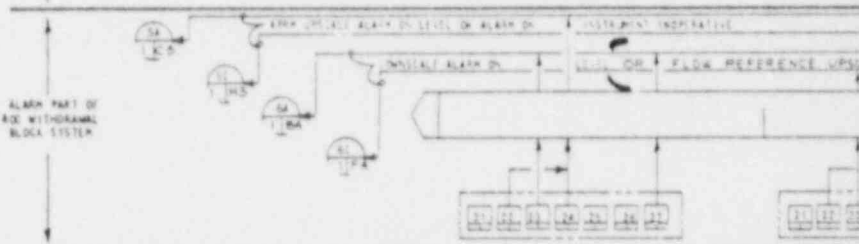
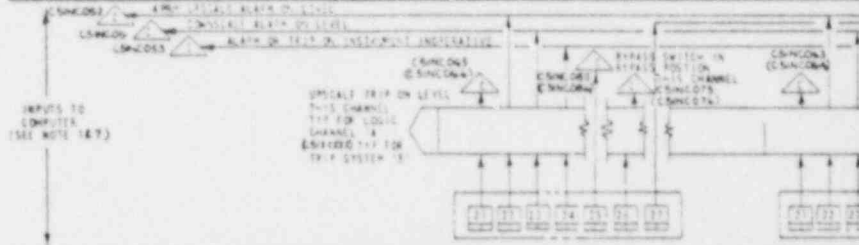
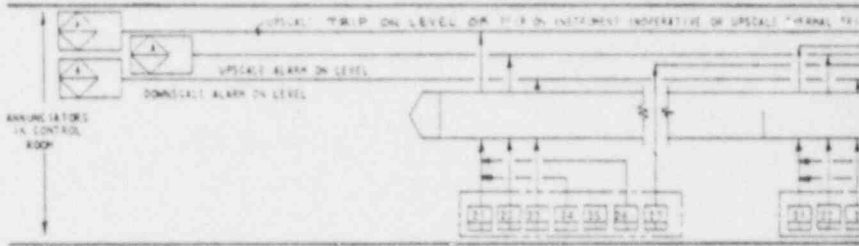
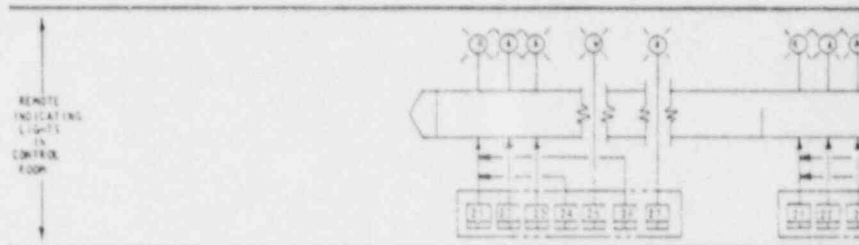
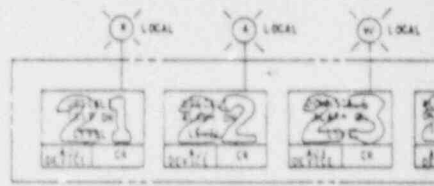
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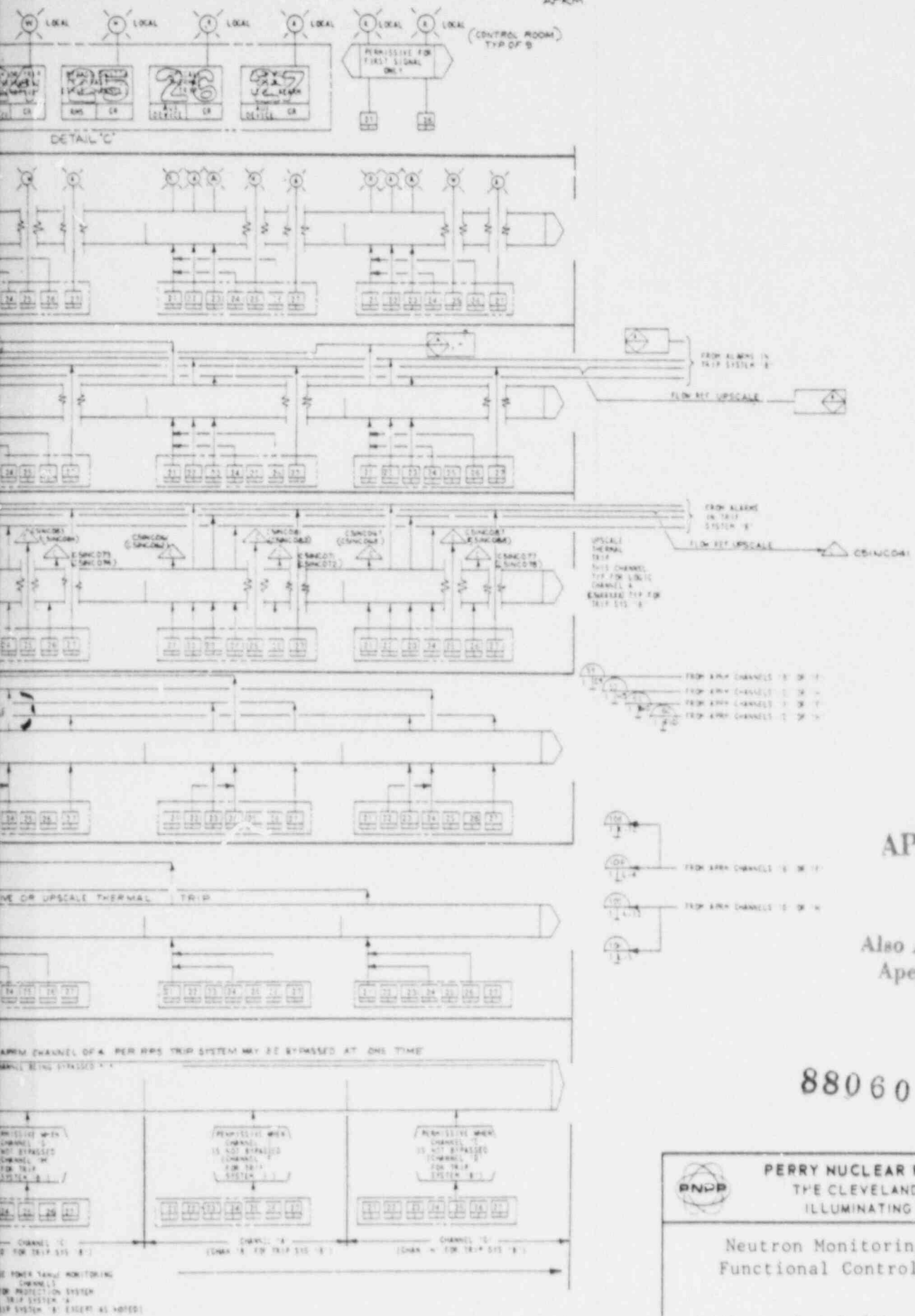
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PNPP PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

Neutron Monitoring System
Functional Control Diagram

Figure 7.6-2 (Sheet 2 of 7)






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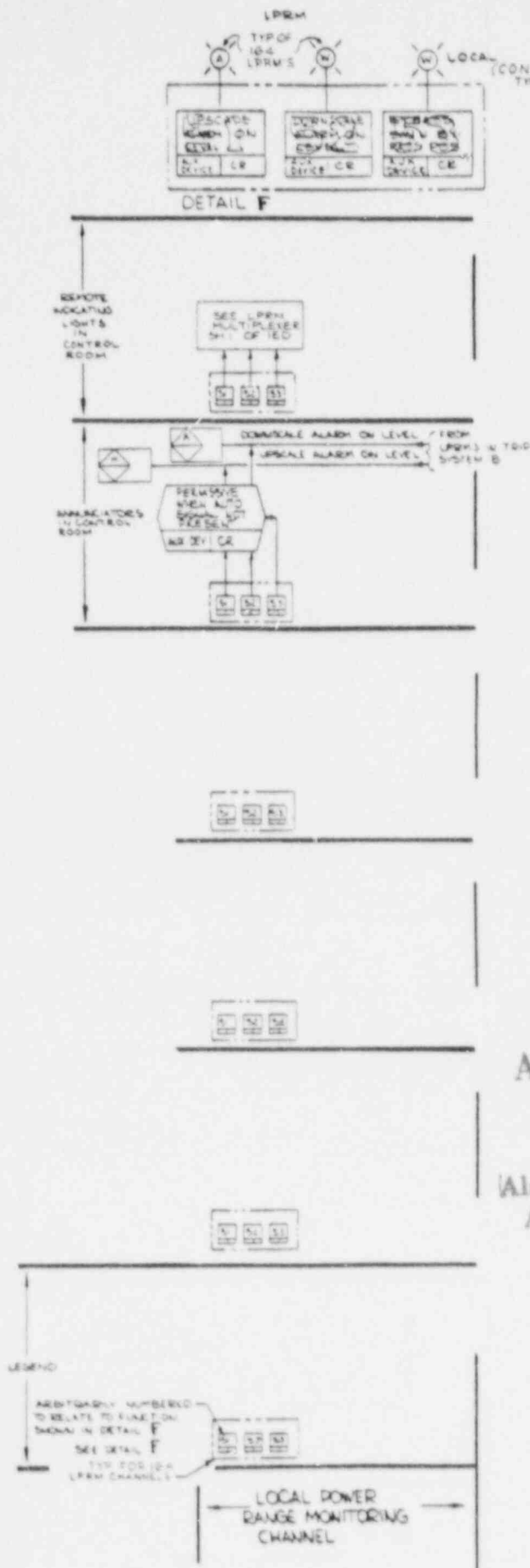
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

Neutron Monitoring System
Functional Control Diagram

Figure 7.6-2 (Sheet 4 of 7)



PERFORMANCE MONITORING SYSTEM
COMPUTER INPUT/OUTPUT NUMBERS
(NOTE 7)

CBIN001
 CBIN002
 CBIN003
 CBIN004
 CBIN005
 CBIN006
 CBIN007
 CBIN008
 CBIN009
 CBIN010
 CBIN011
 CBIN012
 CBIN013
 CBIN014
 CBIN015
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 CBIN114
 CBIN115
 CBIN116
 CBIN117
 CBIN118
 CBIN119
 CBIN120


CBINP01
 CBINP02

SPARE0
 CBINL00
 CBINL01
 CBINL02
 CBINL03
 CBINL04
 CBINL05
 CBINL06
 CBINL07
 CBINL08
 CBINL09
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APERTURE
CARD

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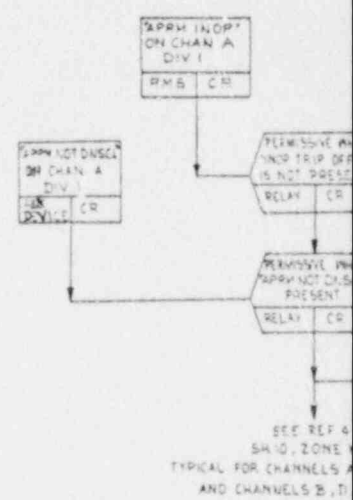
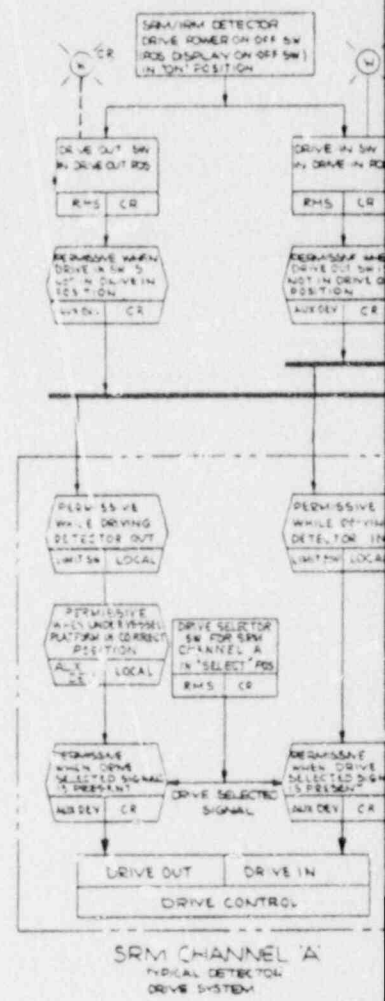
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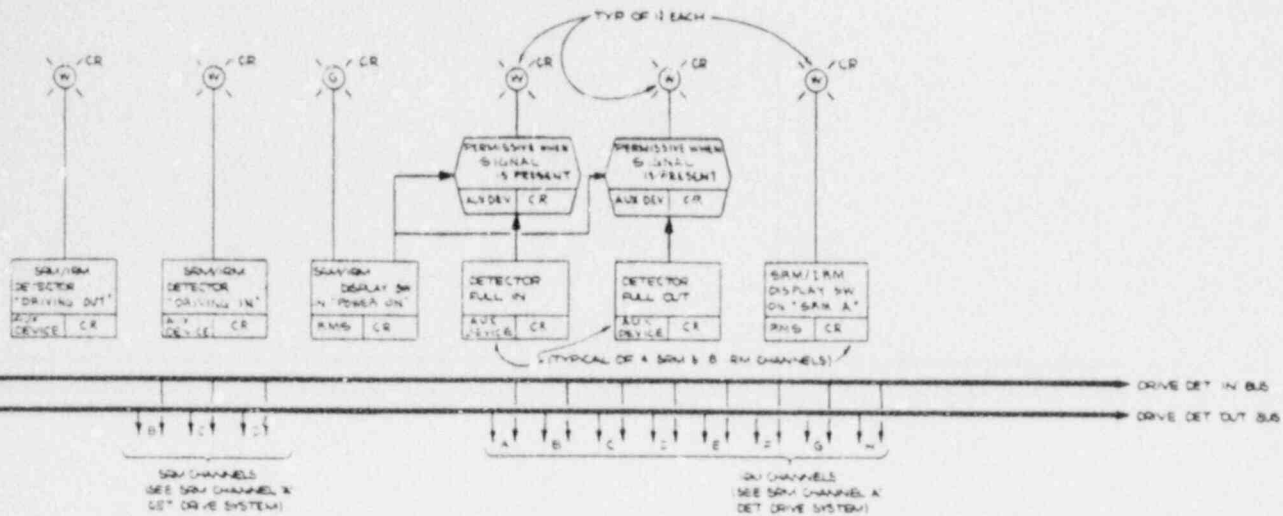


PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
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Neutron Monitoring System
Functional Control Diagram

Figure 7.6-2 (Sheet 5 of 7)






SOURCE RANGE MONITOR / INTERMEDIATE RANGE MONITOR
DETECTOR DRIVE SYSTEM

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Aperture Card

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	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	Neutron Monitoring System Functional Control Diagram
Figure 7.6-2 (Sheet 6 of 7)	

INPUTS TO RRCS

(C,E,B, DIV 1 (RRCS)
F,H, DIV 2 (RRCS))

HIGH DOME PRESSURE
(NOT SEALED IN)

LOW WATER LEVEL 2 TRIP
(NOT SEALED IN)

RPCS MANUAL INITIATION
(NOT SEALED IN)

MR. KAPUC INITIATION

MR. RES-1

HIGH DOME

HIGH DOME PRESSURE
(SEALED IN)

LOW WATER LEVEL 2 TRIP
(SEALED IN)

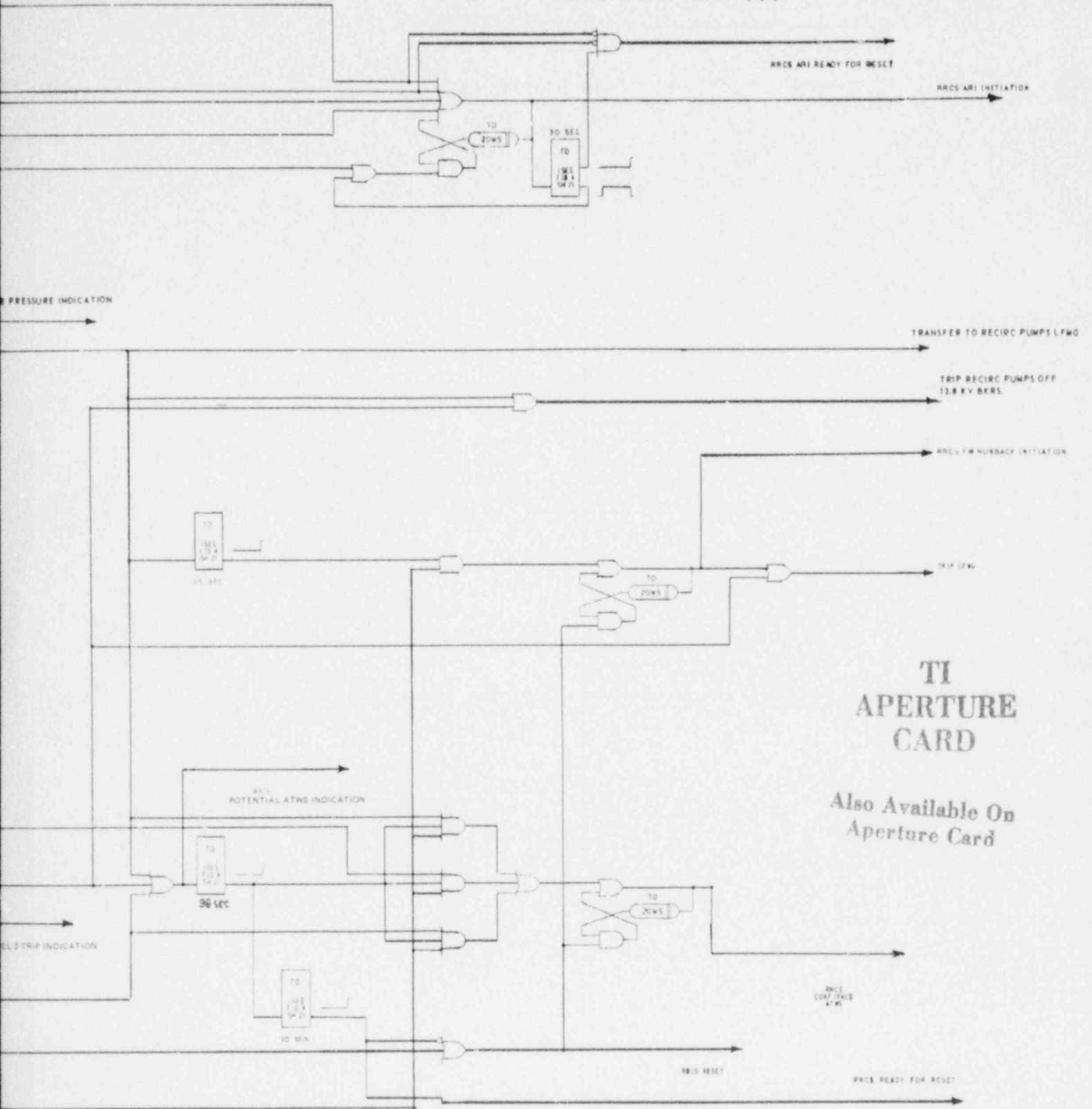
LOW WATER LEVEL

RPCS MANUAL INITIATION
(SEALED IN)

MRCS RES-1

MRCS NOT-DOWNSCALE TRIP

TYPICAL OF LOGIC CHANNELS A,B,C,D



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	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	RRCS Initiation Logic Figure 7.6-8

TABLE 1

TIME DEPENDENT INTERMEDIATE VARIABLES		
SYM	DESCRIPTION	DEFINITION
T	INTERNALLY GENERATED TIME REFERENCE FUNCTION	
TIC	INSERT CYCLE ACTIVE	<p>ABSCISSA INDICATES TIME ELAPSED WHILE ADVANCING THE INSERT CYCLE IS CONTROLLED BY IIC AND IIT AS FOLLOWS:</p> <ol style="list-style-type: none"> 1. WHEN IIC IIT = 1 THE CYCLE IS ADVANCING WITH TIME. 2. WHEN IIC = 0, THE CYCLE IS RESET TO 10. 3. WHEN IIC IIT = 1, THE CYCLE STOPS, BUT DOES NOT RESET.
TII	INSERT PERIOD OF INSERT CYCLE	
TIS	SETTLE PERIOD OF INSERT CYCLE	
-	POD INSERT CONTROL	
-	NETTLE CONTROL	
TOC	WITHDRAW CYCLE ACTIVE	<p>ABSCISSA INDICATES TIME ELAPSED WHILE ADVANCING THE WITHDRAW CYCLE IS CONTROLLED BY IOC AND IOT AS FOLLOWS:</p> <ol style="list-style-type: none"> 1. WHEN IOC IOT = 1, THE CYCLE IS ADVANCING WITH TIME. 2. WHEN IOC = 0, THE CYCLE IS RESET TO 10. 3. WHEN IOC IOT = 1, THE CYCLE STOPS, BUT DOES NOT RESET.
TOI	INSERT PERIOD OF WITHDRAW CYCLE	
TOD	WITHDRAW PERIOD OF WITHDRAW CYCLE	
-	UNLATCH CONTROL	
-	ROD WITHDRAW CONTROL	
-	SETTLE CONTROL	

SEE TABLE 2

TABLE 3

SYSTEM PERFORMANCE					
	INTERVAL	PARAMETER (SEE TABLE 2)	VALUE	MAX ALLOWED TIMES TO ASSURE PROPER DRIVE PERFORMANCE	UNITS
INSERT CYCLE	TIME DELAY TO POD INSERT CONTROL	121	0.42	---	SEC
	POD INSERT CONTROL	122-121	2.90	2.5-3.1	SEC
	SWITCHING OVERLAP	122-131	0.10	0.0-1.5	SEC
	SETTLE CONTROL	132-122	5.30	4.2-6.3	SEC
WITHDRAW CYCLE	TIME DELAY TO UNLATCH CONTROL	151	0.42	---	SEC
	UNLATCH CONTROL	152-151	0.60	0.5-0.8	SEC
	INTERVAL BETWEEN UNLATCH AND SETTLE CONTROL	161-152	0.10	0.0-0.15	SEC
	POD WITHDRAWAL CONTROL	162-161	1.50	1.3-1.7	SEC
	SWITCH OVERLAP FROM WITHDRAWAL TO SETTLE CONTROL	162-171	0.10	0.0-1.5	SEC
	SETTLE CONTROL	172-162	6.00	4.2-6.3	SEC

SYMBOL
 10
 F1
 G0
 G1
 G2
 G3
 G4
 G5
 G6
 G7
 G8
 G9
 H0
 H1
 H2
 H3
 H4
 H5
 H6
 H7
 H8
 H9
 I0
 I1
 I2
 I3
 I4
 I5
 I6
 I7
 I8
 I9
 J0
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 Y4
 Y5
 Y6
 Y7
 Y8
 Y9
 Z0
 Z1
 Z2
 Z3
 Z4
 Z5
 Z6
 Z7
 Z8
 Z9

TABLE 2

SYSTEM PARAMETER VALUES				
	PARAMETER	VALUE	TOLERANCE	UNITS
INSERT CYCLE	111	0.34	± 0.02	SEC.
	112	9.16		
	121	0.42		
	122	3.92		
	131	3.22		
	132	8.62	± 0.02	SEC.
WITHDRAW CYCLE	141	0.34	± 0.02	SEC.
	142	9.16		
	151	0.42		
	152	1.02		
	161	1.12		
	162	2.62		
	171	2.52		
	172	8.82	± 0.02	SEC.

INSERT CYCLE

- 121-111 = DELAY UNTIL ROD MOTION BEGINS
- 122-121 = DRIVE IN TIME
- 132-122 = SETTLE TIME
- 10 F11-122.1 = TIME WHEN CONTINUOUS INSERT CAN BE REQUESTED
- 131 F11-122.1 = CYCLE STOP POINT FOR CONTINUOUS INSERT

WITHDRAW CYCLE

- 151-141 = DELAY UNTIL ROD MOTION BEGINS
- 152-151 = DRIVE IN TIME (UNLATCH)
- 161-152 = DELAY AFTER UNLATCH
- 162-161 = DRIVE OUT TIME
- 172-162 = SETTLE TIME
- 10 C11-162.1 = TIME WHEN CONTINUOUS WITHDRAW CAN BE REQUESTED
- 171 C11-162.1 = CYCLE STOP POINT FOR CONTINUOUS WITHDRAW

TABLE 4

DESCRIPTION
ROD BEING CONTINUOUSLY WITHDRAWN ALL RODS FULLY IN
ROD WITHDRAWAL IS REQUESTED
ROD INSERT REQUESTED
NOTCH OVERRIDE ROD WITHDRAWAL REQUESTED
CONTINUOUS ROD INSERT REQUESTED
SCRAM DISCHARGE VOLUME HIGH LEVEL TRIP "BYPASS" REQUESTED
SCRAM DISCHARGE VOLUME HI WATER LEVEL
ANY ROD SELECTED
ROD WITHDRAWAL IS REQUESTED
ROD INSERT REQUESTED
IN-CLOCK IS ACTIVE
A ROD IS IN MOTION
REFUEL ROD SELECT IS INHIBITED
REFUEL PLATFORM CONTROL PERMISSIVE
REACTOR SYSTEM MODE SWITCH IN START-UP
REACTOR SYSTEM MODE SWITCH IN "REFUEL" SHARD MODE
REACTOR WITHDRAW MODE SWITCH IN "RUN"
NMS DOWNSCALE PERM EQUIPMENT IS IN THE ROD WITHDRAWAL PERMITTED STATE
NWS UPSCALE PERM EQUIPMENT IS IN THE ROD WITHDRAWAL PERMITTED STATE
NMS STARTUP RESERVE EQUIPMENT IS IN THE ROD WITHDRAWAL PERMITTED STATE
ROD MOTION PERMISSIVE
PPS IS OPEXABLE
REFUEL PLATFORM OVER CORE AREA
REFUEL PLATFORM GRAPPLE LOADED
REQUESTED ROD IDENT
ROD IS BEING DRIVEN
INSERT CYCLE ACTIVE
INSERT PERIOD OF INSERT CYCLE
SETTLE PERIOD OF INSERT CYCLE
WITHDRAW CYCLE ACTIVE
INSERT PERIOD OF WITHDRAWN CYCLE
WITHDRAW PERIOD OF WITHDRAWN CYCLE
SETTLE PERIOD OF WITHDRAWN CYCLE

LEGEND:

- * = SWITCHGEAR DEVICE FUNCTION NUMBER ANSI SPEC 317.2
- RMS = REMOTE MANUAL SWITCH
- RPI = ROD POSITION INFORMATION SYSTEM
- NMS = NEUTRON MONITORING SYSTEM
- PRM = POWER RANGE MONITOR

- △ = PMS INPUT (PERFORMANCE MONITORING SYSTEM)
- L.P.S.P. = LOW POWER SET POINT
- H.P.S.P. = HIGH POWER SET POINT
- R.P.C. = ROD PATTERN CONTROLLER

- ⊠ = EMERGENCY RESPONSE INFORMATION SYSTEM

NOTES:

- EACH CRD MECHANISM, AS IT TRAVELS UP (INSERTED) OR DOWN (WITHDRAWN), ACTIVATES INTERNAL POSITION SWITCHES. THE TOP TWO POSITION SWITCHES ARE CALLED "FULL-IN" AND THE BOTTOM TWO POSITION SWITCHES ARE CALLED "FULL-OUT" (DISCONNECTED), RESPECTIVELY. SWITCHES IN BETWEEN ARE DIVIDED INTO ODD (DRIFT) AND EVEN (LATCH) POSITIONS. AS THE ROD TRAVELS OVER ANY SWITCH AN INDICATING SIGNAL IS ACTUATED. ANY EVEN SWITCH WILL INDICATE NUMERIC POSITION (e.g., 00, 02, ..., 48) AND ANY ODD SWITCH WILL INDICATE "ODD".
- WIRING FROM HCU (SCRAM VALVES AND ACCUMULATOR) TO CONTROL ROOM FOR ANNUNCIATION SHALL BE IN SERIES CONNECTION FOR ALL HCU'S.
- WIRING FROM HCU (ROD SCRAM TEST SWITCH IN TEST POSITION) SHALL BE IN SERIES CONNECTION FOR ALL HCU'S.
- EACH ACCUMULATOR FAILURE WILL INITIATE AN ANNUNCIATION (ANNUNCIATOR HORN & FLASHING ANNUNCIATOR WINDOW) AND AN INDIVIDUAL FLASHING INDICATOR (PART OF THE WHOLE CORE DISPLAY). OPERATION OF THE "ACCUMULATOR TROUBLE ACKNOWLEDGE" SWITCH WILL CLEAR THE INPUT TO THE ANNUNCIATOR AND CHANGE THE INDIVIDUAL INDICATOR FROM FLASHING TO STEADY. CLEARING THE ACCUMULATOR TROUBLE WILL CLEAR THE INDIVIDUAL INDICATORS.
- SEE TABLE 4 FOR DEFINITIONS OF VARIABLES APPEARING ON THIS FCD.
- A LOGICAL "1" INDICATES A FAILED COMPARISON.
- GROUP I THRU 10 REFERS TO ROD ASSIGNMENTS WHICH ARE PRE-DETERMINED AND FIXED.
- TERMS F_0 = FULL IN
 F_D = FULL OUT
 H_1, H_2, H_3, H_4 = PREDETERMINED AND FIXED INTERMEDIATE OR BANK POSITIONS
- THE CENTER CONTROL ROD AND THE FOUR CONTROL RODS DIAGONALLY ADJACENT TO THE CENTER ROD WILL ALWAYS BE MOVED IN THE SINGLE ROD MODE (REF. 15).

REFERENCE DOCUMENTS:


REFERENCE DOCUMENTS	MPL ITEM NUMBERS
1. CONTROL ROD DRIVE HYDRAULIC SYS. P&ID	--- C11-1010
2. NEUTRON MONITORING SYS. IED	--- C51-1010
3. REMOVED	
4. REMOVED	
5. CONTROL ROD DRIVE HYDRAULIC SYS. DESIGN SPEC.	--- C11-4010
6. PERFORMANCE MONITORING SYS. INPUT/OUTPUT REQUIREMENTS	--- 13IC8976
7. POSITION INDICATOR PROBE CONNECTION DIAG.	--- 10482506
8. ROD CONTROL AND INFORMATION SYS. ELEM. DIAG.	--- C11-1060
9. NEUTRON MONITORING SYS. FCD	--- C51-1020
10. REACTOR PROTECTION SYS. IED	--- C71-1010
11. DISPLAY CONTROL SYSTEM I/O LISTING	--- C94-4030
12. MOY AND MCC STANDARDS	--- 163C1723
13. CRD ELEMENTARY	--- C11-1060
14. RPS ELEMENTARY	--- C71-1050
15. REACTIVITY CONTROL	--- A15-5131
16. ERIS ELEMENTARY DIAGRAM	--- C85-1050

SYMBOL DEFINITIONS:

- INVERTER GATE: $\left[\frac{a}{b} \right] \rightarrow \left[\bar{a} \right] \cdot \left[\bar{b} \right] \cdot \left[\bar{a} + \bar{b} \right]$
- AND GATE: $\left[\frac{a}{b} \right] \rightarrow \left[\bar{a} \right] \cdot \left[\bar{b} \right] \cdot \left[\bar{a} + \bar{b} \right]$
- OR GATE: $\left[\frac{a}{b} \right] \rightarrow \left[\bar{a} + \bar{b} \right] \cdot \left[\bar{a} \cdot \bar{b} \right]$
- NAND GATE: $\left[\frac{a}{b} \right] \rightarrow \left[\bar{a} + \bar{b} \right] \cdot \left[\bar{a} \cdot \bar{b} \right] \cdot \left[\bar{a} + \bar{b} \right]$
- NOR GATE: $\left[\frac{a}{b} \right] \rightarrow \left[\bar{a} + \bar{b} \right] \cdot \left[\bar{a} \cdot \bar{b} \right] \cdot \left[\bar{a} + \bar{b} \right]$
- EXCLUSIVE OR GATE: $\left[\frac{a}{b} \right] \rightarrow \left[\bar{a} + \bar{b} \right] \cdot \left[\bar{a} \cdot \bar{b} \right] \cdot \left[\bar{a} + \bar{b} \right]$

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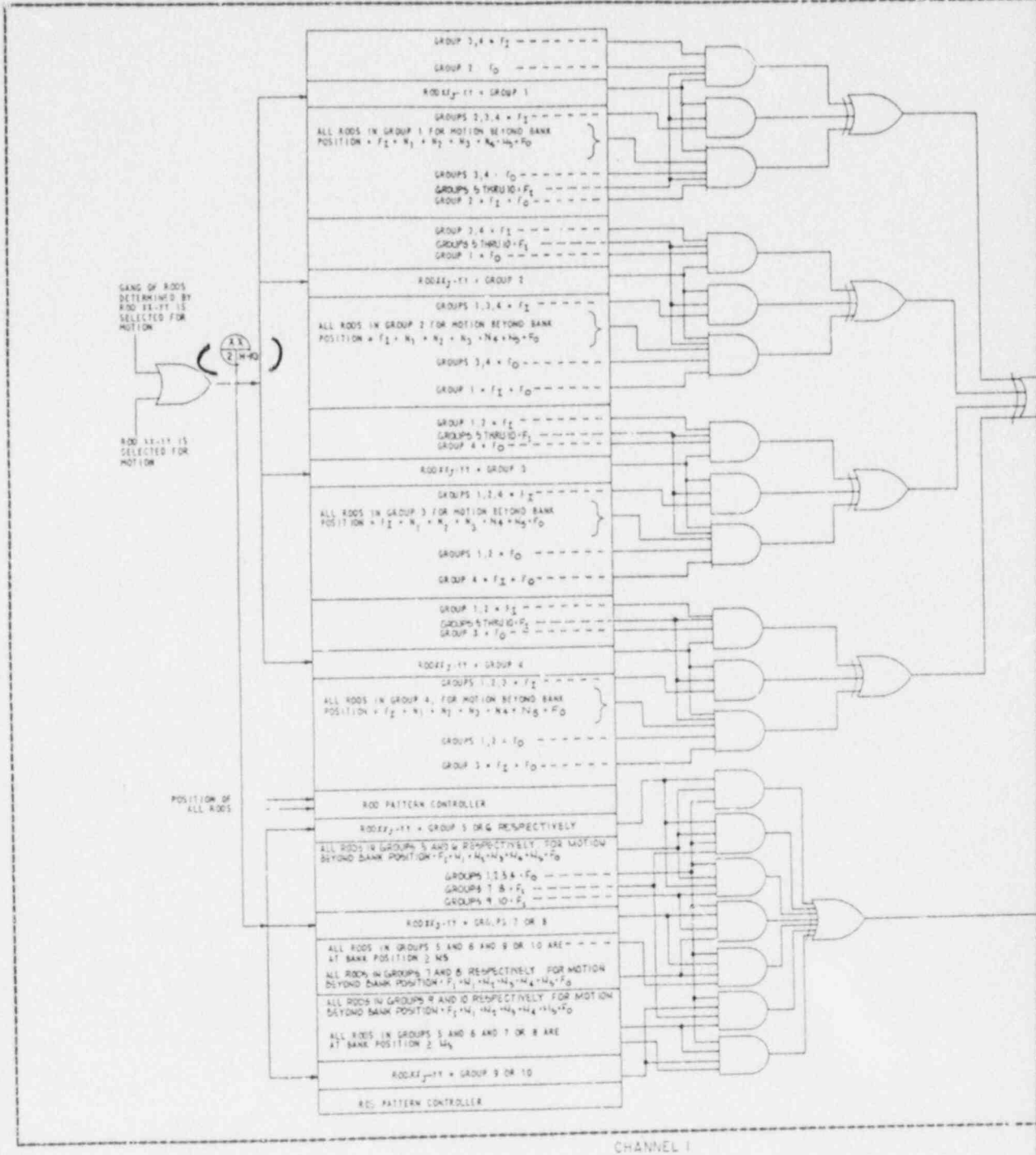
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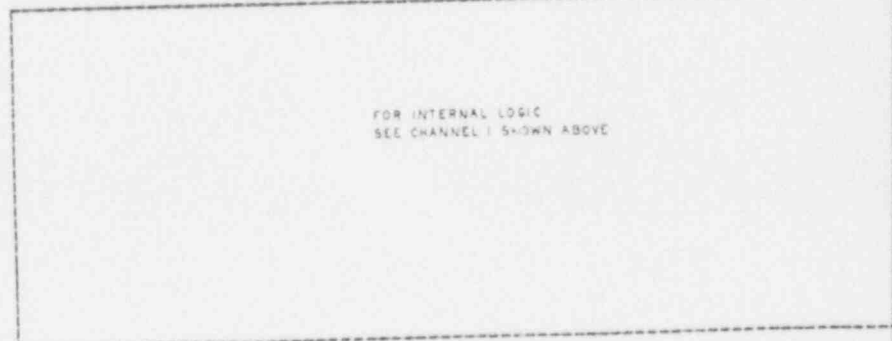
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THE CLEVELAND ELECTRIC
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Control Rod Drive Hydraulic System
Functional Control Diagram

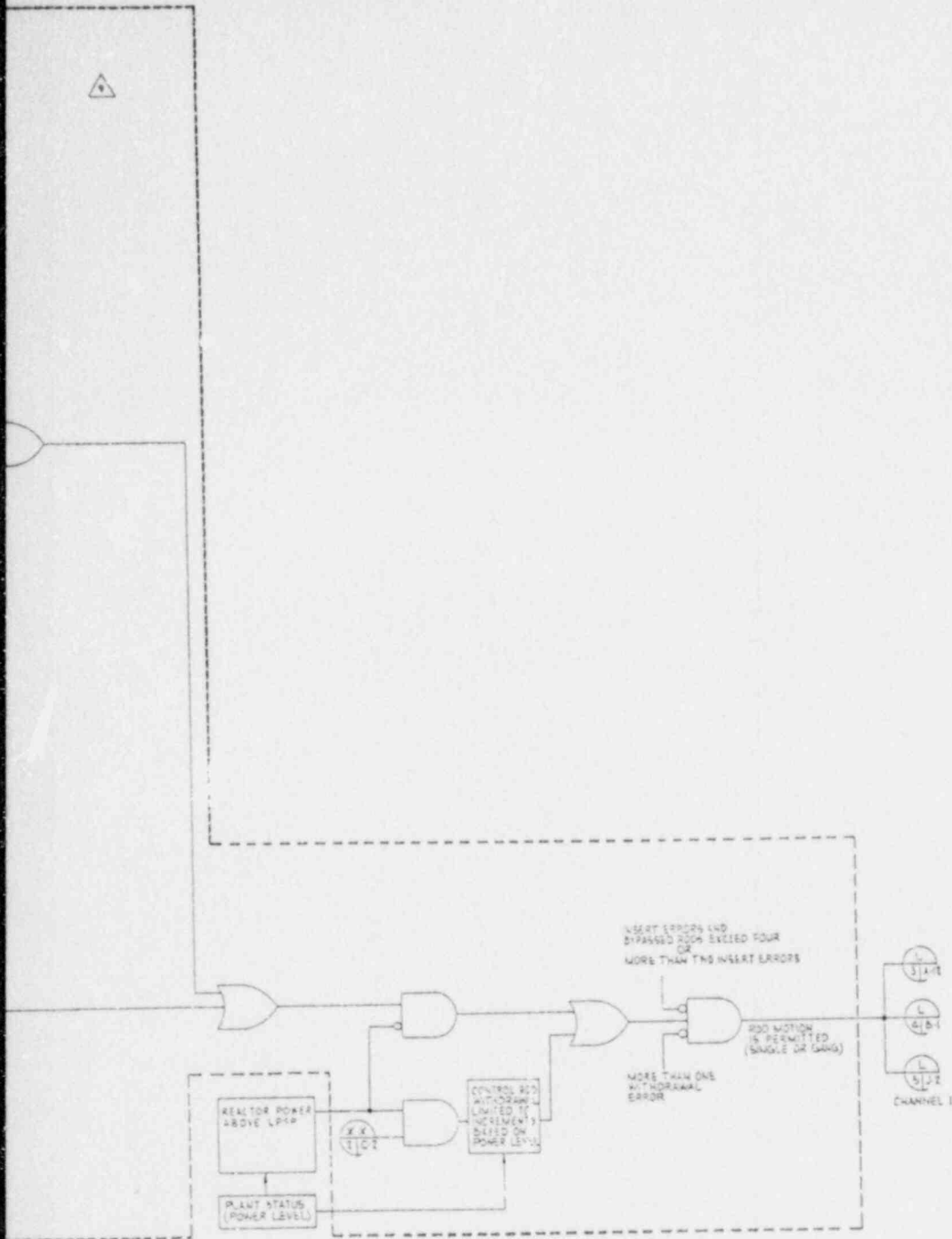
Figure 7.7-1 (Sheet 1 of 7)



CHANNEL 1



CHANNEL 2




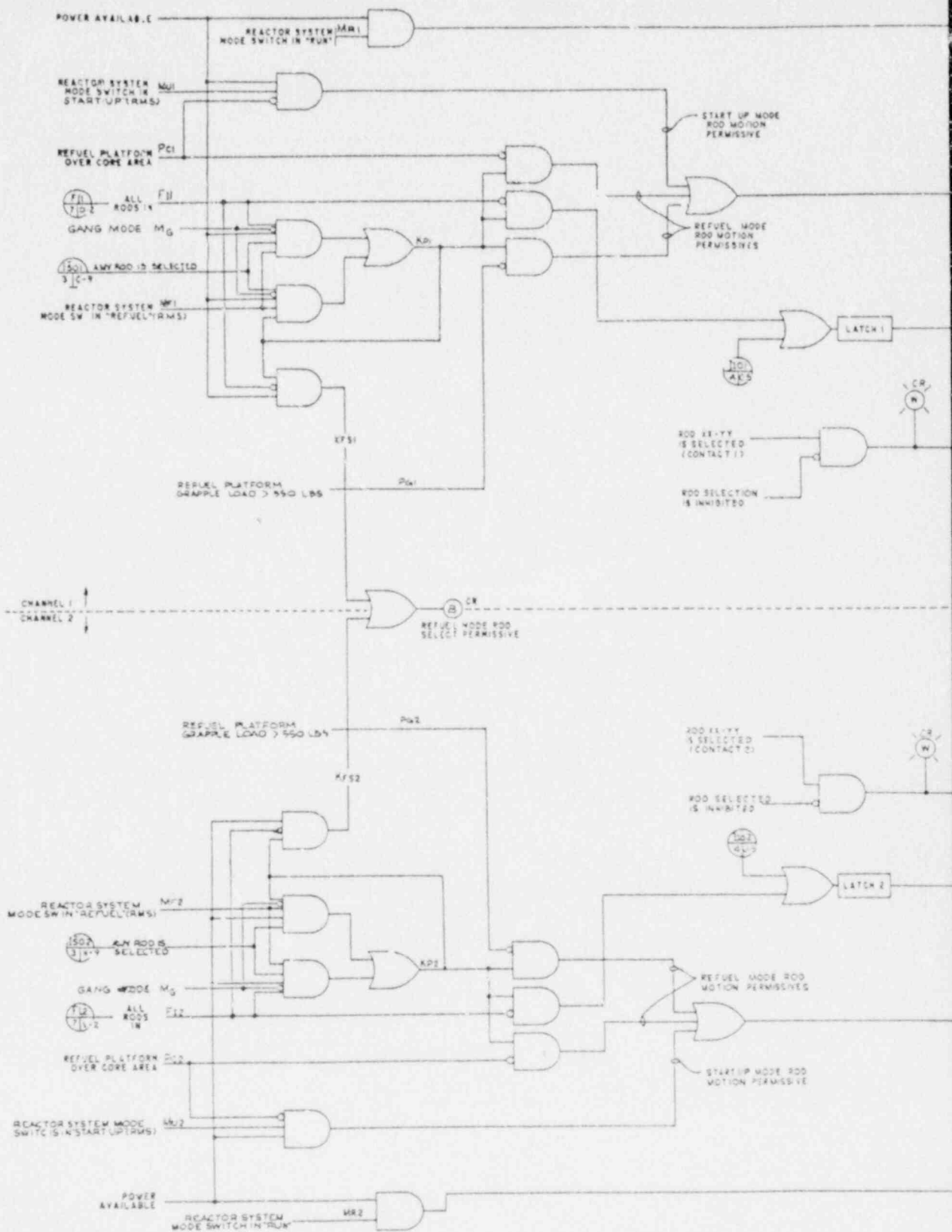
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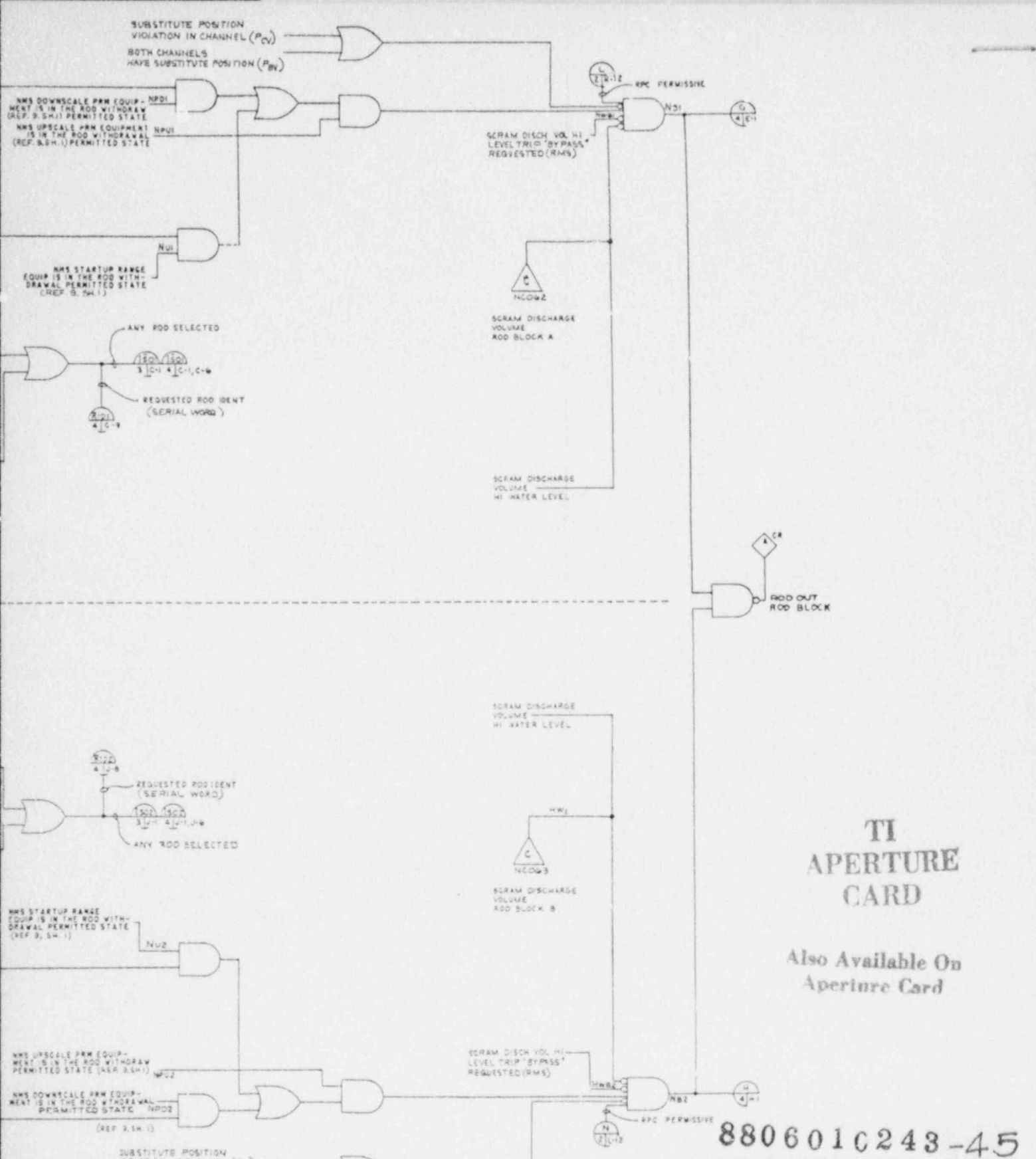


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	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	Control Rod Drive Hydraulic System Functional Control Diagram
Figure 7.7-1 (Sheet 2 of 7)	




RC 1 IS ROD BLO



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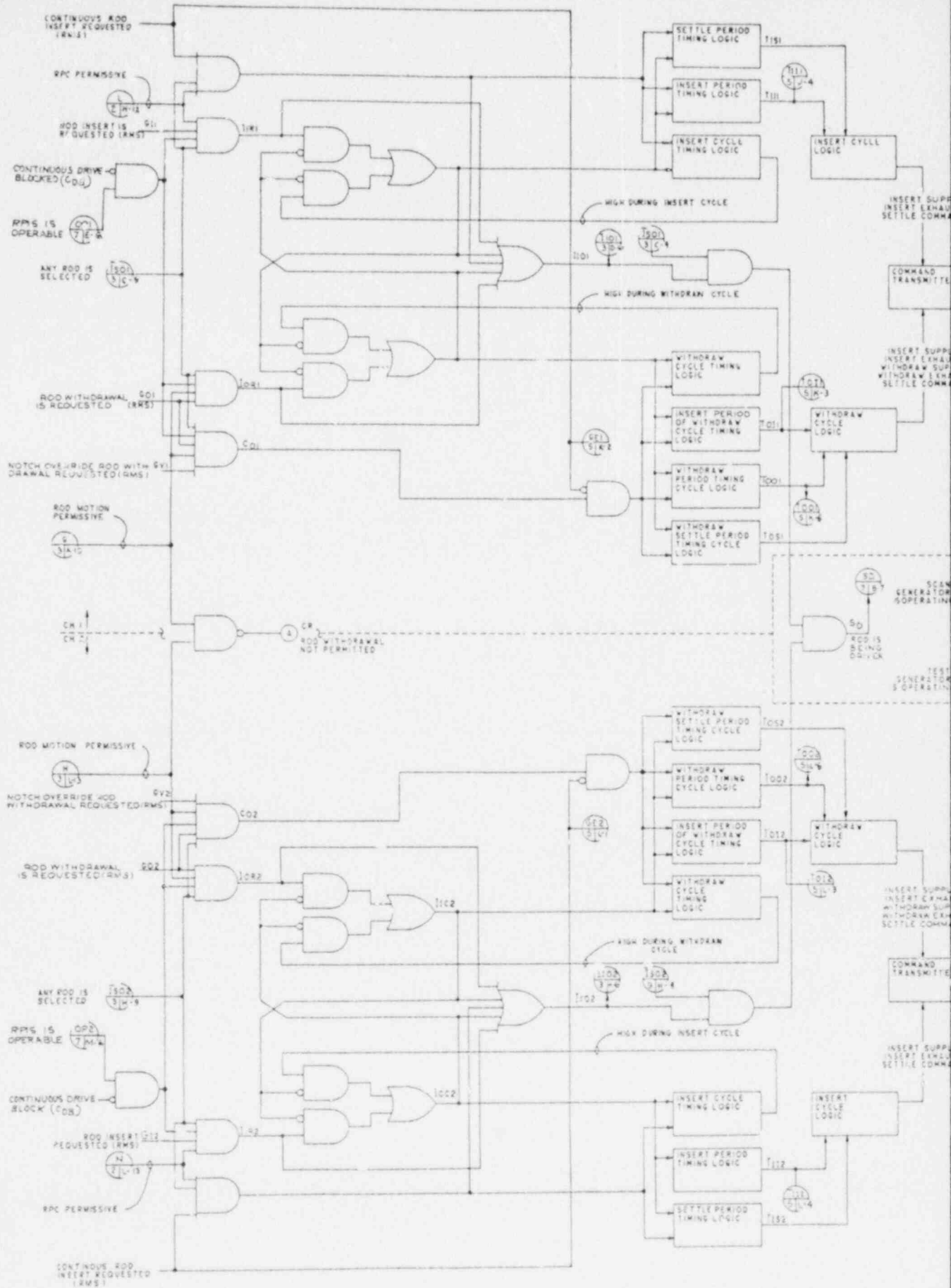
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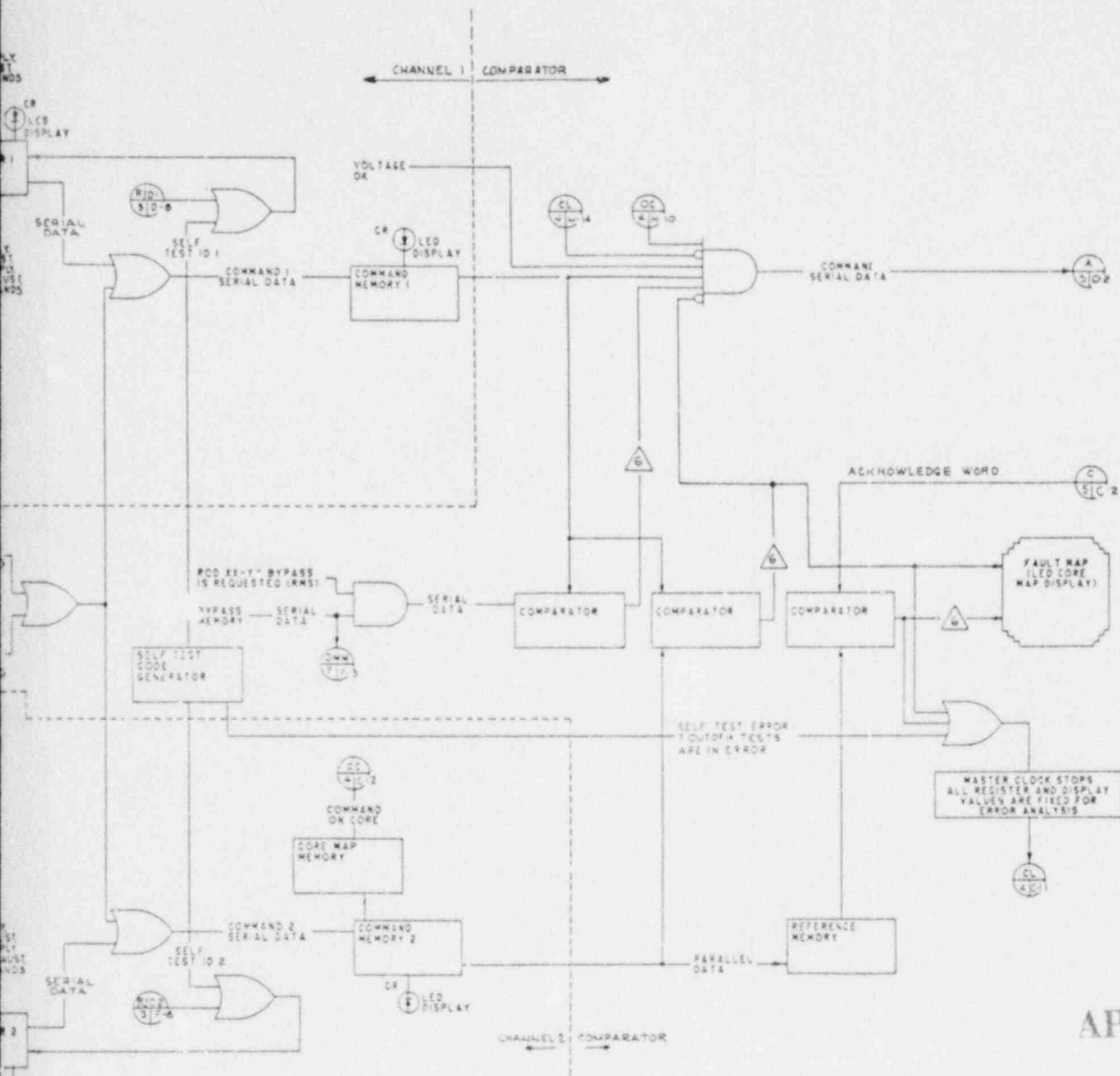
PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

Control Rod Drive Hydraulic System
Functional Control Diagram

Figure 7.7-1 (Sheet 3 of 7)




RC415 CRD MOTION CONTROL LOGIC

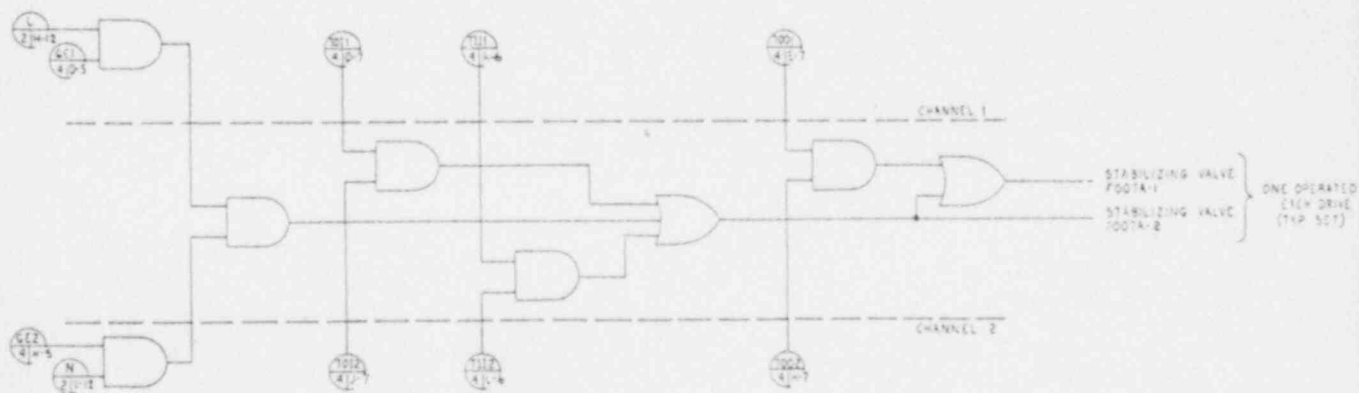
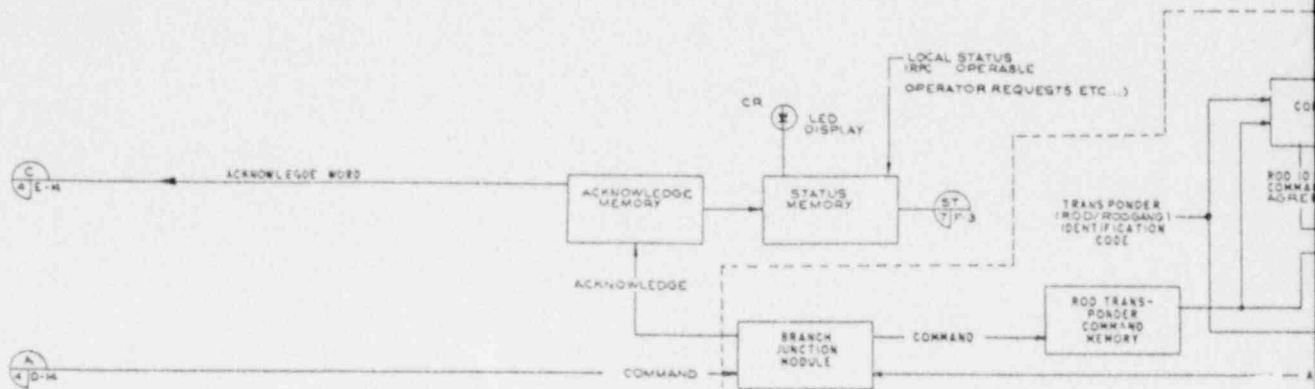


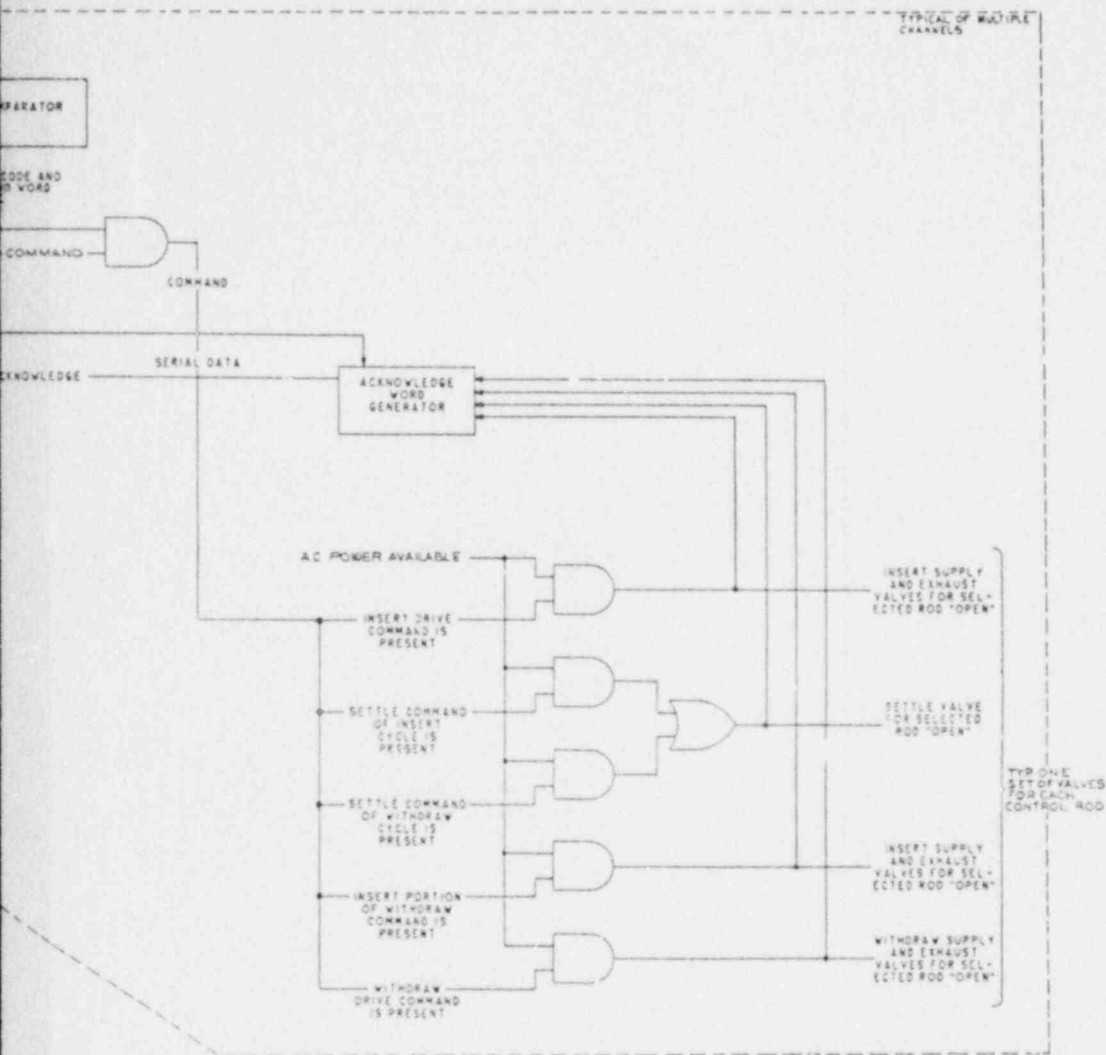
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	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	Control Rod Drive Hydraulic System Functional Control Diagram Figure 7.7-1 (Sheet 4 of 7)





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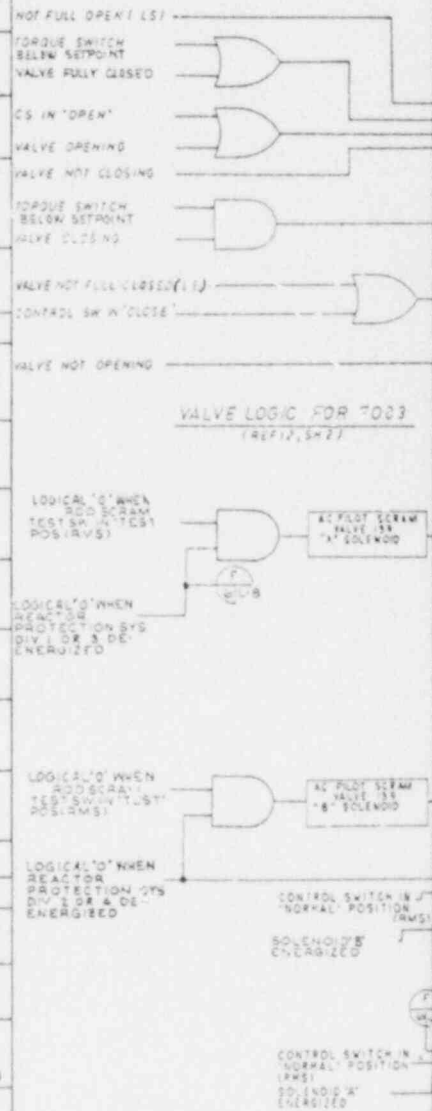
	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
Control Rod Drive Hydraulic System Functional Control Diagram	
Figure 7.7-1 (Sheet 5 of 7)	

TABLE 5

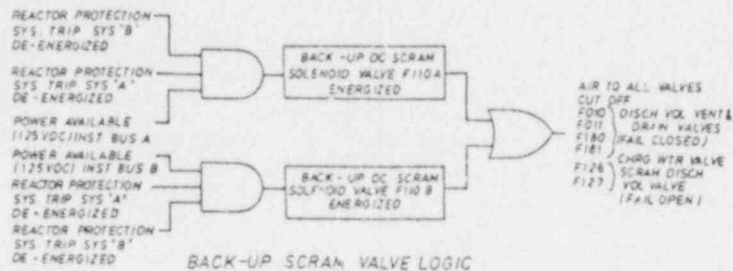
FUNCTION	INITIATING DEVICE	TYPE	COMPUTER INPUTS PMS	ERIS INPUTS
LOW POWER ALARM POINT	PRESS SW N655A/B	ANN.	---	---
LOW POWER SET POINT	PI5 N654 A/B	SIGNAL TO RC&IS	---	---
HIGH POWER SET POINT	PI5 N654 C/D	SIGNAL TO RC&IS	---	---
SCRAM DISCH VOL NOT DRAINED	LIS N402C LIS N402D	ROD NOT DRAINED	NC040 NC041	---
SCRAM DISCH VOL HI LVL ROD BLOCK	LIS N402A LIS N402B	ROD WITHDRAWAL BLOCK	NC042 NC043	---
DRIVE WATER FILTER HIGH DIFF PRESSURE	DIFF PRESS. IND SW N002	ANN.	---	---
CHARGING WATER LOW PRESSURE	PRESS. IND SW N600 PT-N005	ANN. ALARMS	---	C11EAO11
DRIVE WATER PUMP A SUCTION LOW PRESS. HIGH SEAL LEAKAGE LOW OIL PRESS.	PRESS. SW N001A PUMP COO1A PUMP COO1A	ANN ANN ANN	---	---
DRIVE WATER PUMP B SUCTION LOW PRESS. HIGH SEAL LEAKAGE LOW OIL PRESS.	PRESS SW N001B PUMP COO1B PUMP COO1B	ANN ANN ANN	---	---
SCRAM VALVE PILOT AIR HEADER HIGH PRESS	PRESS SW N652 PT-N052	ANN.	NC069	C11EAO15
SCRAM VALVE PILOT AIR HEADER LOW PRESS	PS N652 PT-N052	ANN.	NC068	---
CRD PUMP SUCTION FILTER HIGH DIFF PRESSURE	DIFF PRESS. IND SW N015	ANN.	---	---
ROD WITHDRAWAL BLOCK	RC&IS LOGIC	ANN.	---	---
ROD WITHDRAWAL SEQUENCE A/B SELECTED	SEQUENCE SELECTION PUSH BUTTON	---	---	---
VALVE MO F005	LIMIT SWITCH ON VALVES	IND LAMP R IND LAMP G IND LAMP B IND LAMP Y IND LAMP P IND LAMP O IND LAMP W IND LAMP V	---	C11EAO11 C11EAO12
VALVES AO F010, F011, F100 & F101 FULLY OPEN FULLY CLOSED	LIMIT SWITCH ON VALVES	IND LAMP R IND LAMP G	NC064 NC065 NC066 NC067	---
ACCUMULATOR LOW PRESS OR LEAK DETECTION (TYP FOR EACH ACCUMULATOR) (REF. 1) (NOTE 2)	PRESS SW 30 LEVEL SW 12R	INDICATOR (NOTE 4)	NC049	---
ANY ACCUMULATOR LOW PRESS OR ANY ACCUMULATOR LEAKAGE	PRESS SW 30 LEVEL SW 12R	ANN W/L (NOTE 4)	NC025	---
VALVES CV-27 & CV-12 OPEN	POSITION SWITCH ON VALVES	INDICATOR	NC037	---
CRD SYSTEM FLOW	FT-N004	---	N0001	C11EAO01
DRIVE WATER HEADER A FLOW	FT-N007A	---	---	C11EAO02
DRIVE WATER HEADER B FLOW	FT-N007B	---	---	C11EAO03
DRIVE WATER HEADER C FLOW	FT-N007C	---	---	C11EAO04
DRIVE WATER HEADER D FLOW	FT-N007D	---	---	C11EAO05
DRIVE WATER DIFF PRESS	DPT-N008	---	---	C11EAO06
COOLING WATER HEADER FLOW	FT-N009	---	---	C11EAO07
COOLING WATER HEADER DIFF PRESS	DPT-N011	---	---	C11EAO07
RC&IS STATUS	RC&IS LOGIC	---	NC026	---
RC&IC INOP	RC&IC LOGIC	ANN.	---	---
CONTROL ROD TEMP HIGH	RO18	ANN.	---	---
DRIVE WATER PUMP A B STOP	SW 34/B	IND LAMP G IND LAMP R IND LAMP B IND LAMP Y IND LAMP P IND LAMP O IND LAMP W IND LAMP V	---	IND LAMP R C11EAO02 (A) C11EAO03 (B)
ROD OVERT	SWITCHE S ON ROD DRIVES	ANN	NC031	---
ROD OVER TRAVEL	SWITCHE S ON ROD DRIVES	ANN	NC029	---
AUXILIARY OIL PUMP A & B STOP START	SW 1 A & B	IND LAMP G IND LAMP R	---	---

TABLE 5 (CONTINUED)

FUNCTION	INITIATING DEVICE
VALVE AO F002A	LIMIT SWITCH ON VALVES
VALVE AO F002B	LIMIT SWITCH ON VALVES
VALVE MO F003	LIMIT SWITCH ON VALVES

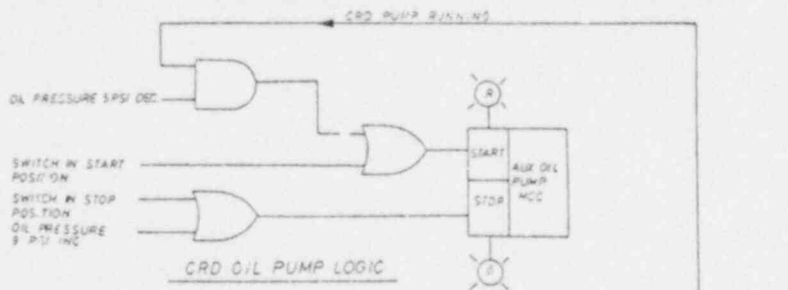


TYPE	COMPUTER INPUTS PMS	ERIS INPUTS
D LAMP R	/	C11EC015
D LAMP S	/	C11EC016
D LAMP T	/	C11EC007
D LAMP U	/	C11EC008
D LAMP V	/	C11EC009
D LAMP W	/	C11EC010

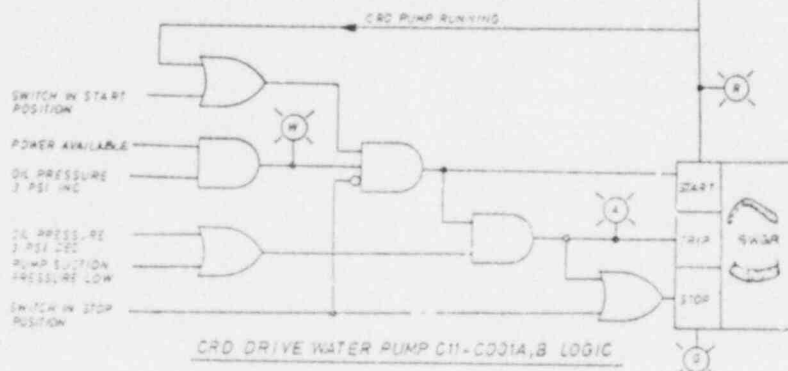


BACK-UP SCRAM VALVE LOGIC

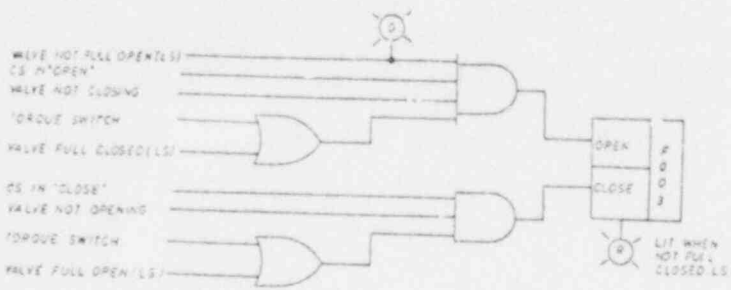
(REF 14)



CRD OIL PUMP LOGIC



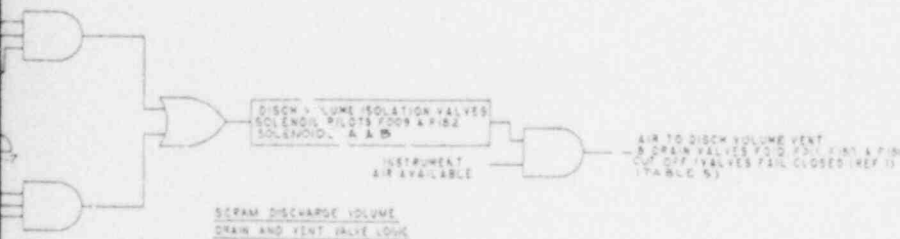
CRD DRIVE WATER PUMP C11-C031A,B LOGIC



VALVE LOGIC FOR F003

(REF 12, SW17)

SCRAM VALVE LOGIC (REF 14)



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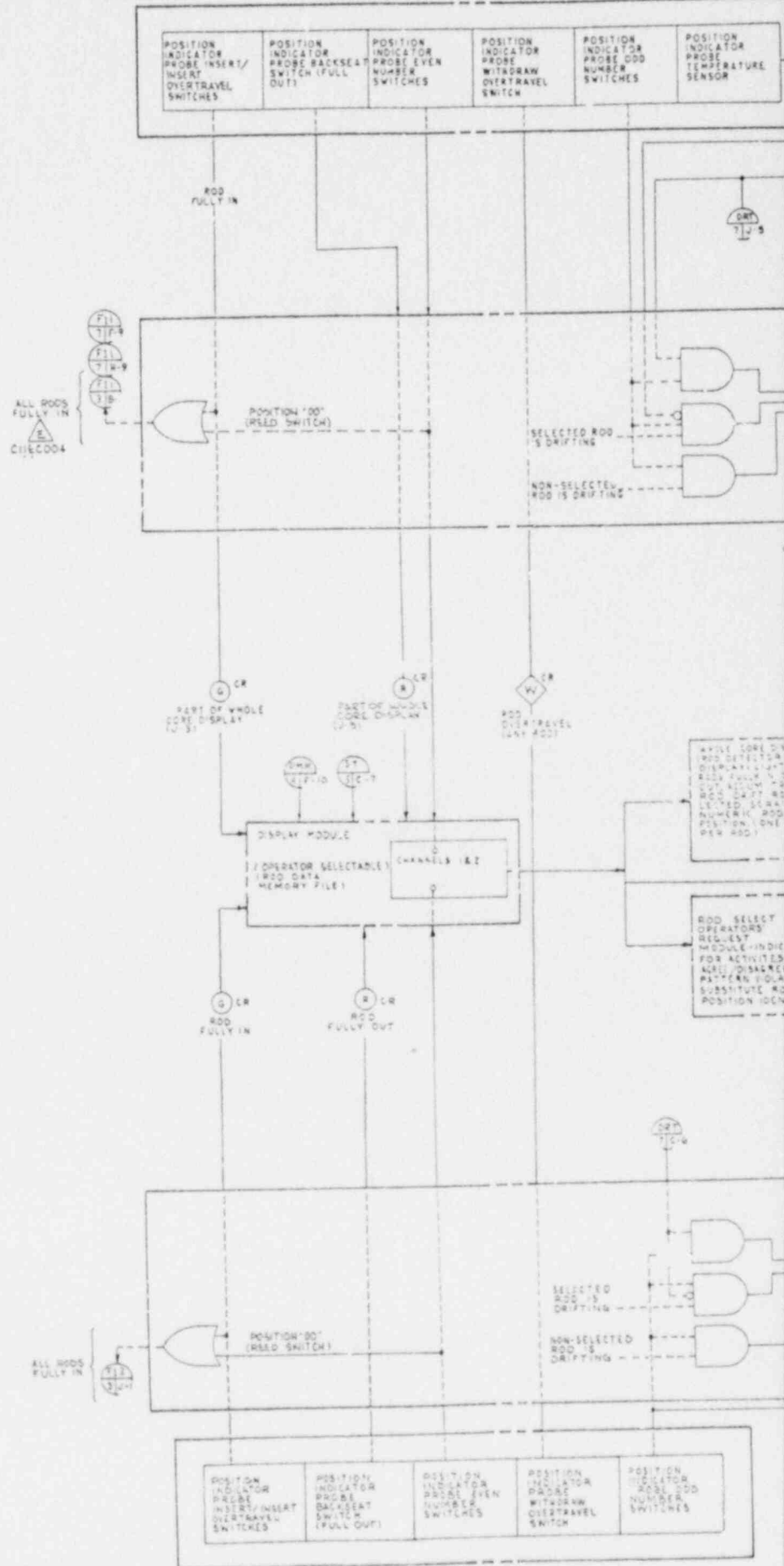
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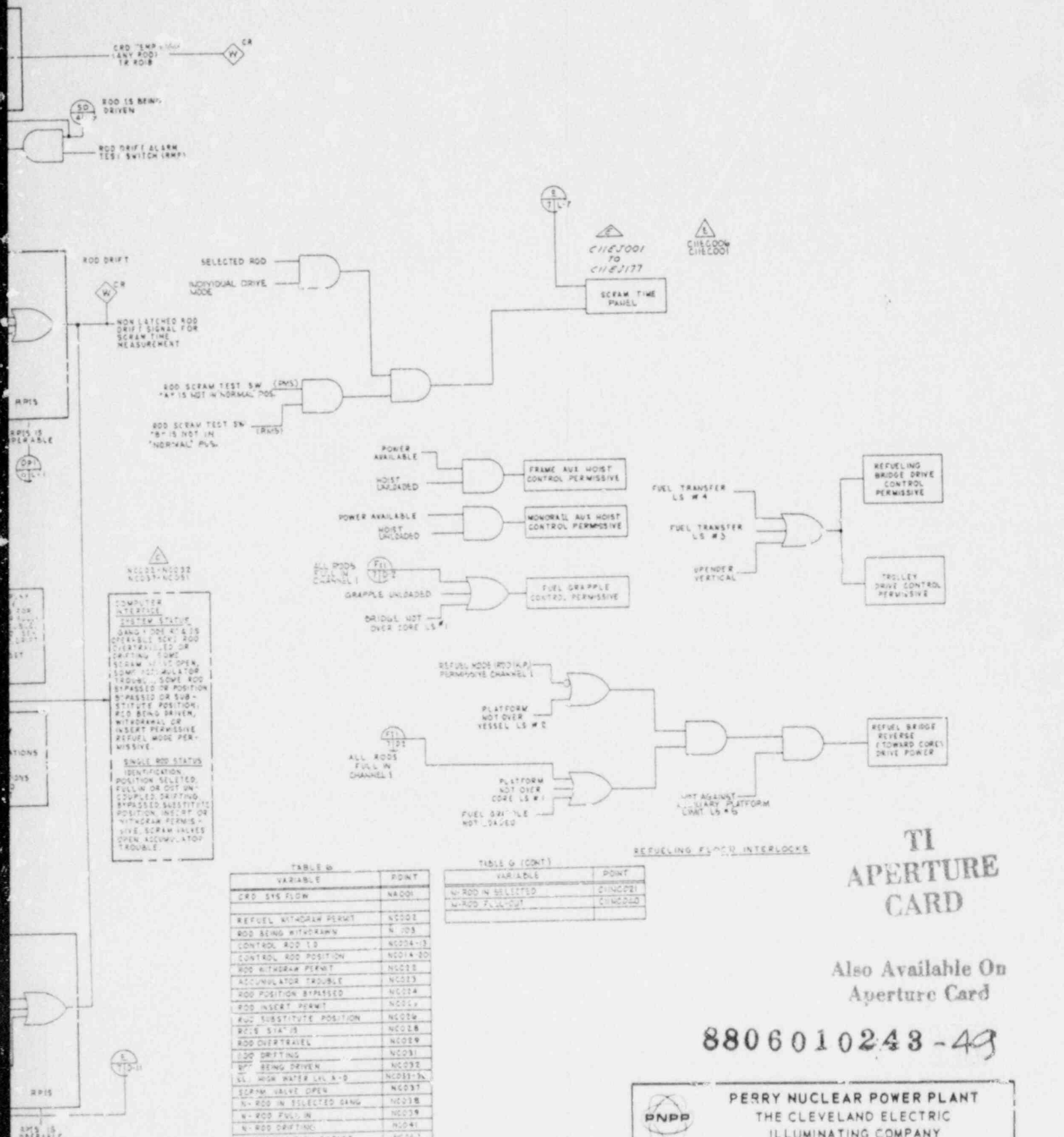
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PNPP PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

Control Rod Drive Hydraulic System Functional Control Diagram

Figure 7.7-1 (Sheet 6 of 7)





COMPUTER INTERFACED SYSTEM STATUS
 GANG 1 DOE AT 4 IS OPERABLE (SCRAM) ROD OVERTRAVELLED OR CRIPPING SCRAM SCRAM VALVE OPEN SCRAM VALVE ACTUATOR TROUBLE SCRAM VALVE BYPASSED OR POSITION BYPASSED OR SUBSTITUTE POSITION ROD BEING DRIVEN WITHDRAWAL OR INSERT PERMISSIVE REFUEL MODE PERMISSIVE

SINGLE ROD STATUS IDENTIFICATION POSITION SELECTED FULL IN OR OUT UNCOUPLED SKIPPING BYPASSED SUBSTITUTE POSITION INSERT OR WITHDRAW PERMISSIVE SCRAM VALVE OPEN ACCUMULATOR TROUBLE

TABLE B

VARIABLE	POINT
CRD SYS FLOW	NAC01
REFUEL WITHDRAW PERMIT	NC002
ROD BEING WITHDRAWN	N J03
CONTROL ROD LD	NC004-13
CONTROL ROD POSITION	NC014-20
ROD WITHDRAW PERMIT	NC018
ACCUMULATOR TROUBLE	NC023
ROD POSITION BYPASSED	NC024
ROD INSERT PERMIT	NC025
ROD SUBSTITUTE POSITION	NC026
ROD STATUS	NC028
ROD OVERTRAVEL	NC029
ROD DRIFTING	NC031
ROD BEING DRIVEN	NC032
ALL HIGH WATER LVL A-B	NC033-34
SCRAM VALVE OPEN	NC037
N-ROD IN SELECTED GANG	NC038
N-ROD FULL IN	NC039
N-ROD DRIFTING	NC041
N-ROD POSITION BYPASS	NC042
N-ROD OVERTRAVELLED	NC044
N-ROD DATA FAULT	NC045
N-ROD SUBSTITUTE POSITION	NC046
RPC WITHDRAW PERMISSIVE	NC047
RPC INSERT PERMISSIVE	NC048
N-ROD ACCUMULATOR TROUBLE	NC049
N-ROD TEST SWITCH CLOSED	NC050
N-ROD SCRAM VLV NOT CLOSED	NC051
CIM OK	NC052

TABLE G (CONT)

VARIABLE	POINT
N-ROD IN SELECTED	CHNC001
N-ROD FULL IN	CHNC002

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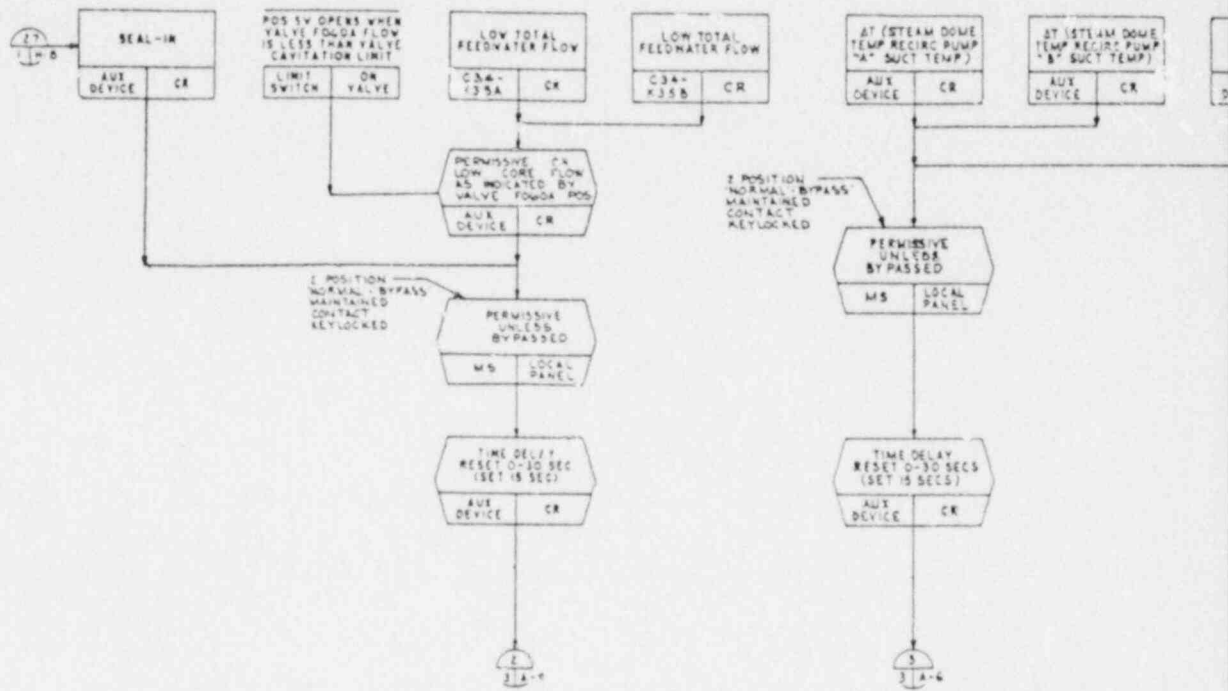
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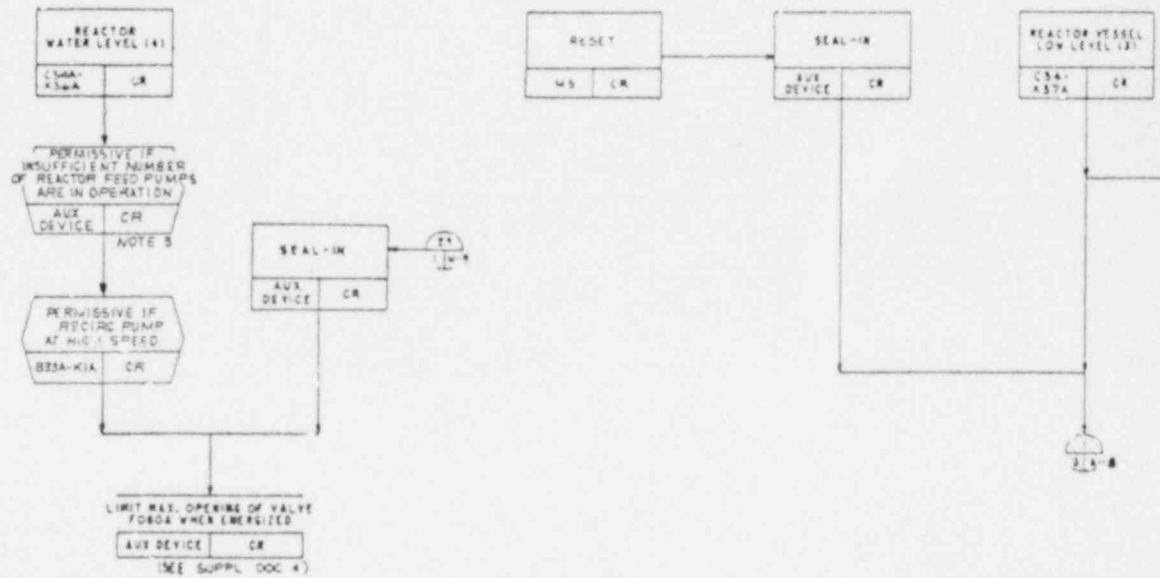
PERRY NUCLEAR POWER PLANT
 THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

Control Rod Drive Hydraulic System
 Functional Control Diagram

Figure 7.7-1 (Sheet 7 of 7)

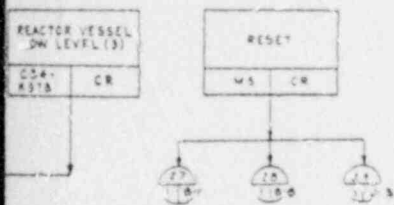
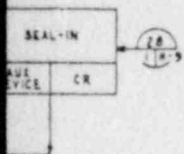


PUMP SPEED INTERLOCKS, PUMP SUCTION TO STEAM DOME AT, LOW TOTAL FEEDWATER FLOW



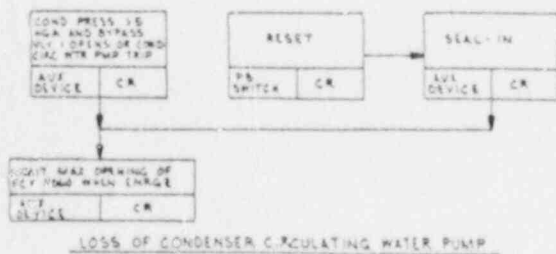
INSUFFICIENT NUMBER OF REACTOR FEED PUMPS
REACTOR WATER LEVEL AUX DEVICE

REACTOR VESSEL LOW LEVEL
AUX DEVICE



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NOTES:

1. FUNCTION IS SHOWN FOR RECIRCULATION SYSTEM 'A' & IS TYPICAL FOR RECIRCULATION SYSTEM 'B' EXCEPT FOR LETTER SUFFIXES.
2. AUXILIARY DEVICES ARE SHOWN WHERE NECESSARY TO CLARIFY THE FUNCTION.
3. DETECTION OF REACTOR FEED PUMP TRIP, AND COINCIDENT OR SUBSEQUENT LOW-REACTOR WATER LEVEL LOGIC IS PROVIDED TO INITIATE CLOSURE OF THE RECIRCULATION FLOW CONTROL VALVE TO REDUCE THE REACTOR POWER LEVEL TO WITHIN THE CAPACITY OF THE REMAINING FEEDWATER PUMP, THE TURBINE OR MOTOR DRIVEN PUMP FAILURE CONTACTS SHALL BE PROVIDED BY THE AE/CUSTOMER. (SEE SUPPL. DOC. 1)
4. NUMEROUS PILOT LAMP ALARM INDICATIONS ARE ALSO PROVIDED ON THE ANALOG CONTROL SYSTEM PANEL WIS-1034 TO COMPLEMENT THESE REMOTE ALARMS. THE INDICATIONS ARE MORE EXTENSIVE & INDICATE ALL FAULTS THAT GIVE RISE TO THESE FUNCTIONALLY GROUPED CONTROL ROOM ALARMS.
5. DELETED.

SUPPLEMENTAL DOCUMENTS UNDER THE FOLLOWING IDENTITIES ARE TO BE USED IN CONJUNCTION WITH THIS DRAWING.

1. CS4-1040 FEEDWATER CONTROL SYS IED
2. 833-1010 REACTOR RECIRC SYS PAID
3. 071-1013 REACTOR PROTECTION SYS IED
4. 833-1040 REACTOR RECIRC SYS IED
5. 022-1030 REDUNDANT REACTIVITY CONTROL SYS FCD
6. 045-1090 ERIS ELEMENTARY DIAGRAM

SUPPORTING DOCUMENTS:

1. 20RA47M LOGIC SYMBOLS
2. 145904U PURCHASE SPECIFICATION DATA SHEET
3. 214580 PURCHASE SPECIFICATION

CODES AND STANDARDS

1. ANSI/IEEE C37.1 INTX ELECTRICAL POWER SYS DEVICE FUNCTION NUMBERS

LEGEND:

- ① - MATCH NUMBER
- ② - ZONE
- ③ - SHEET NO.
- * - SWITCH/GEAR DEVICE FUNCTION (SEE CODES AND STDS 1)
- CR - CONTROL ROOM
- LP - LOCAL PANEL
- SWB - PUMP DRIVE MOTOR SWITCH ARM
- MS - MANUAL SWITCH
- PA - PUSHBUTTON
- NOL - SOLENOID
- POS - POSITION
- AND - AUTOMATIC SWITCHING DEVICE
- SUCT - SUCTION

⚠ - EMERGENCY RESPONSE INFORMATION SYSTEM
(SEE NOTE 6) TYP

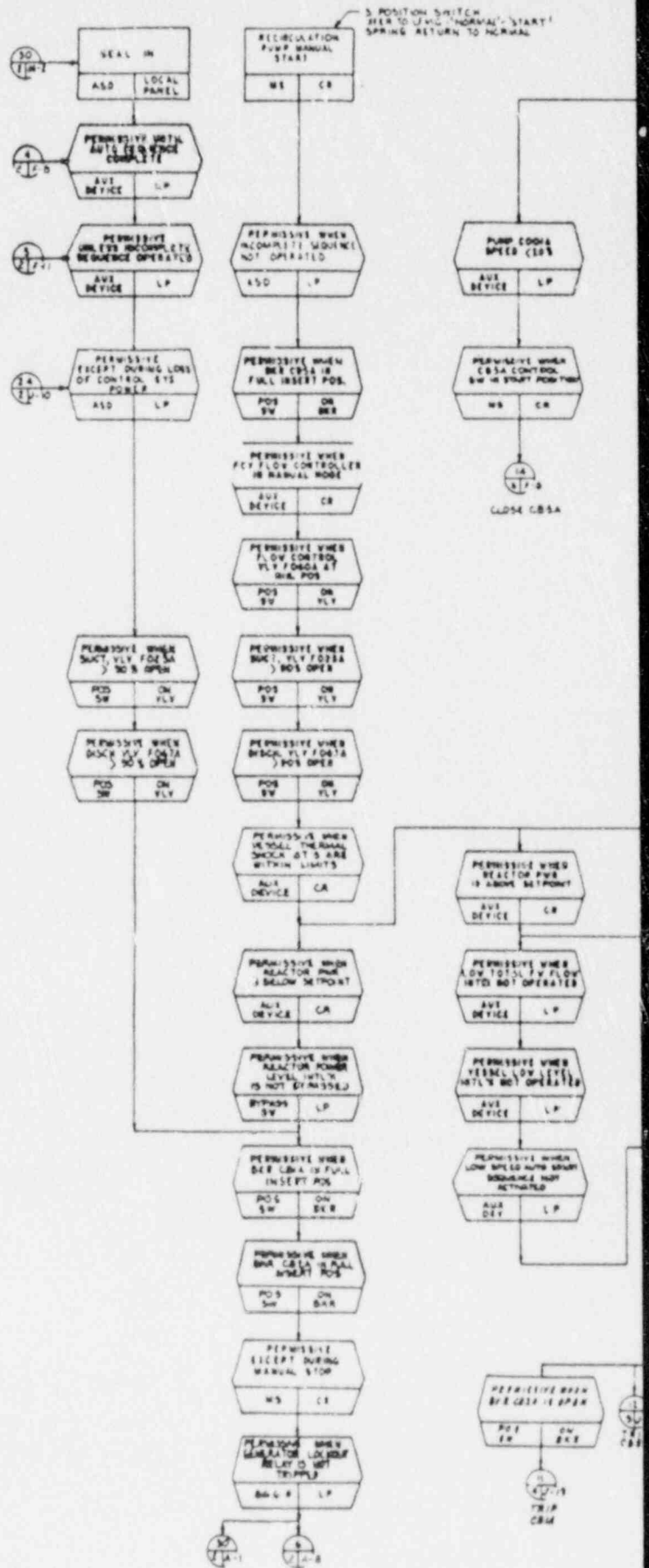
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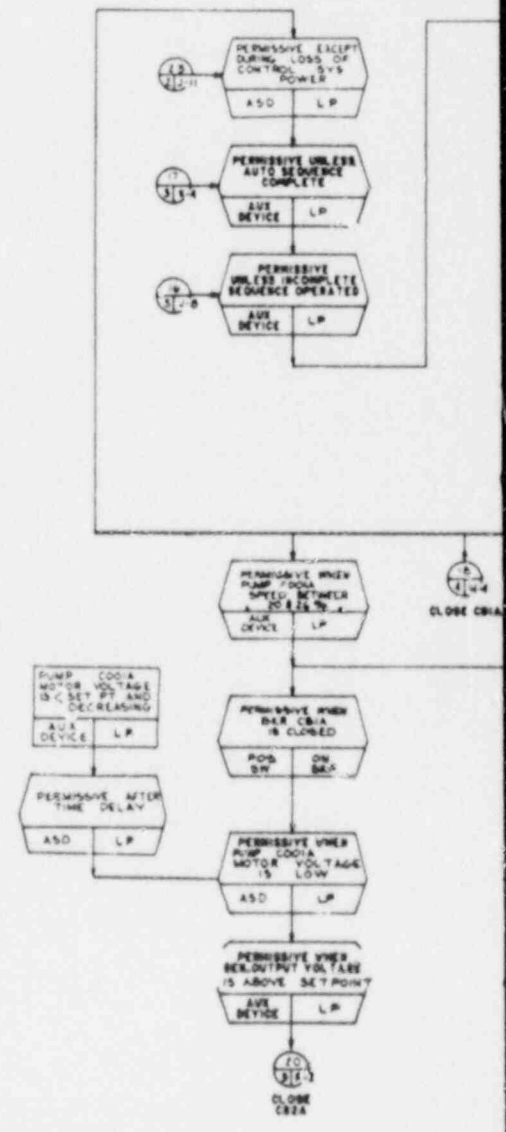


PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

Reactor Recirculation System
Functional Control Diagram

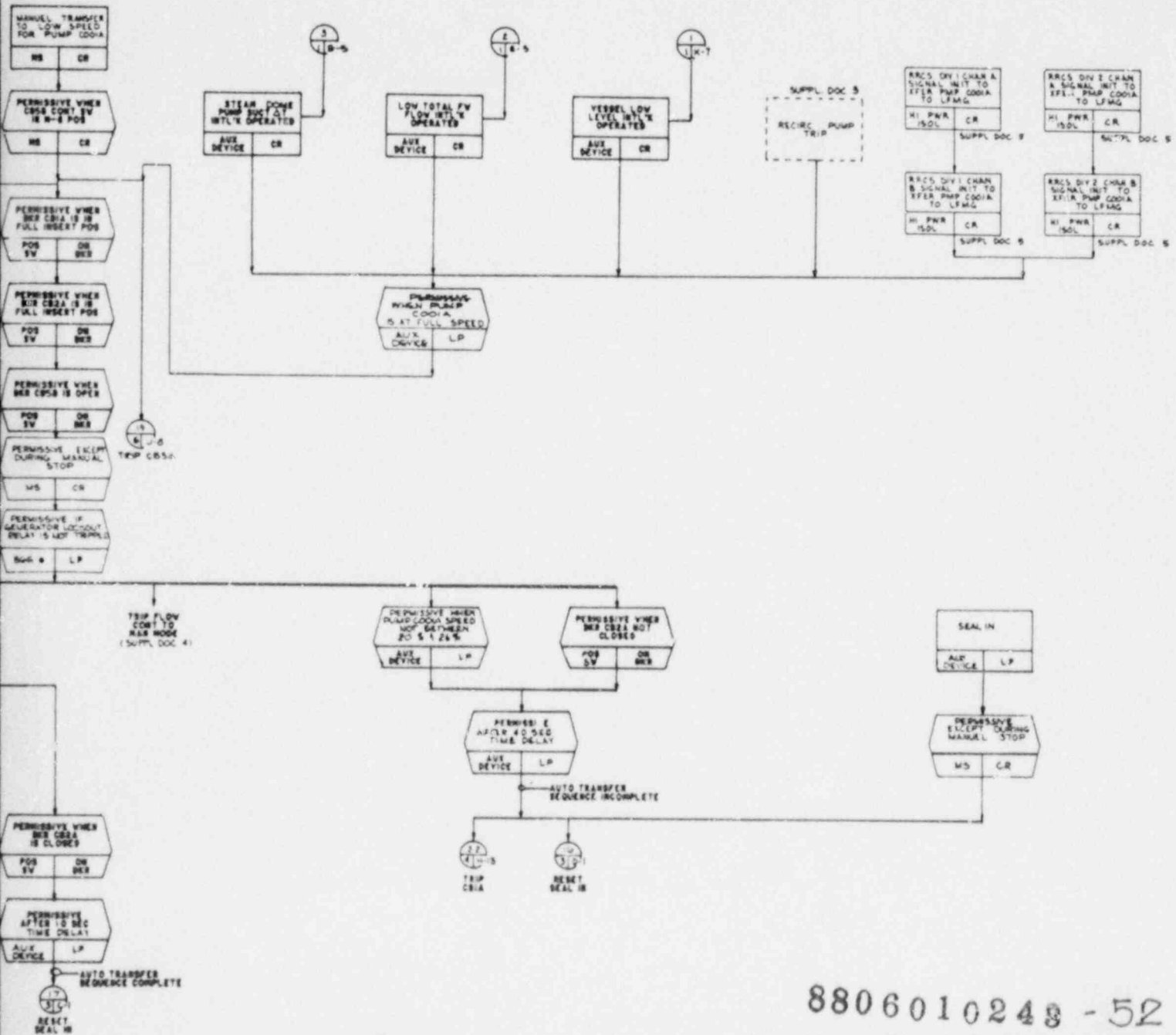
Figure 7.7-4 (Sheet 1 of 7)





TRIP OR TRANSFER PUMP FROM HIGH SPEED TO LOW SPEED

(TYPICAL FOR COO-5)



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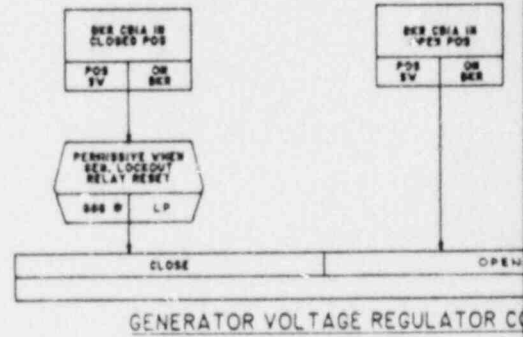
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

Reactor Recirculation System
Functional Control Diagram
Figure 7.7-4 (Sheet 3 of 7)



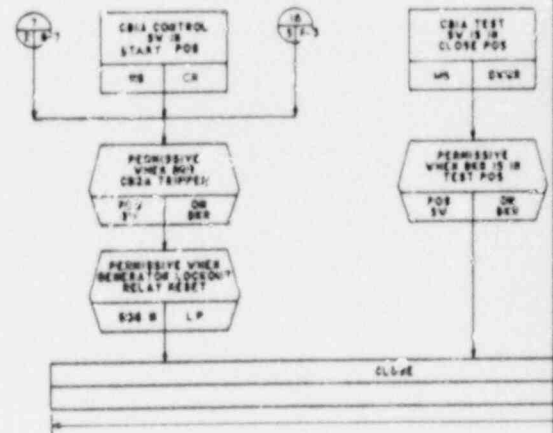
ER'S SIGNALS - JET PUMP DIFFERENTIAL PRESSURE

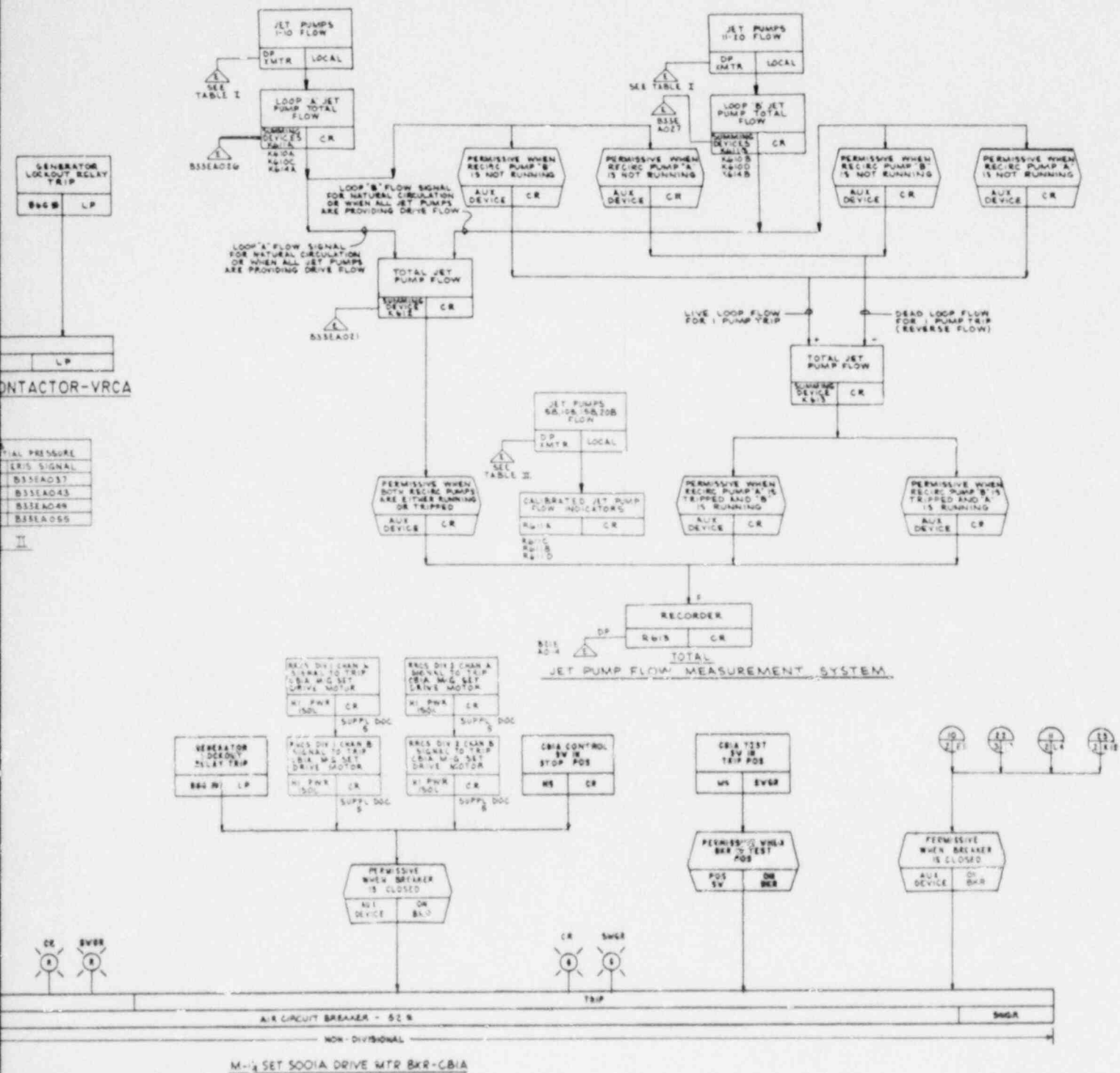
LOOP A			LOOP B		
JET PUMP	XMTA	ER'S SIGNAL	JET PUMP	XMTB	ER'S SIGNAL
JP1	NOSTA	B33EA032	JP11	NOSTB	B33EA044
JP2	NOSTE	B33EA033	JP12	NOSTF	B33EA045
JP3	NOSTJ	B33EA034	JP13	NOSTK	B33EA046
JP4	NOSTN	B33EA035	JP14	NOSTP	B33EA047
JP5A	NOSTT	B33EA036	JP15A	NOSTU	B33EA048
JP6	NOSTC	B33EA038	JP16	NOSTD	B33EA050
JP7	NOSTG	B33EA039	JP17	NOSTX	B33EA051
JP8	NOSTL	B33EA040	JP18	NOSTM	B33EA052
JP9	NOSTR	B33EA041	JP19	NOSTS	B33EA053
JP10A	NOSTY	B33EA042	JP20A	NOSTW	B33EA054

ER'S SIGNALS - JET PUMP DIFFERENTIAL PRESSURE

JET PUMP	XMTA
JP5B	NOSTA
JP5C	NOSTC
JP5D	NOSTB
JP5E	NOSTD

TABLE I






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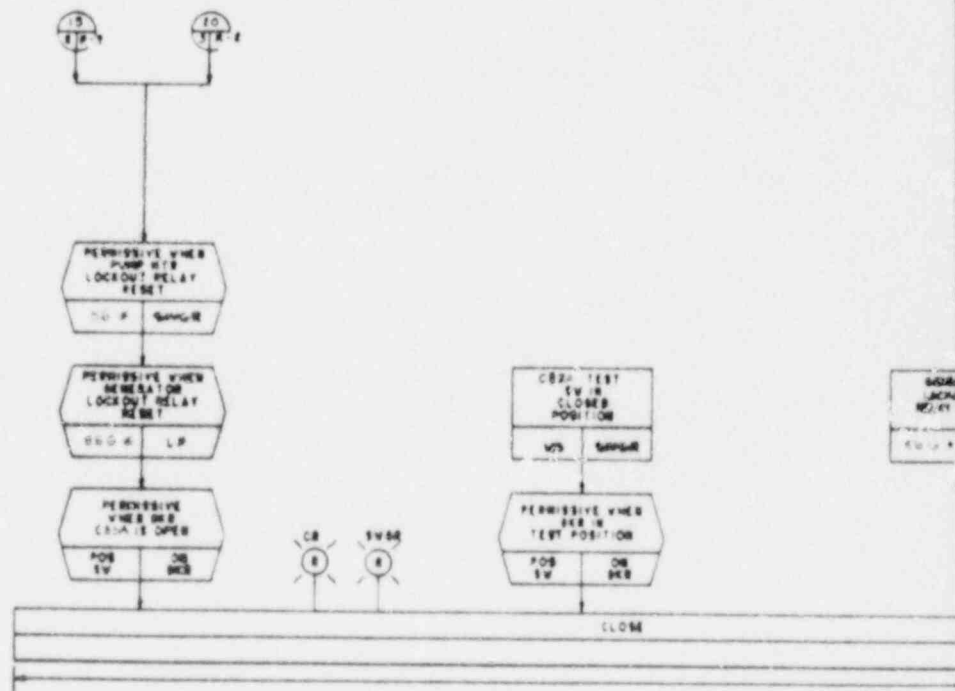
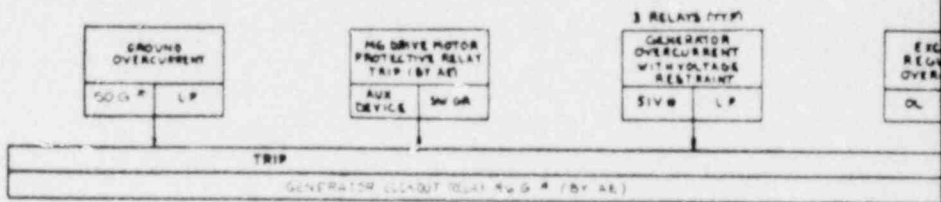
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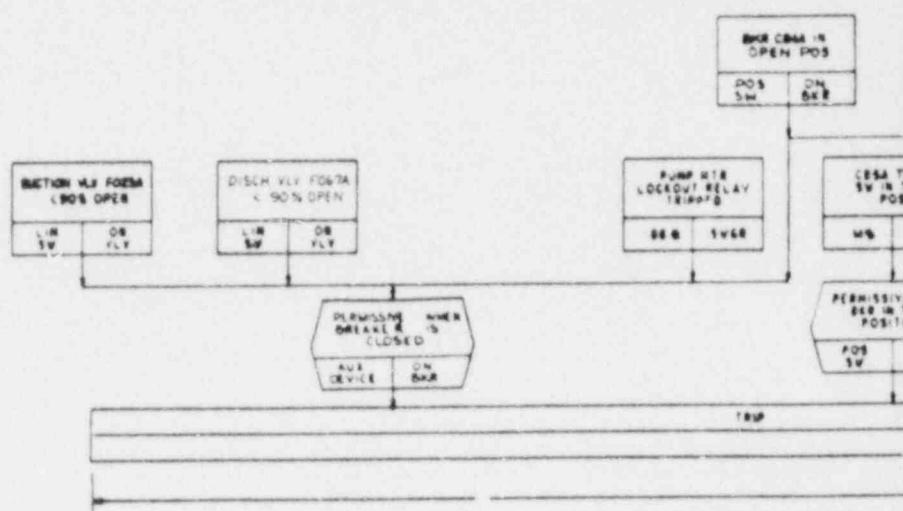
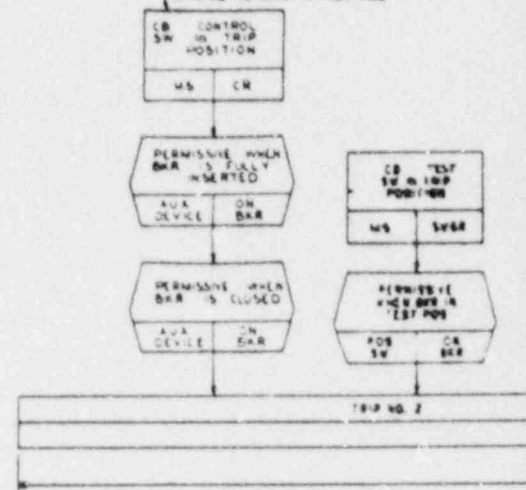
PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

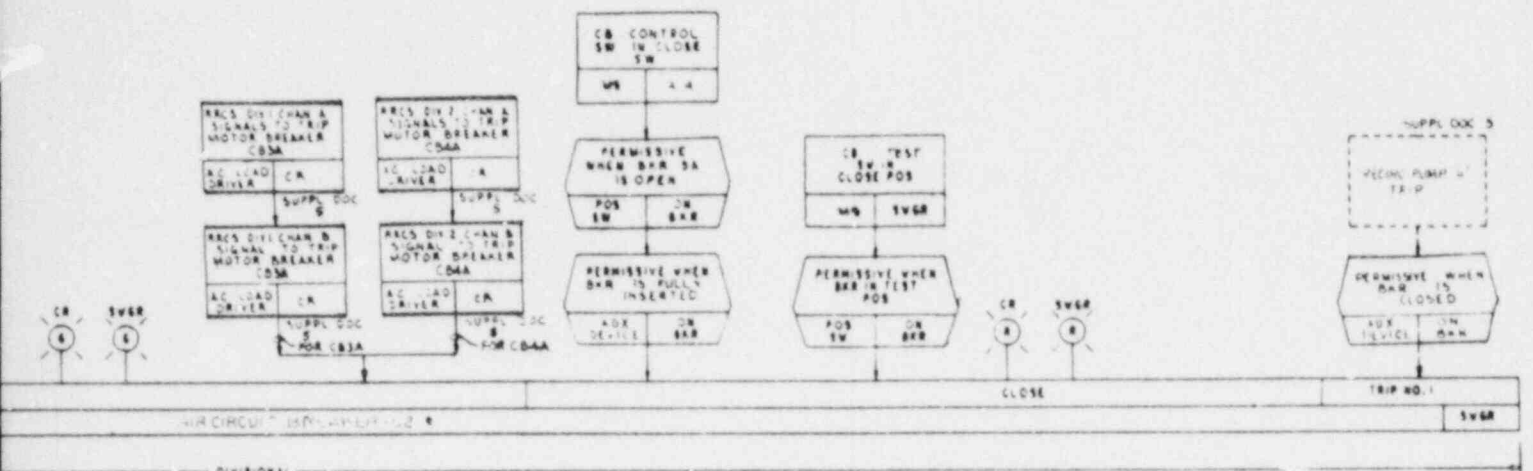
Reactor Recirculation System
Functional Control Diagram
Figure 7.7-4 (Sheet 4 of 7)



M-G SET SOG

1 POSITION WHICH TRIP NORMAL CLOSE SPRING RETURN TO NORMAL

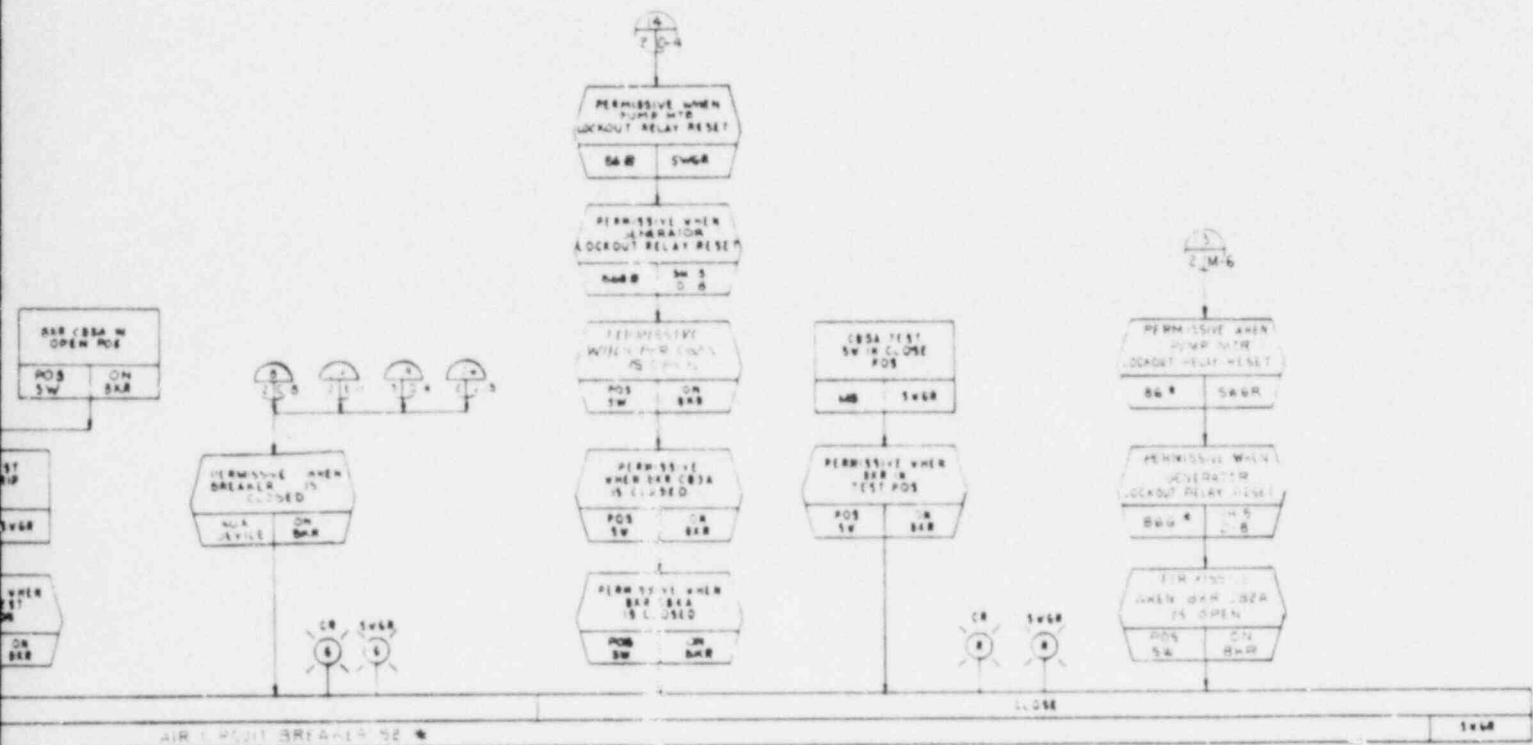




AIR CIRCUIT BREAKER 42

DIVISIONAL

PUMP C001A DRIVE MOTOR BKR-CB4A/CB3A



AIR CIRCUIT BREAKER 52

DIVISIONAL

PUMP C001A DRIVE MOTOR BKR-CB5A

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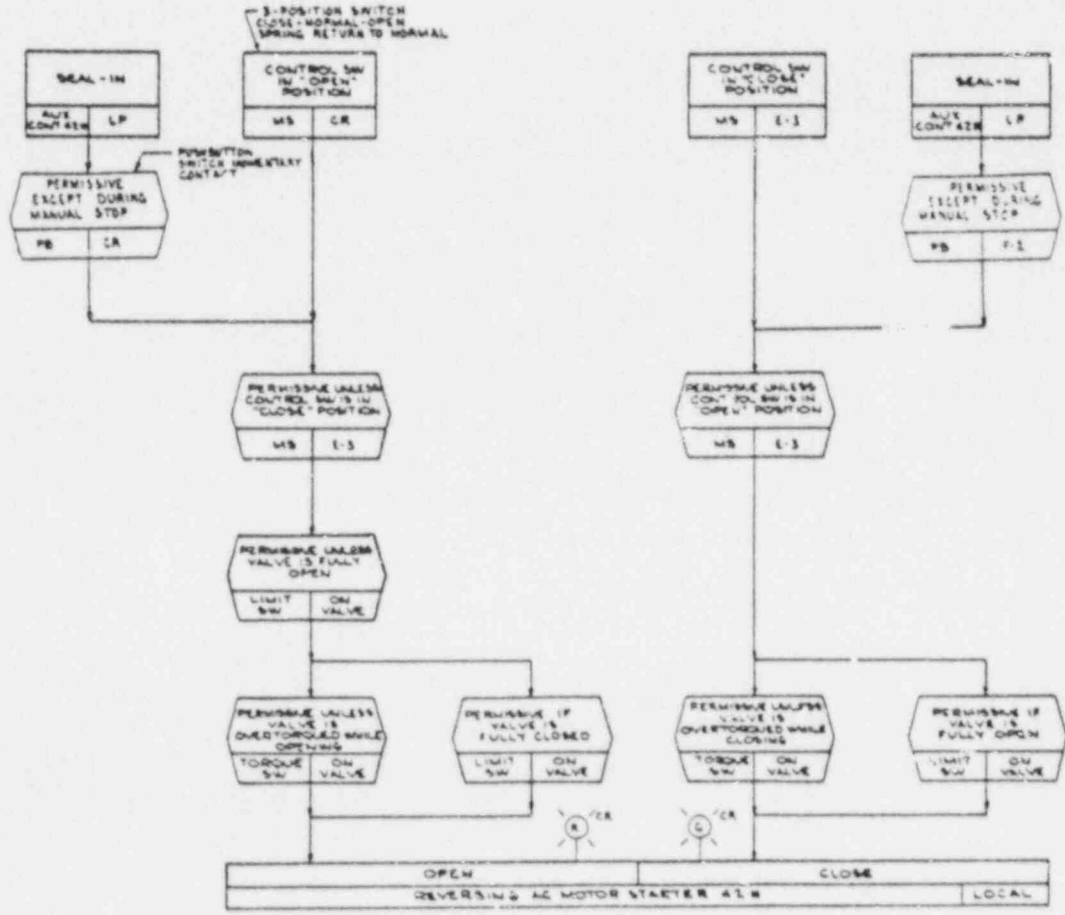
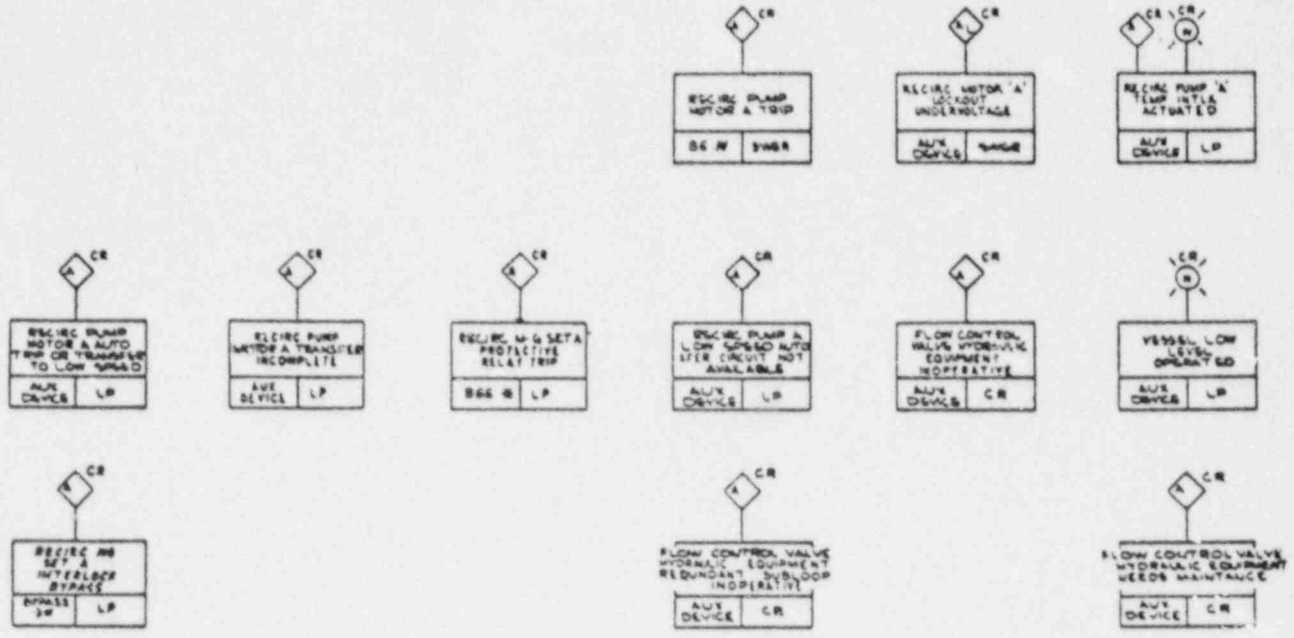
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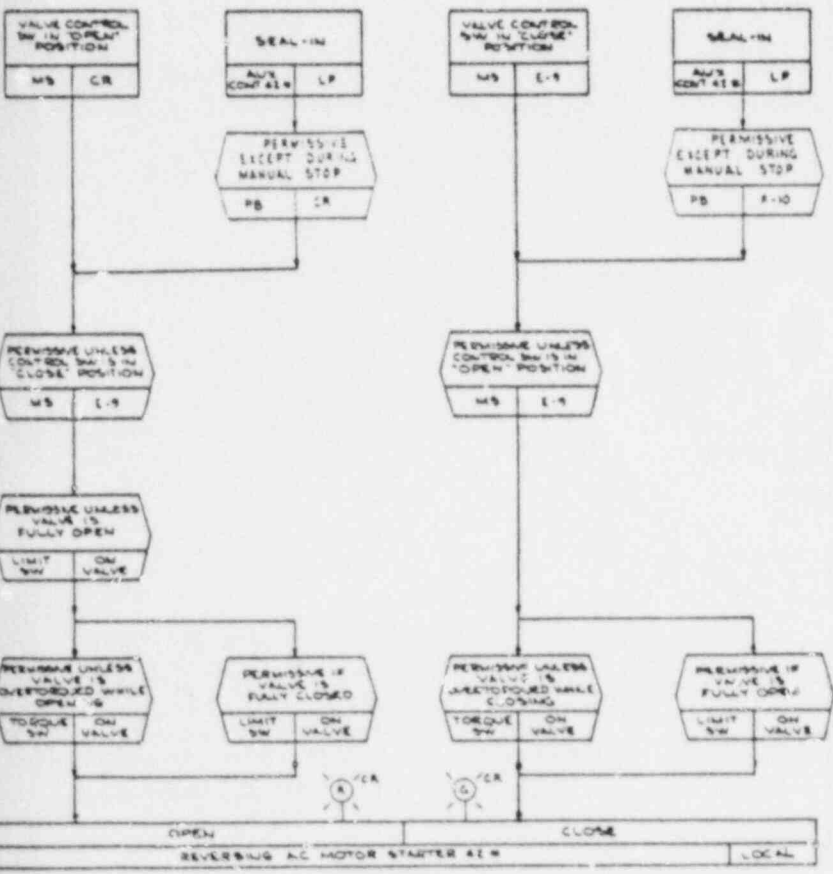
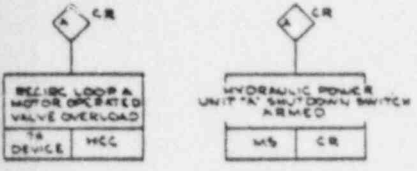
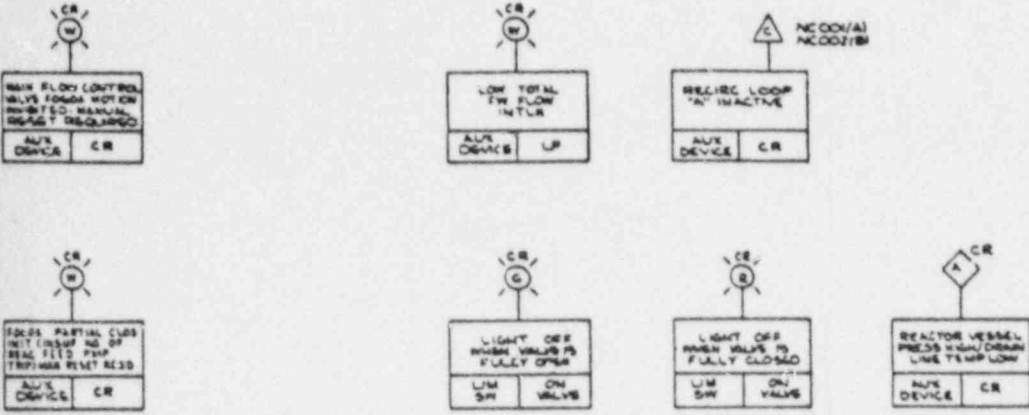


PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

Reactor Recirculation System
Functional Control Diagram
Figure 7.7-4 (Sheet 6 of 7)



PUMP DISCHARGE VALVE F067A




PUMP SUCTION VALVE FO23A

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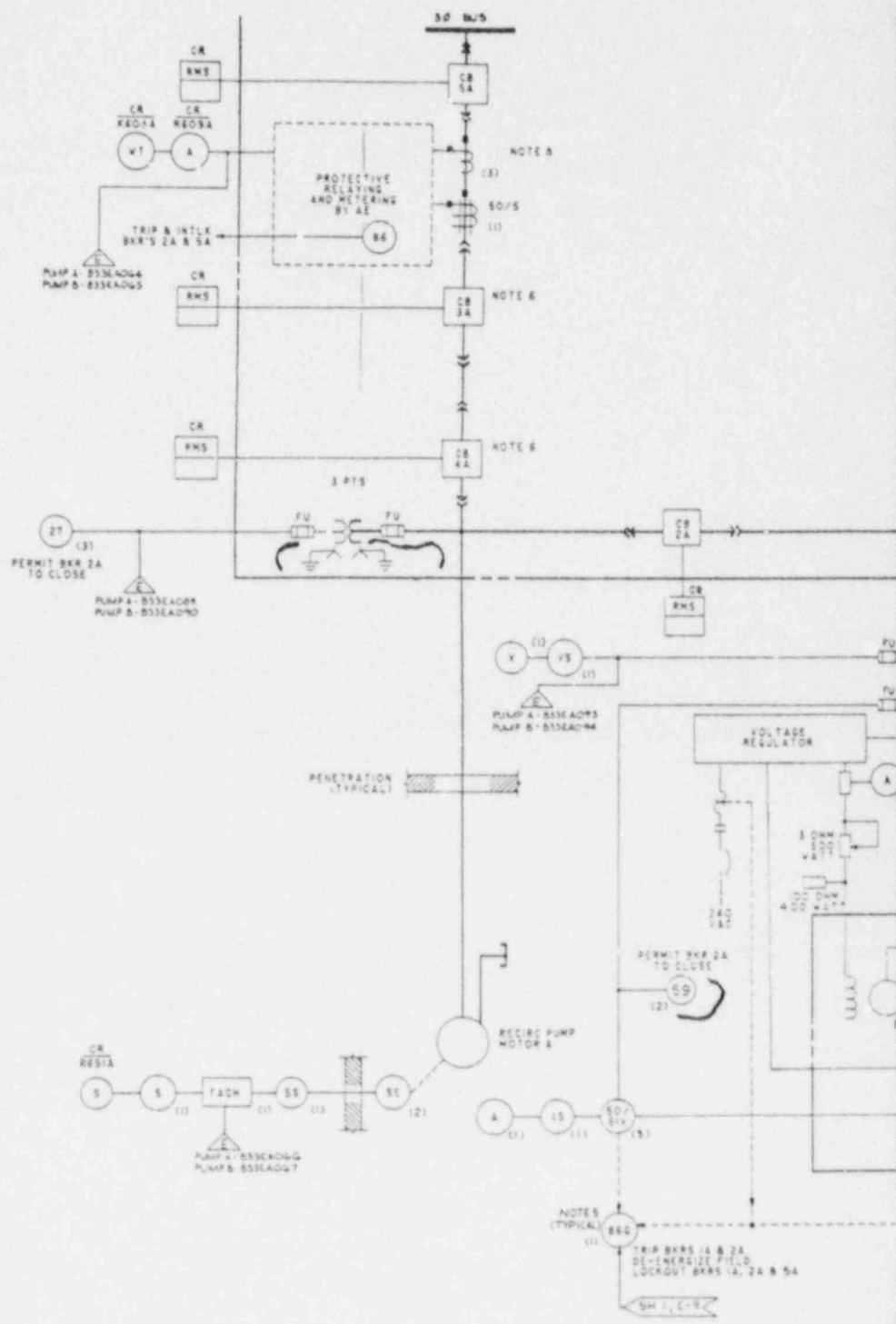
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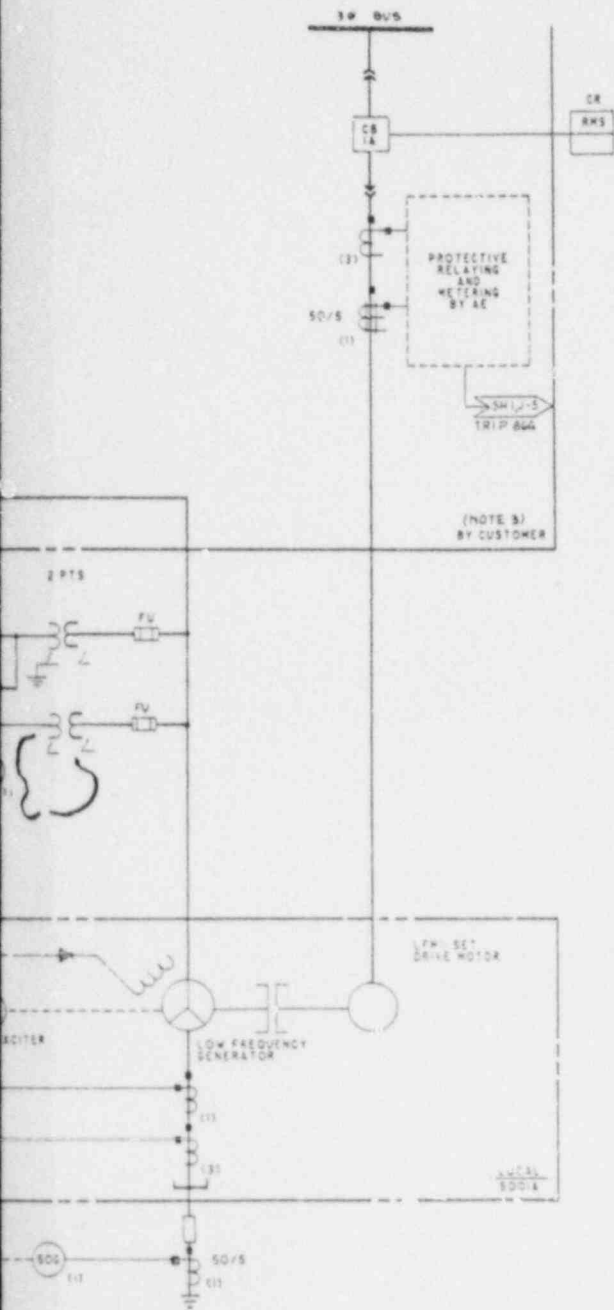
PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

Reactor Recirculation System
Functional Control Diagram

Figure 7.7-4 (Sheet 7 of 7)



MPL NO. (833-1000)



NOTES

1. SWITCH-GEAR DEVICE FUNCTION NUMBERS ARE PER ANSI C37.2.
2. FUNCTION IS SHOWN FOR RECIRCULATION SYSTEM A AND IS TYPICAL FOR RECIRCULATION SYSTEM B EXCEPT FOR LETTER SUFFIXES.
3. THE CUSTOMER / AE SHALL BE RESPONSIBLE FOR THE INDICATED PORTION. THE RELAYING IN CUSTOMER'S SWITCH-GEAR IS FOR REFERENCE ONLY AND DETAIL DESIGN IS BY CUSTOMER / AE.
4. CR DEVICES ARE LOCATED IN PLANT CONTROL ROOM.
5. EXCEPT AS NOTED, ALL DEVICES SHOWN IN THE DIAGRAM ARE LOCATED IN THE LOCAL PG SET CONTROL CUBICLE ROOM.
6. BOTH BREAKERS 3 & 4 SHALL BE PROVIDED WITH DUAL TRIP COILS AND ONE OF THE COILS SHALL BE FOR ESSENTIAL APPLICATION. SEE REF 9.
7. NUMBERS IN () INDICATE QUANTITY.
8. ANSI-METERING ACCURACY CLASS SHALL BE 0.5 BURDEN OF THE WATT TRANSDUCER, IS - POTENTIAL CIRCUIT - 4 VA AND CURRENT CIRCUIT - 0.25 VA.
9. THE MANUAL SWITCH IS USED TO SELECT THE SIGNAL FROM THE (H) OR (L) SET OF FILTER AND LEAD/LAG UNITS DEPENDING UPON WHETHER THE PLANT IS OPERATING HIGHER OR LOWER THAN THE POWER FLOW REF LINE AS DEFINED IN REF. DOC. II.
10. THE LOGIC UNIT SELECTS THE FLUX APRM SIGNAL WHEN THE ABSOLUTE MAGNITUDE OF THE DIFFERENCE BETWEEN THE FLUX ESTIMATED / FLUX APRM SIGNALS IS GREATER THAN THE VALUE DEFINED IN REF. DOC. II.1. THE FLUX ESTIMATED SIGNAL WHEN THE ABSOLUTE MAGNITUDE IS LESS THAN THE VALUE DEFINED IN REF. DOC. II. THE LOGIC UNIT ALSO SELECTS THE FLUX APRM SIGNAL IF THE FLUX APRM SIGNAL IS GREATER THAN THE VALUE DEFINED IN REF. DOC. II.2. SELECTS THE FLUX ESTIMATED SIGNAL IF THE FLUX APRM SIGNAL IS LESS THAN THE VALUE DEFINED IN REF. DOC. II.
11. EACH TIME THE LOGIC UNIT SELECTS FLUX APRM, THE TIMER MEASURES THE TOTAL DURATION OVER WHICH THE FLUX APRM SIGNAL IS PRESENT AT THE OUTPUT OF THE LOGIC UNIT. THE COMPUTER COUNTS THE NUMBER OF TIMES IN A GIVEN TIME PERIOD THAT THE LOGIC UNIT SWITCHES BETWEEN THE FLUX APRM AND FLUX ESTIMATED SIGNALS.

LEGEND

- A = AMMETER
- AS = AMMETER SWITCH
- V = VOLTMETER
- VT = WATT TRANSDUCER
- SE = SPEED SENSOR
- S = SPEED INDICATOR
- SS = SPEED SENSOR SWITCH
- VS = VOLTMETER SWITCH
- △ = ANALOG DIAL GENERATOR
- = HYDRAULIC LINE
- POS = POSITION SWITCH
- PT = POSITION TRANSMITTER
- VT = VELOCITY TRANSMITTER
- △ = EMERGENCY RESPONSE INFORMATION SYSTEM


REFERENCE DOCUMENTS

1. 833-1010 REACTOR RECIRCULATION SYS FEED
2. 831-1010 NUCLEAR DOLLAR SYSTEM FEED
3. 831-1010 NEUTRON MONITORING SYS FEED
4. 833-1030 REACTOR RECIRCULATION SYS ELEM DIAG
5. 833-1030 REACTOR RECIRCULATION SYSTEM FEED
6. 095-10500 ERIS ELEMENTARY DIAG
7. 030104-1010 FEEDWATER SYSTEM IEP
8. 442-1050 INSTRUMENT SYMBOLS
9. 833-1080 RPT INTERCONNECTION DIAGRAM
10. 462-412C TURBINE GENERATOR CONTROL REQUIREMENTS
11. 833-4710 REACTOR RECIRCULATION SYS FLOW CONT DESIGN SPEC

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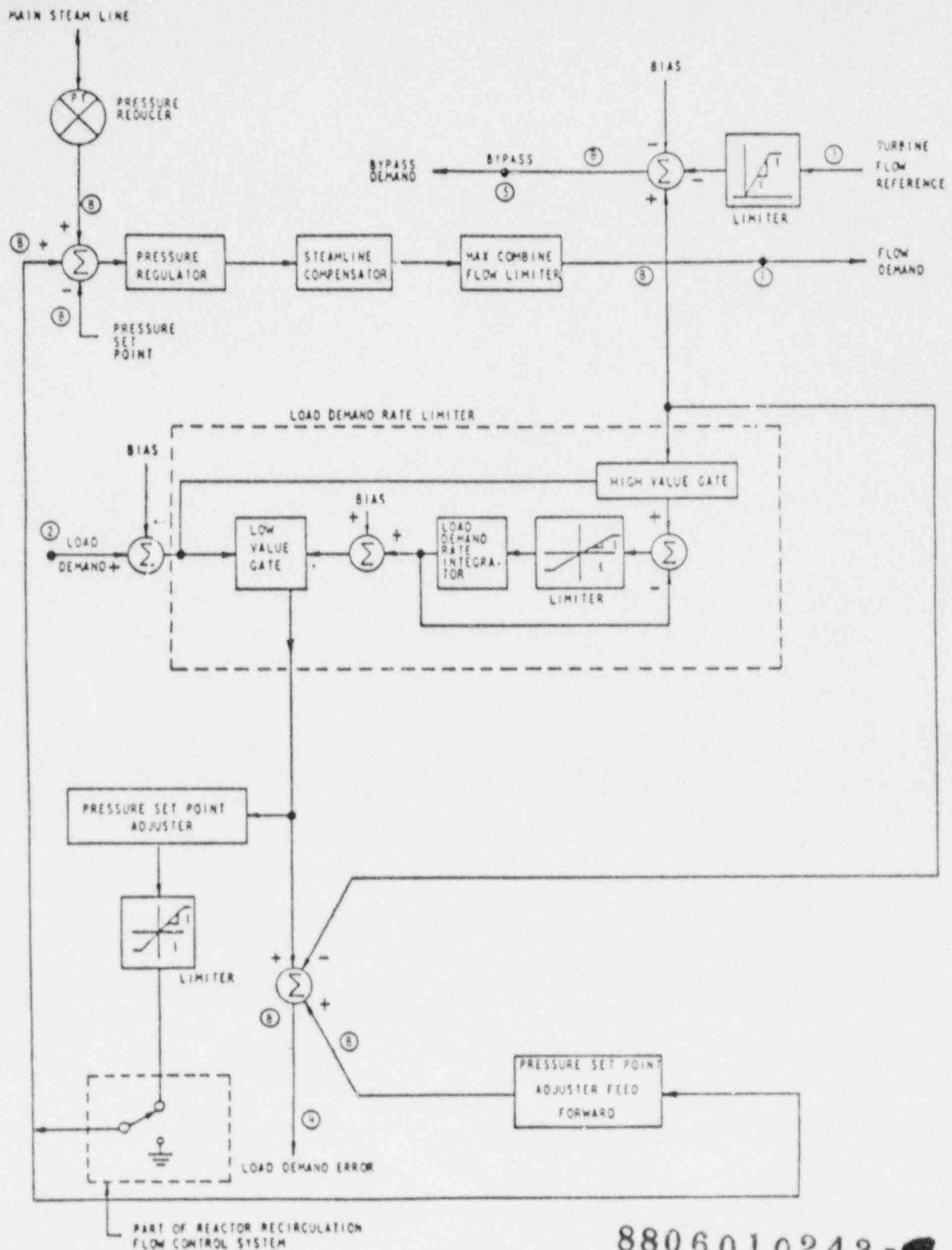
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

Recirculation Flow Control
Illustrations

Figure 7.7-5 (Sheet 1 of 6)



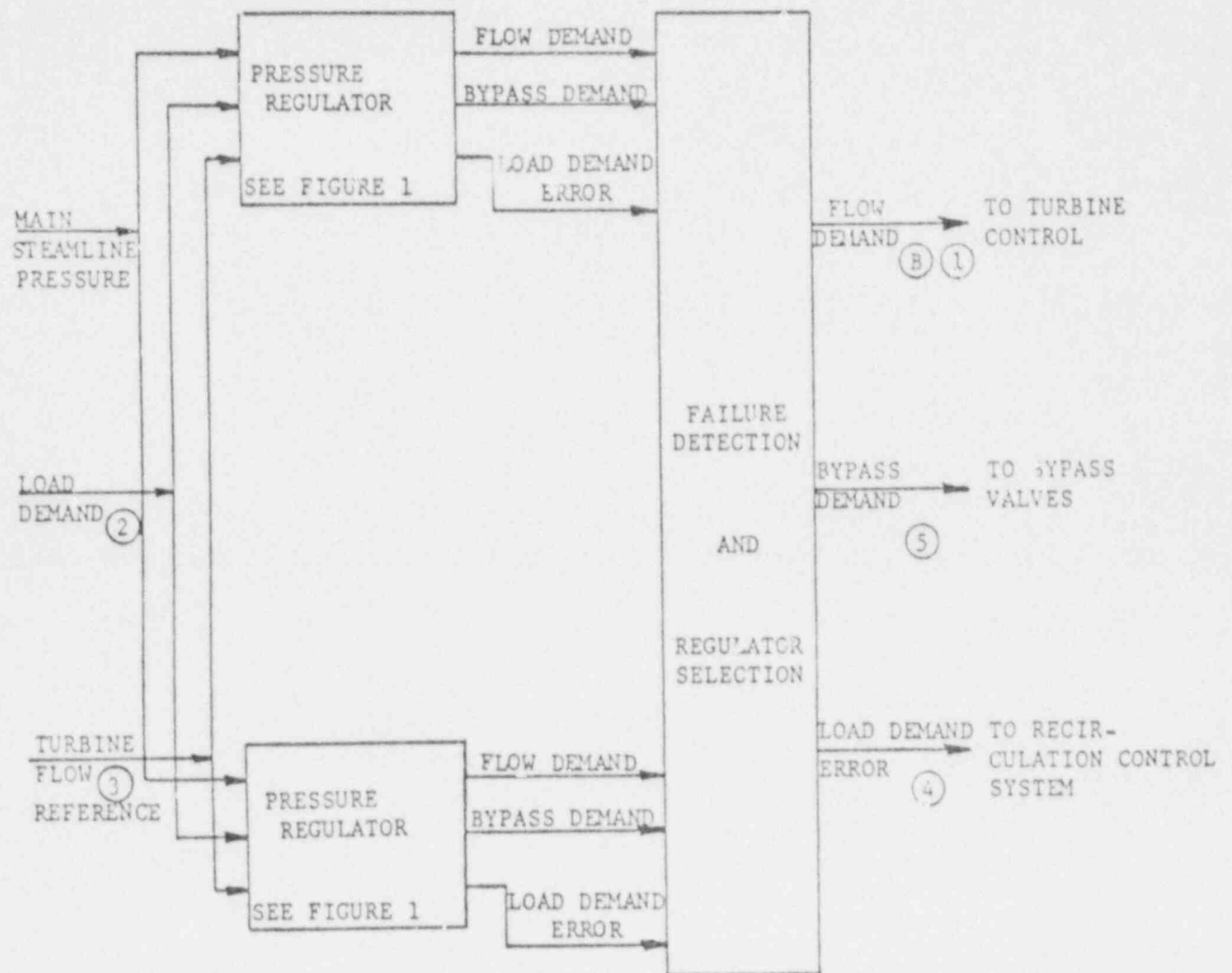
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PERRY NUCLEAR POWER PLANT
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

Pressure Regulator/Turbine Control
System Diagram

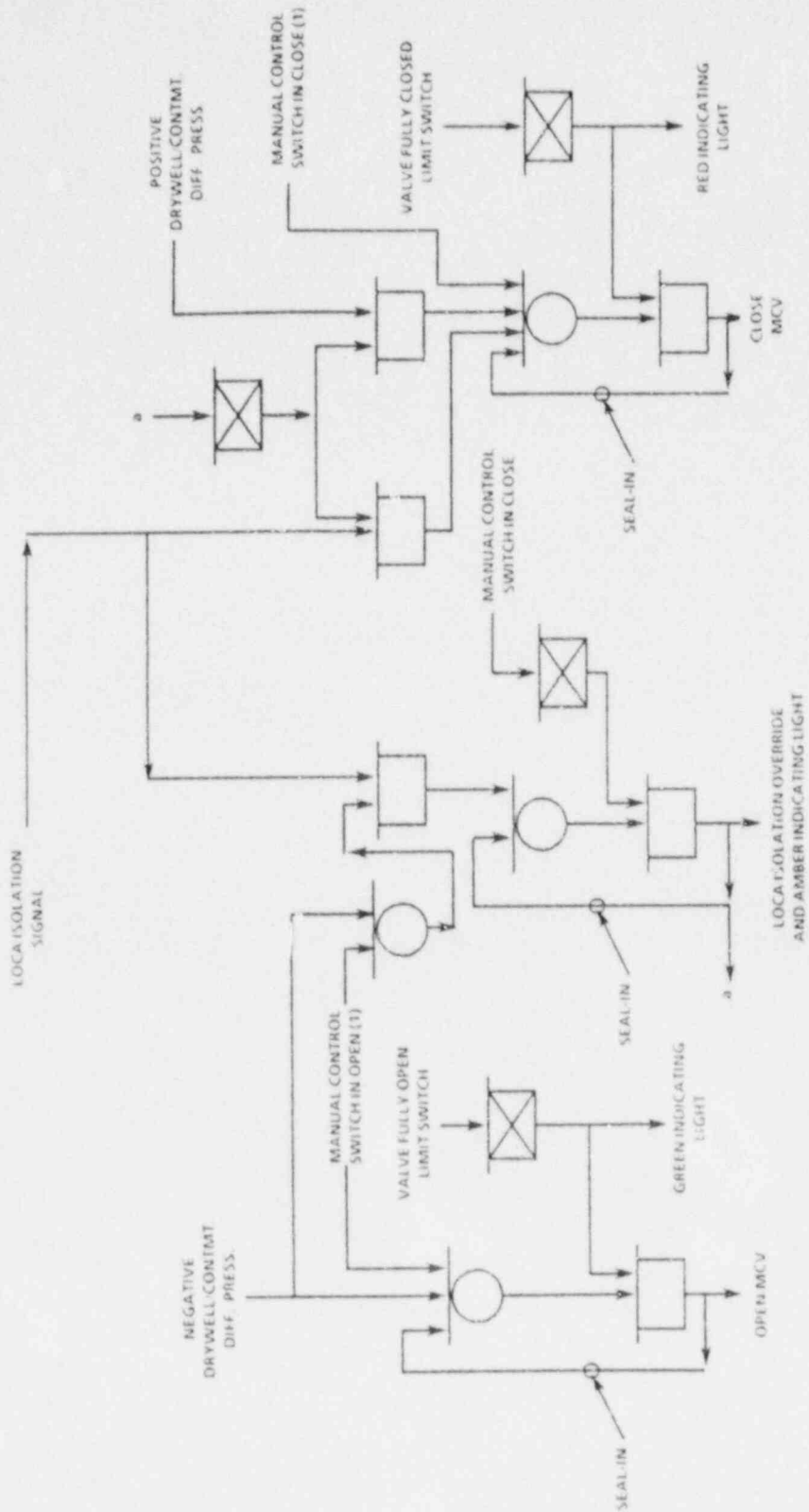
Figure 7.7-7 (Sheet 1 of 2)




PERRY NUCLEAR POWER PLANT
 THE CLEVELAND ELECTRIC
 ILLUMINATING COMPANY

Pressure Regulator/Turbine Control
 System Diagram

Figure 7.7-7 (Sheet 2 of 2)



NOTE:
 (1) Manual Control Switches are Spring Return to Neutral or Center Position.

	PERRY NUCLEAR POWER PLANT THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
	Drywell Vacuum Relief System Control Logic for Motor Operated Isolation Valves Figure 7.7-8

