

TABLE I. ANNUNCIATION IN CONTROL ROOM TRIP LOGIC (NOTE 13)

ALARM FUNCTION	DIVISION
1. CRD SCRAM DISCHARGE VOLUME HIGH WATER LEVEL	1, 2, 3 OR 4
2. CRD DISCHARGE VOLUME HIGH WATER LEVEL TRIP BYPASS	1, 2, 3 OR 4
3. MAIN STEAM LINE ISOLATION VALVE (MSIV) CLOSURE TRIP	1, 2, 3 OR 4
4. MSIV CLOSURE TRIP BYPASS	1, 2, 3 OR 4
5. DRYWELL HIGH PRESSURE TRIP	1, 2, 3 OR 4
6. DRYWELL HIGH PRESSURE TRIP BYPASS	1, 2, 3 OR 4
7. REACTOR VESSEL HIGH PRESSURE	1, 2, 3 OR 4
8. REACTOR VESSEL LOW WATER LEVEL (3) TRIP	1, 2, 3 OR 4
9. REACTOR VESSEL HIGH WATER LEVEL (8) TRIP	1, 2, 3 OR 4
10. TURBINE CONTROL VALVE FAST CLOSURE TRIP	1, 2, 3 OR 4
11. TURBINE STOP VALVE CLOSURE TRIP	1, 2, 3 OR 4
12. TURBINE CONTROL VALVE FAST CLOSURE AND STOP VALVE CLOSURE TRIP BYPASS	1, 2, 3 OR 4
13. DRYWELL HIGH OR LOW PRESSURE (APPROACH TO TRIP)	1, 2, 3 OR 4
14. NEUTRON MONITORING SYSTEM TRIP	1, 2, 3 OR 4
15. MANUAL SCRAM TRIP	1, 2, 3 OR 4
16. MANUAL SCRAM SWITCH ARMED	1, 2, 3 OR 4
17. REACTOR MODE SWITCH SHUTDOWN INTERRUPT CLEARED	1, 2, 3 OR 4
18. TRIP ACTUATORS A OR C TRIPPED	1, 2, 3 OR 4
19. TRIP ACTUATORS B OR D TRIPPED	1, 2, 3 OR 4
20. RECIRC PUMP EOC TRIP SYSTEM A BYPASSED	1
21. RECIRC PUMP EOC TRIP SYSTEM B BYPASSED	2
22. FULL SCRAM	1 OR 3
23. CLOSURE TRIPS FOR EITHER OF TWO VALVES WILL ANNUNCIATE	2 OR 4
24. BOTH OF TWO NMS TRIPS ARE REQUIRED FOR ANNUNCIATION	1 OR 3

TABLE I.A. ANNUNCIATION IN THE CONTROL ROOM - SYSTEM FAILURE OR OUT OF SERVICE

ALARM FUNCTION	DIVISION
1. RPS SYSTEM A/C OUT OF SERVICE	1 OR 3
2. 24 VDC ISOLATOR PWR LOSS OR CARD OUT OF FILE	1
3. 24 VDC ISOLATOR PWR LOSS OR CARD OUT OF FILE	2
4. RPS SYSTEM B/D OUT OF SERVICE	2 OR 4
5. 24 VDC ISOLATOR PWR LOSS OR CARD OUT OF FILE	2
6. 24 VDC ISOLATOR PWR LOSS OR CARD OUT OF FILE	4
7. TRIP UNIT IN CAL. OR GROSS FAILURE (NON SAFETY)	1
8. TRIP UNIT IN CAL. OR GROSS FAILURE (SAFETY)	1
9. TRIP UNIT OUT OF FILE OR POWER FAILURE	1
10. RPS A/C SW IN STOP	1
11. TRIP UNIT IN CALIBRATION OR GROSS FAILURE	1
12. TRIP UNIT OUT OF FILE OR POWER FAILURE	2
13. RPS B/D SW IN STOP	3
14. TRIP UNIT IN CALIBRATION OR GROSS FAILURE	3
15. TRIP UNIT OUT OF FILE OR POWER FAILURE	3
16. TRIP UNIT IN CALIBRATION OR GROSS FAILURE	4
17. TRIP UNIT OUT OF FILE OR POWER FAILURE	4

TABLE II. ALARM INPUTS TO COMPUTER FOR RPS

DESCRIPTION	INPUT NUMBER	CHANNEL (DIVISION)
1. CRD DISCHARGE VOLUME HIGH WATER LEVEL	C11	NC033 NC034 NC035 NC036
2. DRYWELL HIGH PRESSURE	C11	NC001 NC002 NC003 NC004
3. REACTOR VESSEL HIGH PRESSURE	B11	NC001 NC002 NC003 NC004
4. REACTOR VESSEL LOW WATER LEVEL	B11	NC005 NC006 NC007 NC008
5. MAIN STEAM LINE HIGH RADIATION	D11	NC001 NC002 NC003 NC004
6. TURBINE CONTROL VALVE FAST CLOSURE	C11	NC011 NC012 NC013 NC014
7. MAIN STEAM ISOLATION VALVES NOT FULLY OPEN	B11	NC047 NC048 NC049 NC050
8. TURBINE STOP VALVE CLOSURE	C11	NC011 NC012 NC013 NC014
9. NEUTRON MONITORING SYSTEM	C11	NC001 NC002 NC003 NC004
10. REACTOR MANUAL SCRAM	C11	NC005 NC006 NC007 NC008
11. REACTOR SCRAM CHANNELS A AND C TRIPPED	C11	NC009 NC010 NC011 NC012
12. REACTOR VESSEL HIGH WATER LEVEL	B11	NC051 NC052 NC053 NC054
13. REACTOR VESSEL LOW WATER LEVEL	B11	NC055 NC056 NC057 NC058
14. RECIRC. PUMP SYSTEM A TRIPPED	C11	NC059 NC060 NC061 NC062
15. RECIRC. PUMP SYSTEM B TRIPPED	C11	NC063 NC064 NC065 NC066
16. SCRAM DISCHARGE VOLUME VENT VALVE CLOSED, F010	C11	NC067 NC068 NC069 NC070
17. SCRAM DISCHARGE VOLUME VENT VALVE CLOSED, F011	C11	NC071 NC072 NC073 NC074
18. SCRAM DISCHARGE VOLUME DRAIN VALVE CLOSED, F011	C11	NC075 NC076 NC077 NC078
19. SCRAM DISCHARGE VOLUME DRAIN VALVE CLOSED, F012	C11	NC079 NC080 NC081 NC082

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

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 R-4 SET AND ALTERNATE SOURCE SIMULTANEOUSLY.
- CLASS 1E ELECTRICAL PROTECTION ASSEMBLY (EPA) TRIP CIRCUIT BREAKERS ON OVER VOLTAGE, UNDER VOLTAGE OR UNDER FREQUENCY.
- MAIN STEAM LINE ISOLATION VALVE CLOSURE TRIP SHALL BE ARRANGED SO THAT ONLY ONE STEAM LINE MAY BE ISOLATED (BY FULL CLOSURE OF ITS ISOLATION VALVE) AND THE ISOLATION VALVE FOR ANY ONE OTHER STEAM LINE CAN BE CLOSED (MORE THAN 100) WITHOUT CAUSING A SCRAM.
- LOGIC FOR THE "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 (C1 ETC.), A AND B SOLENOID CABLES MAY BE RUN TOGETHER IN ONE CONDUIT WITH NO OTHER WIRING.
- OMITTED
- EACH MAIN STEAM LINE RADIATION MONITOR MONITORS ALL FOUR MAIN STEAM LINES.
- ALL EQUIPMENT & INSTRUMENTS ARE PREFIXED BY SYSTEM NUMBER (C71) UNLESS OTHERWISE NOTED.
- FOR LOCATION AND IDENTIFICATION OF INSTRUMENTS SEE INSTRUMENT INDEX.
- SELENIUM INTRINSIC SUPPRESSORS (OR EQUIVALENT) SHALL BE USED TO SUPPRESS ELECTRICAL NOISE CAUSED BY THE SCRAM SOLENOIDS.
- THIS DISCHARGE VOLUME HIGH LEVEL BYPASS SWITCH SHALL BE SO CONSTRUCTED THAT RPS CHANNELS A AND C ARE PHYSICALLY SEPARATED FROM CHANNELS B & D.
- ALL ALARMS LOCATED IN 1013-000.
- FOR CONTROL ROOM, LOCAL OR REMOTE PANEL AND BACK IN NUMBERS FOR INSTRUMENTS, SEE THE INSTRUMENT INDEX.

REFERENCE DOCUMENTS:

- PROCESS COMPUTER INPUT/OUTPUT REQUIREMENTS
- NEUTRON MONITORING SYS IED
- NEUTRON MONITORING SYS PCO
- NEUTRON MONITORING SYS PCO
- CONTROL ROD DRIVE HYD SYS PCO
- CONTROL ROD DRIVE HYD SYS PCO
- NEUTRON MONITORING SYS PCO
- NEUTRON MONITORING SYS PCO
- REACTOR SCRAM SYS IED
- REACTOR SCRAM SYS PCO
- TURBINE MONITORING & STEAM BYPASS SYS DESIGN SPEC
- PROCESS COMP I/O LIST
- RPS IN SET ELEM DIAGRAM
- RPS ELEMENTARY DIAGRAM

NPL ITEM NO.

- CS-1010
- CS-1010
- CS-1010
- CS-1010
- CS-1010
- CS-1010
- CS-1010
- CS-1010
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REPERTORY DOCUMENTS:

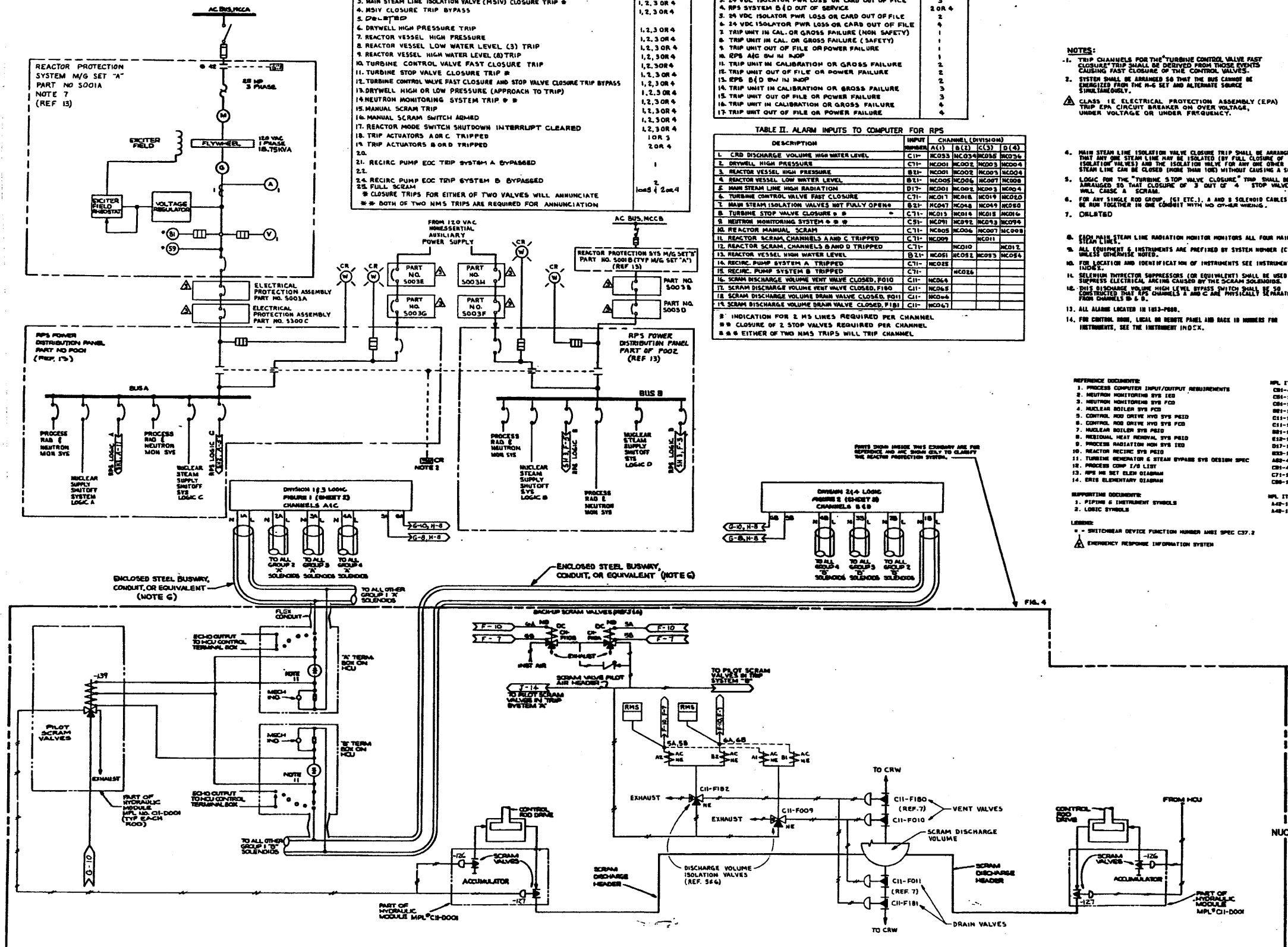
- PIPING & INSTRUMENT SYMBOLS
- LOGIC SYMBOLS

NPL ITEM NO.

- A42-1010
- A42-1030

LEGEND:

- SWITCHING DEVICE FUNCTION NUMBER AND SPEC C37.2
- EMERGENCY RESPONSE INFORMATION SYSTEM



NUCLEAR SAFETY RELATED

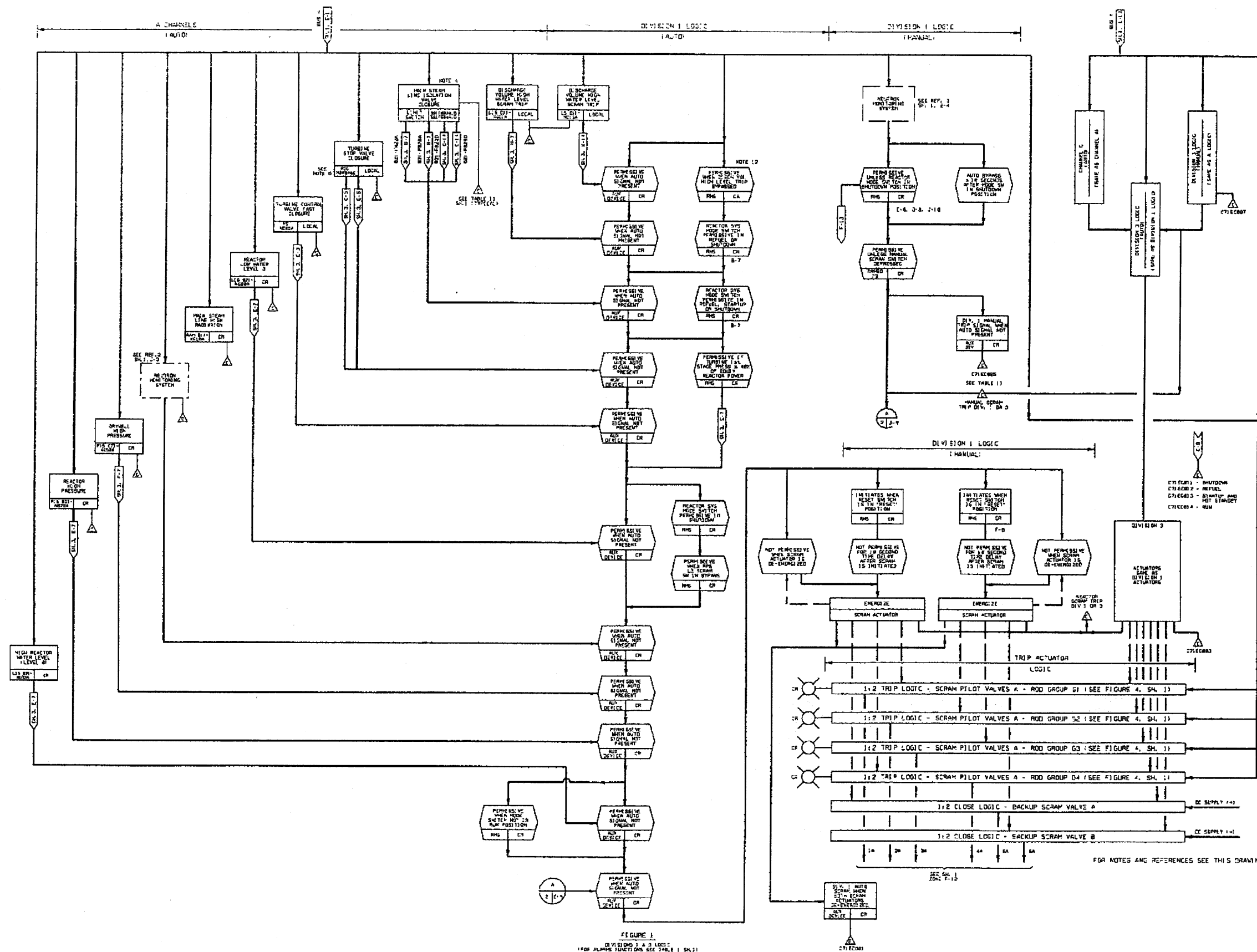
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PERRY NUCLEAR POWER PLANT

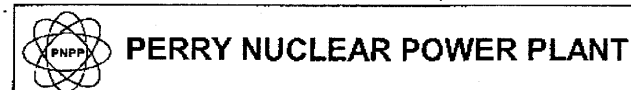
Reactor Protection System

Figure 7.2-1 (Sheet 1 of 4)

[Dwg. D-808-302(1)]



(Rev. 14 10/05)

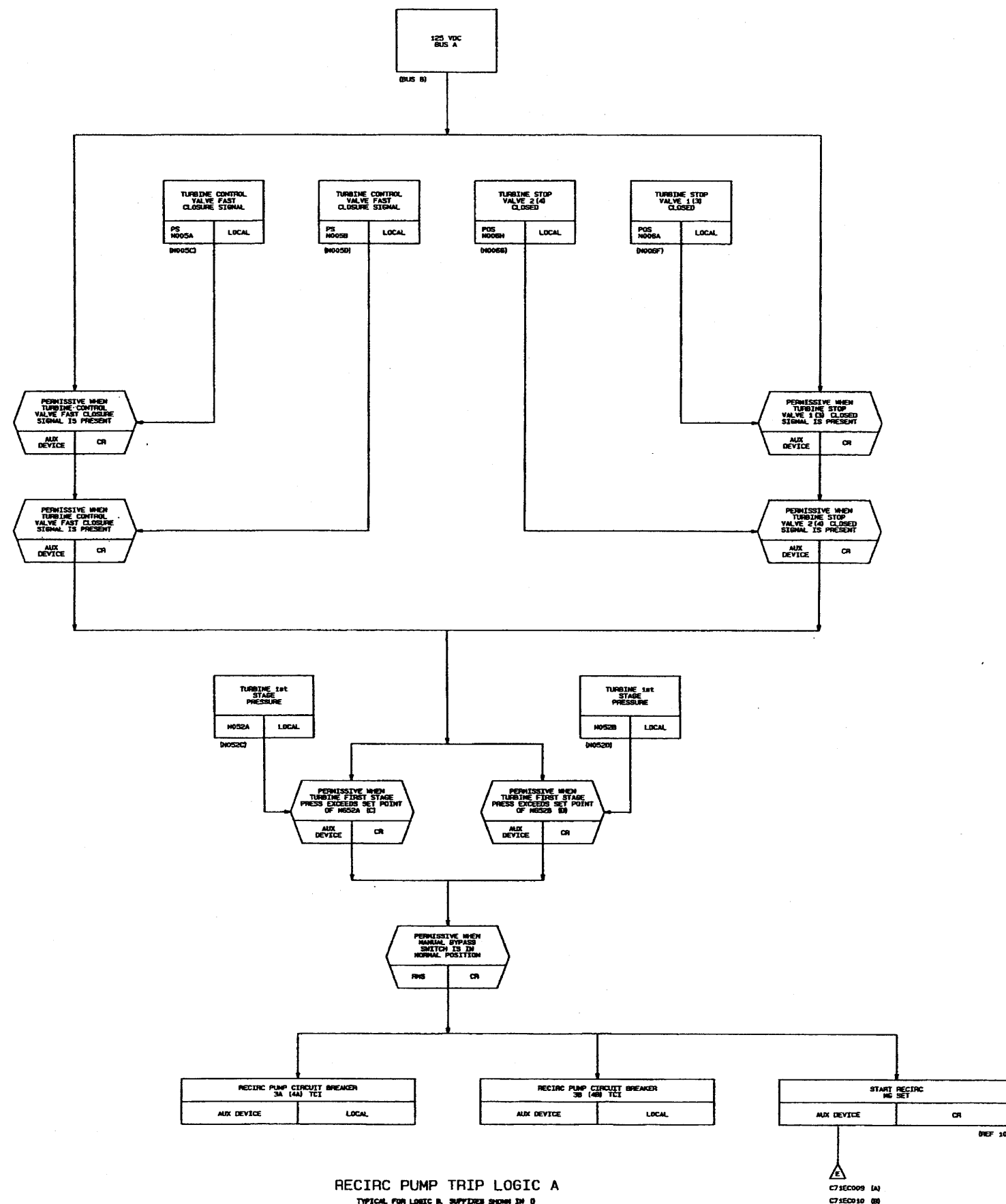


Reactor Protection System

Figure 7.2-1 (Sheet 2 of 4)

[Dwg. D-808-302(2)]





(Rev. 12 1/03)

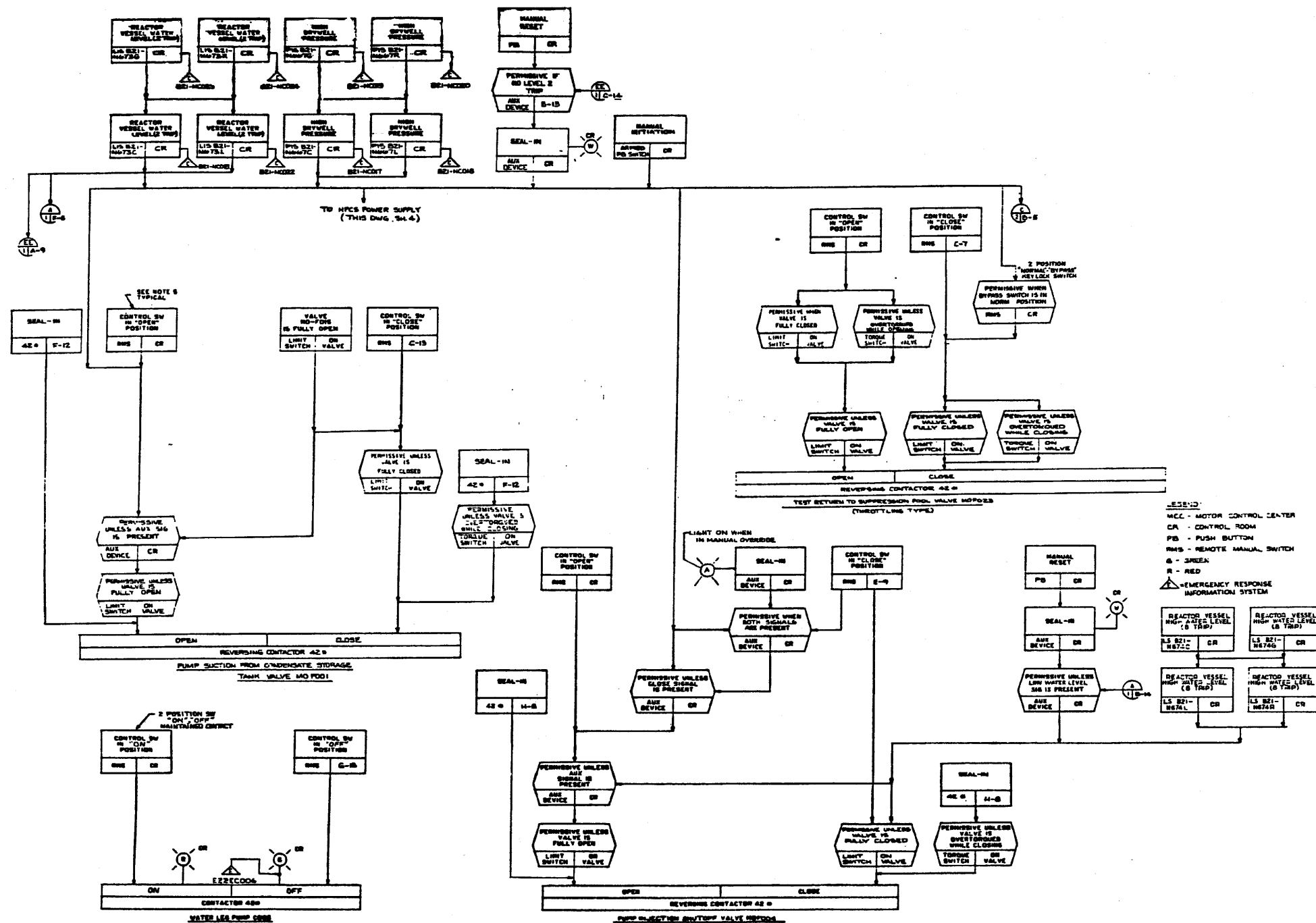


**PERRY NUCLEAR POWER PLANT**

Reactor Protection System  
Instrumentation and Electrical  
Diagram

Figure 7.2-1 (Sheet 4 of 4)  
[Dwg. D-808-302(4)]





- NOTES:
1. A) FLOW-MOTOR COMBINATION STARTERS SHALL BE PROVIDED WITH THERMAL OVERLOAD 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 ANNUNCIATION. IN ADDITION VALVE MOTOR CIRCUITS ARE TO BE PROVIDED WITH SHORT CIRCUIT CURRENT PROTECTIVE TRIP.
  3. ALL EQUIPMENT AND INSTRUMENTS ARE PREVIEWED BY SYSTEM NUMBER 222 UNLESS OTHERWISE NOTED.
  4. FOR ADDITIONAL ALARMS & PROCESS INSTRUMENTATION NOT SHOWN SEE REF. 1.
  5. UNLESS OTHERWISE NOTED ALL SW'S SHALL BE 3 POSITION SWITCHES. "CLOSE" - "OPEN" - "STOP" (RETURN TO "STOP" FROM "CLOSE" - "OPEN").
  6. THE HPCSS SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH: (HNP-770107) & (HNP-770107-1).
  7. LABEL "2" IS PART OF LIGHT AND LOCATED BELOW REGULAR HPCSS ANNUNCIATION LABEL AS SHOWN.

- REFERENCE DOCUMENTS:
- | NO. | DOCUMENT                   | REV.     |
|-----|----------------------------|----------|
| 1.  | HPCSS POWER SUPPLY         | 122-1000 |
| 2.  | HPCSS CONTROL SYSTEM       | 122-1000 |
| 3.  | DELETED                    | NA       |
| 4.  | LEAK DETECTION SW. PRD     | 122-1000 |
| 5.  | ELECTRICAL POWER SYSTEM    | 122-1000 |
| 6.  | LOGIC SYMBOLS              | 122-1000 |
| 7.  | REACTOR VESSEL CONTROL SYS | 122-1000 |
| 8.  | END ELEMENTARY DIAGRAM     | 122-1000 |

NUCLEAR SAFETY RELATED

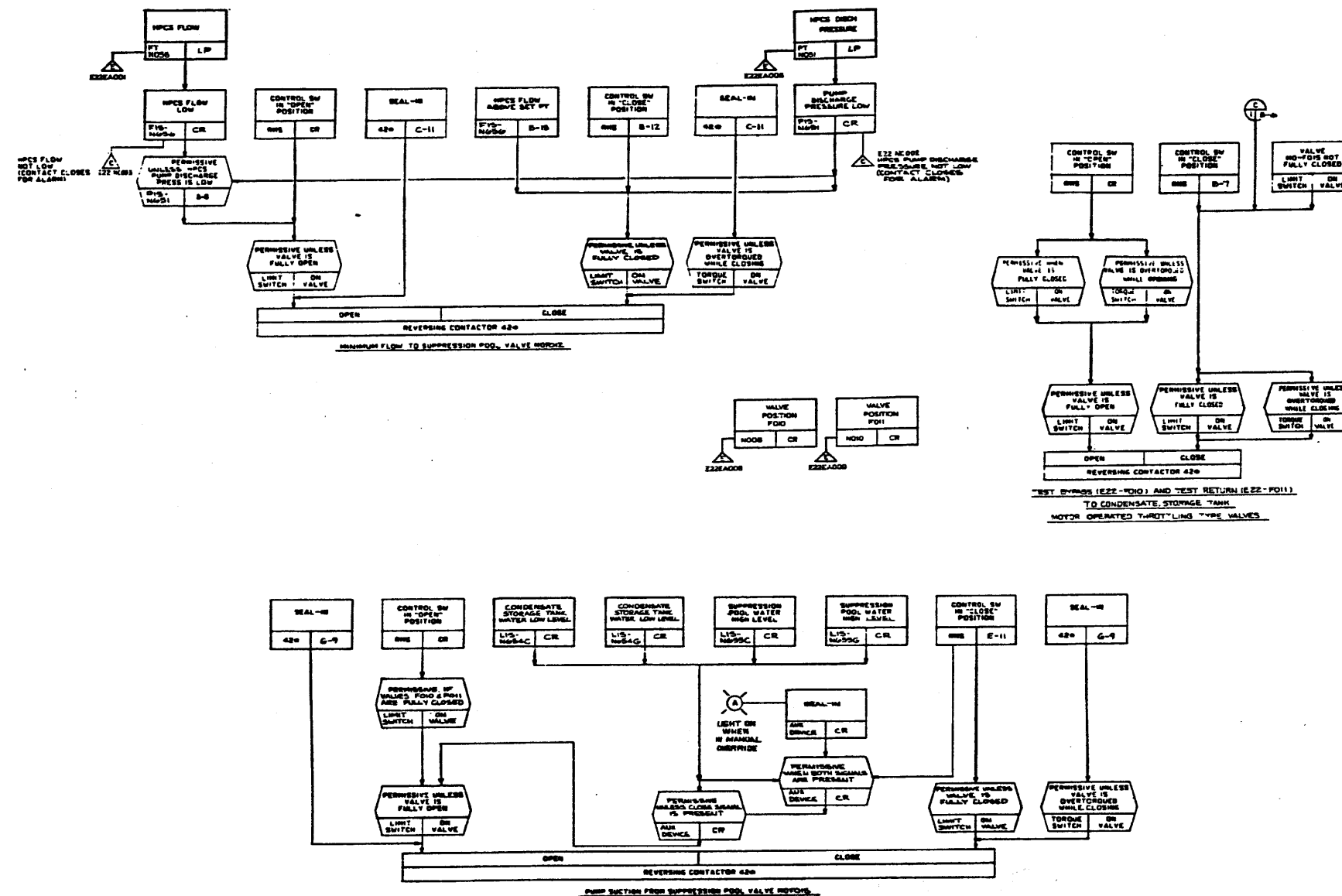
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**PERRY NUCLEAR POWER PLANT**

High Pressure Core Spray System

Figure 7.3-1 (Sheet 1 of 3)

(Dwg. D-808-311)



NUCLEAR SAFETY RELATED

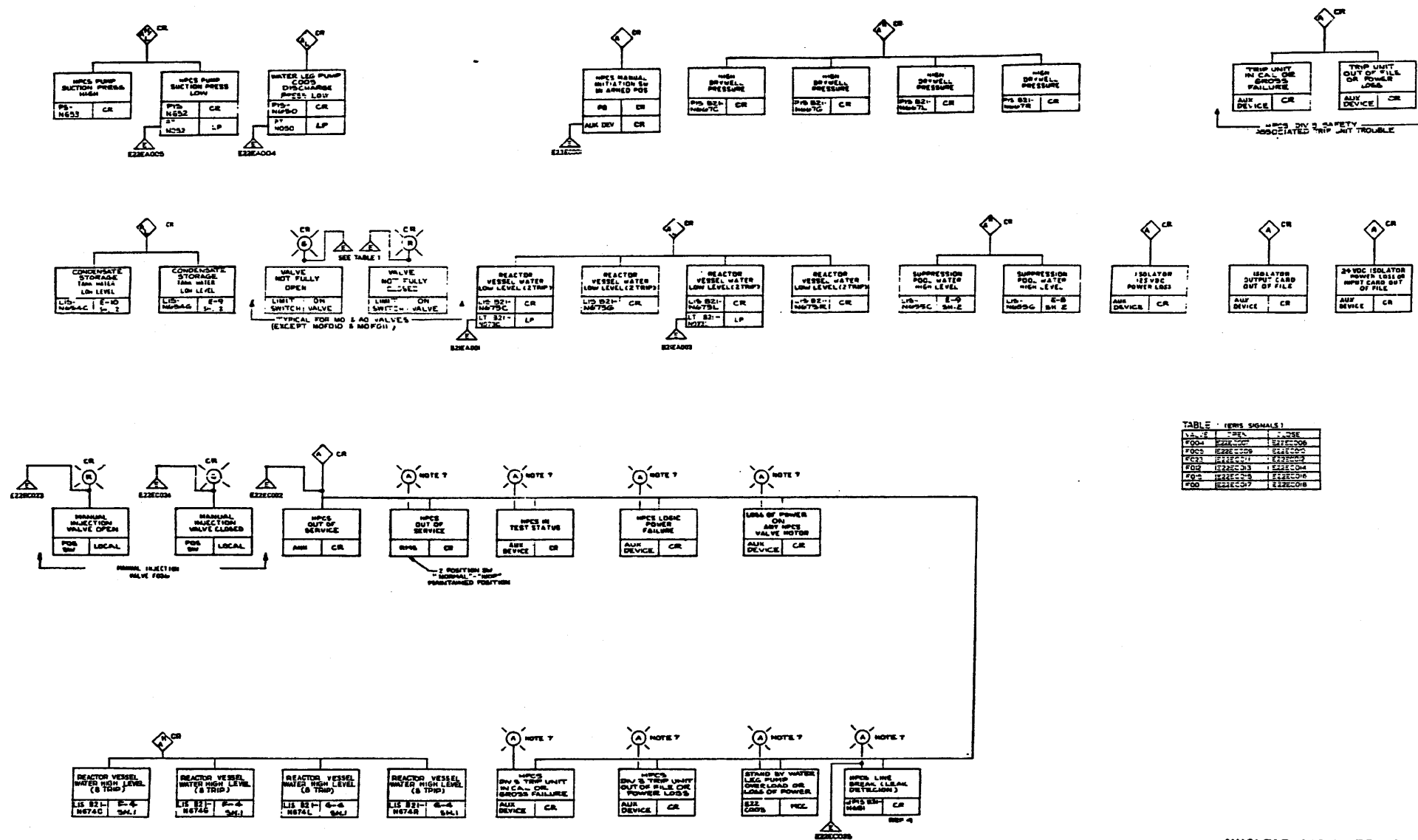
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**PERRY NUCLEAR POWER PLANT**

High Pressure Core Spray System

Figure 7.3-1 (Sheet 2 of 3)

(Dwg. D-808-311)



NUCLEAR SAFETY RELATED

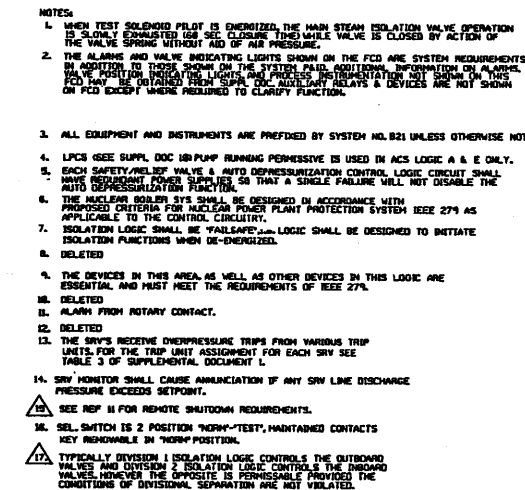
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**PERRY NUCLEAR POWER PLANT**

High Pressure Core Spray System


Figure 7.3-1 (Sheet 3 of 3)

(Dwg. D-808-311)



<u>SUPPORTING DOCUMENTS</u>		<u>REFERENCE DESIGNATOR</u>
1. LOGIC SYMBOLS	---	A62-1638
2. BOLD GROUP SEPARATION FOR PROTECTION SYS	---	A62-1636
3. DELETED	---	---
<u>SUPPLEMENTAL DOCUMENTS</u>		<u>REFERENCE DESIGNATION</u>
1. NUCLEAR BOILER PAID	---	E62-1818
2. DELETED	---	---
3. REACTOR PROTECTION SYS RED	---	C71-1819
4. PROCESS INMAGINATION SYS RED	---	017-1818
5. DELETED	---	---
6. REACTOR NEGOC SYS PAID	---	E63-1818
7. HWS SYS PAID	---	E12-1818
8. LEAK DETECTION SYS PCD	---	E21-1822
9. ISOLATION VALVES PURCH PART DWG	---	E21-F822, F028
10. LOW PRESSURE CDM SPRAY PAID	---	E22-1818
11. ELEGITE SHUTDOWN SYS PCD	---	E22-1828
12. STANDBY LIQUID CONTROL SYS PCD	---	C41-1838
13. REACTOR WATER CLEANUP SYS PCD	---	C63-1828
14. PAH SYS PCD	---	E12-1828
15. DELETED	---	---
16. CRDS ELEMENTARY DIAGRAM	---	C46-1858

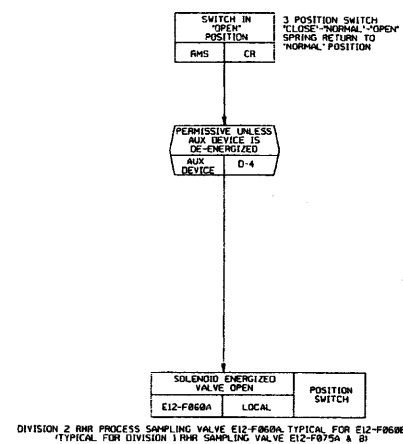
**LEGEND:**

IEEE	INSTITUTE OF ELECTRICAL & ELECTRONICS ENGINEERS
APS	AUTO DEPRESSURIZATION SYSTEM
RFS	REACTOR PROTECTION SYSTEM
•	APPLIES IF IN GE SCOPE OF SUPPLY
	SWITCHGEAR DEVICE FUNCTION NDS ASA SPEC C37.2
RAM	RADIATION MONITOR
	EMERGENCY RESPONSE INFORMATION SYSTEM

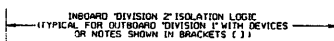
MAIN STEAM LINE DRAIN ISLN VALVE		
VALVE	OPEN	CLOSE
B21-FB16	B21EC1B3	B21EC1B4
B21-FB19	B21EC1A3	B21EC1A4

VALVE	OPEN	CLOSE
B21-P081	B21EC115	B21EC116
B21-P082	B21EC117	B21EC118
B21-P083	B21EC105	B21EC106
B21-P021	B21EC109	B21EC110

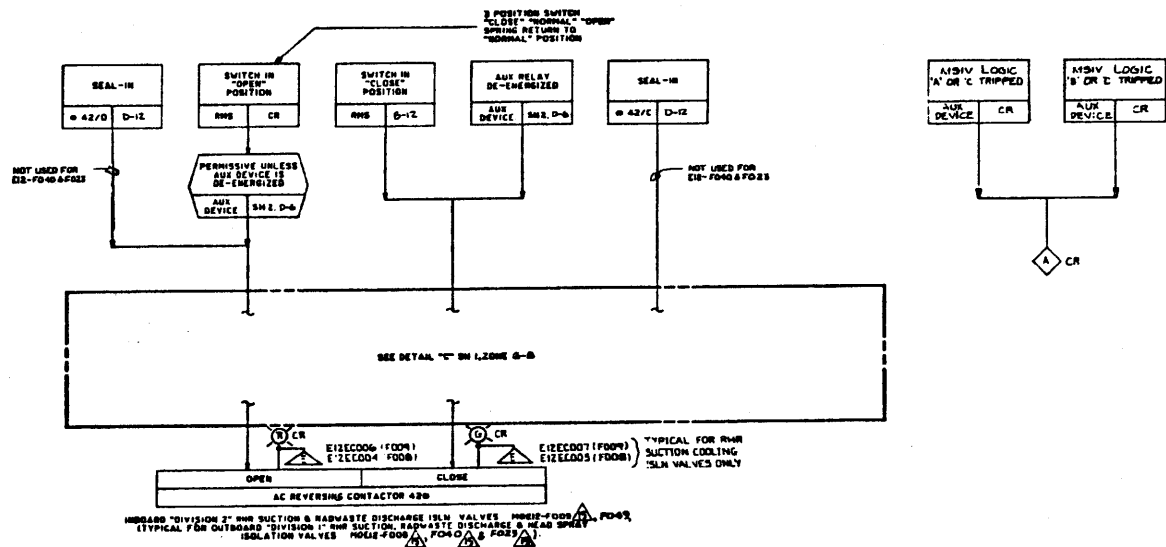
VALVE	OPEN	CLOSE
G33F001	G33EC012	G33EC013
G33F040	G33EC018	G33EC019
G33F053	G33EC008	G33EC009
G33F028	G33EC004	G33EC005
G33F004	G33EC014	G33EC015
G33F039	G33EC016	G33EC017
G33F054	G33EC010	G33EC011
G33F034	G33EC006	G33EC007



DIVISION 2 RHR PROCESS SAMPLING VALVE E12-F060A TYPICAL FOR E12-F060B  
(TYPICAL FOR DIVISION 1 RHR SAMPLING VALVE E12-F075A & B)



[Dwg. D-808-303(2)]



NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

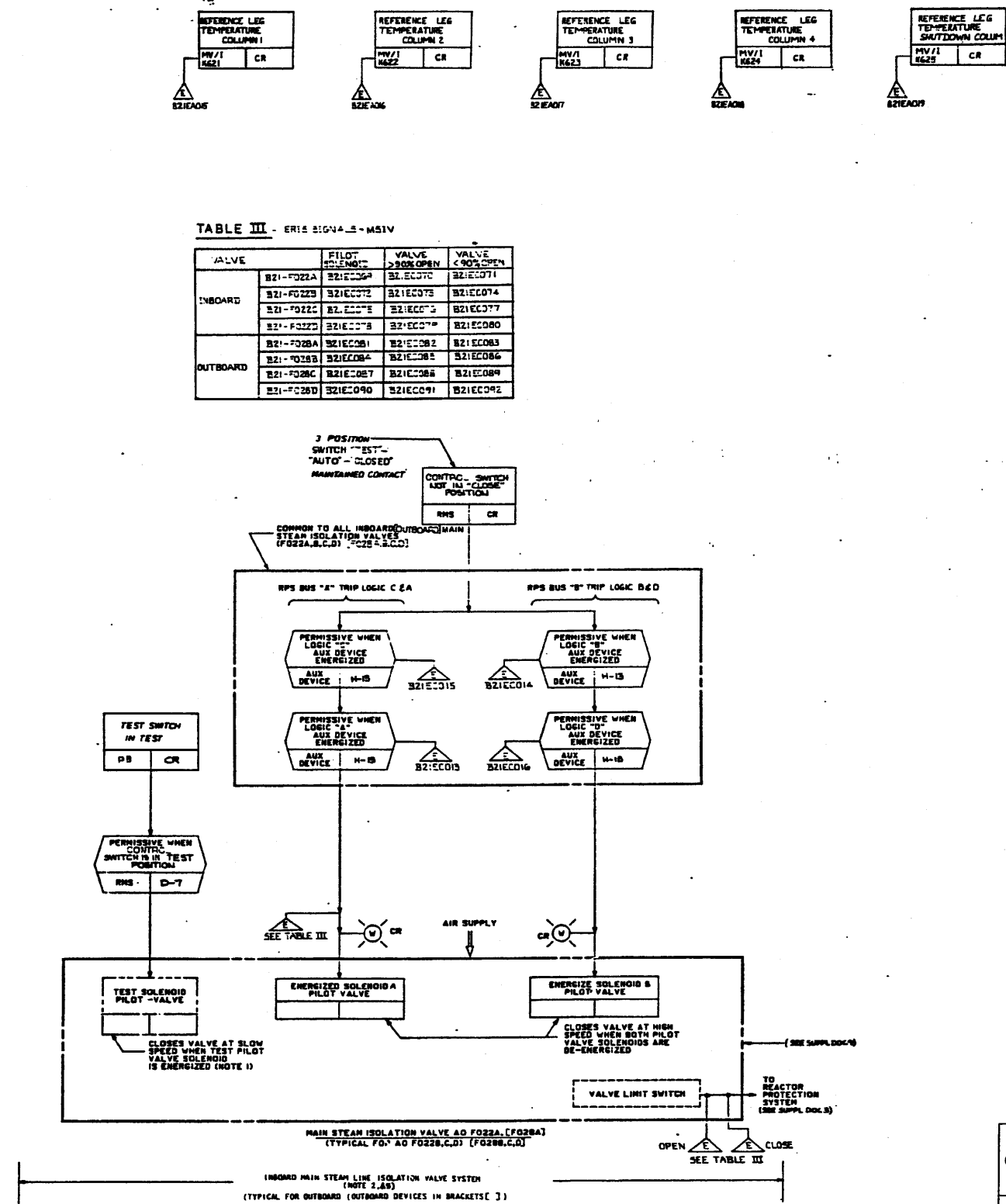


PERRY NUCLEAR POWER PLANT


Nuclear Boiler System

Figure 7.3-3 (Sheet 3 of 7)

[Dwg. D-808-303(3)]



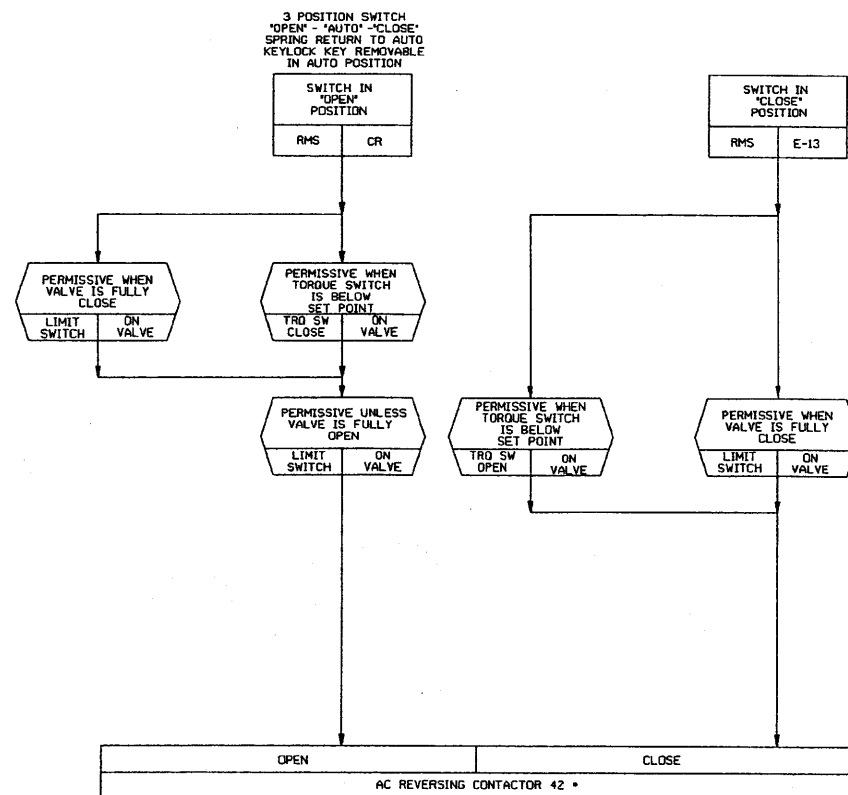
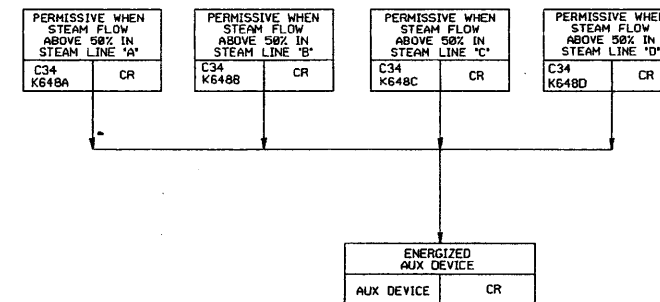
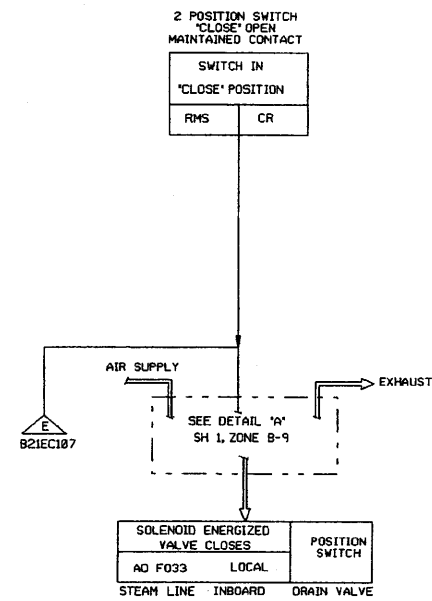
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 **PERRY NUCLEAR POWER PLANT**

Nuclear Boiler System

Figure 7.3-3 (Sheet 4 of 7)

[Dwg. D-808-303(4)]



3-d MAIN STEAM LINE SHUTOFF VALVE MO INU-F020A  
STEAM LINE "A" (TYP FOR STEAM LINE B, C & D EXCEPT SUFFIX A WILL  
BE SUFFIX B, C & D RESPECTIVELY)

(Rev. 12 1/03)



PERRY NUCLEAR POWER PLANT

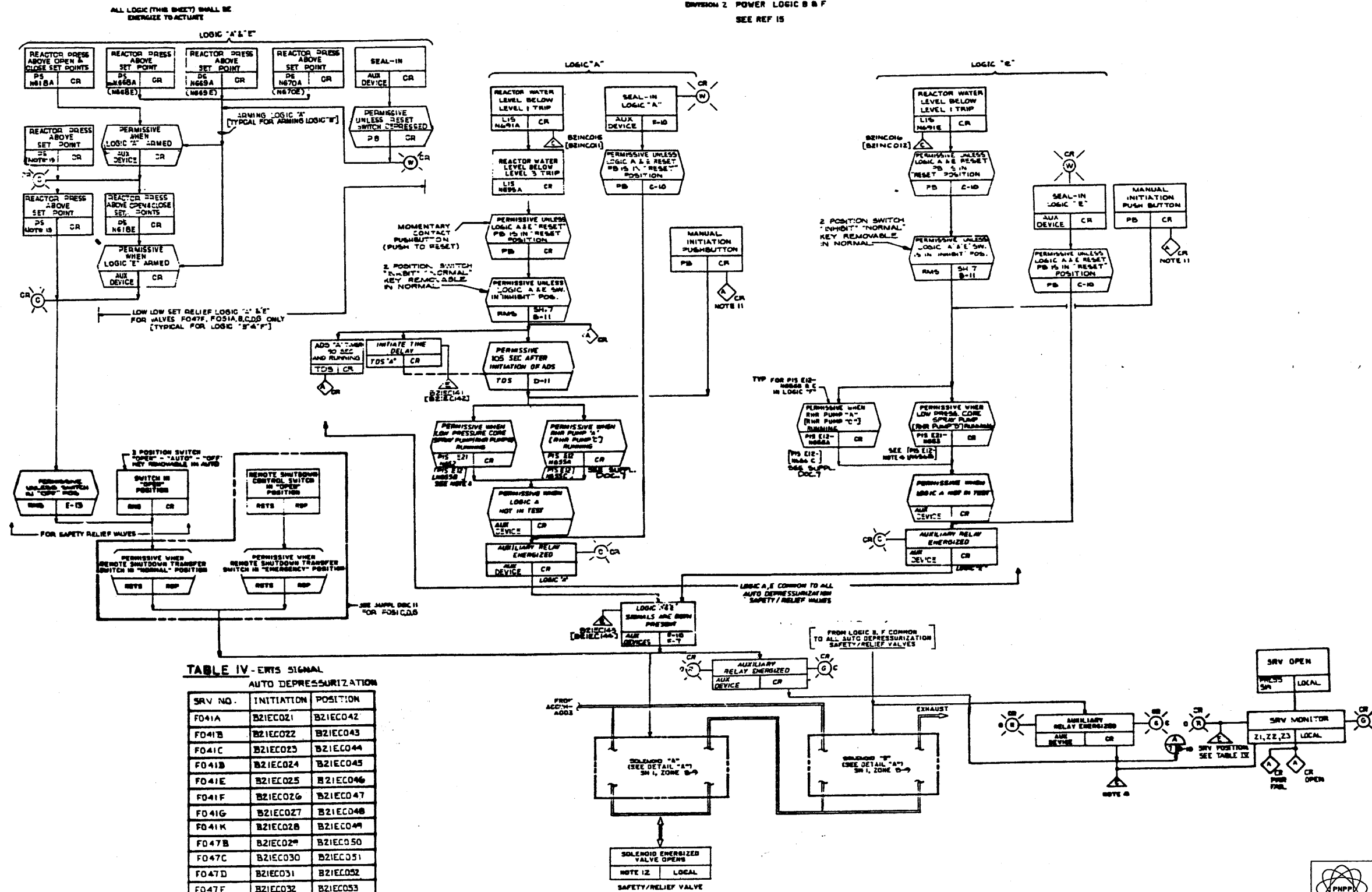
Nuclear Boiler System

Figure 7.3-3 (Sheet 5 of 7)

[Dwg. D-808-303(5)]



DIVISION 1 POWER LOGIC A & E  
 DIVISION 2 POWER LOGIC B & F  
 SEE REF 15



NUCLEAR SAFETY RELATED

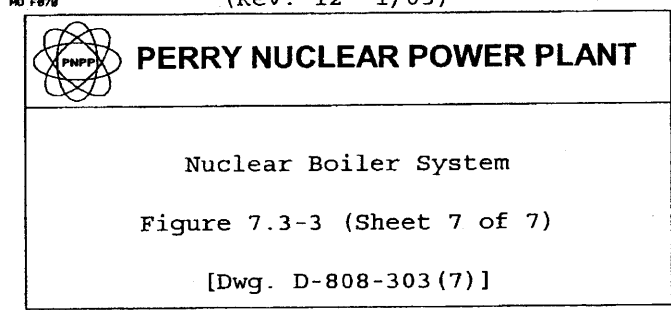
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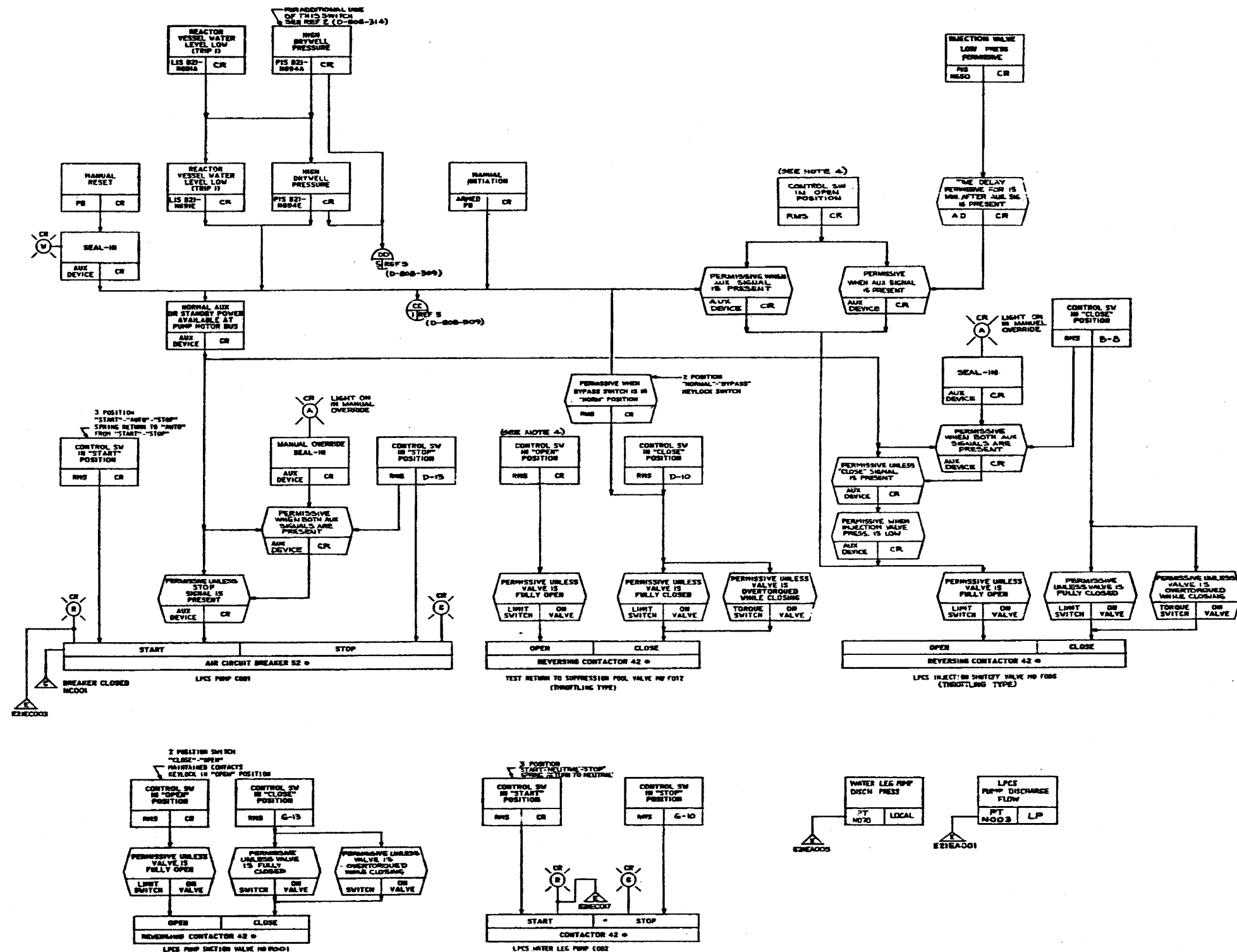
**PERRY NUCLEAR POWER PLANT**

Nuclear Boiler System

Figure 7.3-3 (Sheet 6 of 7)

[Dwg. D-808-303(6)]





- NOTES:**
1. PUMP MOTOR SHALL BE PROTECTED WITH OVERLOAD PROTECTION. PROTECTION DELAYS ARE TO BE APPLIED SO AS TO MAINTAIN POWER ON THE MOTOR AS LONG AS POSSIBLE WITHOUT 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 3 POSITION SWITCHES, "CLOSE", "AUTO", "OPEN". SPRING RETURN TO "AUTO" FROM "CLOSE" OR "OPEN".
  5. CONTROL AND MOTIVE POWER FOR LPCS SHALL BE FROM SAME SOURCE AS THE RMS LOOP "AP EQUIPMENT" (REF. 5).
  6. THE LPCS SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH IEEE 275-1971 AND REF. 7.

- REFERENCE DOCUMENTS:**
- | REF. NO. | DESCRIPTION  | REV. NO. |
|----------|--|----------|
| 1.       | LOW PRESSURE CORE SPRAY SYSTEM P&ID                  | E21-1010 |
| 2.       | REAC. CORE, MAIN CLO. SYSTEM P&ID                    | E21-1010 |
| 3.       | NUCLEAR ROILER SYSTEM P&ID                           | E21-1010 |
| 4.       | RESIDUAL HEAT REMOVAL SYSTEM P&ID                    | E21-1010 |
| 5.       | RESIDUAL HEAT REMOVAL SYSTEM P&ID                    | E21-1010 |
| 6.       | NUCLEAR ROILER SYS. P&ID                             | E21-1010 |
| 7.       | ELECTRICAL EQUIPMENT SEPARATION FOR SAFEGUARD SYSTEM | 602-4000 |
| 8.       | LEAK DETECTION SYS. (NEEP)                           | 602-1010 |
| 9.       | EPSS ELEMENTARY DIAGRAM                              | C08-1000 |

**LEGEND:**  
 RMS - SWITCHING DEVICE FUNCTION NO., UNIT SPEC., CST. 2  
 IEEE - INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEER.  
 E21EAC001 - EMERGENCY RESPONSE INFORMATION SYSTEM

# NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

## PERRY NUCLEAR POWER PLANT

Low Pressure Core  
Spray System

Figure 7.3-4 (Sheet 1 of 2)  
[Dwg. D-808-310(1)]

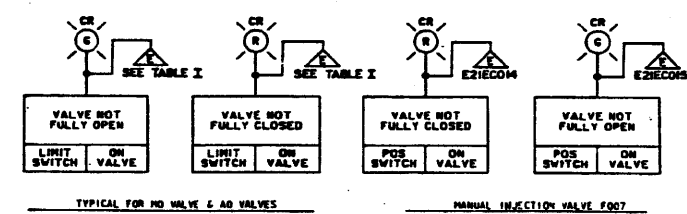
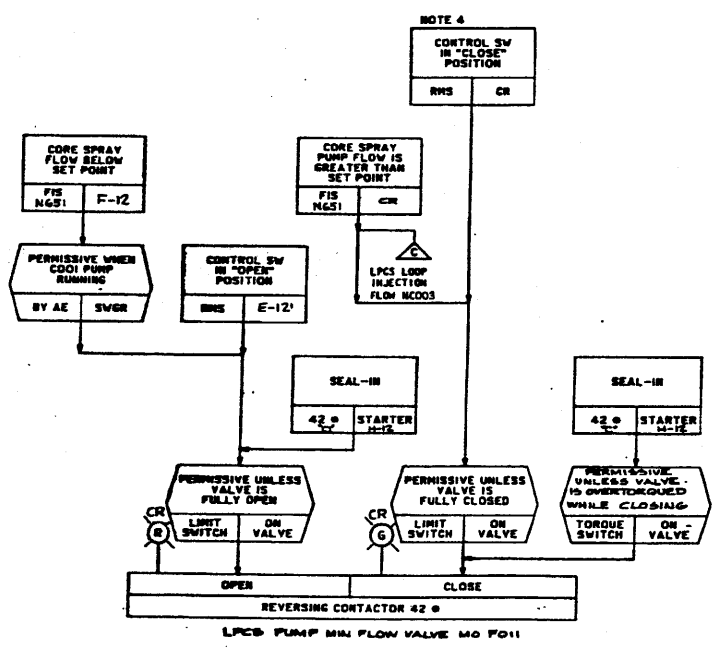
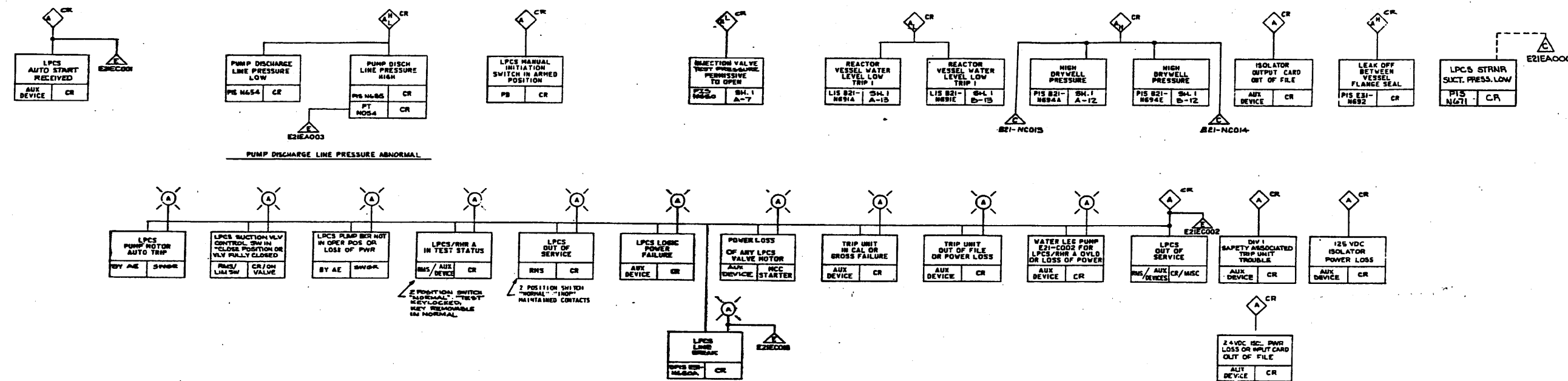


TABLE I  
ERIS SIGNALS

VALVE	OPEN	CLOSE
FO05	E21EC004	E21EC005
FO06	E21EC006	E21EC007
FO01	E21EC008	E21EC009
FO11	E21EC010	E21EC011
FO12	E21EC012	E21EC013

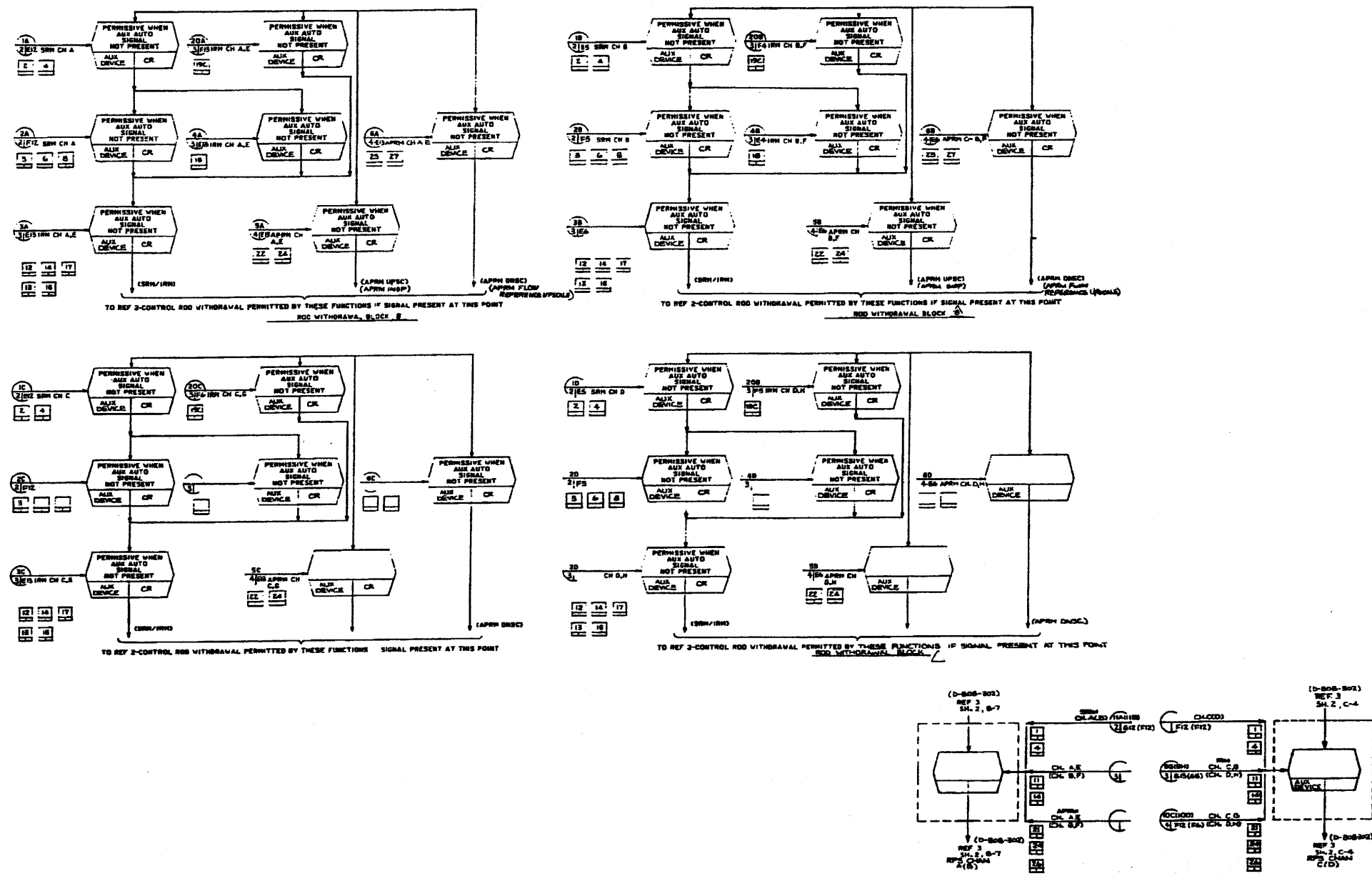
NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

Low Pressure Core  
Spray System

Figure 7.3-4 (Sheet 2 of 2)  
[Dwg. D-808-310(2)]



1. THE EVENT THAT POWER IS LOST. FOLLOWING ACTIONS WILL BE INITIATED AFTER POWER IS RESTORED.
2. IN AUTOMATIC MODE, DETECTOR RETURNS TO "GOOD" VIA AUTOMATIC RESET PATH. DETECTOR MUST THEN BE RETURNED TO STORAGE POSITION TO REPROGRAM DETECTOR.
3. IN MANUAL MODE, MUST RESTART MANUAL SWITCH IN REVERSE AND RETURN TO STORAGE POSITION TO REPROGRAM DETECTOR.
4. THE TIME DURATION OF THE RESPONSE SHALL BE COMPATIBLE WITH ASSOCIATED COMPUTER SYSTEM EXCEPT FOR MANUAL EQUIPMENT & INSTRUMENTS BY OTHERS.
5. CHANNELS A, C, E & G CHANNELS B, D, F & H.

ROD WITHDRAWAL BLOCKS SUBJECT TO BYPASSING AT SUBSYSTEM LEVEL - SEE SHEETS

**LEGEND**

--- WITHIN BLOCK (SEE DETAILS WITH NUMBERS)

--- INTERMEDIATE RANGE

--- AVERAGE POWER

--- SOURCE RANGE

--- LOCAL POWER RANGE

--- TRIMMING IN-CORE

MOC --- MULTIPLE OUTPUT

**REFERENCE DOCUMENTS**

1. PERFORMANCE DESIGN SPEC --- C11-1030 / D-808-305

2. CONTROL ROD WTD SYS --- C11-1040 / D-808-306

3. REACTOR PROTE SYS --- C22-1030 / D-808-307

4. DIS ELEMENT DIAGRAM --- / D-808-308

5. PERFORMANCE MONITORING SYS ---

**LEGEND (CONT.)**

DCU ---

△ ---

FIGURE 3

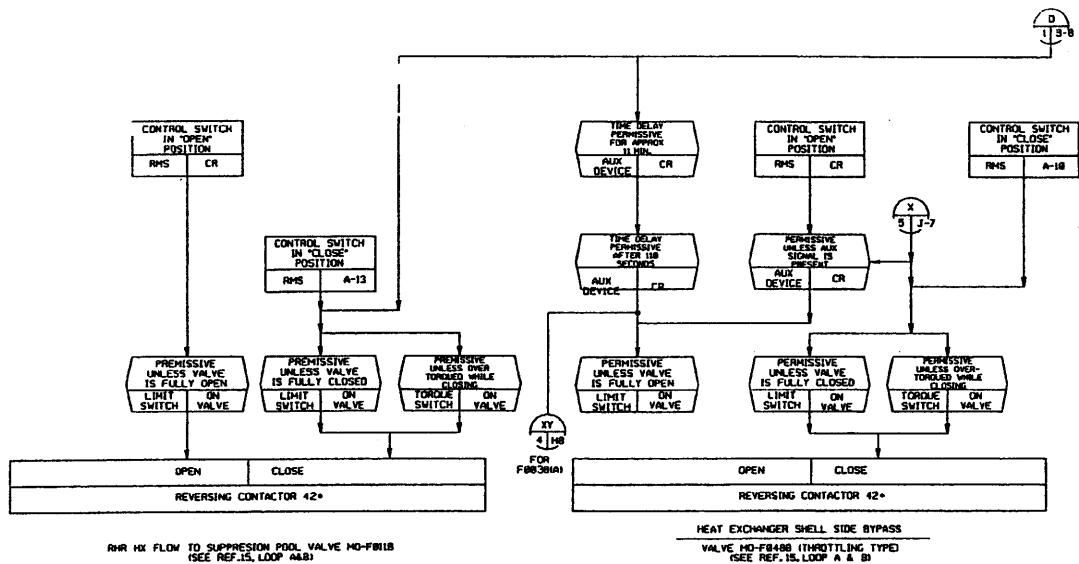
(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

Residual Heat Removal System

Figure 7.3-5 (Sheet 1 of 5)

[Dwg. D-808-309(1)]



FOR NOTES AND LEGEND, SEE THIS DWG., SHT. 1

(Rev. 12 1/03)

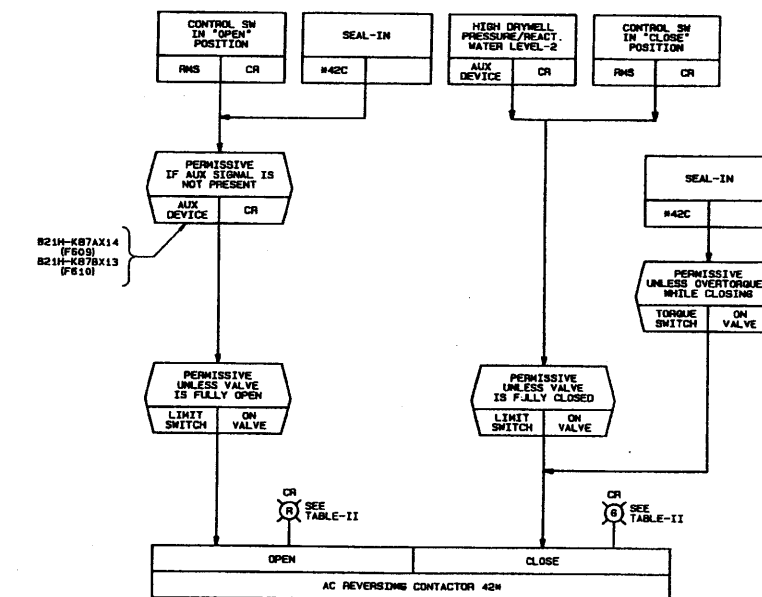
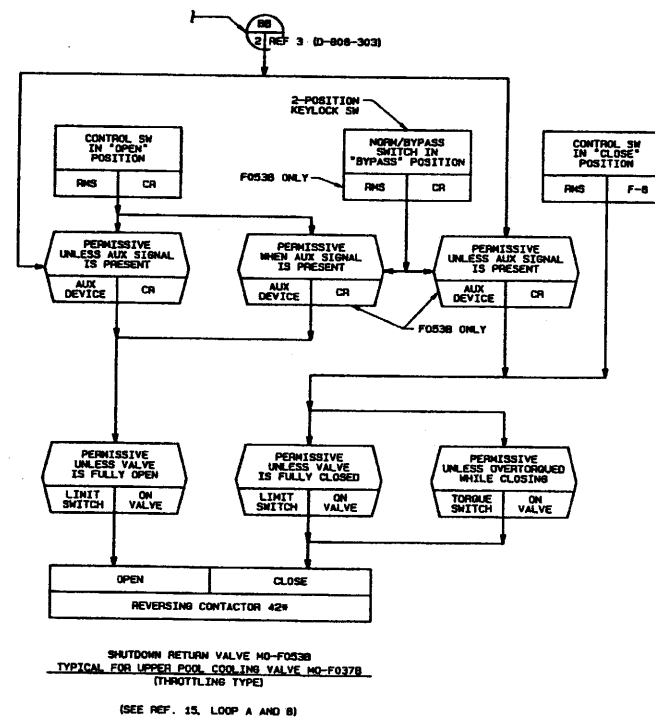
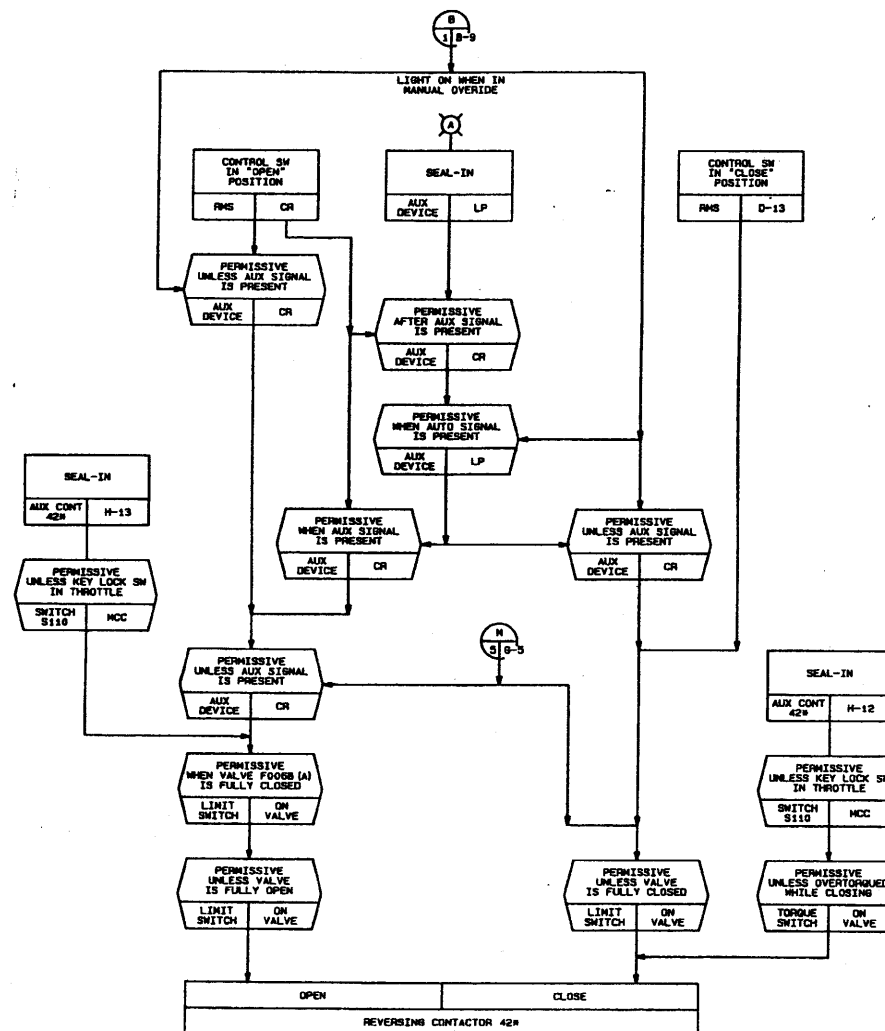
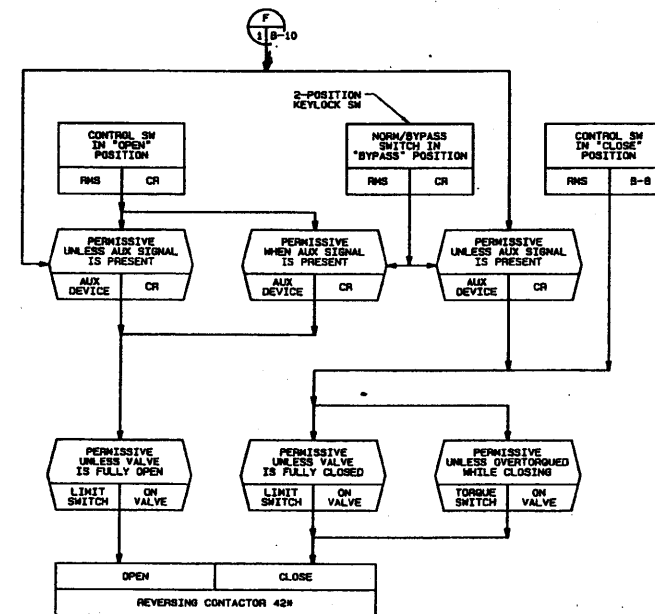
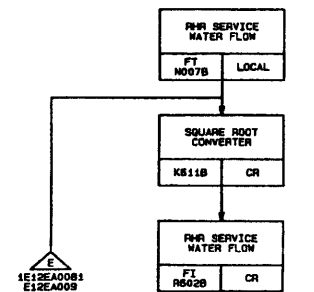


## PERRY NUCLEAR POWER PLANT

Residual Heat Removal System

Figure 7.3-5 (Sheet 2 of 5)

[Dwg. D-808-309(2)]



FOR NOTES AND LEGEND SEE THIS Dwg. SHEET 1

THIS DRAWING AS-BUILT, REDRAWN AND CONVERTED TO CADD REV. A

NUCLEAR SAFETY RELATED

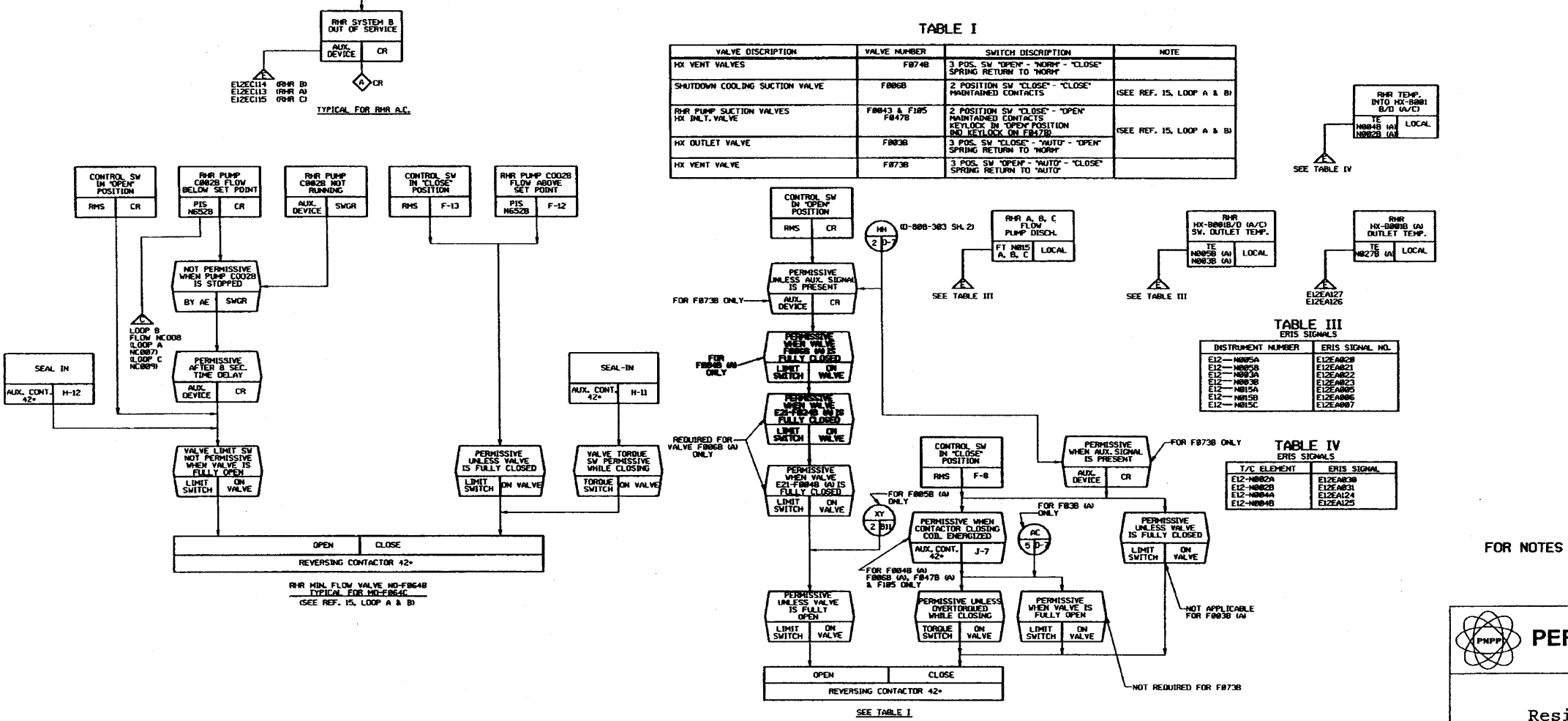
(Rev. 12 1/03)

## PERRY NUCLEAR POWER PLANT

### Residual Heat Removal System

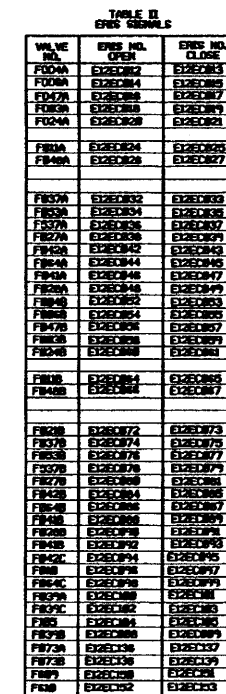
Figure 7.3-5 (Sheet 3 of 5)

[Dwg. D-808-309(3)]



[Dwg. D-808-309(4)]





(Rev. 12 1/03)

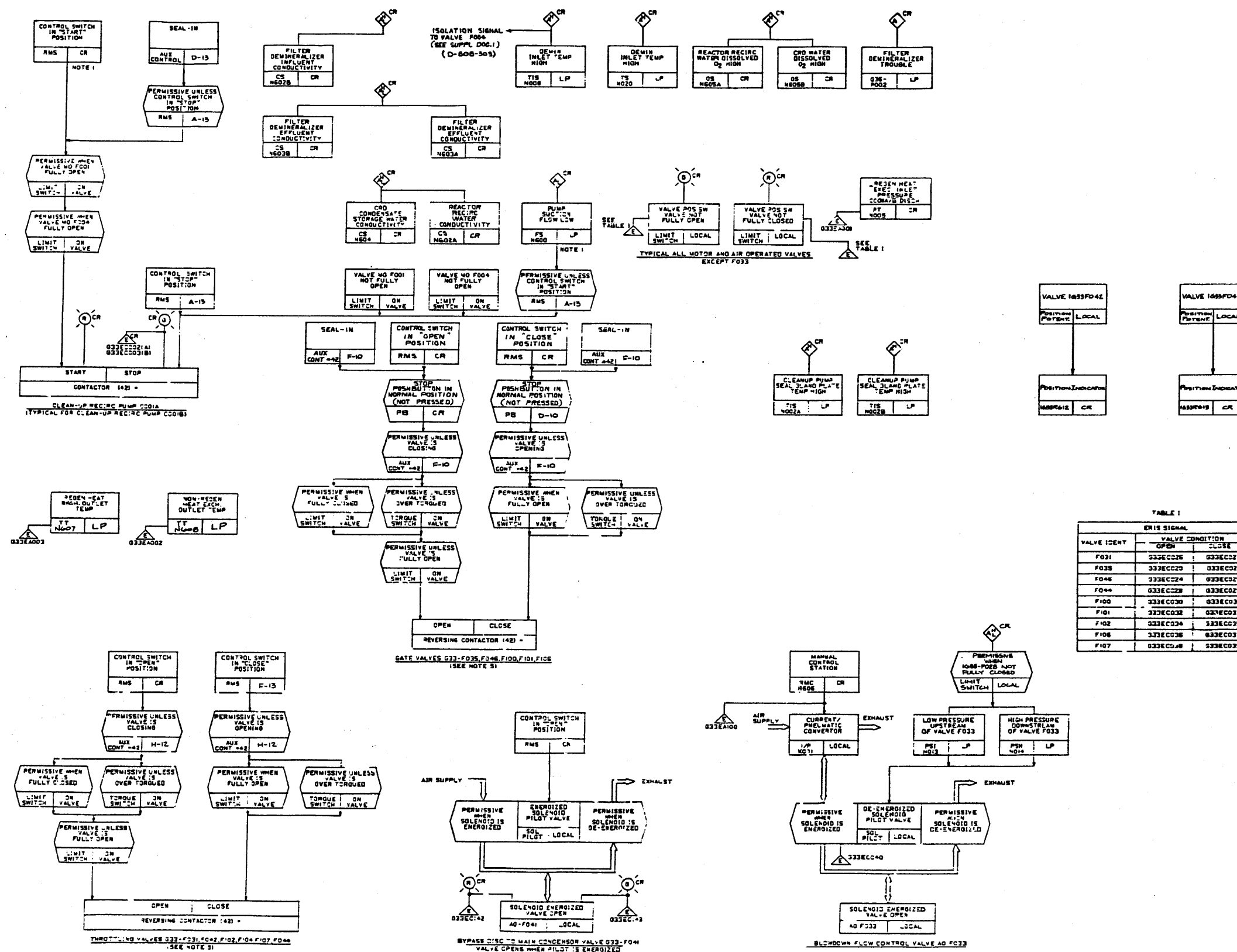


## 8 PERRY NUCLEAR POWER PLANT

## Residual Heat Removal System

Figure 7.3-5 (Sheet 5 of 5)

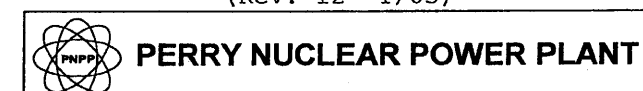
[Dwg. D-808-309(5)]



- NOTES:**
1. INTERLOCK PUMP START-UP CIRCUIT WITH PUMP SECTION LOW FLOW SWITCH TO PERMIT PUMP TO BE STARTED. PUMP IS TO TRIP OFF AFTER START IF FLOW IS NOT ESTABLISHED AFTER A TIME DELAY.
  2. EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NO. 033 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.
  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.
1. B21-1030 NUCLEAR BOILER SYSTEM FCD
  2. CSB-1050 ERS ELEM DIAG (C954)
  3. DELETE

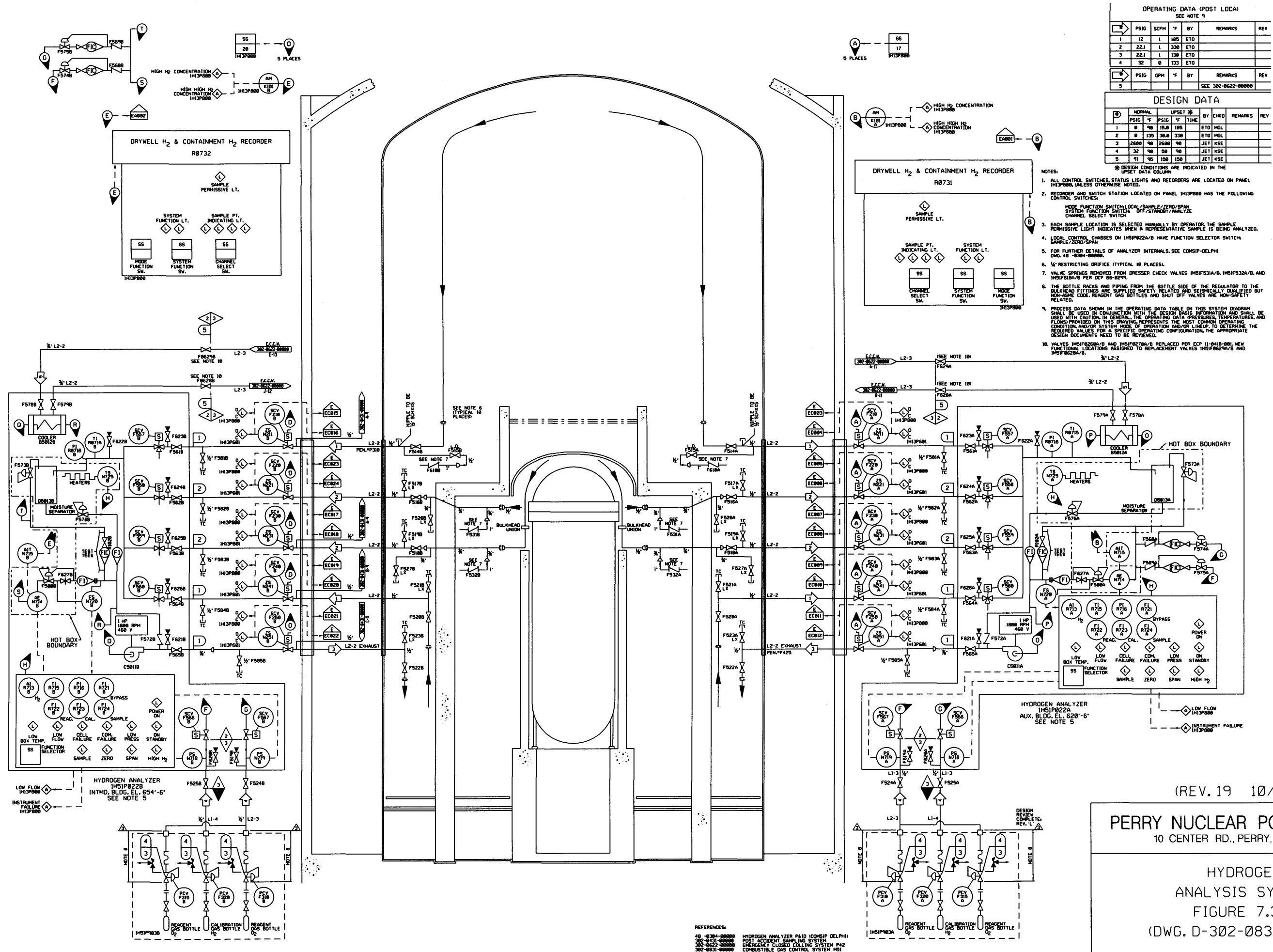
(Rev. 12 1/03)



Reactor Water Cleanup System

Figure 7.3-6

(Dwg. D-808-315)



OPERATING DATA (POST LOCA)  
SEE NOTE 9

PSIG	SCFM	F	BY	REMARKS	REV
1	12	1	185	ETO	
2	22.1	1	330	ETO	
3	22.1	1	130	ETO	
4	32	8	133	ETO	
5					

SEE 302-0622-00000

DESIGN DATA

PSIG	F	BY	CHKD	REMARKS	REV
1	8	90	15.0	185	ETO MGL
2	8	125	30.0	230	ETO MGL
3	2600	90	2600	90	JET KSE
4	32	90	50	90	JET KSE
5	91	90	150	150	JET KSE

\* DESIGN CONDITIONS ARE INDICATED IN THE  
UPSET DATA COLUMN

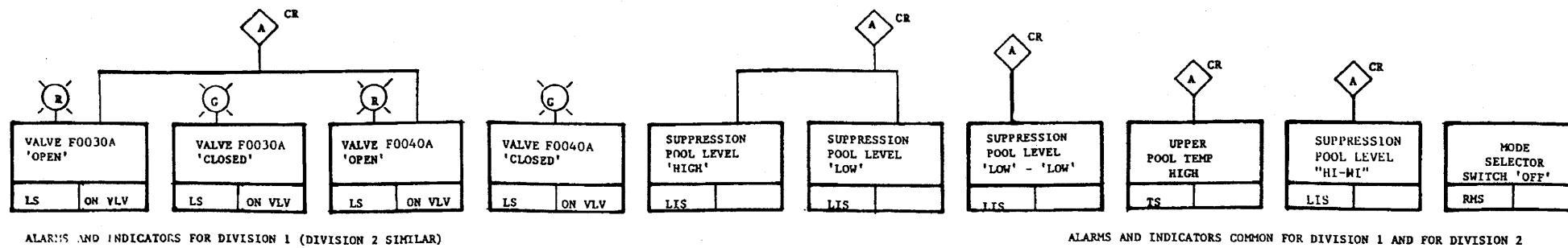
- NOTES:
1. ALL CONTROL SWITCHES, STATUS LIGHTS AND RECORDERS ARE LOCATED ON PANEL IH5IP0000 UNLESS OTHERWISE NOTED.
  2. RECORDER AND SWITCH STATION LOCATED ON PANEL IH5IP0000 HAS THE FOLLOWING CONTROL SWITCHES:  
MODE FUNCTION SWITCH: LOCAL/SAMPLE/ZERO/SPAN  
SYSTEM FUNCTION SWITCH: OFF/STANDBY/ANALYZE  
CHANNEL SELECT SWITCH
  3. EACH SAMPLE LOCATION IS SELECTED MANUALLY BY OPERATOR. THE SAMPLE PERMISSIVE LIGHT INDICATES WHEN A REPRESENTATIVE SAMPLE IS BEING ANALYZED.
  4. LOCAL CONTROL CHASSES ON IH5IP022A/B HAVE FUNCTION SELECTOR SWITCH: SAMPLE/ZERO/SPAN
  5. FOR FURTHER DETAILS OF ANALYZER INTERNALS, SEE COMSIP-DELPHI DWG. 48-8304-00000.
  6. 1/4" RESTRICTING ORIFICE (TYPICAL 10 PLACES).
  7. VALVE SPRINGS REMOVED FROM DRESSER CHECK VALVES IH5IP531A/B, IH5IP532A/B, AND IH5IP518A/B PER DCP 06-0299.
  8. THE BOTTLE RACKS AND PIPING FROM THE BOTTLE SIDE OF THE REGULATOR TO THE BULKHEAD FITTINGS ARE SUPPLIED SAFETY RELATED AND SEISMICALLY QUALIFIED BUT NON-ASME CODE. REAGENT GAS BOTTLES AND SHUT OFF VALVES ARE NON-SAFETY RELATED.
  9. PROCESS DATA SHOWN IN THE OPERATING DATA TABLE ON THIS SYSTEM DIAGRAM SHALL BE USED IN CONJUNCTION WITH THE DESIGN BASIS INFORMATION AND SHALL BE USED WITH CAUTION. IN GENERAL, THE OPERATING DATA PRESSURES, TEMPERATURES, AND FLOWS PROVIDED ON THIS DRAWING REPRESENTS THE MOST COMMON OPERATING CONDITION AND/OR SYSTEM MODE OF OPERATION AND/OR LINEUP. TO DETERMINE THE REQUIRED VALUES FOR A SPECIFIC OPERATING CONFIGURATION, THE APPROPRIATE DESIGN DOCUMENTS NEED TO BE REVIEWED.
  10. VALVES IH5IP528A/B AND IH5IP527A/B REPLACED PER ECP 11-0418-001. NEW FUNCTIONAL LOCATIONS ASSIGNED TO REPLACEMENT VALVES IH5IP528A/B AND IH5IP527A/B.

REFERENCES:  
48-8304-00000 HYDROGEN ANALYZER PAID (COMSIP DELPHI)  
302-0431-00000 POST ACCIDENT SAMPLING SYSTEM  
302-0622-00000 EMERGENCY CLOSED COLLING SYSTEM P42  
302-0831-00000 COMBUSTIBLE GAS CONTROL SYSTEM M51

(REV. 19 10/2015)

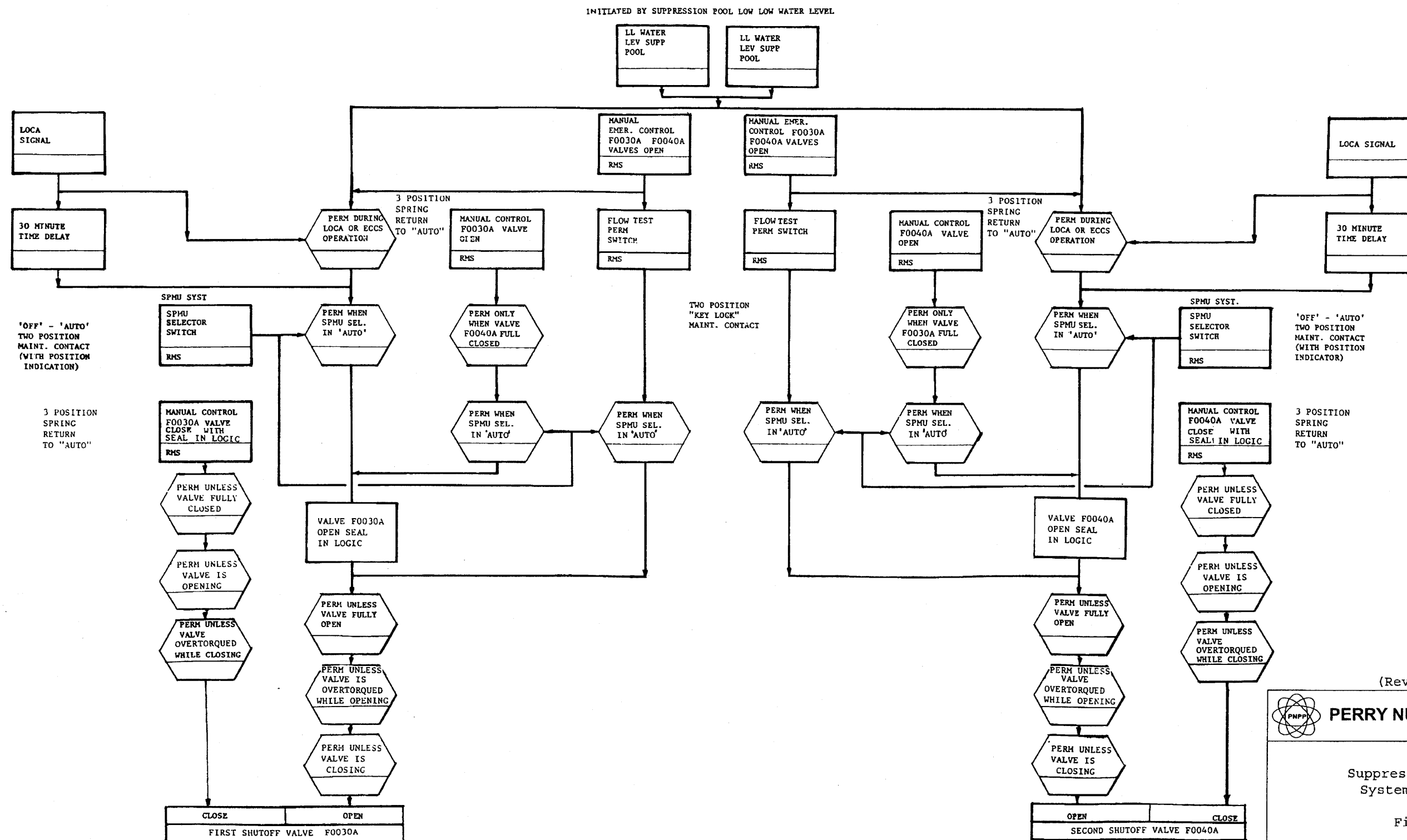
**PERRY NUCLEAR POWER PLANT**  
10 CENTER RD., PERRY, OHIO 44081

**HYDROGEN  
ANALYSIS SYSTEM**  
FIGURE 7.3-8  
(DWG. D-302-0832-00000)



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.



(Rev. 12 1/03)

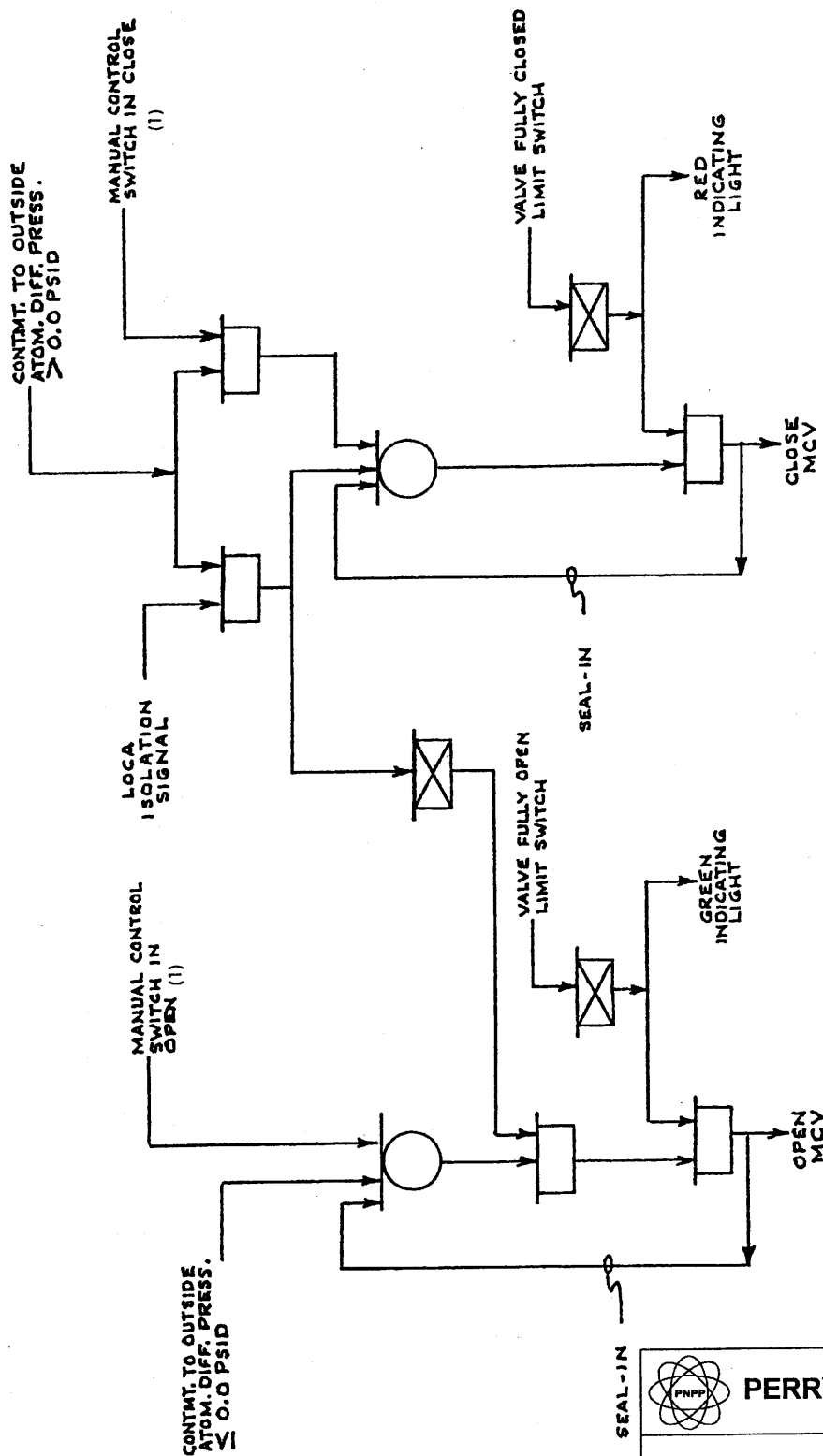


PERRY NUCLEAR POWER PLANT

Suppression Pool Makeup  
System Logic Diagram

Figure 7.3-9





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

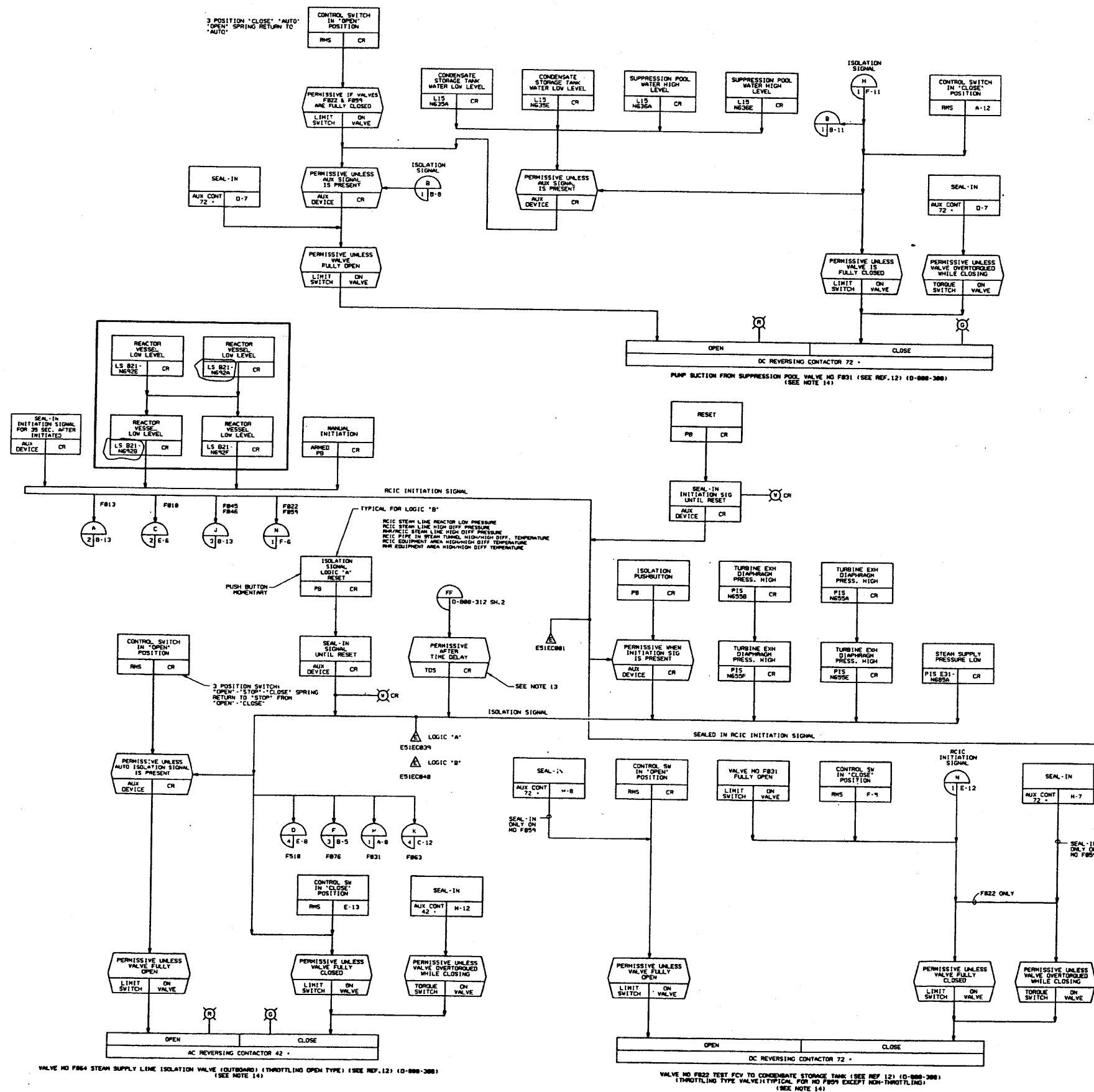
(Rev. 12 1/03)



**PERRY NUCLEAR POWER PLANT**

Containment Vacuum Relief  
System Control Logic

Figure 7.3-11



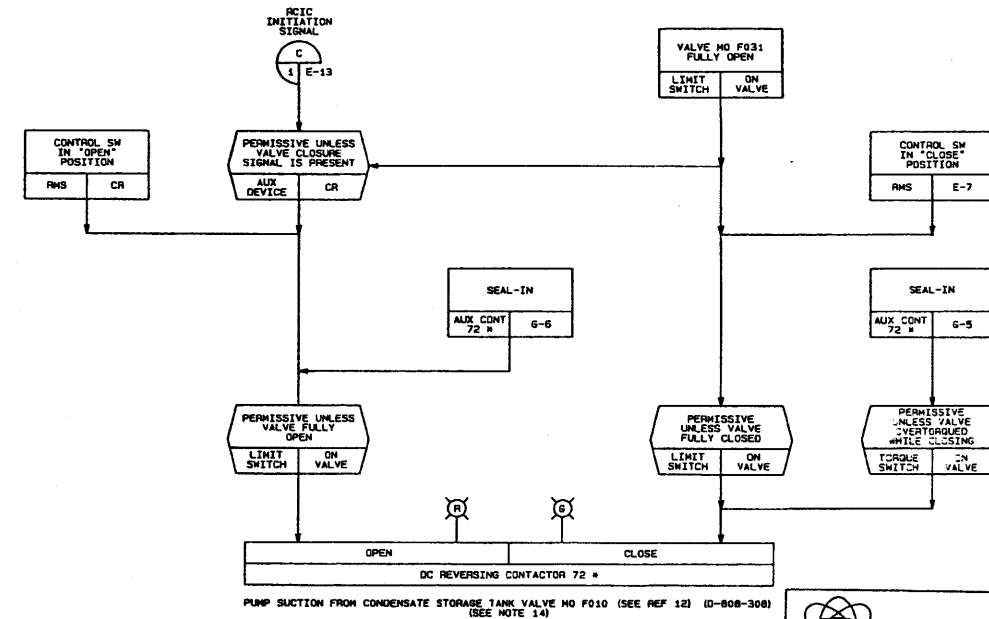
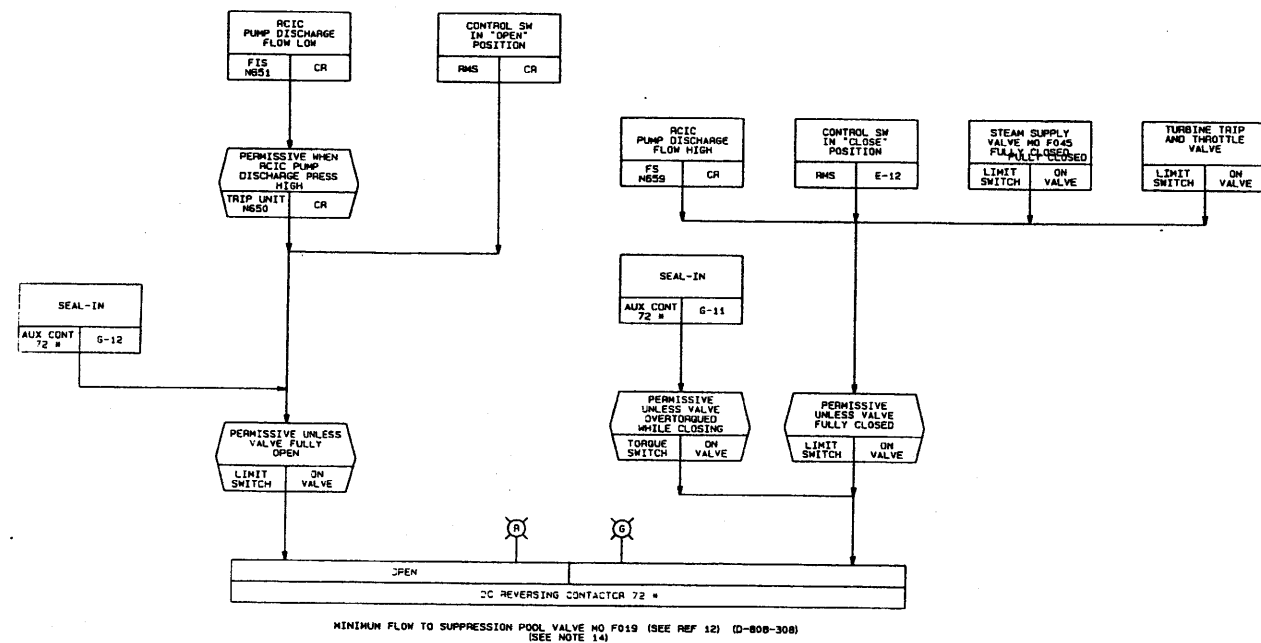
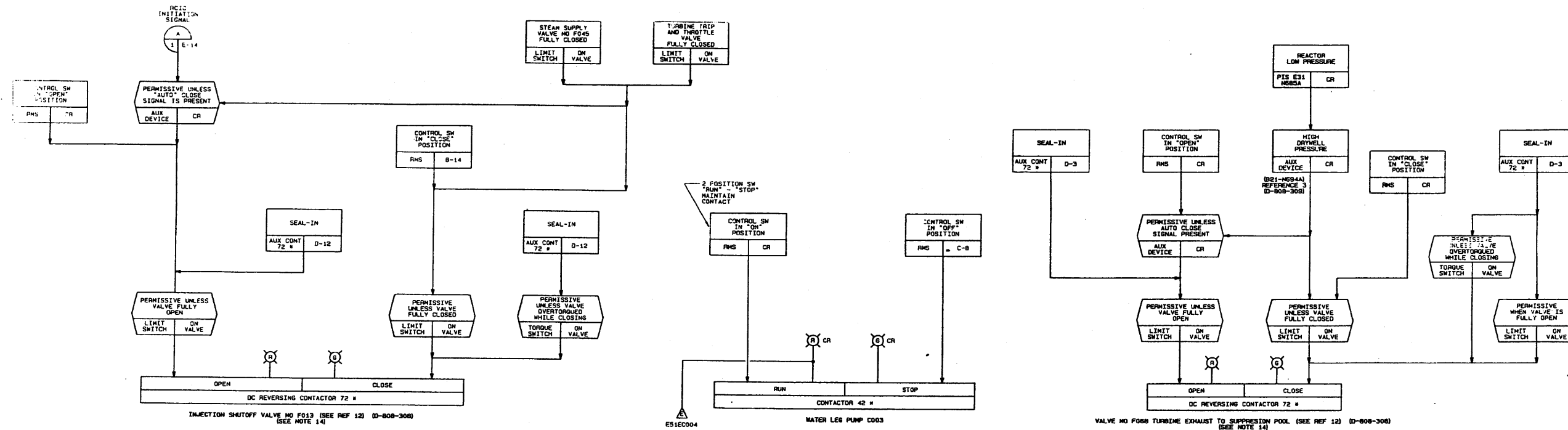
## NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

### PERRY NUCLEAR POWER PLANT

Reactor Core Isolation  
Cooling System

Figure 7.4-1 (Sheet 1 of 5)  
[Dwg. D-808-314(1)]



NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

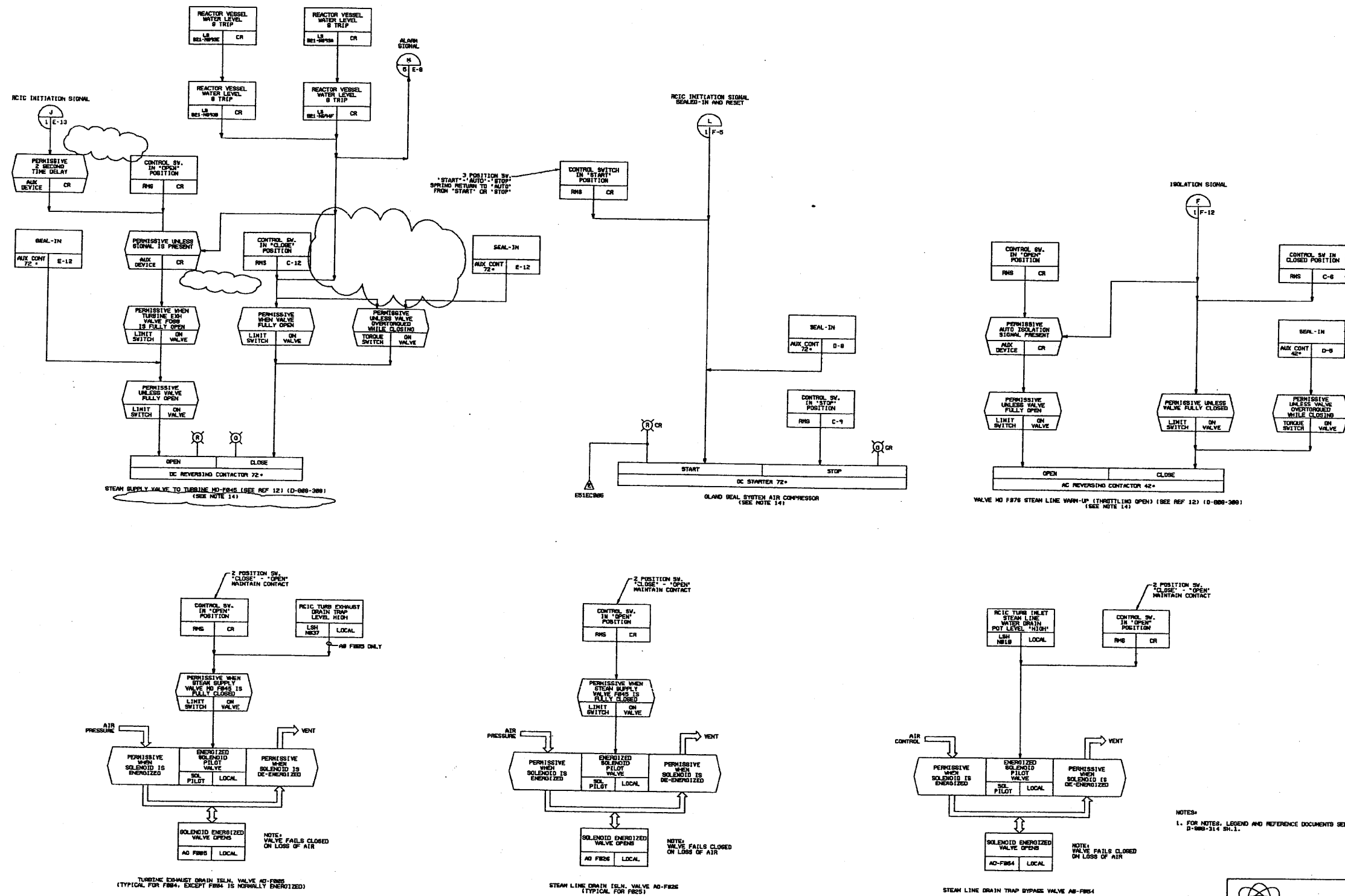
## PERRY NUCLEAR POWER PLANT

### Reactor Core Isolation Cooling System

Figure 7.4-1 (Sheet 2 of 5)  
[Dwg. D-808-314 (2)]

NOTES:  
1. FOR NOTES, LEGEND AND REFERENCE DOCUMENTS SEE DRAWING  
D-808-314 (2-1).



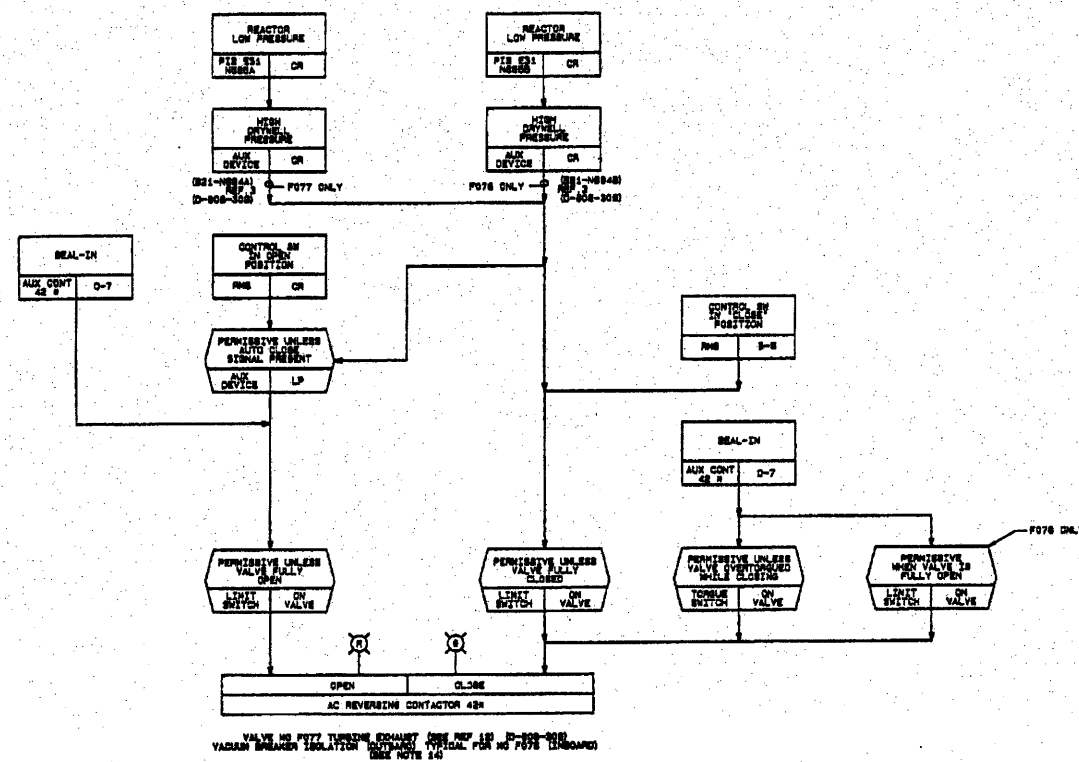
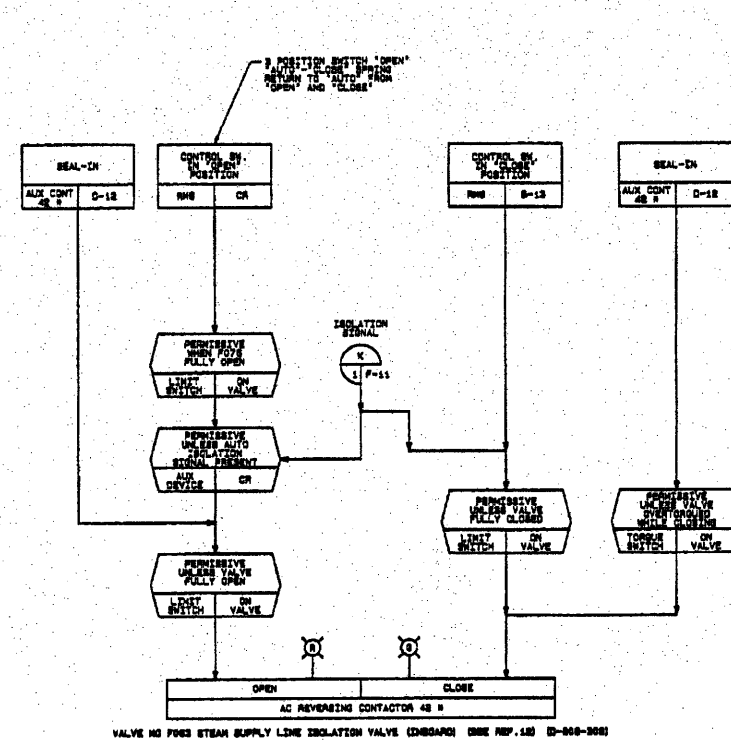


(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

Reactor Core Isolation  
Cooling System

Figure 7.4-1 (Sheet 3 of 5)  
[Dwg. D-808-314(3)]



NOTES:  
1. FOR NOTES, LEGEND AND REFERENCE DOCUMENTS SEE DRAWING D-808-314 SH. 1.

NUCLEAR SAFETY RELATED

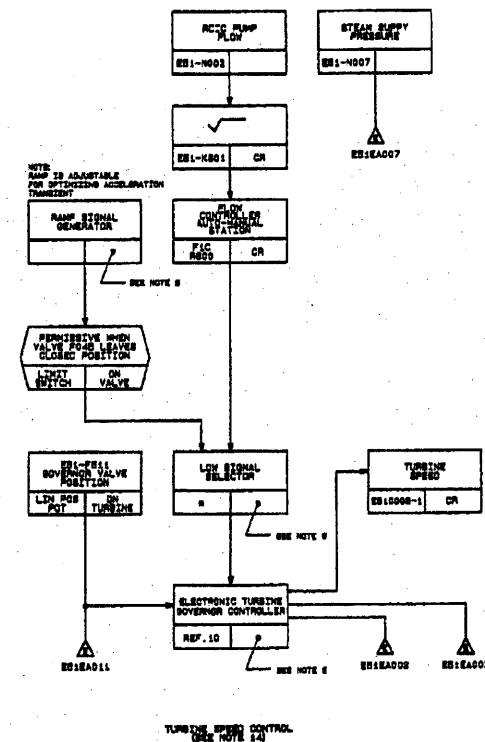
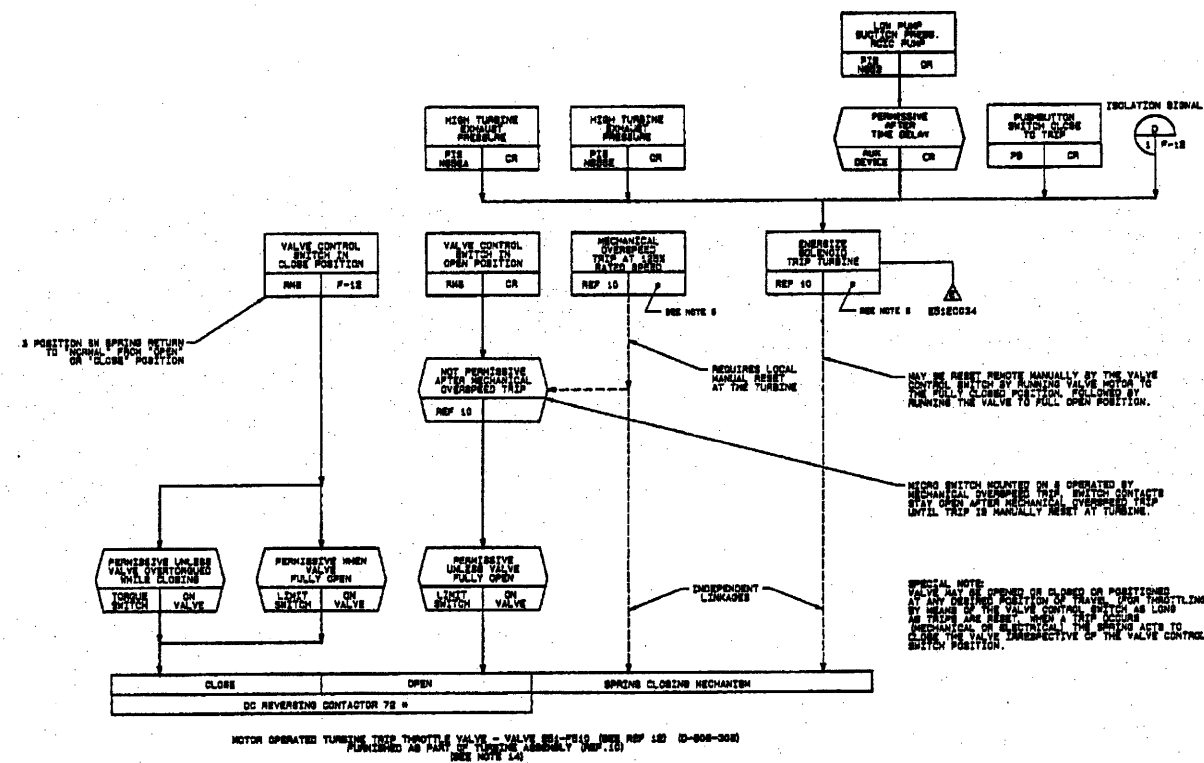


TABLE III - ERIS SIGNALS

VALVE NO.	OPEN	CLOSE
ES1-P003 (ACT)	ES1EC004	ES1EC006
ES1-P078 (ACT)	ES1EC008	ES1EC007
ES1-P084 (ACT)	ES1EC009	ES1EC007
ES1-P017 (ACT)	ES1EC008	ES1EC008
ES1-P079 (ACT)	ES1EC008	ES1EC008
ES1-P088	ES1EC010	ES1EC011
ES1-P010	ES1EC012	ES1EC013
ES1-P010	ES1EC014	ES1EC015
ES1-P088	ES1EC016	ES1EC017
ES1-P006	ES1EC018	ES1EC018
ES1-P084	ES1EC020	ES1EC024
ES1-P088	ES1EC020	ES1EC021
ES1-P004	ES1EC022	ES1EC023
ES1-P013	ES1EC042	ES1EC043
ES1-P081	ES1EC044	ES1EC045
ES1-P010	ES1EC046	ES1EC047
ES1-P088	ES1EC048	ES1EC048
ES1-P016	ES1EC050	ES1EC051
ES1-P082	ES1EC052	ES1EC053
ES1-P088	ES1EC054	ES1EC055

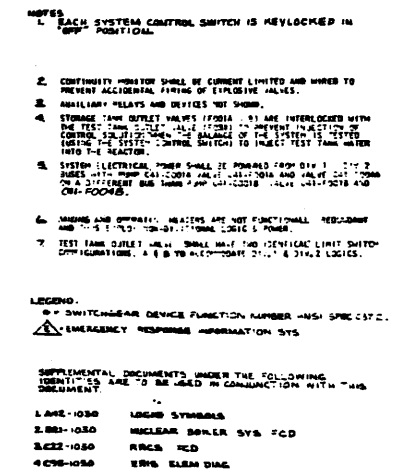
(Rev. 16 10/09)

**PERRY NUCLEAR POWER PLANT**

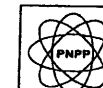
Reactor Core Isolation  
Cooling System

Figure 7.4-1 (Sheet 4 of 5)  
[Dwg. D-808-314(4)]





(Rev. 12 1/03)



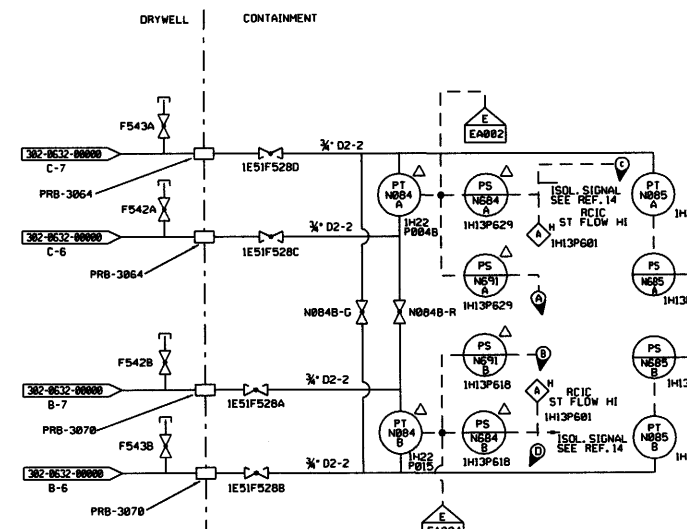
**PERRY NUCLEAR POWER PLANT**

## Standby Liquid Control System

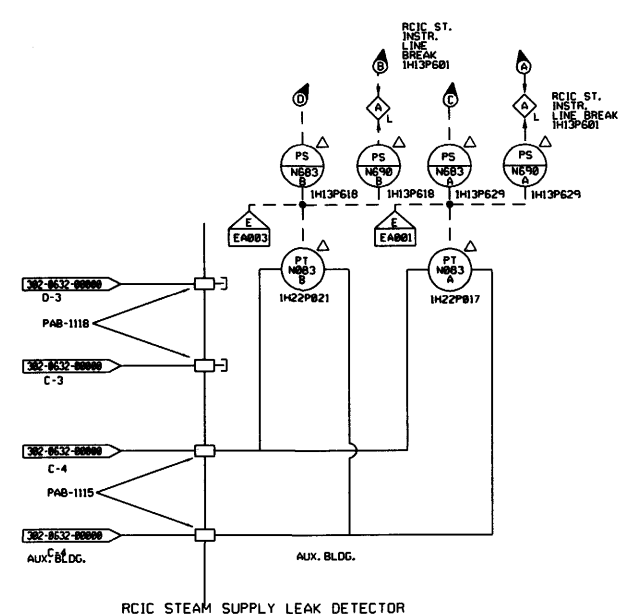
Figure 7.4-2 (Sheet 1 of 2)

[Dwg. D-808-306(1)]

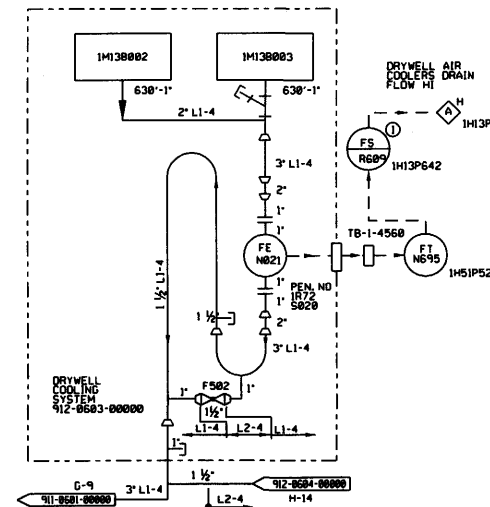




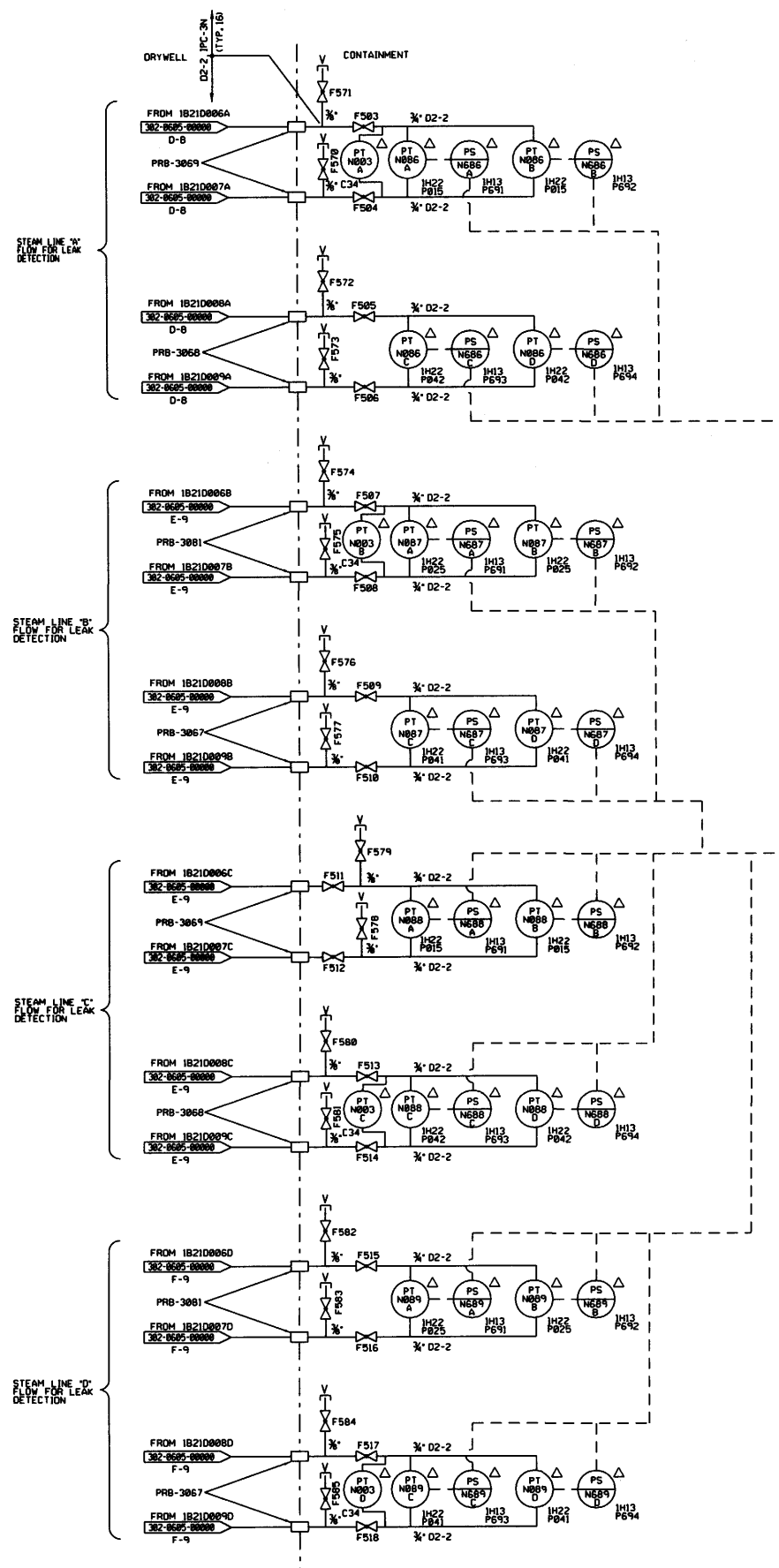
RCIC STEAM SUPPLY FLOW LEAK DETECTOR



RCIC STEAM SUPPLY LEAK DETECTOR



DRYWELL AIR COOLER LEAK DETECTOR  
(NON-SAFETY RELATED)  
SEISMIC CATEGORY 1



- NOTES:
1. ALL EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NO. IE31, UNLESS OTHERWISE SPECIFIED.
  2. DUAL THERMOCOUPLE TE1 IS FOR ISOLATION SIGNAL, TE2 IS FOR INDICATORS.
  3. TYPICAL OF 4, ONE IN EACH MAIN STEAM LINE GUARD PIPE AREA, TE PLACED AT OPEN END OF GUARD PIPE TO DETECT LEAKAGE IN GUARD PIPE AREA.
  4. INSTRUMENT LINE VALVING MUST COMPLY WITH INSTRUMENT PIPING SPECIFICATION A62-4078.
  5. ANY DIVISIONAL AREA HIGH TEMPERATURE WILL ALARM A SINGLE ANNUNCIATOR WINDOW LOCATED ON PANEL IM13P681 AS 'MSL ISOLATION LOGIC "X" TURBINE AREA HIGH TEMPERATURE'.
  6. A. CLOSE MAIN STEAM LINE ISOLATION VALVE.  
B. CLOSE MAIN STEAM LINE DRAIN VALVE.
  7. ALL INSTRUMENT PIPING IS SAFETY CLASS 2, EXCEPT AS NOTED.
  8. FOUR TEMPERATURE ELEMENTS ARE EQUALLY SPACED IN THE VERTICAL DIRECTION OF THE DRYWELL.
  9. PRESSURE INTEGRITY CLASSIFICATION OF LEAK-OFF LINE SHOULD CORRESPOND TO THE CLASSIFICATION OF THE LEAK-OFF VALVES AND COMPLY WITH SUPPLEMENTARY DOCUMENT A62-4038.
  10. BYPASS TIMER IS PROVIDED TO OVERRIDE THE ISOLATION SIGNAL DURING THE REACTOR WATER CLEANUP SYSTEM SURGES.
  11. ONE 'XS' IS USED TO MEASURE SUMP FILLUP TIME AND SECOND 'XS' IS MONITORING SUMP PUMP-OUT TIME.
  12. TE2 SPARE FOR NOXXB

- REFERENCES:
1. 302-0601-00000 REACTOR WATER RECIRCULATION SYSTEM P&ID
  2. 302-0602-00000 REACTOR WATER RECIRCULATION SYSTEM P&ID
  3. 302-0603-00000 NUCLEAR BOILER SYSTEM P&ID
  4. 302-0631-00000 REACTOR CORE ISOLATION COOLING SYSTEM P&ID
  5. 302-0632-00000 REACTOR CORE ISOLATION COOLING SYSTEM P&ID
  6. 302-0642-00000 RESIDUAL HEAT REMOVAL SYSTEM P&ID
  7. 302-0671-00000 REACTOR WATER CLEANUP SYSTEM P&ID
  8. 302-0705-00000 LOW PRESSURE CORE SPRAY SYSTEM P&ID
  9. 814-0639-00000 SAFETY RELATED AREA TEMPERATURE MONITORING INSTALLATION DETAIL FOR LEAK DETECTION SYSTEM E31
  10. 200-0013-00000 NUCLEAR STEAM SUPPLY SHUTOFF SYSTEM ELEMENTARY
  11. 200-0055-00000 RWR SYSTEM ELEMENTARY
  12. 200-0060-00000 LPCS SYSTEM ELEMENTARY
  13. 200-0065-00000 HPCS SYSTEM ELEMENTARY
  14. 200-0075-00000 RCIC SYSTEM ELEMENTARY
  15. C91-4030-00000 PROCESS COMPUTER I/O LISTING
  16. 911-0601-00000 REACTOR BUILDING DRAINS
  17. 912-0604-00000 CONTAINMENT VESSEL AND DRYWELL PURGE

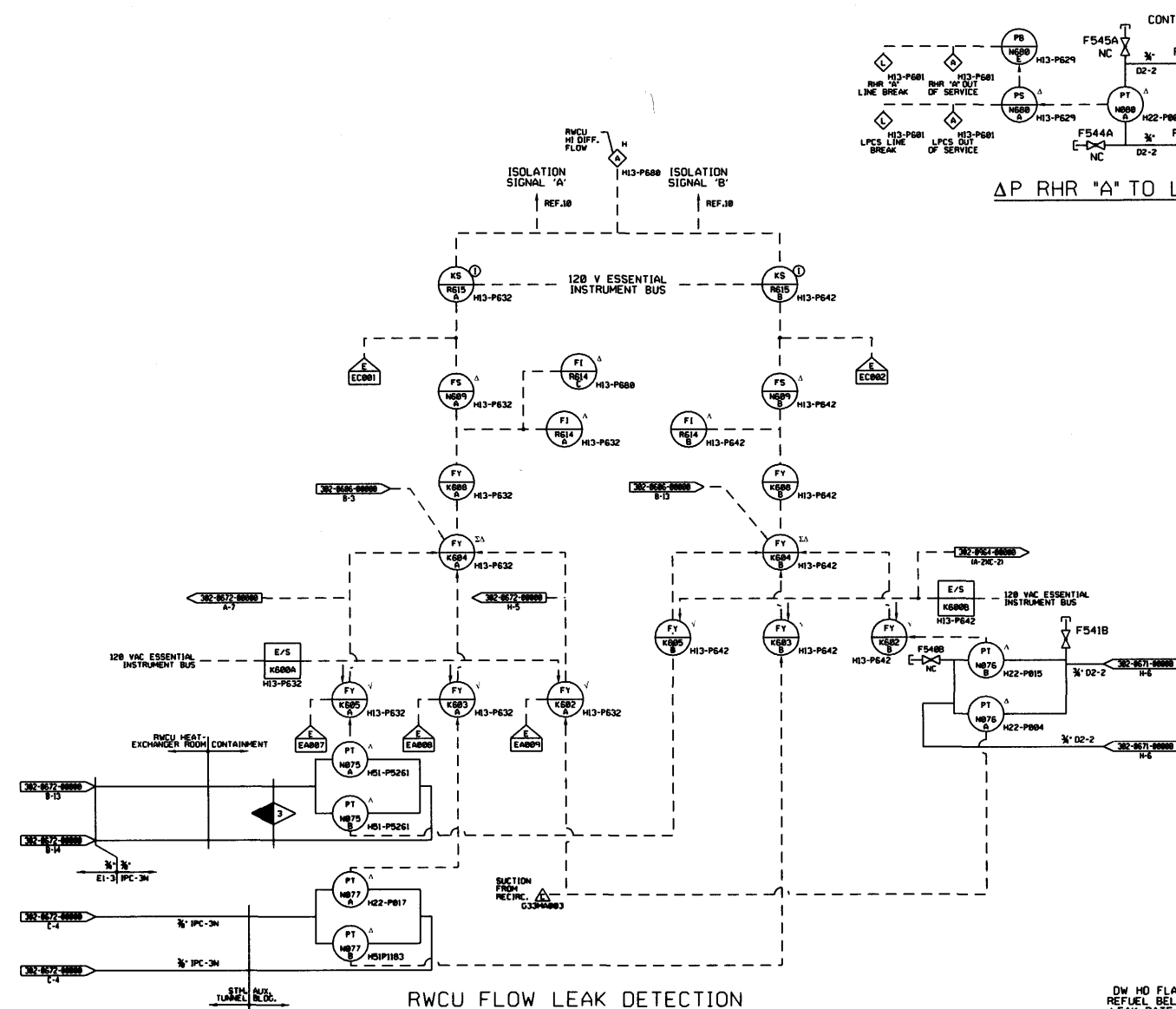
- SUPPORTING DOCUMENTS:
- | MPL NUMBER | DESCRIPTION  |
|------------|--|
| A42-1010   | PIPING AND INSTRUMENT SYMBOLS                          |
| A62-4030   | PRESSURE INTEGRITY OF NUCLEAR COMPONENTS SPECIFICATION |
| A62-4070   | PROCESS INSTRUMENT SPECIFICATION                       |
| A62-4200   | DRYWELL COOLING SYSTEM DESIGN SPECIFICATION            |
| A62-4050   | ELECTRICAL SEPARATION SPECIFICATION                    |
| A62-4350   | MECHANICAL EQUIPMENT SEPARATION                        |

(REV. 19 10/2015)

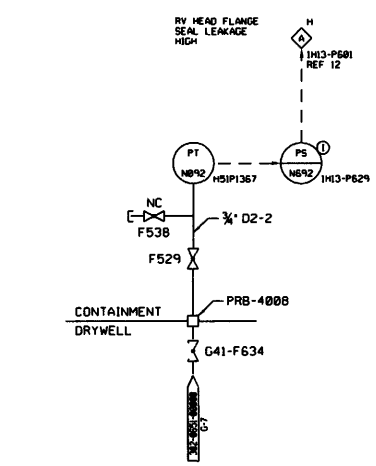
**PERRY NUCLEAR POWER PLANT**  
10 CENTER RD., PERRY, OHIO 44081

**LEAK DETECTION  
SYSTEM**

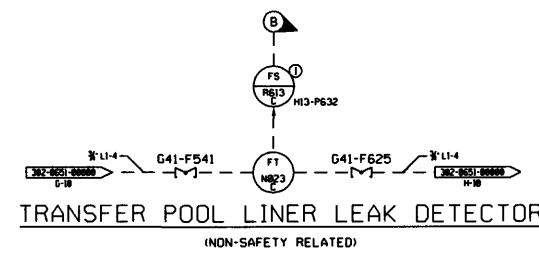
FIGURE 7.6-1 (SHEET 1 OF 4)  
(DWG. D-302-0961-00000)



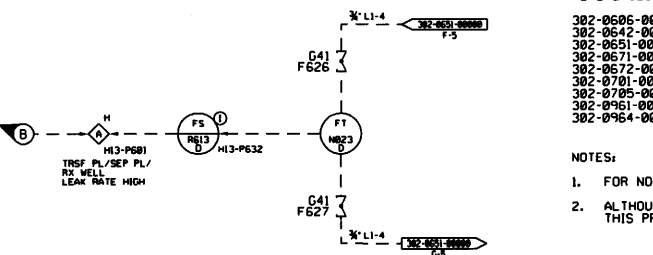
RWCU FLOW LEAK DETECTION



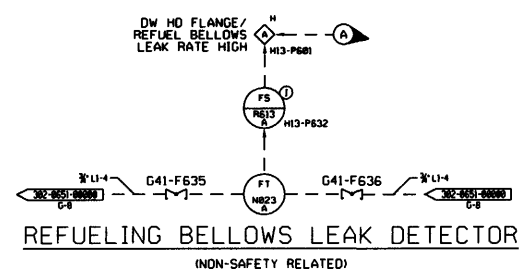
REACTOR FLANGE LEAK DETECTOR  
(NON-SAFETY RELATED) SEE NOTE 2



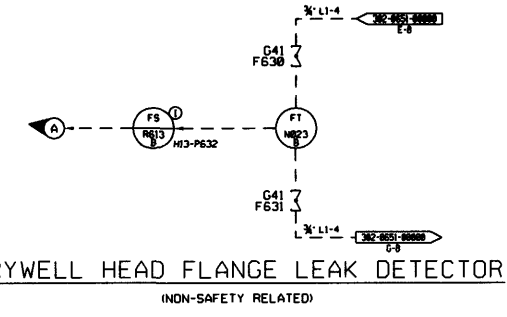
TRANSFER POOL LINER LEAK DETECTOR  
(NON-SAFETY RELATED)



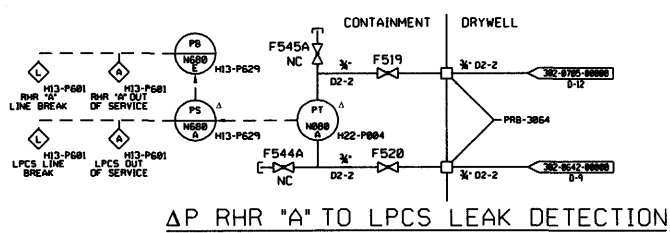
REACTOR WELL OR SEPARATOR LINER LEAK DETECTOR  
(NON-SAFETY RELATED)



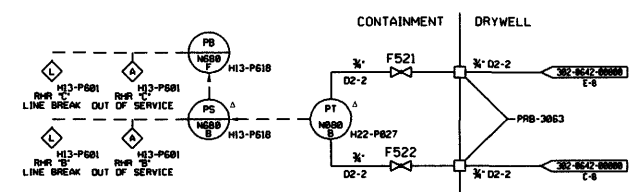
REFUELING BELLOWS LEAK DETECTOR  
(NON-SAFETY RELATED)



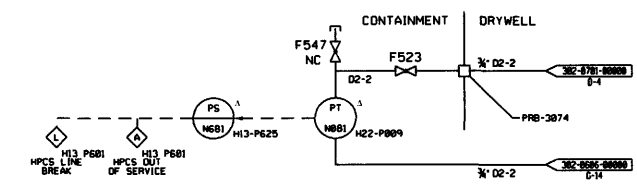
DRYWELL HEAD FLANGE LEAK DETECTOR  
(NON-SAFETY RELATED)



AP RHR "A" TO LPCS LEAK DETECTION



AP RHR "B" TO RHR "C" LINE BREAK LEAK DETECTION



HPCS LINE BREAK LEAK DETECTOR

- REFERENCES:
- 302-0606-00000 NUCLEAR BOILER SYSTEM B21
  - 302-0642-00000 RESIDUAL HEAT REMOVAL SYSTEM IE12
  - 302-0651-00000 FUEL POOL COOLING AND CLEAN-UP SYSTEM G41
  - 302-0671-00000 REACTOR WATER CLEANUP SYSTEM G33
  - 302-0672-00000 REACTOR WATER CLEANUP SYSTEM G33
  - 302-0701-00000 HIGH PRESSURE CORE SPRAY SYSTEM E22
  - 302-0705-00000 LOW PRESSURE CORE SPRAY SYSTEM E21
  - 302-0961-00000 LEAK DETECTION SYSTEM E31
  - 302-0964-00000 LEAK DETECTION SYSTEM E31

- NOTES:
- FOR NOTES, SEE DRAWING 302-0961-00000
  - ALTHOUGH THERE ARE SAFETY RELATED COMPONENTS, THIS PROVIDES A NON-SAFETY FUNCTION.

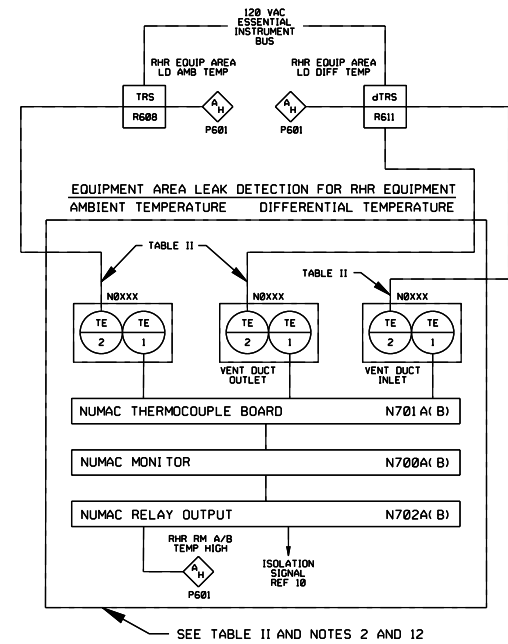
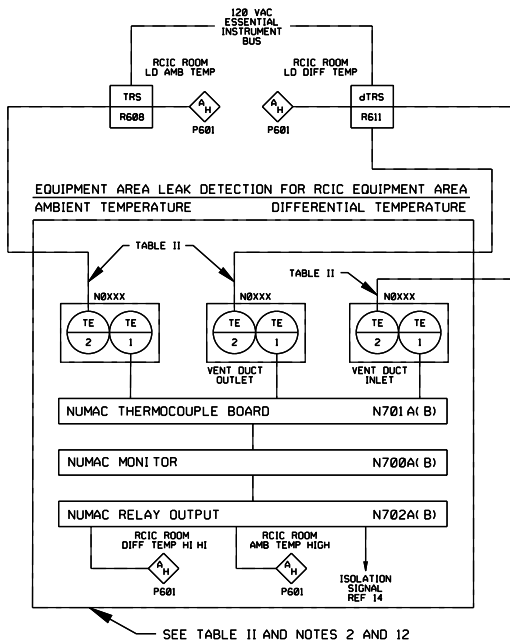
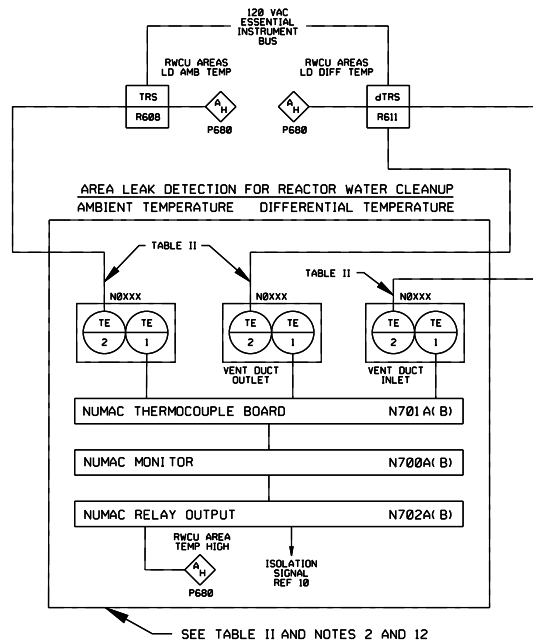
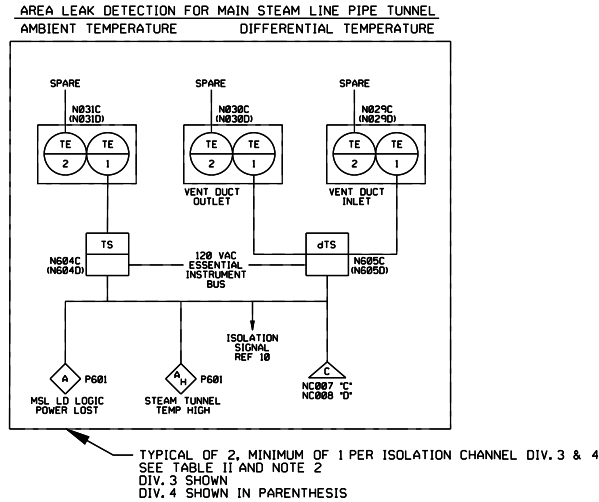
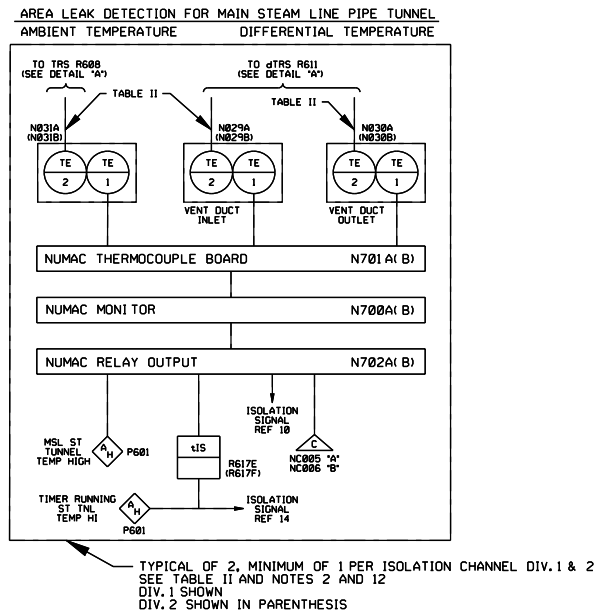
(REV. 19 10/2015)

**PERRY NUCLEAR POWER PLANT**  
10 CENTER RD., PERRY, OHIO 44081

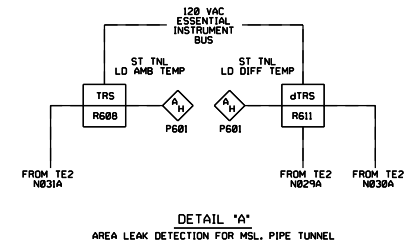
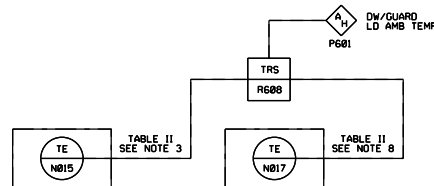
**LEAK DETECTION SYSTEM**

FIGURE 7.6-1 (SHEET 2 OF 4)  
(DWG. D-302-0962-00000)

TABLE II  
RECORDED EQUIPMENT AREA TEMPERATURE MONITORING AND VALVES CLOSED



AREA MONITORED	DIV	AMBIENT TEMPERATURE				DIFFERENTIAL TEMPERATURE					VALVES CLOSED	
		TS	TE	TRS CH. NO.	ALARM GROUPING	dTS	TE INLET	TE OUTLET	dTRS POINT NO.	ALARM GROUPING	(DIFFERENTIAL TEMPERATURE WILL NOT CLOSE VALVES AND PROVIDES ALARM FUNCTION ONLY.)	
MSL PIPE TUNNEL	1	N700A - A6-2, A6-3	N031A	R600-1	1	N700A - A5-2, A5-3	N029A	N030A	R611-1	SW-1	B21-F022A-D, F028A-D, F019, F067A-D, E51-F064, F031, G33-F004, F034, F039, F054	
MSL PIPE TUNNEL	2	N700B - A6-2, A6-3	N031B			N700B - A5-2, A5-3	N029B	N030B				B21-F022A-D, F028A-D, F016, E51-F063, F076, G33-F001, F028, F040, F053
MSL PIPE TUNNEL	3	N040C	N031C			N050C	N029C	N030C				B21-F022A-D, F028A-D, F016
MSL PIPE TUNNEL	4	N040D	N031D			N050D	N029D	N030D				B21-F022A-D, F028A-D, F019, F067A-D
DRYWELL	-		N017A	R600-2	2					NONE		
DRYWELL	-		N017B	R600-3								
DRYWELL	-		N017C	R600-4								
DRYWELL	-		N017D	R600-5								
RHR EQUIPMENT AREA 1	1	N700A - A6-4	N018A	R600-6	3	N700A - A5-4	N027A	N028A	R611-2	SW-3	E12-F008, F023, F037A, F040, F053A, F075A/B, E51-F031, F064	
RHR EQUIPMENT AREA 1	2	N700B - A6-4	N018B			N700B - A5-4	N027B	N028B				E12-F009, F037B, F049, F053B, F068A/B, E51-F063, F076
RHR EQUIPMENT AREA 2	1	N700A - A6-5	N001A	R600-7		N700A - A5-5	N002A	N003A	R611-3			E12-F008, F023, F037A, F040, F053A, F075A/B, E51-F031, F064
RHR EQUIPMENT AREA 2	2	N700B - A6-5	N001B			N700B - A5-5	N002B	N003B				E12-F009, F037B, F049, F053B, F068A/B, E51-F063, F076
RCIC EQUIPMENT AREA	1	N700A - A6-1	N004A	R600-9	4	N700A - A5-1	N005A	N006A	R611-4	SW-4	E51-F064, F031	
RCIC EQUIPMENT AREA	2	N700B - A6-1	N004B			N700B - A5-1	N005B	N006B				E51-F063, F076
RWCU HEAT EXCHANGER ROOM	1	N700A - A2-3	N034A	R600-10	6	N700A - A1-3	N036A	N035A	R611-5	SW-5	G33-F004, F034, F039, F054	
RWCU HEAT EXCHANGER ROOM	2	N700B - A2-3	N034B			N700B - A1-3	N036B	N035B				G33-F001, F040, F053, F028
RWCU PUMP B ROOM	1	N700A - A2-2	N037A	R600-11	5	N700A - A1-2	N038A	N039A	R611-6	SW-2	G33-F004, F034, F039, F054	
RWCU PUMP B ROOM	2	N700B - A2-2	N037B			N700B - A1-2	N038B	N039B				G33-F001, F040, F053, F028
RWCU PUMP A ROOM	1	N700A - A2-1	N040A	R600-12		N700A - A1-1	N041A	N042A	R611-7			G33-F004, F034, F039, F054
RWCU PUMP A ROOM	2	N700B - A2-1	N040B			N700B - A1-1	N041B	N042B				G33-F001, F040, F053, F028
RWCU VALVE NEST ROOM	1	N700A - A4-1	N043A	R600-13	2	N700A - A3-1	N044A	N045A	R611-8	SW-5	G33-F004, F034, F039, F054	
RWCU VALVE NEST ROOM	2	N700B - A4-1	N043B			N700B - A3-1	N044B	N045B				G33-F001, F040, F053, F028
RWCU DEMIN ROOM 1	1	N700A - A4-2	N046A	R600-14	6	N700A - A3-2	N048A	N047A	R611-9	SW-5	G33-F004, F034, F039, F054	
RWCU DEMIN ROOM 1	2	N700B - A4-2	N046B			N700B - A3-2	N048B	N047B				G33-F001, F040, F053, F028
RWCU DEMIN ROOM 2	1	N700A - A4-3	N049A	R600-15		N700A - A3-3	N051A	N050A	R611-10			G33-F004, F034, F039, F054
RWCU DEMIN ROOM 2	2	N700B - A4-3	N049B			N700B - A3-3	N051B	N050B				G33-F001, F040, F053, F028
RWCU DEMIN VALVE ROOM	1	N700A - A4-5	N052A	R600-16	2	N700A - A3-5	N054A	N053A	R611-11	SW-5	G33-F004, F034, F039, F054	
RWCU DEMIN VALVE ROOM	2	N700B - A4-5	N052B			N700B - A3-5	N054B	N053B				G33-F001, F040, F053, F028
RWCU DEMIN REC TANK	1	N700A - A4-4	N055A	R600-17		N700A - A3-4	N057A	N056A	R611-12			G33-F004, F034, F039, F054
RWCU DEMIN REC TANK	2	N700B - A4-4	N055B			N700B - A3-4	N057B	N056B				G33-F001, F040, F053, F028
GUARD PIPE MONITORED												
MAIN STEAM LINE "A"	-		N015A	R600-18	2					NONE		
MAIN STEAM LINE "B"	-		N015B	R600-19								
MAIN STEAM LINE "C"	-		N015C	R600-20								
MAIN STEAM LINE "D"	-		N015D	R600-21								



NOTES:

1. FOR NOTES AND REFERENCES, SEE DRAWING D-302-961.

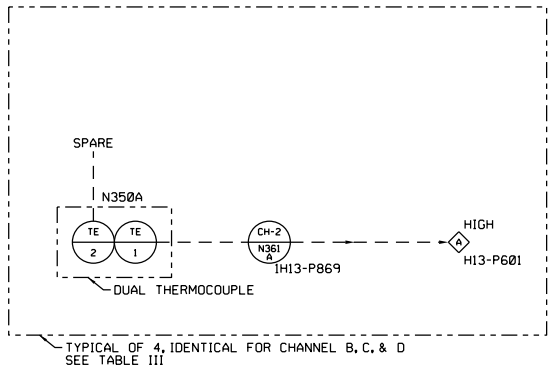
(Rev. 18 10/13)

PERRY NUCLEAR POWER PLANT  
10 CENTER RD., PERRY, OHIO 44081

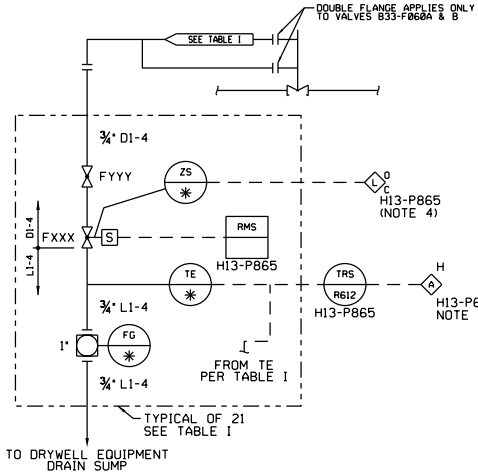
Leak Detection System  
Figure 7.6-1 (Sheet 3 of 4)  
(Dwg. 302-0963-00000)



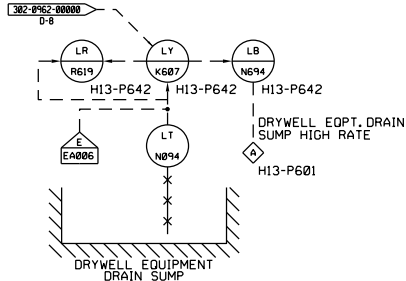
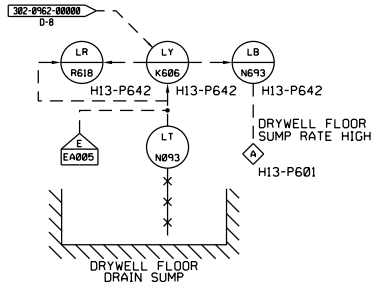
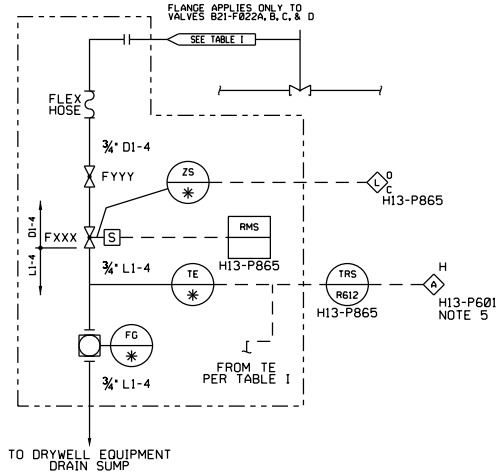
AREA LEAK DETECTION FOR MAIN STEAM LINE IN STEAM TURBINE POWER COMPLEX



DETAIL "A"  
VALVE STEM LEAK DETECTION



DETAIL "B"  
VALVE STEM LEAK DETECTION



AREA LEAK DETECTION FOR MAIN STEAM LINE IN TURBINE BUILDING

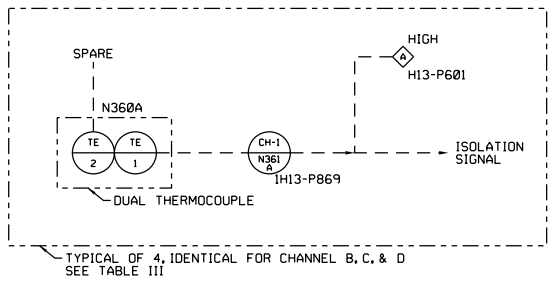
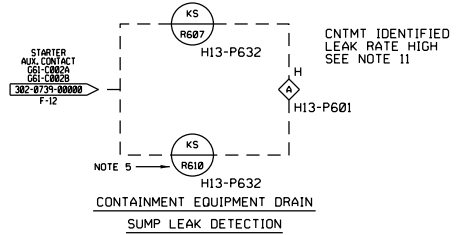
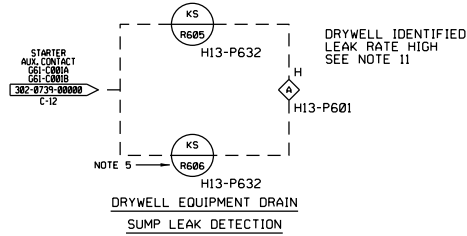
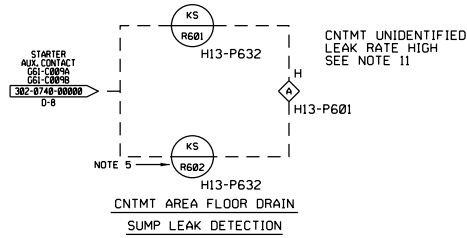


TABLE I

THE FOLLOWING VALVES, INSIDE THE DRYWELL, ARE EQUIPPED WITH VALVE STEM LEAK-OFF. TYPICAL ARRANGEMENT SHOWN DETAIL "A" OR "B" AS NOTED

VALVES WITH LEAKOFF	LOCATION	LEAK-OFF EQUIP. SUFFIX	TR POINT NO.	ALARM GROUPING	TE E31-	SCV FXXX	FG	VALVE FYYY	ZS	FLEX HOSE E31-	DETAIL
B21-F022A	302-0605-00000, C-7	A1	R612-23	ALM1	N370	F400	D430	F460	N400	D008	B
B21-F022B	302-0605-00000, E-9	A2	R612-24	ALM1	N371	F401	D431	F461	N401	D009	B
B21-F022C	302-0605-00000, F-9	A3	R612-25	ALM1	N372	F402	D432	F462	N402	D006	B
B21-F022D	302-0605-00000, F-9	A4	R612-26	ALM1	N373	F403	D433	F463	N403	D010	B
B33-F023A	302-0602-00000, D-7	B1	R612-01	ALM1	N374	F404	D434	F464	N404	D012	B
B33-F023B	302-0602-00000, D-9	B2	R612-02	ALM1	N375	F405	D435	F465	N405	D011	B
B33-F060A	302-0602-00000, C-4	B3	R612-03	ALM1	N376	F406	D436	F466	N406	D006	A
B33-F060B	302-0602-00000, C-11	B4	R612-04	ALM1	N377	F407	D437	F467	N407	D007	A
B33-F067A	302-0602-00000, C-4	B7	R612-07	ALM1	N380	F410	D440	F470	N410	D005	B
B33-F067B	302-0602-00000, C-11	B8	R612-08	ALM1	N381	F411	D441	F471	N411	D017	B
E12-F009	302-0642-00000, G-10	C1	R612-09	ALM1	N382	F412	D442	F472	N412	D007	B
E51-F063	302-0632-00000, B-6	E1	R612-16	ALM1	N387	F417	D447	F477	N417	D007	A
G33-F001	302-0671-00000, J-8	F1	R612-18	ALM1	N389	F419	D449	F479	N419	D016	B
G33-F100	302-0671-00000, H-13	F2	R612-19	ALM1	N390	F420	D450	F480	N420	D013	B
G33-F101	302-0671-00000, J-13	F3	R612-20	ALM1	N391	F421	D451	F481	N421	D014	A
G33-F102	302-0671-00000, J-11	F4	R612-05	ALM1	N392	F422	D452	F482	N422	D014	B
G33-F106	302-0671-00000, G-12	F5	R612-06	ALM1	N393	F423	D453	F483	N423	D014	B
B21-F001	302-0605-00000, E-13	A5	R612-27	ALM1	N395	F425	D455	F485	N425	D019	B
B21-F002	302-0605-00000, E-13	A6	R612-28	ALM1	N396	F426	D456	F486	N426	D018	B
B21-F005	302-0605-00000, D-13	A7	R612-29	ALM1	N397	F427	D457	F487	N427	D020	B
B21-F016	302-0121-00000, D-11	A8	R612-30	ALM1	N398	F428	D458	F488	N428	D015	B



NOTES:  
1. DELETED

- THIS DRAWING WAS ADAPTED FROM GE DRAWING NUMBER 762E293CA SHEETS 1-5.
- FOR OTHER NOTES AND REFERENCES SEE DWG. 302-0961-00000.
- FOR 1E31F0407, THE OPEN AND CLOSED POSITION INDICATION IS DISABLED UNDER ECP 18-0246.
- OUTPUT FROM THE LIQUID RADWASTE DISTRIBUTED CONTROL SYSTEM.

REFERENCES:  
302-0739-00000 LIQUID RADWASTE SUMPS SYSTEM EQUIPMENT  
302-0740-00000 DRAIN SUMPS AND OIL SEPARATORS G61  
302-0740-00000 LIQUID RADWASTE SUMPS SYSTEM FLOOR DRAIN SUMPS G61  
302-0962-00000 LEAK DETECTION SYSTEM E31

TABLE III

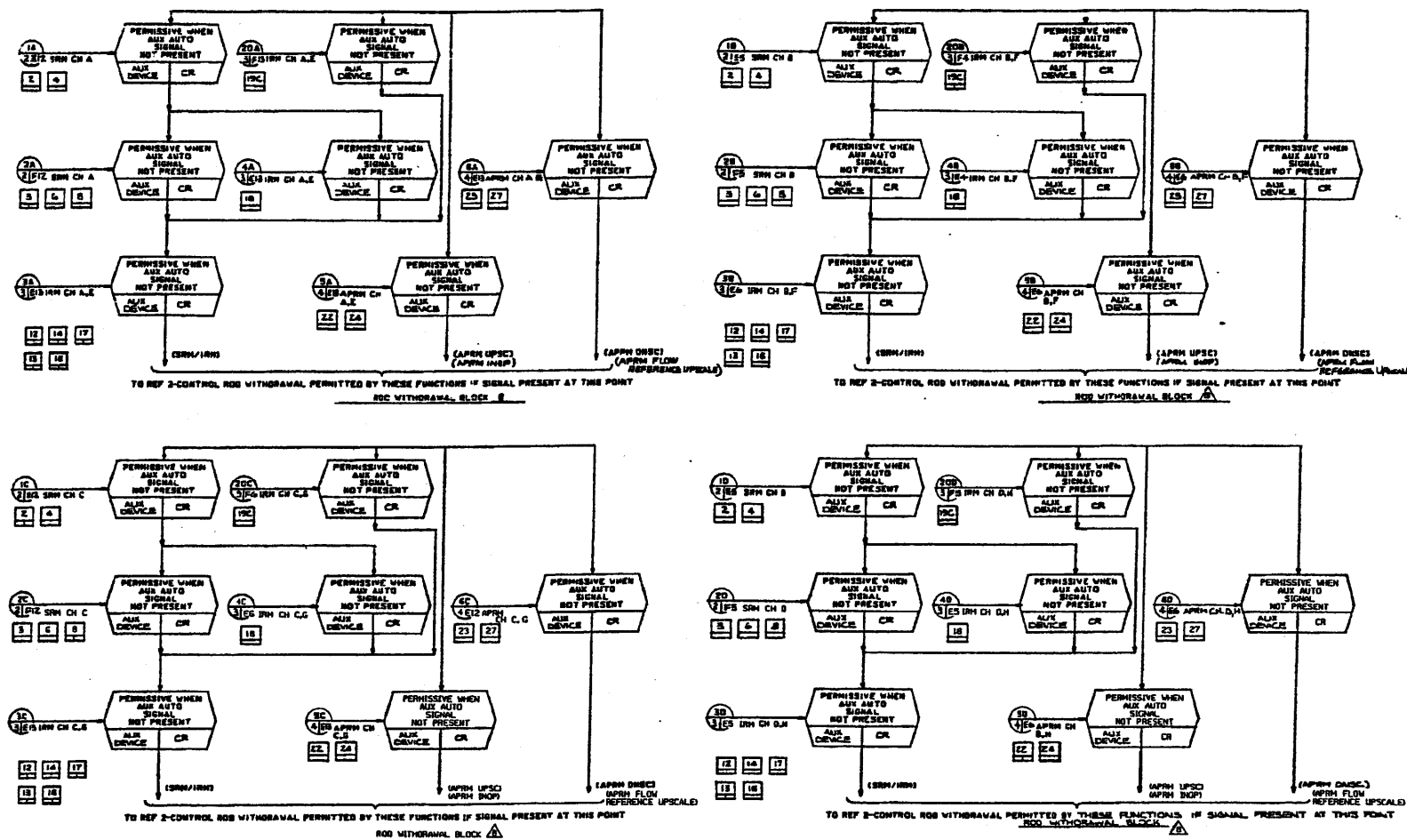
AREA TEMPERATURE MONITORING & VALVES CLOSED

AREA MONITORED	AMBIENT TEMPERATURE					DEVICE LOCATION			VALVES CLOSED
	DIV.	TS	TE	TI	TY	TS PANEL LOCATION	ALARM LOCATION	TI PANEL LOCATION	
TURBINE POWER COMPLEX									
MSL STEAM TUNNEL	1	N361A	N350A			H13-P869	H13-P601	H13-P869	
MSL STEAM TUNNEL	2	N361B	N350B			H13-P868	H13-P601	H13-P868	
MSL STEAM TUNNEL	3	N361C	N350C			H13-P868	H13-P601	H13-P868	
MSL STEAM TUNNEL	4	N361D	N350D			H13-P869	H13-P601	H13-P869	
TURBINE BUILDING									
MSL TURBINE BUILDING	1	N361A	N360A			H13-P869	H13-P601	H13-P869	B21-F022A-D, B21-F028A-D
MSL TURBINE BUILDING	2	N361B	N360B			H13-P868	H13-P601	H13-P868	B21-F022A-D, B21-F028A-D
MSL TURBINE BUILDING	3	N361C	N360C			H13-P868	H13-P601	H13-P868	B21-F022A-D, B21-F028A-D
MSL TURBINE BUILDING	4	N361D	N360D			H13-P869	H13-P601	H13-P869	B21-F022A-D, B21-F028A-D

(REV. 21 10/2019)

PERRY NUCLEAR POWER PLANT  
10 CENTER RD., PERRY, OHIO 44081

LEAK  
DETECTION SYSTEM  
FIGURE 7.6-1 (SHEET 4 OF 4)  
(DWG. D-302-964-00000)



- 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 RETURNS TO "0001" VIA AUTOMATIC MODE PATH. DETECTOR MUST THEN BE RETURNED TO STORAGE POSITION TO REPROGRAM DETECTOR.
    - B. IN MANUAL MODE, MUST RESTART 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 CRI 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. DELETED

△ ROD WITHDRAWAL BLOCKS SUBJECT TO BYPASSING AT SUBSYSTEM LEVEL - SEE SUBSYSTEM 2.3.4 & 5.

- LEGEND:
- -- INITIATOR BLOCK (SEE DETAILS CORRESPONDING WITH NUMBERS)
  - IRH -- INTERMEDIATE RANGE MONITOR
  - APRH -- AVERAGE POWER RANGE MONITOR
  - SRH -- SOURCE RANGE MONITOR
  - LPFH -- LOCAL POWER RANGE MONITOR
  - TRP -- TRIP/REARMING IN-COME PROBE
  - MOCC -- MULTIPLE OUTPUT CONTROLLER
  - RPV -- REACTOR PRESSURE VESSEL
  - △ -- EMERGENCY RESPONSE INFORMATION SYSTEM
  - OPRH -- OSCILLATION POWER RANGE MONITOR

- REFERENCE DOCUMENTS:
- |  |                     |
|--|---------------------|
| 1. PERFORMANCE MONITORING SYSTEM DESIGN SPEC | CR-1018             |
| 2. CONTROL ROD DRIVE SYS FCD                 | CR-1020 / D-808-305 |
| 3. REACTOR PROTECTION SYS IED                | CR-1000 / D-808-302 |
| 4. REDUNDANT REACTIVITY CONTROL SYS FCD      | CR-1000 / D-808-302 |
| 5. SPS ELEMENTARY DIAGRAM                    | CR-1020 / D-808-306 |
| 6. PERFORMANCE MONITORING                    | CR-1020             |

- SUPPORTING DOCUMENTS:
- 1. LOGIC SYMBOLS -- A-12-1038

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

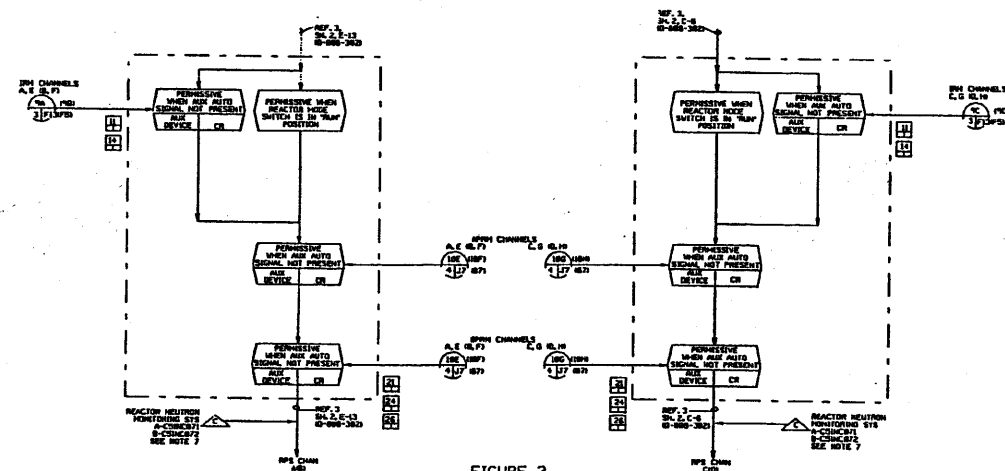
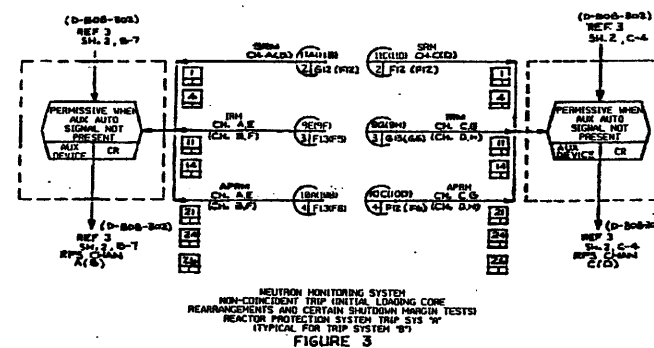
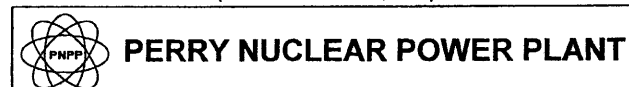


FIGURE 2  
NEUTRON MONITORING SYSTEM TRIP  
REACTOR PROTECTION SYSTEM TRIP  
SYSTEM A  
(TYP. FOR SYSTEM B)



NEUTRON MONITORING SYSTEM  
REARRANGEMENTS AND CERTAIN SHUTDOWN MARGIN TESTS  
REACTOR PROTECTION SYSTEM TRIP SYS W  
(TYPICAL FOR TRIP SYSTEM B)  
FIGURE 3

(Rev. 12 1/03)



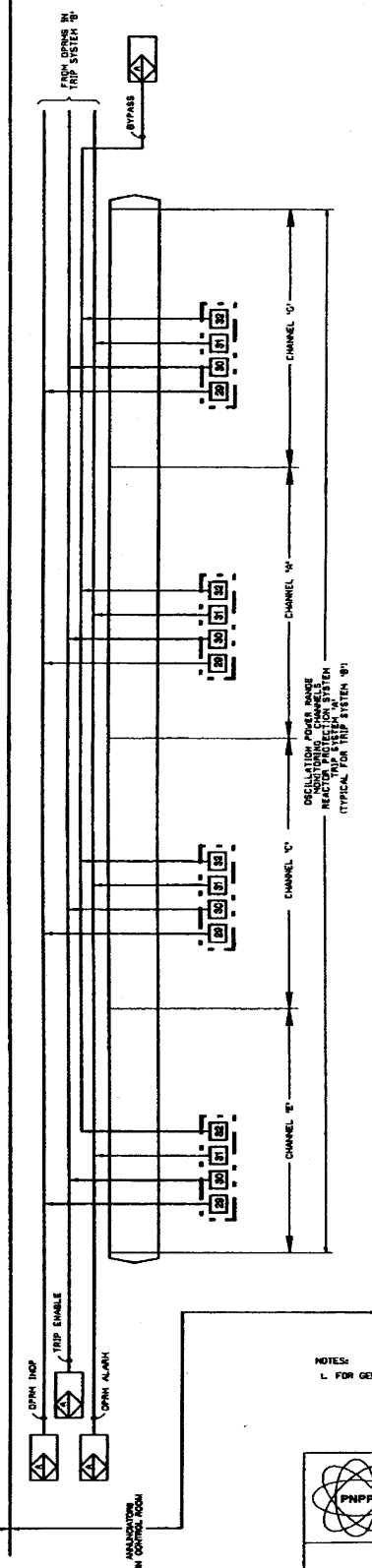
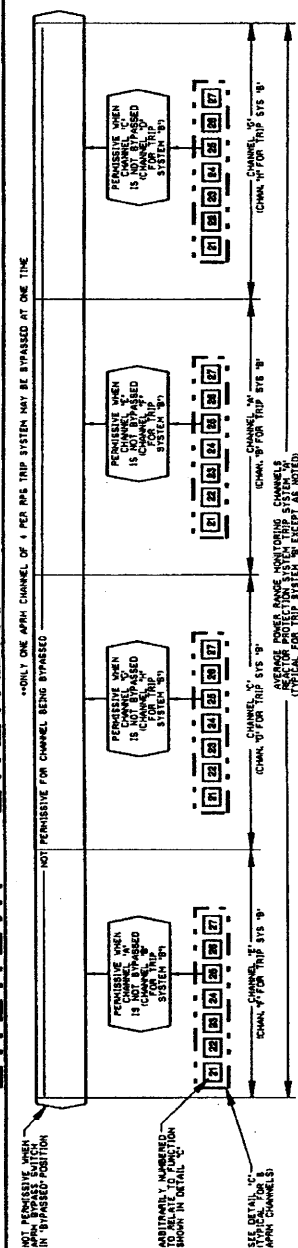
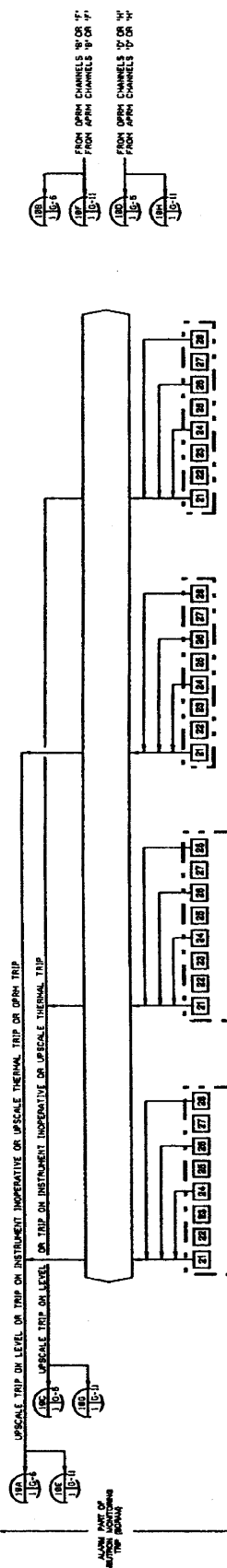
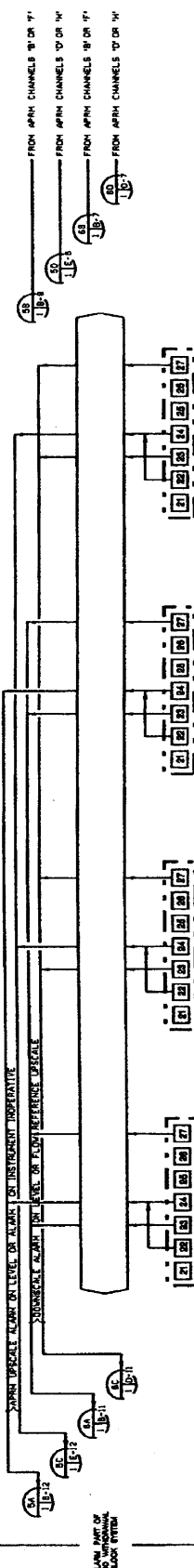
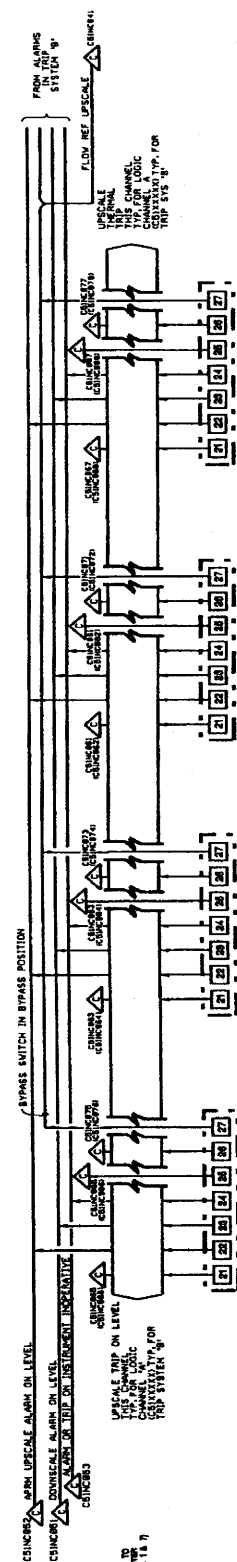
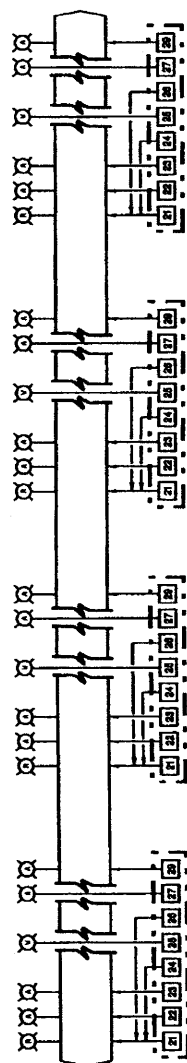
Neutron Monitoring System

Figure 7.6-2 (Sheet 1 of 7)

[Dwg. D-808-307(1)]







NOTES:

L. FOR GENERAL NOTES AND REFERENCES, SEE THIS DWG. SH. 1.

(Rev. 12 1/03)



## PERRY NUCLEAR POWER PLANT

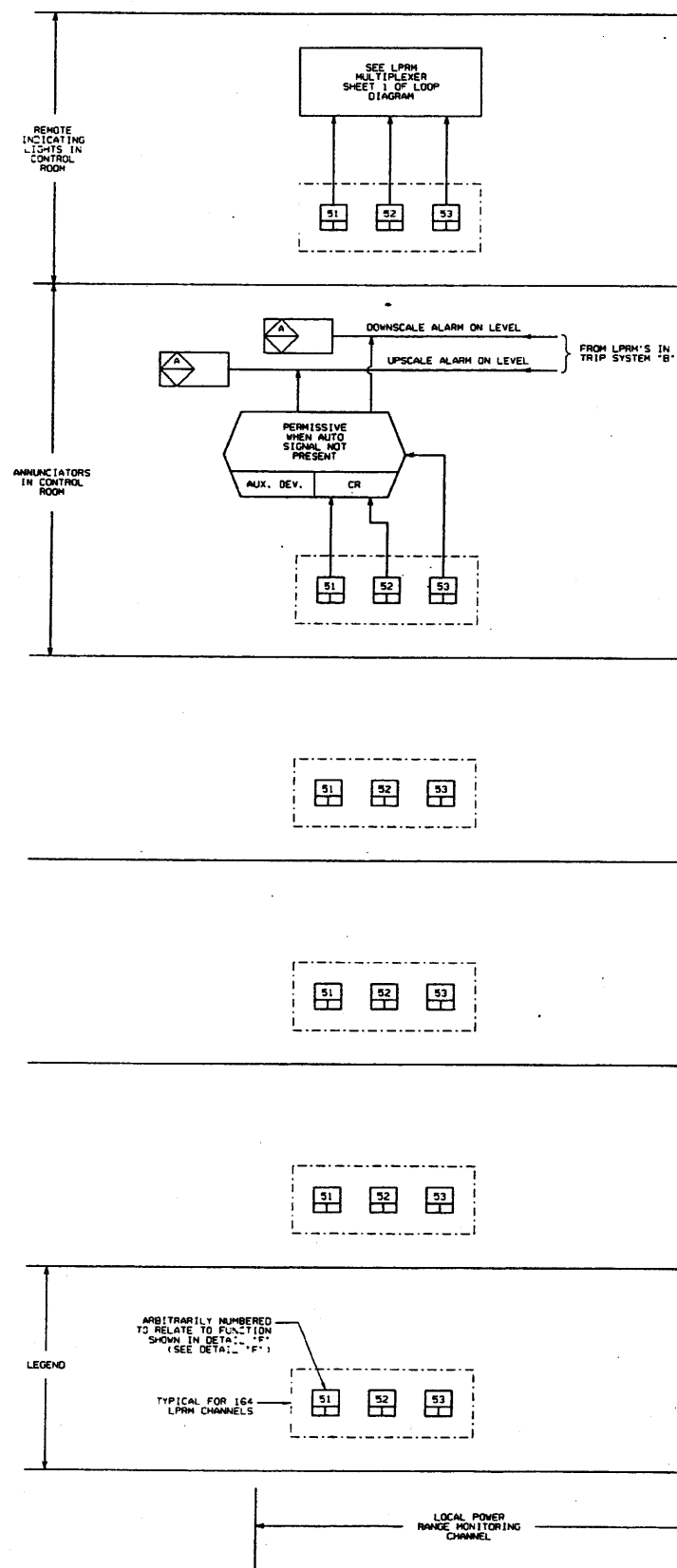
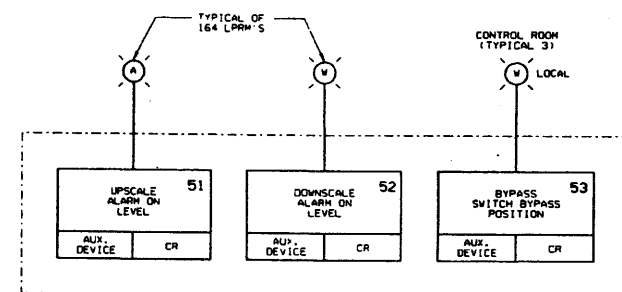
Neutron Monitoring System

Figure 7.6-2 (Sheet 4 of 7)

[Dwg. D-808-307 (4)]

PERFORMANCE MONITORING SYSTEM  
COMPUTER INPUT / OUTPUT NUMBERS

CSINC001	CSINC076	CSINC142
CSINC002	CSINC077	CSINC143
CSINC003	CSINC078	CSINC144
CSINC004	CSINC080	CSINC151
CSINC021	CSINC082	CSINC152
CSINC022	CSINC083	CSINC153
CSINC023	CSINC084	CSINC154
CSINC024	CSINC085	
CSINC025	CSINC086	CSINC181
CSINC031	CSINC087	CSINC182
CSINC032	CSINC088	CSINC183
CSINC033	CSINC091	CSINC184
CSINC034	CSINC092	CSINC185
CSINC035	CSINC093	CSINC111
CSINC036	CSINC094	CSINC112
CSINC037	CSINC101	CSINC113
CSINC038	CSINC102	CSINC114
CSINC041	CSINC103	CSINC115
CSINC051	CSINC104	CSINC121
CSINC052	CSINC105	CSINC122
CSINC053	CSINC106	CSINC123
CSINC061	CSINC111	CSINC124
CSINC062	CSINC112	CSINC125
CSINC063	CSINC113	
CSINC064	CSINC114	CSINC081
CSINC065	CSINC121	CSINC082
CSINC066	CSINC122	
CSINC067	CSINC123	SPARES
CSINC068	CSINC124	CSINC186
CSINC071	CSINC125	CSINC116
CSINC072	CSINC131	CSINC126
CSINC073	CSINC132	CSINC135
CSINC074	CSINC133	CSINC136
CSINC075	CSINC134	CSINC137
	CSINC141	CSINC138



NUCLEAR SAFETY RELATED

NOTES:

1. FOR GENERAL NOTES AND REFERENCES, SEE THIS DRAWING SHEET 1.

(Rev. 12 1/03)

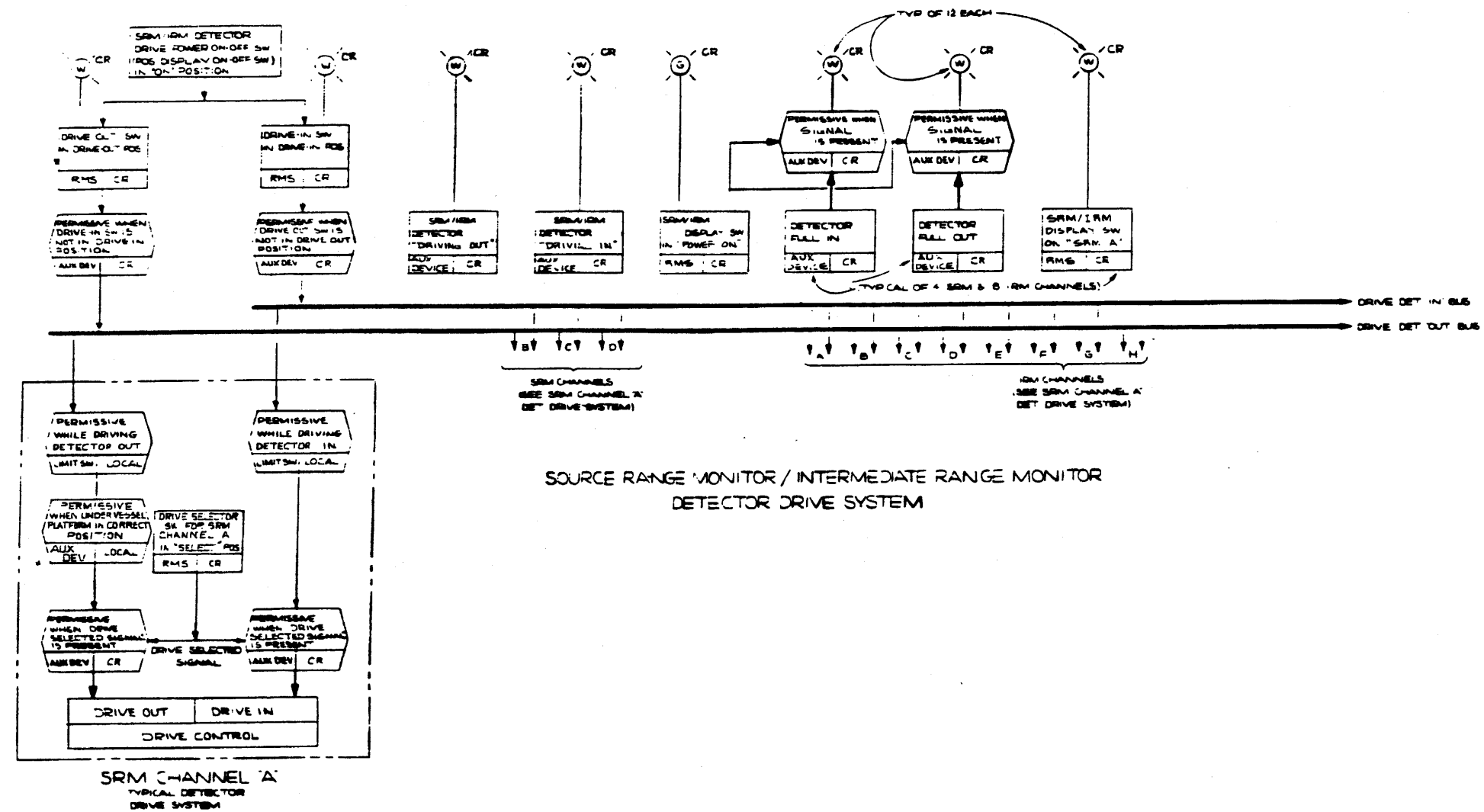


PERRY NUCLEAR POWER PLANT

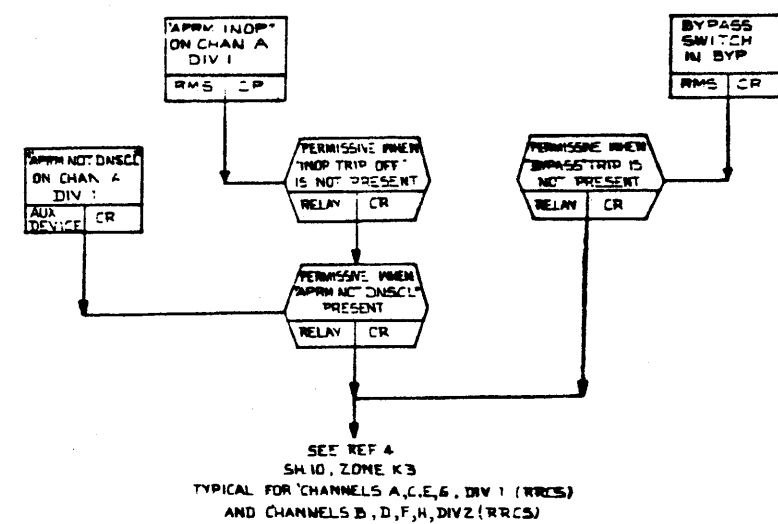
Neutron Monitoring System

Figure 7.6-2 (Sheet 5 of 7)

[Dwg. D-808-307(5)]



# SOURCE RANGE MONITOR / INTERMEDIATE RANGE MONITOR DETECTOR DRIVE SYSTEM

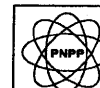


APRM NOT DSCALE INPUTS TO RRCS

## NOTES:

- FOR GENERAL NOTES AND REFERENCE, SEE THIS DWG SH. 1.

(Rev. 12 1/03)

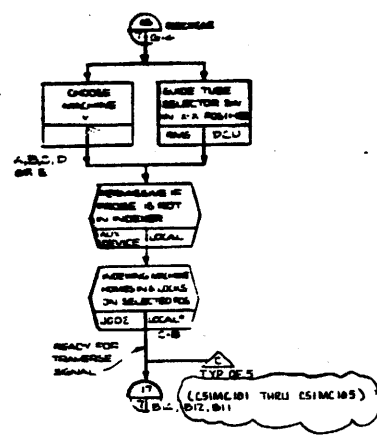



PERRY NUCLEAR POWER PLANT

Neutron Monitoring System

Figure 7.6-2 (Sheet 6 of 7)

[Dwg. D-808-307(6)]



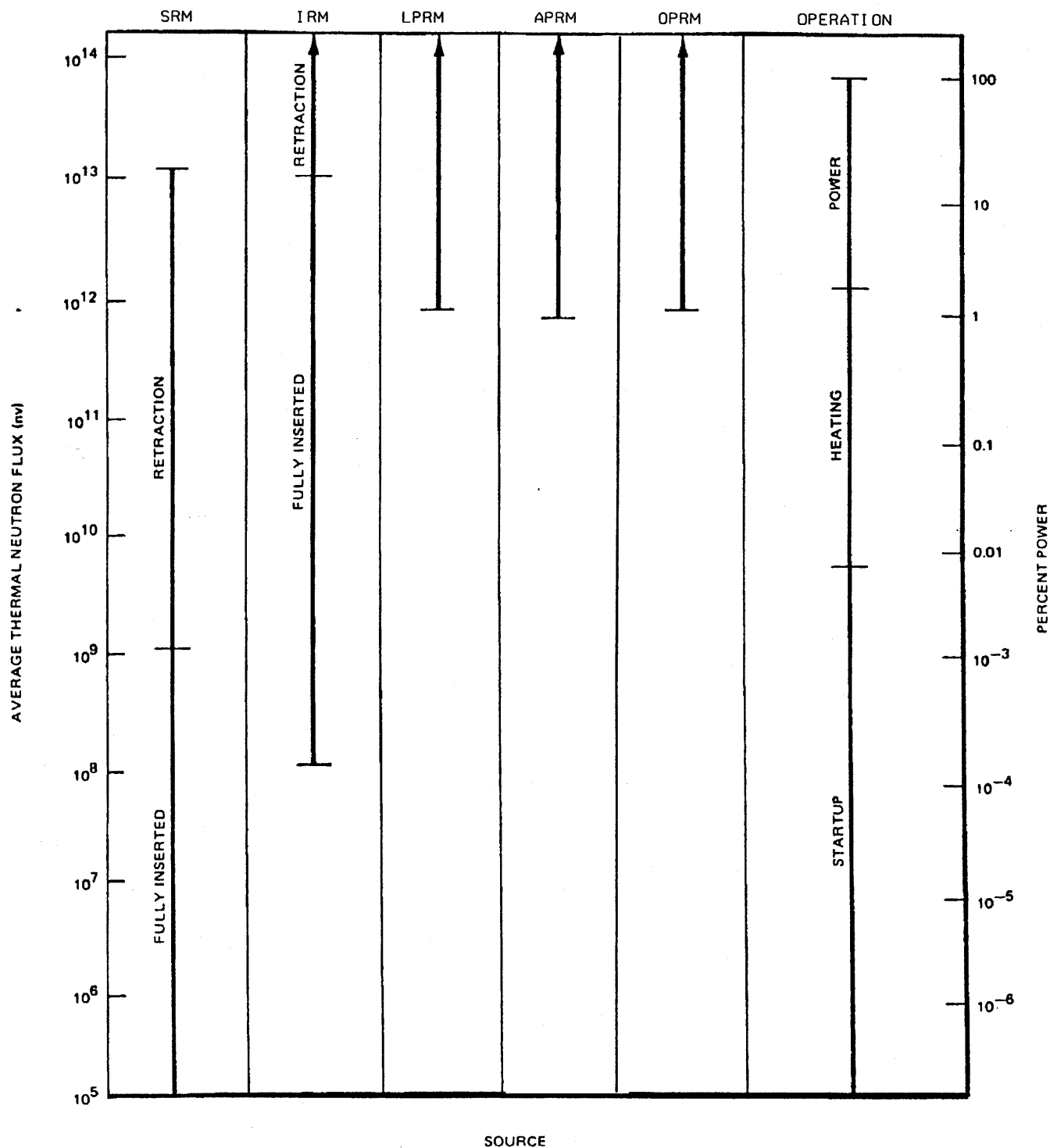
 **PERRY NUCLEAR POWER PLANT**

Neutron Monitoring System


Figure 7.6-2 (Sheet 7 of 7)

[Dwg. D-808-307(7)]





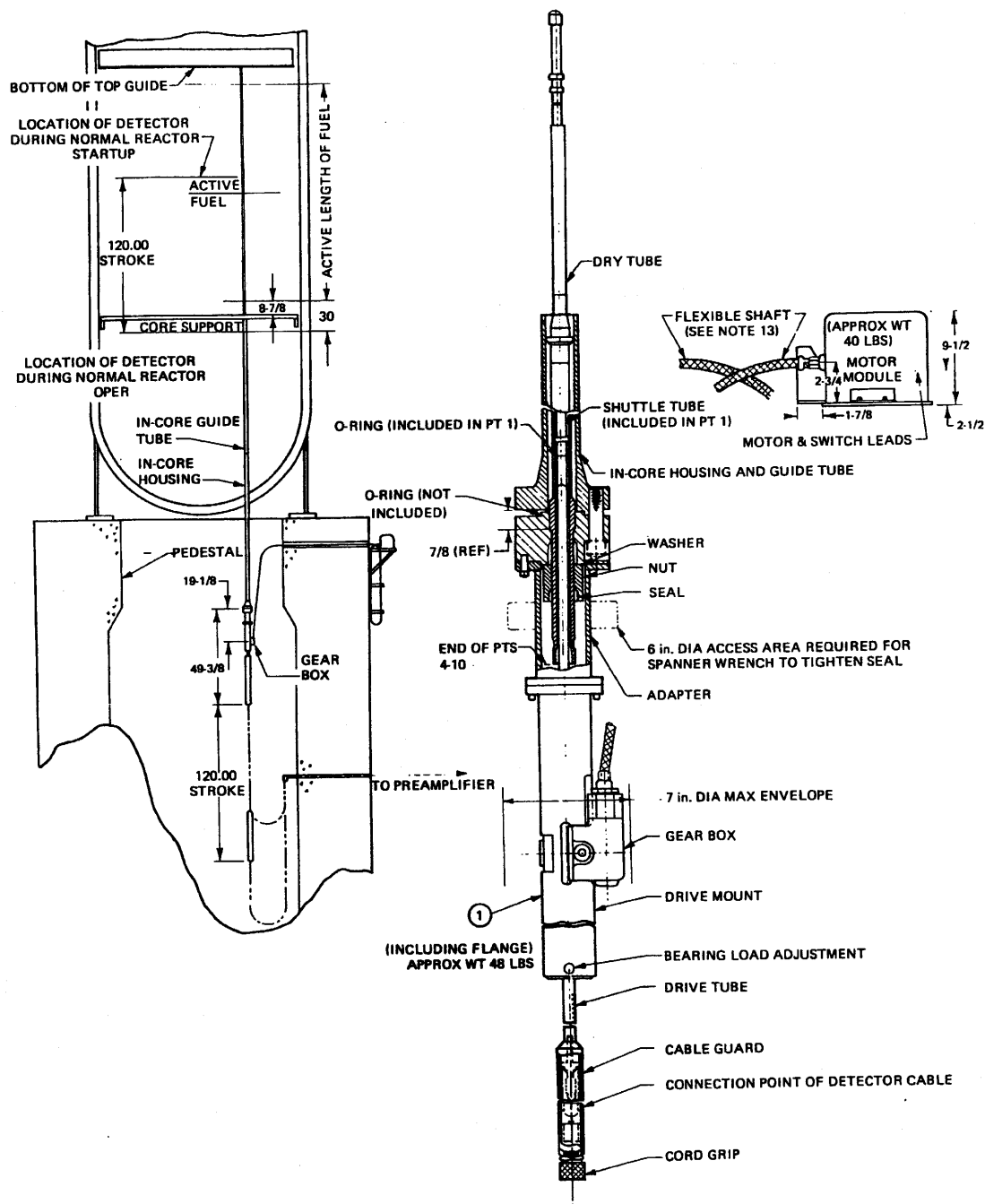
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**PERRY NUCLEAR POWER PLANT**

Ranges of Neutron  
Monitoring System

Figure 7.6-3



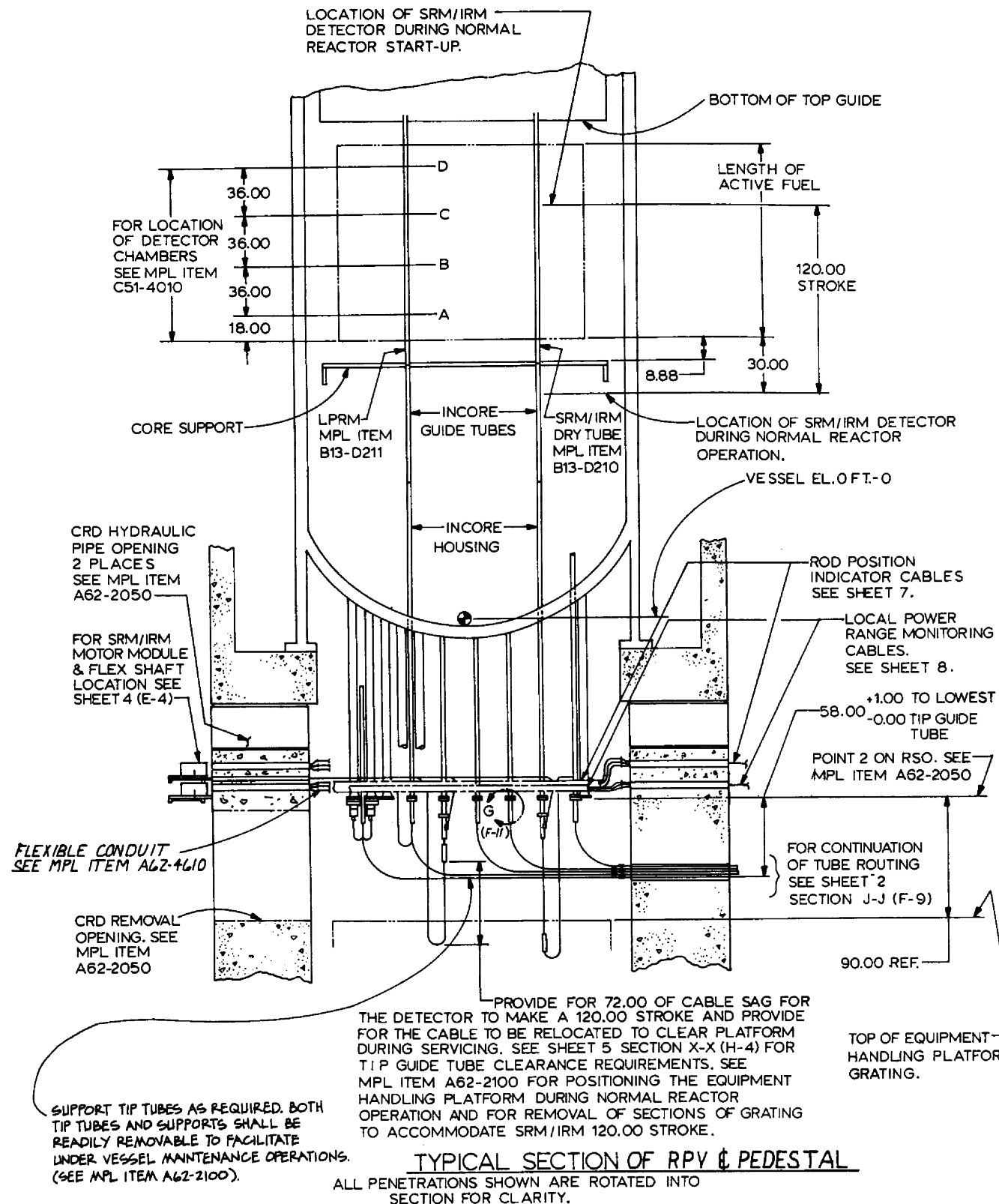
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## PERRY NUCLEAR POWER PLANT

SRM/IRM Neutron  
Monitoring Unit

Figure 7.6-4



#### NOTES:

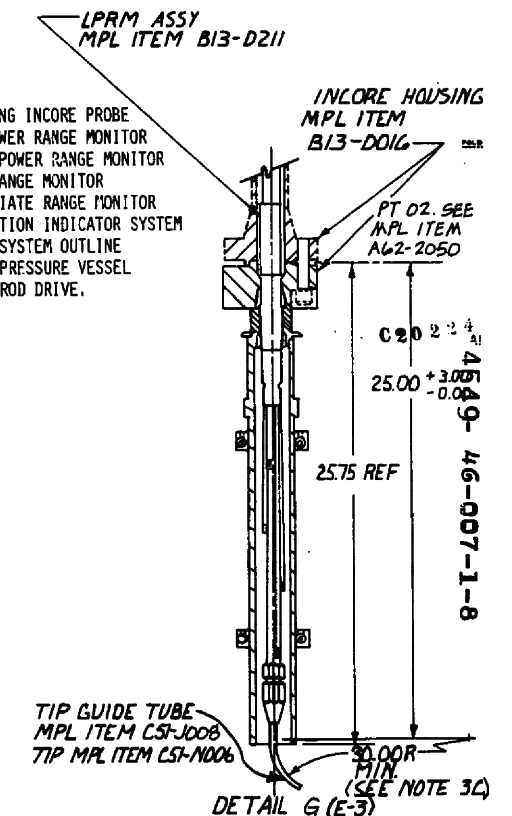
1. TIP TUBE RUN FROM IN-CORE HOUSING FLANGE TO DRIVE MECHANISM. SEE MPL ITEM C51-N006.
2. TUBE UNIONS MAY BE LOCATED AS REQUIRED BETWEEN REACTOR PEDESTAL WALL AND DRYWELL PENETRATION. THE NUMBER OF UNIONS SHALL BE HELD TO A MINIMUM.
3. THE NUMBER AND DEGREE OF BENDS FOR TIP GUIDE TUBES SHALL BE HELD TO A MINIMUM.
  - A. MAX. DEGREE OF BENDS IN THIS AREA SH2(A-3) IN ALL PLANES SHALL BE 60° AND MINIMUM RADIUS SHALL BE 60.00 MIN. EXCEPT FOR TIP STORAGE GUIDE TUBES WHICH MAY HAVE 220° MAX. DEGREE OF BENDS AND 30.00 MIN. BEND RADIUS.
  - B. MAX. DEGREE OF BENDS IN THIS AREA SH2(B-2) IN ALL PLANES SHALL BE 180° AND MINIMUM RADIUS SHALL BE 60.00.
  - C. MAX. DEGREE OF BENDS IN THIS AREA SH2 (C-1) IN ALL PLANES SHALL BE 145° AND MIN. RADIUS SHALL BE 60.00, ONE BEND 90°-100° MAY BE 30.00 RADIUS MIN.
4. COMPLETED GUIDE TUBE INSTALLATION SHALL BE CHECKED BY MANUALLY DRIVING DUMMY TIP FULL LENGTH THROUGH EACH GUIDE TUBE PATH ACCORDING TO MPL ITEM A42-3750 BEFORE INSTALLING TRAVERSING DETECTOR, MPL ITEM C51-J010.
5. THE TIP GUIDE TUBES SHALL BE HELD AT 60.00 MAXIMUM INTERVALS BY A SUPPORT (FURNISHED BY OTHERS).
6. BENDS MUST BE SMOOTH, MADE WITH A FIXTURE, AND FREE OF INTERNAL DEFORMATIONS. TUBE FLARES TO BE FORMED WITH PROPER TOOLS. WHEN ASSEMBLED WITH FITTINGS, TEST WITH A .273 + .000 DIA. ROD 3.00" LONG (FURNISHED BY OTHERS) FOR PROPER CLEARANCE AND ALIGNMENT.
7. ALL TUBING AND FITTINGS ARE TO BE SHIPPED TO SITE FOR MODIFICATION AND INSTALLATION.
8. ALL TIP TUBE RUNS TO BE TESTED AND BE BUBBLE TIGHT AT 45 PSI INTERNAL AIR PRESSURE AFTER FINAL ASSEMBLY.
9. FOR SRM/IRM FLEXIBLE SHAFT ROUTING, CARE MUST BE TAKEN TO PREVENT JAMMING THE INNER SHAFT WHEN CLAMPING. MOTOR MODULE DRIVE CABLE LENGTH SUPPLIED IS 33 FT-0. TOTAL BENDS FOR LENGTH OF CABLE IS 540° MAX. (SEE SH.4 (F-4) FOR DETAILS). MIN. BEND RADIUS IS 9.00 INCHES.
10. PURGE AIR PIPING FROM PURGE AIR SUPPLY TO THE PURGE AIR CONTROL UNIT MPL ITEM C51-J009 SHALL BE FURNISHED BY OTHERS AND BE DESIGNED AND FABRICATED FOR SERVICE COMPATIBLE WITH AIR SUPPLY REQUIREMENTS (SEE NOTE 14). PURGE AIR TUBING, FITTINGS AND VALVES FROM PURGE AIR CONTROL UNIT TO TIP INDEXING MECHANISM MPL ITEM C51-J002 AND THE TIP GUIDE TUBES SHALL BE SUPPLIED BY OTHERS AND BE OF SIZE AND MATERIAL COMPATIBLE WITH TIP GUIDE TUBES. (SEE MPL ITEM C51-J008).
11. MECHANICAL PROTECTION FOR TIP GUIDE TUBING SHALL BE PROVIDED (BY OTHERS) TO PREVENT DAMAGE DURING MAINTENANCE.
12. DIMENSIONS GIVEN ARE NOMINAL UNLESS OTHERWISE NOTED.
13. ALL DIMENSIONS ARE IN INCHES EXCEPT WHERE NOTED.
14. PURGE AIR SUPPLY SHALL BE PROVIDED BY OTHERS. THE AIR SHALL HAVE (-) 15°F OR LOWER DEMPPOINT AND PRESSURE OF 40 PSIG MIN. TO 100 PSIG MAX. WITH FLOW RATE 0 TO 10 CFM.
15. THE DISTANCE OF 15 FT FROM INDEXING MECHANISM TO OUTER FACE OF DRYWELL IS THE RECOMMENDED MINIMUM DISTANCE. ACTUAL DISTANCE TO BE DETERMINED BY OTHERS TO BE CONSISTENT WITH THE RADIOLOGICAL DESIGN REQUIREMENTS OF THE PLANT.
16. TYPE 3 FITTING IS A QUICK DISCONNECT FITTING INSTALLED ON TIP TUBING AT PEDESTAL WALL AND LPRM FOR TIP TUBING REMOVAL TO FACILITATE UNDER VESSEL MAINTENANCE OPERATIONS.

SUPPLEMENTAL DOCUMENTS UNDER THE FOLLOWING IDENTITIES ARE TO BE USED IN CONJUNCTION WITH THESE DRAWINGS:

TITLE	REFERENCE DESIGNATOR
1. REACTOR SYSTEM OUTLINE-----	MPL ITEM A62-2050
2. PROCESS INSTRUMENTATION-----	MPL ITEM A62-4070
3. RECIRC. LOOP ROUTING-----	MPL ITEM A13-2011
4. REF. CONTAINMENT DEF.-----	MPL ITEM A42-5170
5. NUCLEAR INSTRUMENTATION INSTALL. INSTRUCTION-----	MPL ITEM A42-3750
6. REACTOR PRESSURE VESSEL CABLING PROTECTION----	MPL ITEM A62-4610

#### ABBREVIATIONS

TIP ---- TRAVERSING INCORE PROBE  
 LPRM --- LOCAL POWER RANGE MONITOR  
 APRM --- AVERAGE POWER RANGE MONITOR  
 SRM --- SOURCE RANGE MONITOR  
 IRM --- INTERMEDIATE RANGE MONITOR  
 RPI S --- ROD POSITION INDICATOR SYSTEM  
 RSO --- REACTOR SYSTEM OUTLINE  
 RPV --- REACTOR PRESSURE VESSEL  
 CRD --- CONTROL ROD DRIVE.

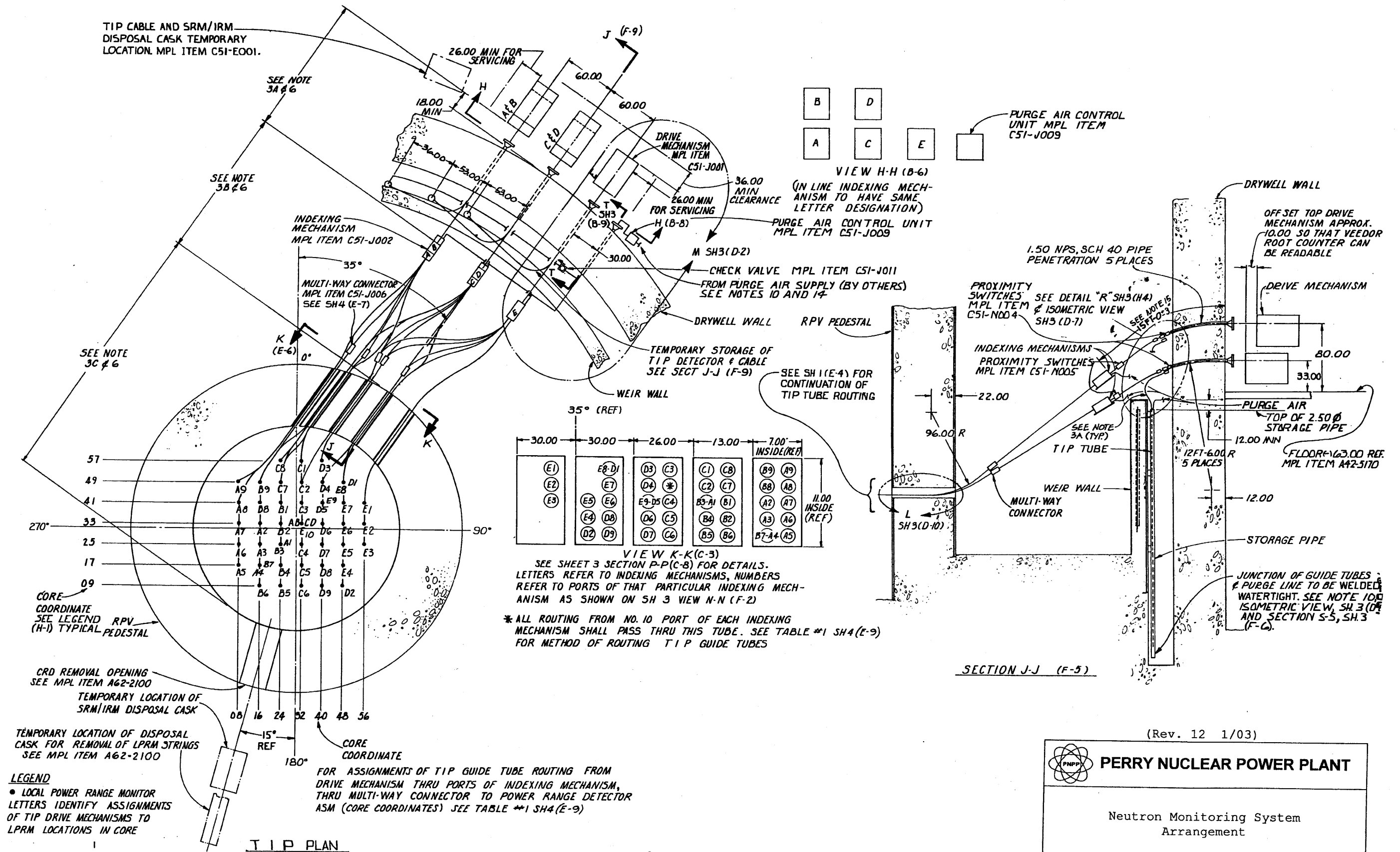


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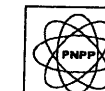
**PERRY NUCLEAR POWER PLANT**  
 10 CENTER RD., PERRY, OHIO 44081

NEUTRON MONITORING SYSTEM  
 ARRANGEMENT

Figure 7.6-5 (SHEET 1 OF 8)



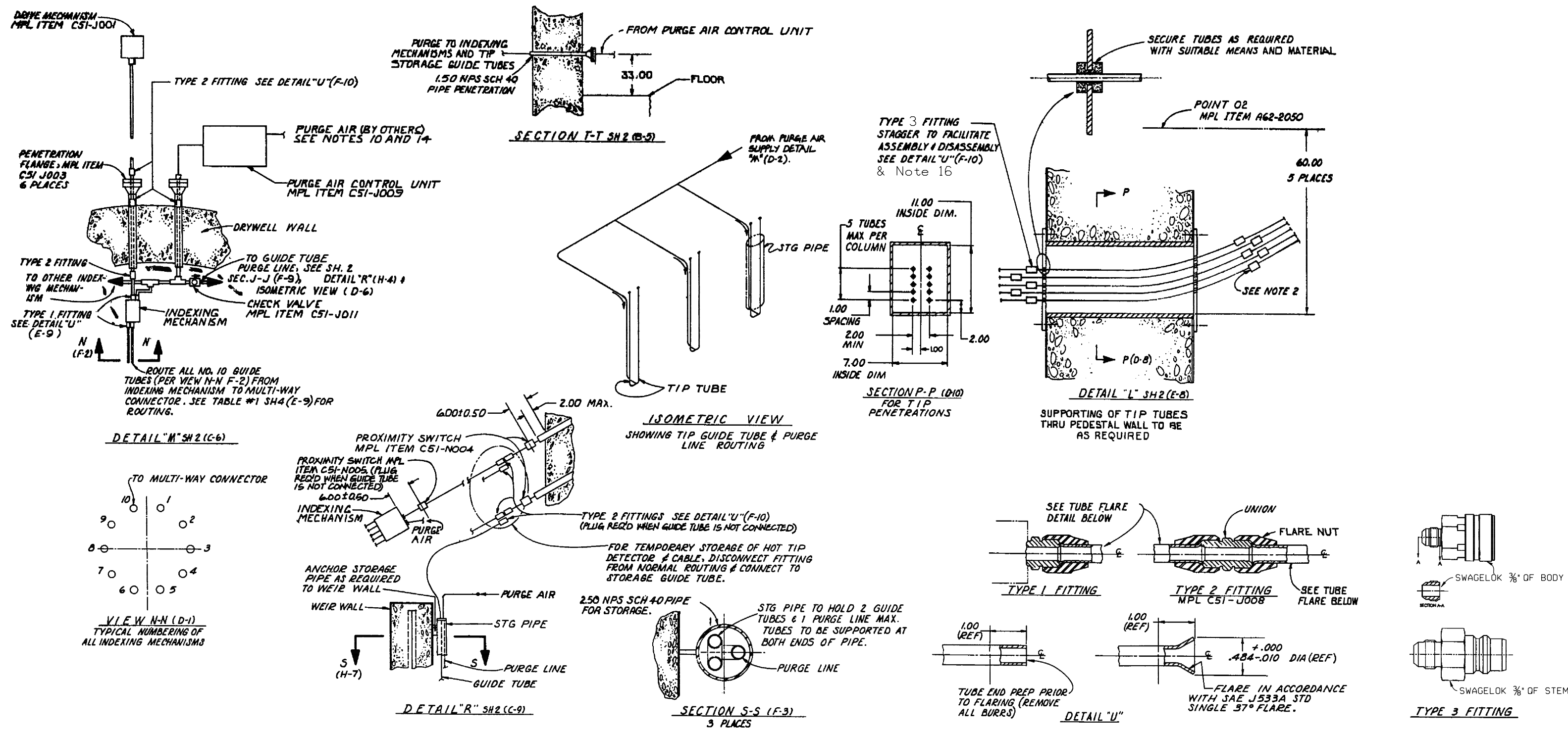
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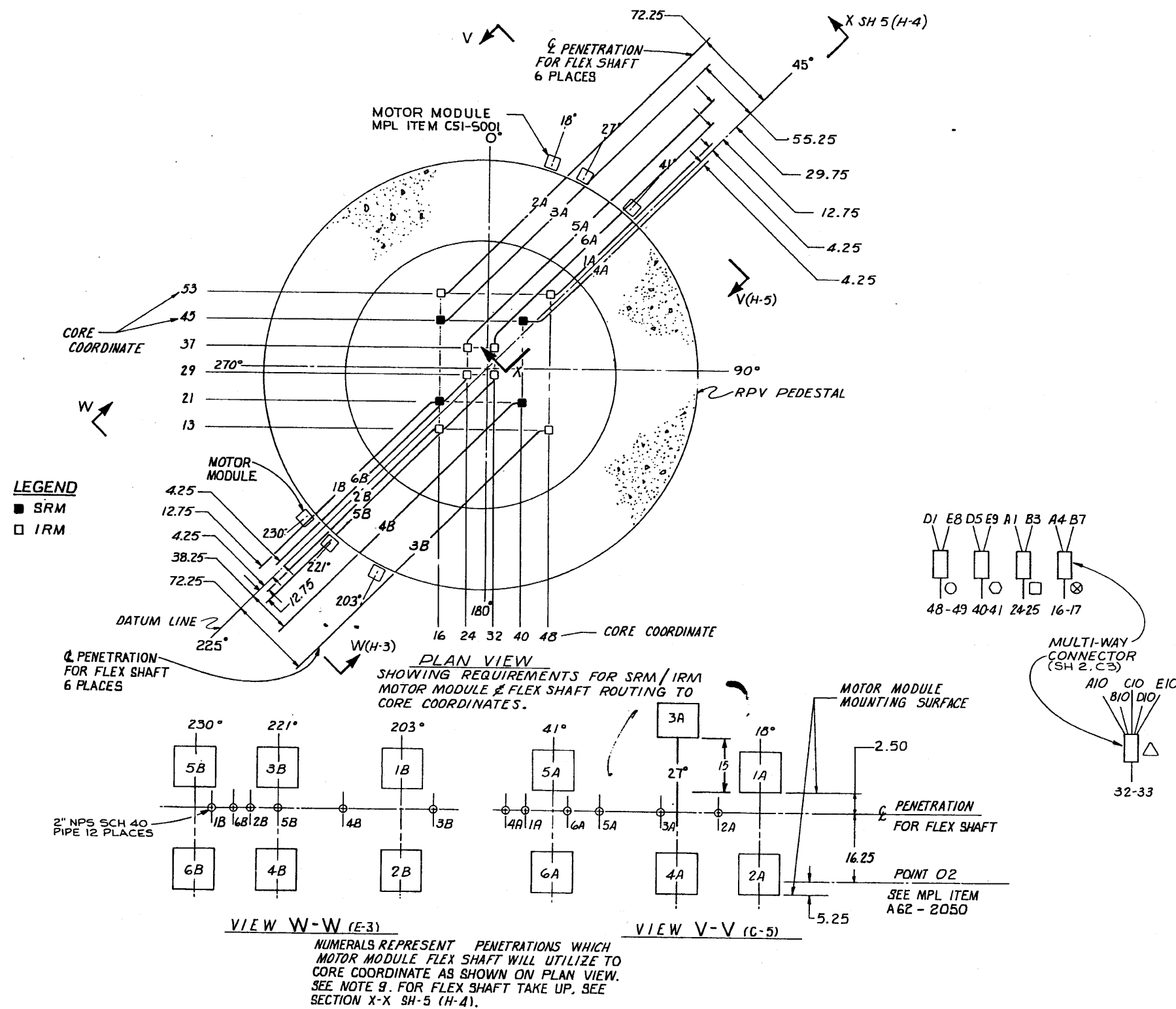
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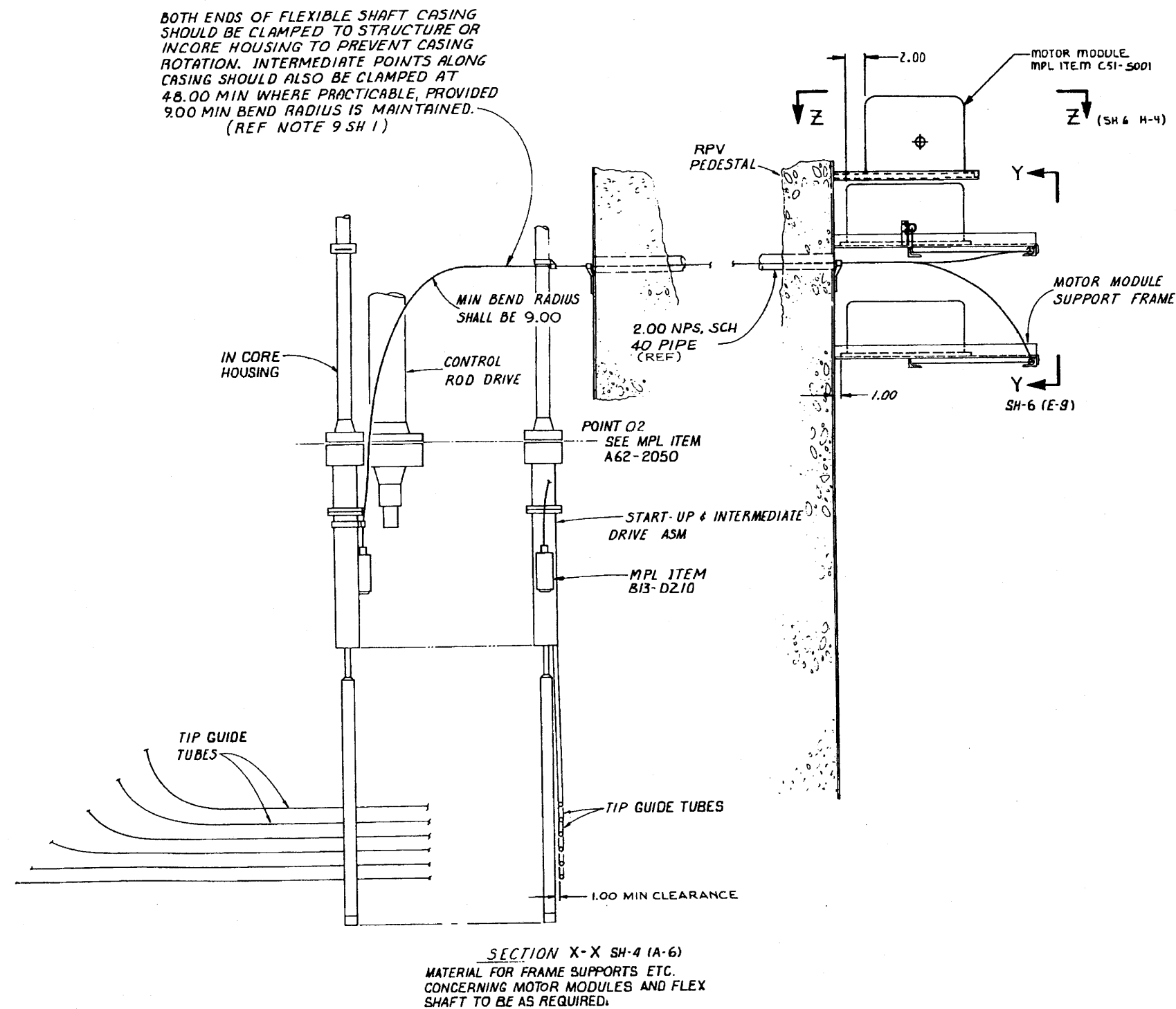
Neutron Monitoring System  
Arrangement

Figure 7.6-5 (Sheet 2 of 8)



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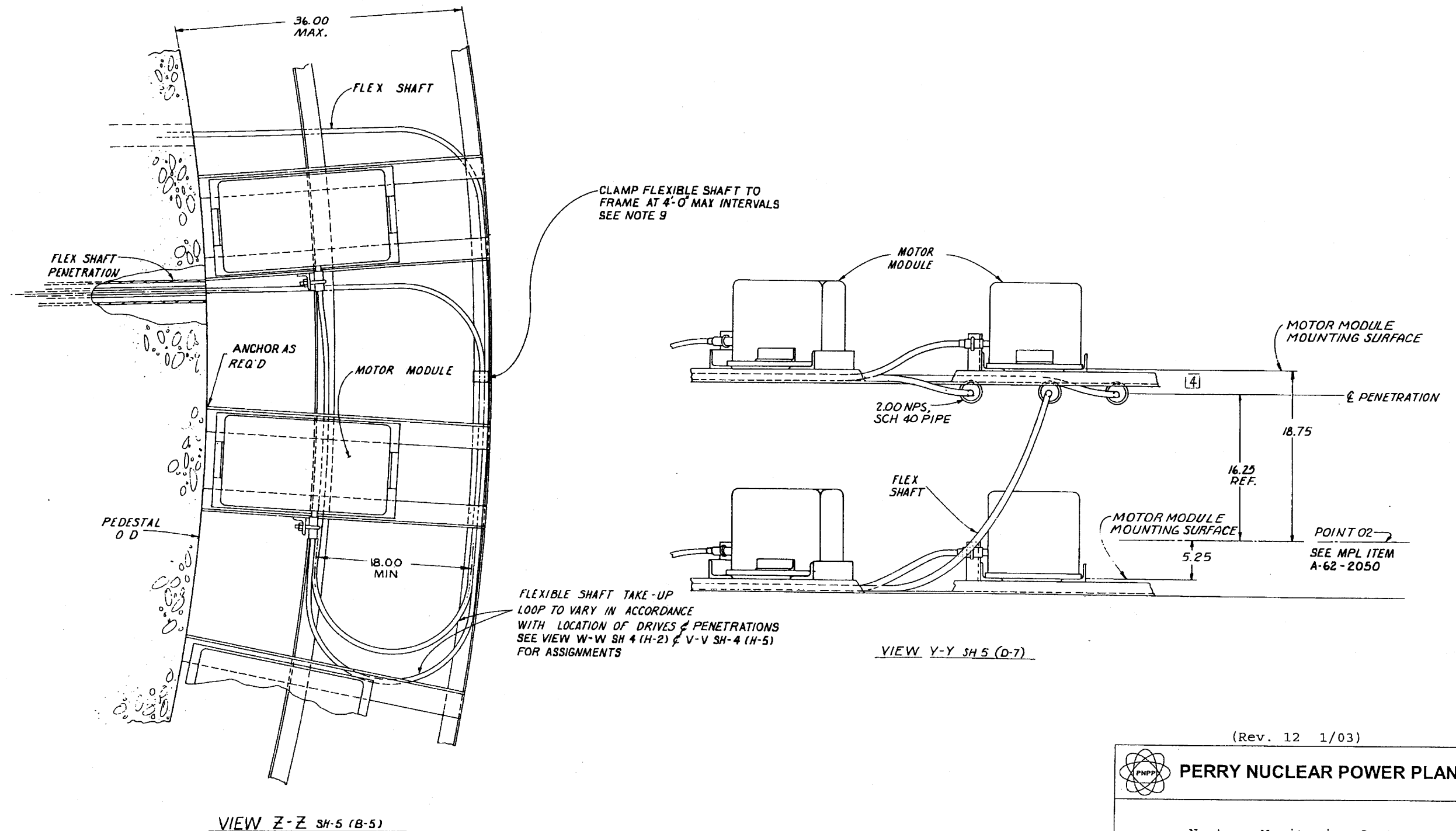
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PERRY NUCLEAR POWER PLANT

Neutron Monitoring System  
Arrangement

Figure 7.6-5 (Sheet 5 of 8)



(Rev. 12 1/03)



PERRY NUCLEAR POWER PLANT

Neutron Monitoring System  
Arrangement

Figure 7.6-5 (Sheet 6 of 8)



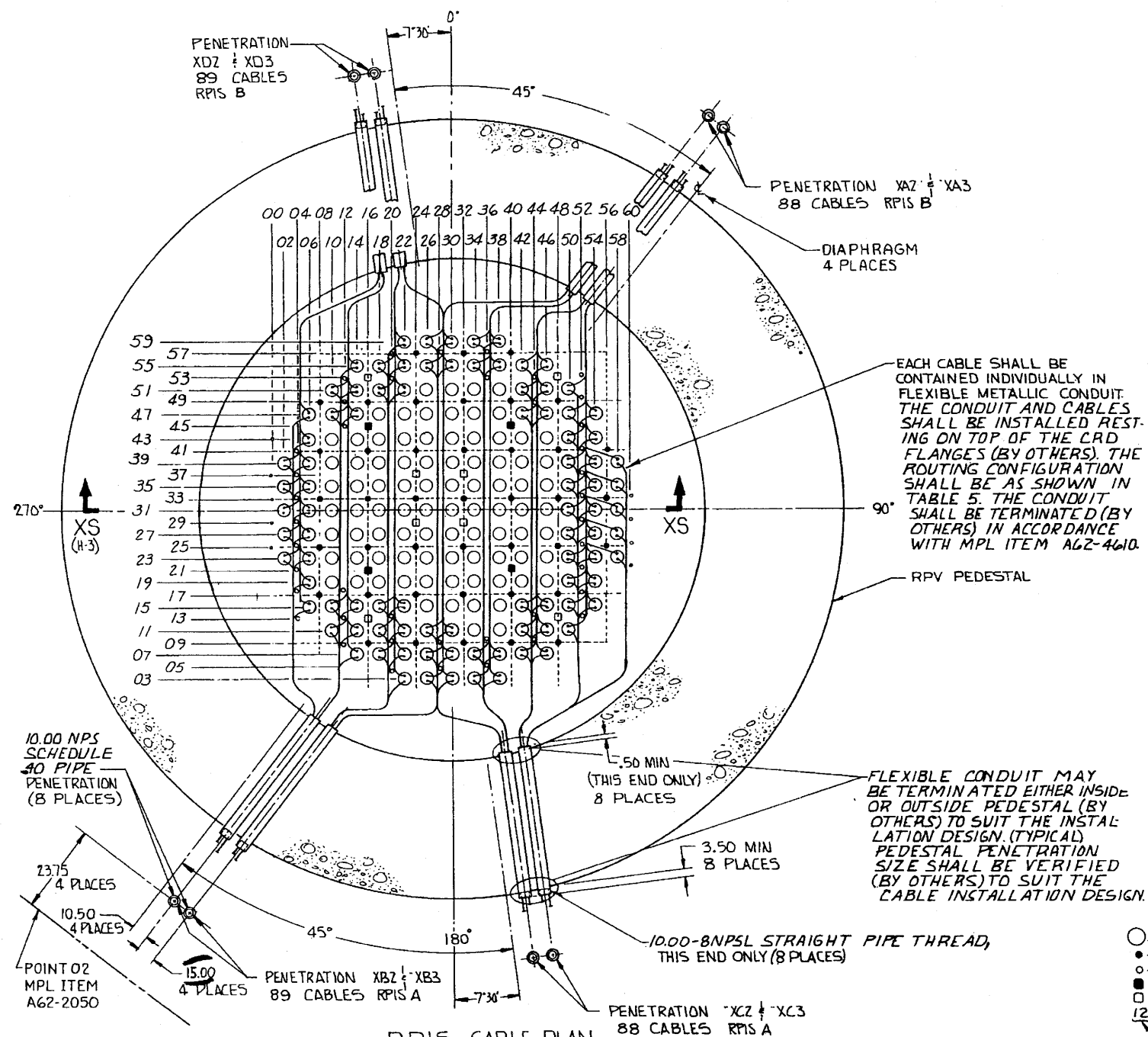


TABLE 5  
ROUTING OF CABLES FROM CRD TO RPIS

CABLE	RPIS 'B'	RPIS 'A'	CABLE	RPIS 'B'	RPIS 'A'	CABLE	RPIS 'B'	RPIS 'A'	CABLE	RPIS 'B'	RPIS 'A'
PENETRATION	XD2, XD3	YX2, YX3	PENETRATION	XD2, XD3	YX2, YX3	PENETRATION	XD2, XD3	YX2, YX3	PENETRATION	XD2, XD3	YX2, YX3
CRD LOCATION	RACE WAY NO.	RACE WAY NO.	CRD LOCATION	RACE WAY NO.	RACE WAY NO.	CRD LOCATION	RACE WAY NO.	RACE WAY NO.	CRD LOCATION	RACE WAY NO.	RACE WAY NO.
02-23	04R	04L	18-47	20R	20L	34-03	36R	36L	46-07	44R	44L
27			51			07			11		
31			18-55			11			15		
35			22-03			15			19		
02-39			07			19			23		
06-15			11			23			27		
19			15			27			31		
23			19			31			35		
27			23			35			39		
31			27			39			43		
35			31			43			47		
39			35			47			51		
43			39			51			46-55	44-R	44L
47			43			55			50-11	52-R	52L
06-47	04R	04L	43			34-59			15		
10-11	12R	12L	47			38-03			19		
15			51			07			23		
19			55			11			27		
23			22-59	20R	20L	15			31		
27			26-03	28R	28L	19			35		
31			07			23			39		
35			11			27			43		
39			15			31			47		
43			19			35			50-51		
47			23			39			54-15		
10-51			27			43			19		
14-07			31			47			23		
11			35			51			27		
15			39			55			31		
19			43			38-59	36R	36L	35		
23			47			42-07	44R	44L	39		
27			51			11			43		
31			55			15			47		
35			26-59			19			54-47		
39			30-03			23			58-23		
43			07			27			27		
47			11			31			31		
51			15			35			35		
14-55	12R	12L	19			39			58-39	52R	60L
18-07	20R	20L	23			43			30-35	28R	60L
11			27			47			39		
15			31			51			43		
19			35			55			47		
23			39			42-55	44R	44L	51		
27			43						55		
31			47						30-59	28R	28L
35			51								
39			55								
43			18-43	20R	20L						
47											
51											
55											
59											

LEGEND  
 ○ - CONTROL ROD DRIVE.  
 ● - LOCAL POWER RANGE MONITOR.  
 ○ - CRD HOUSING SUPPORT ROD.  
 ● - SOURCE RANGE MONITOR.  
 ○ - INTERMEDIATE RANGE MONITOR.  
 12L - INDICATES AREA TO LEFT OF COORDINATE  
 LOOKING TOWARD 0° AZIMUTH.  
 NUMERIC COORDINATE LOCATOR.

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**PERRY NUCLEAR POWER PLANT**

Neutron Monitoring System  
Arrangement

Figure 7.6-5 (Sheet 7 of 8)



(APRM TRIP SYSTEM A)

(APRM TRIP SYSTEM B)

CHANNEL →	APRM "B"		APRM "D"		APRM "F"		APRM "H"	
DIV. PEN →	2	XBI	4	XDI	2	XBI	4	XDI
LPRM DET LOCATION	LPRM DET HGT	RACE WAY NO.	LPRM DET HGT	RACE WAY NO.	LPRM DET HGT	RACE WAY NO.	LPRM DET HGT	RACE WAY NO.
08-17	B	16L	C	08R	D	16L	A	08R
33	D	↑	A	08R	B	↑	C	08R
49	B	↑	C	08R	D	↑	A	08R
16-09	A	↓	B	24R	C	↓	D	24R
25	C	↓	D	↑	A	↓	B	↑
41	A	16L	B	↑	C	16L	D	↑
24-17	D	32L	A	↑	B	32L	C	↑
33	B	↑	C	↓	D	↑	A	↓
49	D	↑	A	24R	B	↑	C	24R
32-09	C	↓	D	40R	A	↓	B	40R
25	A	↓	B	↑	C	↓	D	↑
41	C	↓	D	↑	A	↓	B	↑
57	A	32L	B	↑	C	32L	D	↑
40-17	B	48L	C	↑	D	48L	A	↑
33	D	↑	A	↓	B	↑	C	↓
49	B	↑	C	40R	D	↑	A	40R
48-09	A	↓	B	56R	C	↓	D	56R
25	C	↓	D	↑	A	↓	B	↑
41	A	↓	B	↑	C	↓	D	↑
56-33	B	48L	C	56R	D	48L	A	56R

[illegible]

\* RUN AND SUPPORT SEPARATELY TO AVOID INTERFERENCE WITH UNDER VESSEL MAINTENANCE PLATFORM.

TABLE 4 ,  
ROUTING OF CABLES

## FROM SRM DETECTORS TO SRM CHANNELS

CHANNEL DIV. PEN.	SAM "A" 1. XA1	SAM "B" 2. XB1	SAM "C" 3. XC1	SAM "D" 4. XD1
SAM DET. LOCATION	RACE WAY NO.	RACE WAY NO.	RACE WAY NO.	RACE WAY NO.
16-21		16L		
45	16R			
40-21			40L	
45				40R

LEGEND

- +—CONTROL ROD DRIVE.
- LOCAL POWER RANGE MONITOR. (LPRM)
- CRD HOUSING SUPPORT ROD
- SOURCE RANGE MONITOR. (SRM)
- ▣—INTERMEDIATE RANGE MONITOR. (IRM)

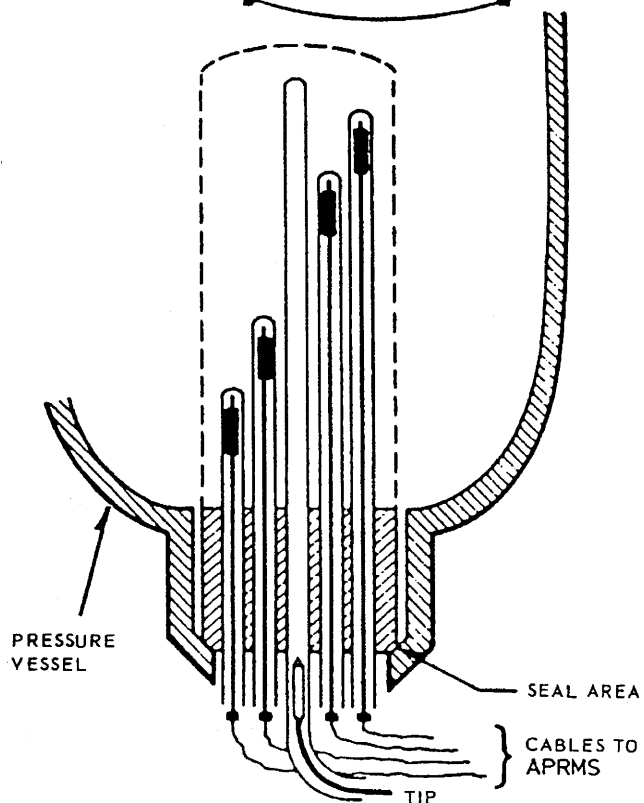
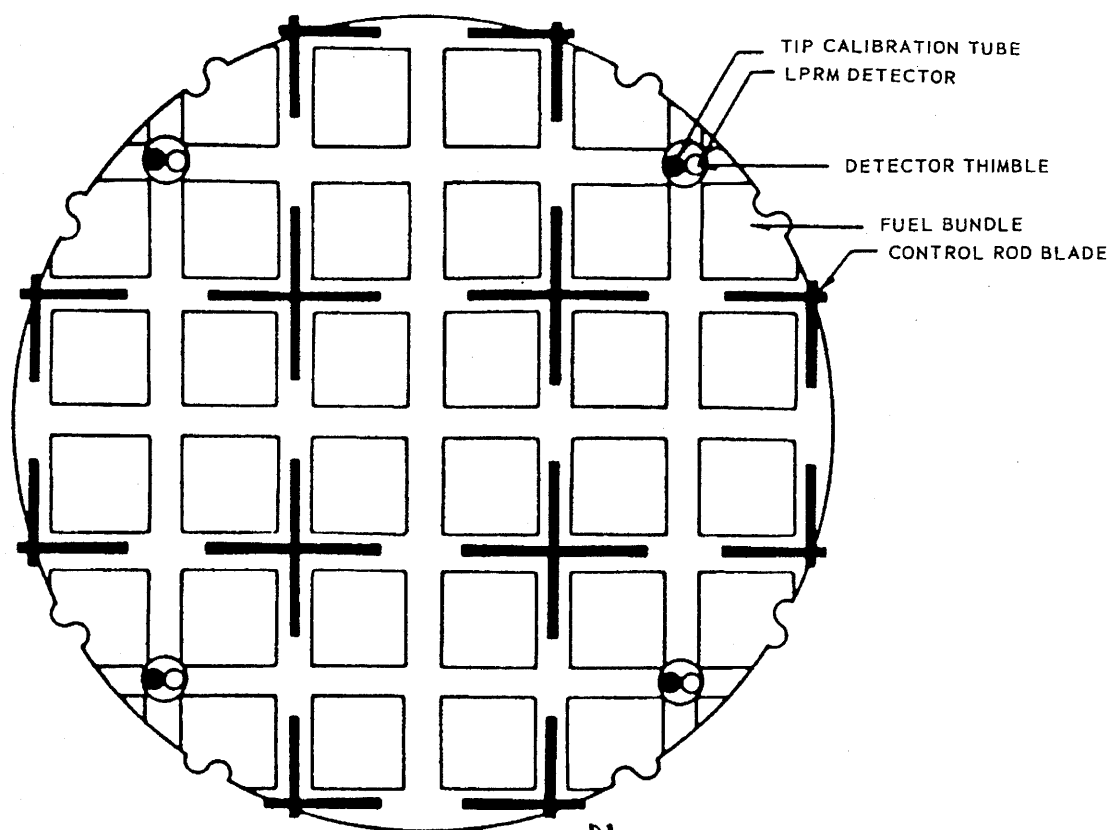
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## PERRY NUCLEAR POWER PLANT

## Neutron Monitoring System Arrangement

Figure 7.6-5 (Sheet 8 of 8)



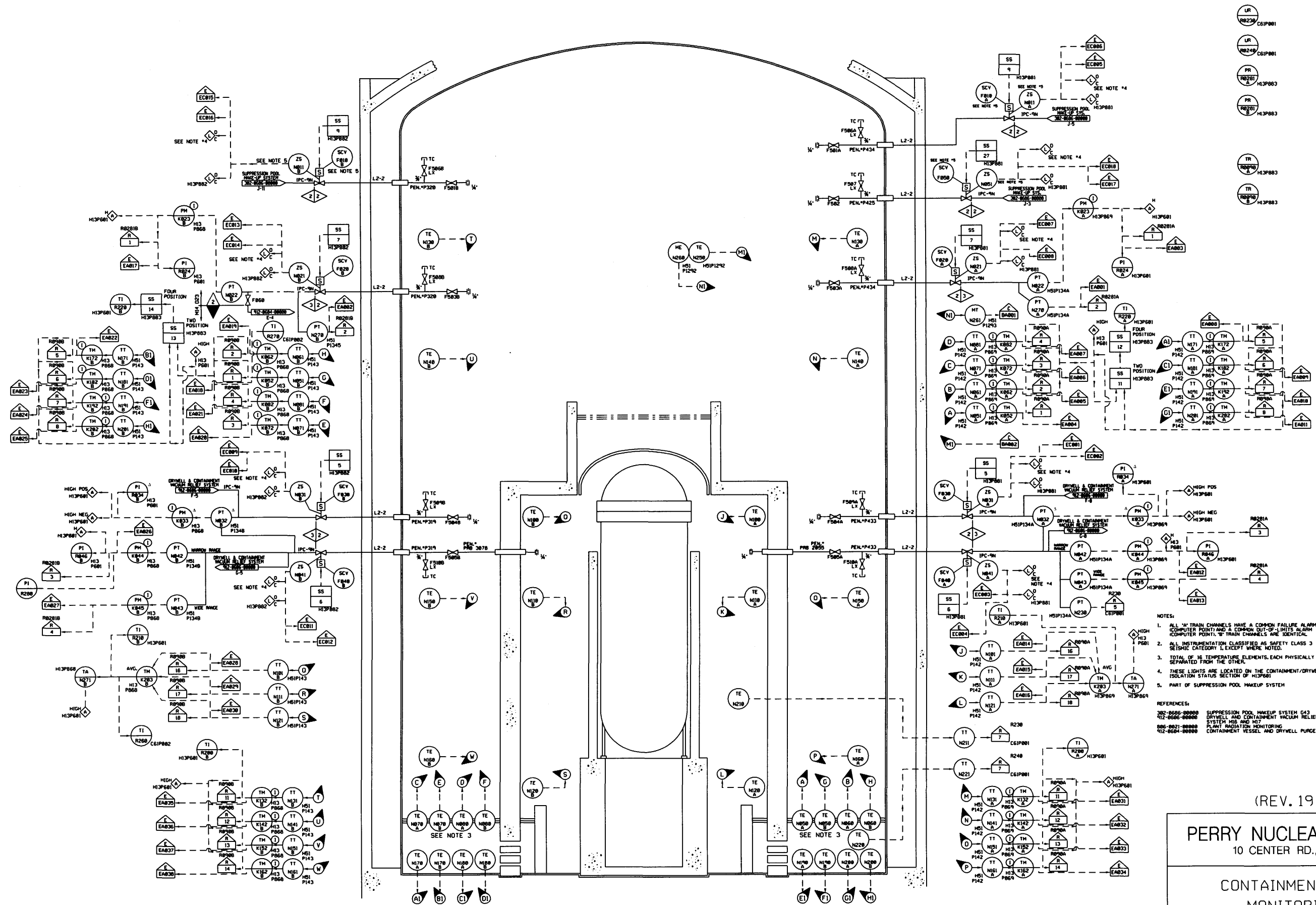
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**PERRY NUCLEAR POWER PLANT**

Power Range Monitor  
Director Assembly Location

Figure 7.6-6



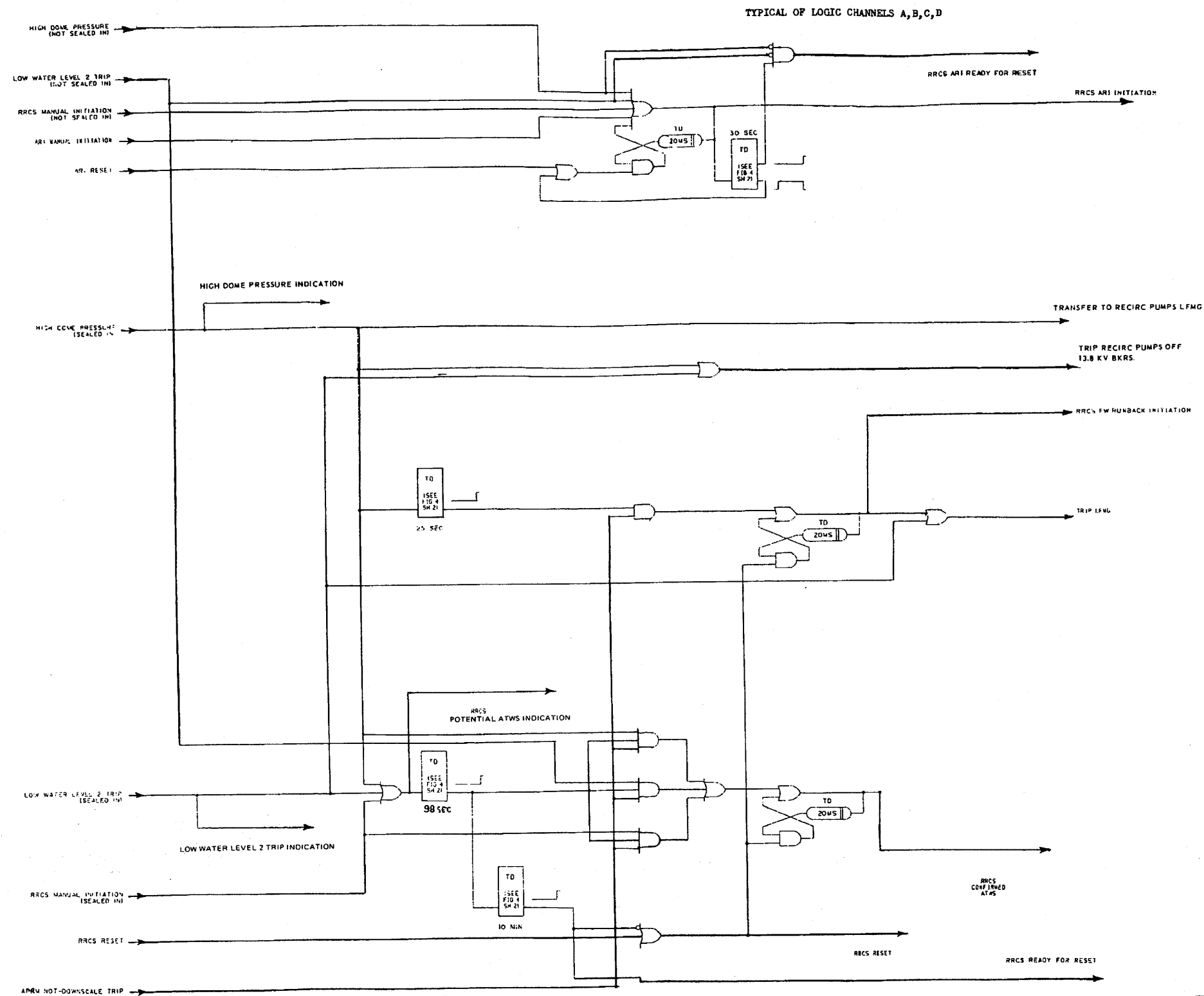
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**PERRY NUCLEAR POWER PLANT**  
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**CONTAINMENT ATMOSPHERE  
MONITORING SYSTEM**

**FIGURE 7.6-7**

(DWG. D-302-0881-00000)



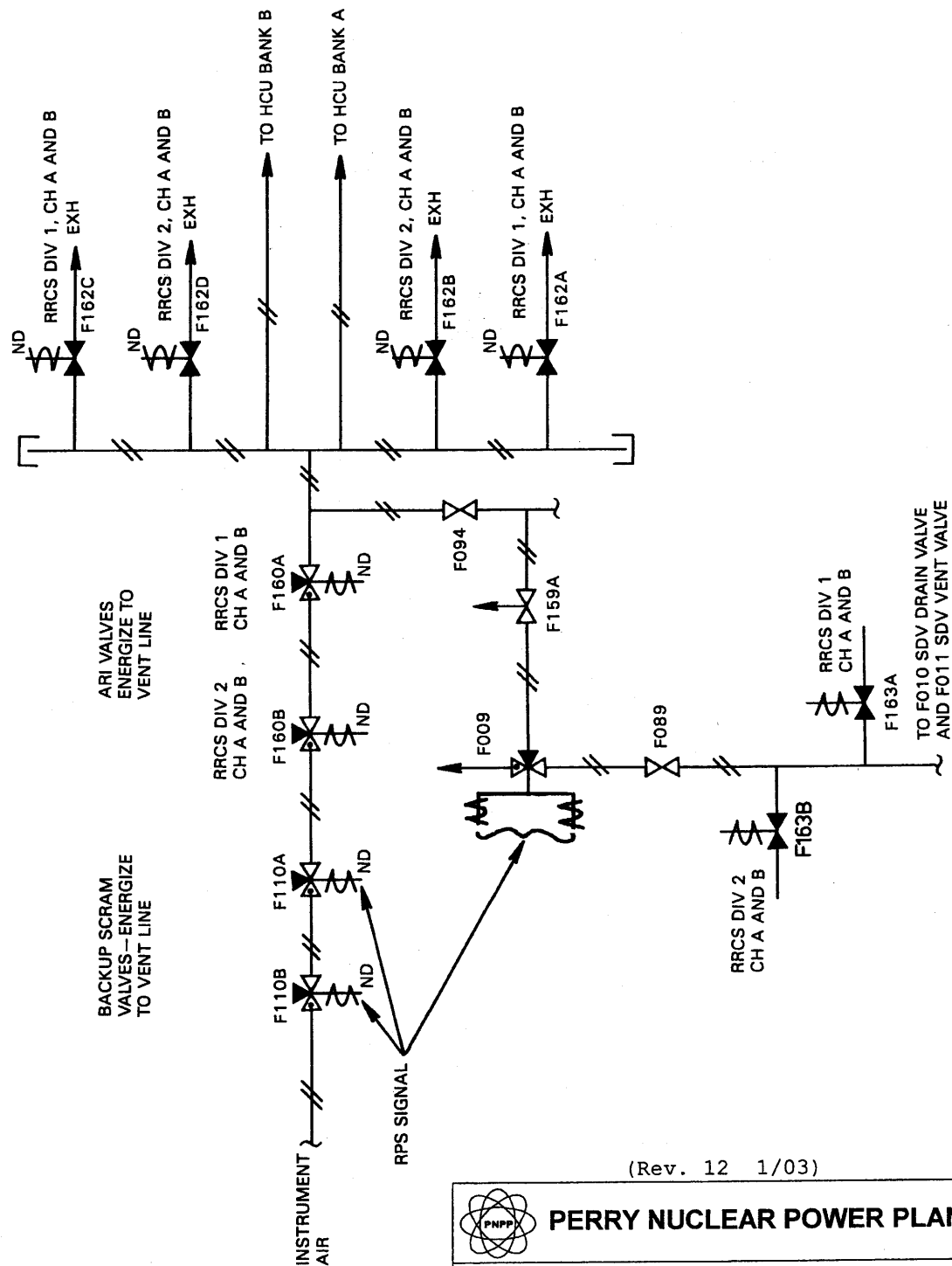
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**PERRY NUCLEAR POWER PLANT**

RRCS Initiation Logic

Figure 7.6-8



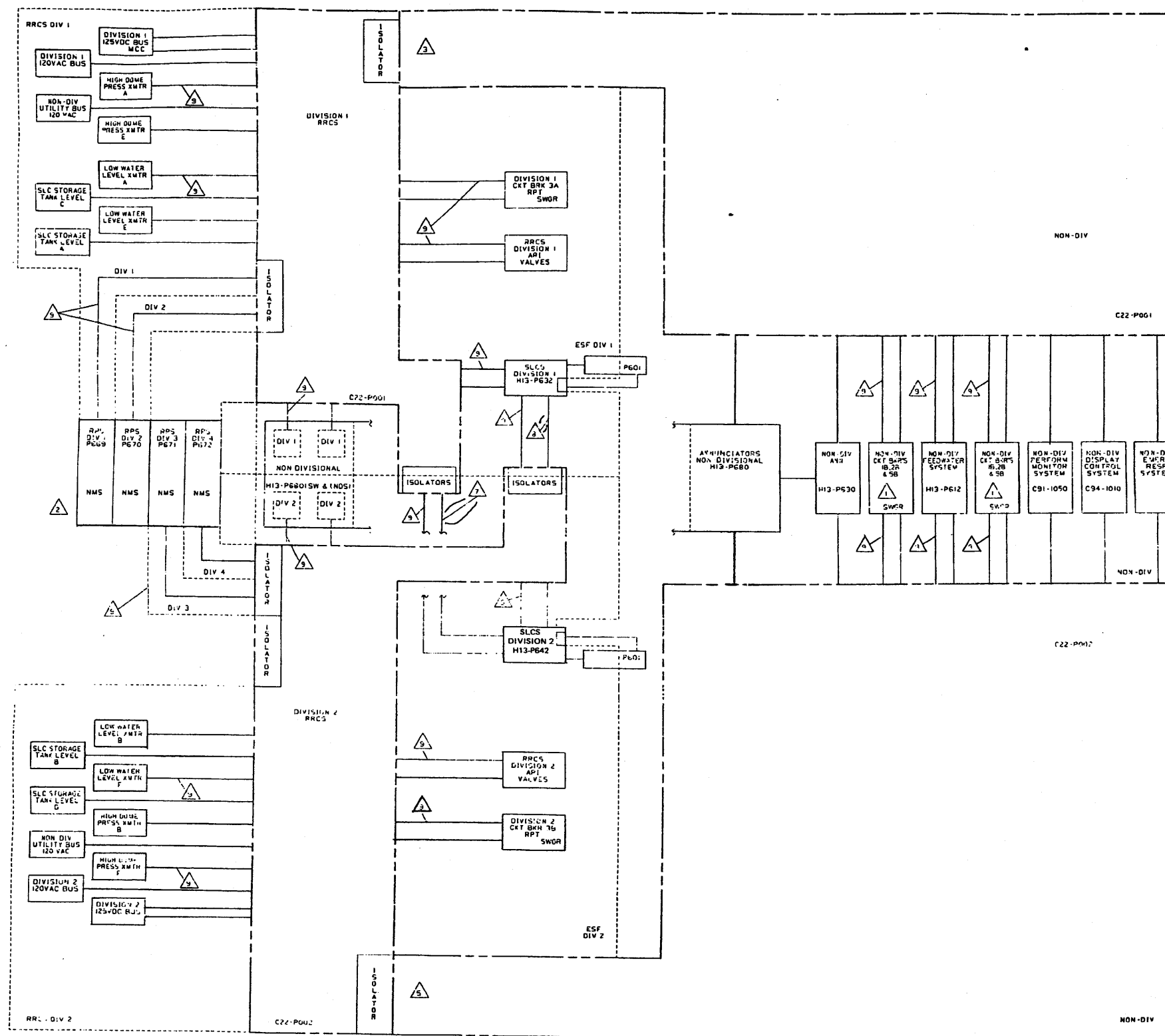
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## PERRY NUCLEAR POWER PLANT

Perry RRCS ARI Valves

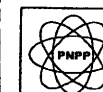
Figure 7.6-9



NOTES APPLY TO THIS SHEET ONLY

- ⚠ DIVISION 1 OR DIVISION 2 RRCS SIGNALS WILL TRIP BREAKERS
- ⚠ RRCS APRM SIGNALS FOR EACH DIV ARE SEPARATE FROM RPS, ALL WIRING SHALL BE SEPARATED
- ⚠ ALL SIGNALS FROM DIVISION 1 TO NON-DIVISIONAL ARE THROUGH OPTICAL ISOLATORS LOCATED AT RRCS PANEL
- ⚠ ALL SIGNALS FROM DIVISION 2 TO NON-DIVISIONAL ARE THROUGH OPTICAL ISOLATORS LOCATED AT RRCS PANEL
- ⚠ RRCS SIGNALS FROM DIVISION 2 TO DIVISION 4 RPT ARE THROUGH OPTICAL ISOLATORS LOCATED AT RRCS PANEL
- ⚠ RRCS SIGNALS FROM DIVISION 1 TO SLC DIVISION 2 H13-P642 ARE THROUGH OPTICAL ISOLATORS LOCATED IN DIV 1 RRCS PANEL
- ⚠ RRCS SIGNALS FROM DIVISION 2 TO SLC DIVISION 1 H13-P632 ARE THROUGH OPTICAL ISOLATORS LOCATED IN DIV 2 RRCS PANEL
- ⚠ WIRING SHALL BE INSTALLED IN GROUNDED METALLIC CONDUIT, ALL TERMINATIONS AT RRCS PANEL(S) SHALL BE TO THE CHANNEL "B" LOGIC SECTION

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**PERRY NUCLEAR POWER PLANT**

RRCS Separation Block Diagram

Figure 7.6-10

TABLE 1

TIME DEPENDENT INTERMEDIATE VARIABLES		
SYM.	DESCRIPTION	DEFINITION
T	INTERNALLY GENERATED TIME REFERENCE FUNCTION	
TIC	INSERT CYCLE ACTIVE	
TII	INSERT PERIOD OF INSERT CYCLE	
TIS	SETTLE PERIOD OF INSERT CYCLE	
-	ROD INSERT CONTROL	
-	SETTLE CONTROL	
TOC	WITHDRAW CYCLE ACTIVE	
TOI	INSERT PERIOD OF WITHDRAW CYCLE	
TOO	WITHDRAW PERIOD OF WITHDRAW CYCLE	
TOS	SETTLE 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 ROD INSERT CONTROL	I21	0.42	—	SEC
	ROD INSERT CONTROL	I22-I21	2.98	2.5-3.1	SEC
	SWITCHING OVERLAP	I22-I31	0.10	0.0-1.5	SEC
	SETTLE CONTROL	I32-I22	5.30	4.2-6.3	SEC
WITHDRAW CYCLE	TIME DELAY TO UNLATCH CONTROL	I51	0.42	—	SEC
	UNLATCH CONTROL	I52-I51	0.40	0.3-0.9	SEC
	INTERVAL BETWEEN UNLATCH AND SETTLE CONTROL	I51-I55	0.10	0.0-0.15	SEC
	ROD WITHDRAWAL CONTROL	I52-I51	1.99	1.3-1.7	SEC
	SWITCH OVERLAP FROM WITHDRAWAL TO SETTLE CONTROL	I52-I71	0.10	0.0-1.5	SEC
	SETTLE CONTROL	I72-I62	6.00	4.2-6.3	SEC

TABLE 2

SYSTEM PARAMETER VALUES				
	PARAMETER	VALUE	TOLERANCE	UNITS
INSERT CYCLE	I11	0.36	± 0.02	SEC.
	I12	9.6		
	I21	0.42		
	I22	3.32		
	I31	3.22		
WITHDRAW CYCLE	I32	8.62	± 0.02	SEC.
	I41	0.36	± 0.02	SEC.
	I42	9.16		
	I51	0.42		
	I52	1.02		
	I61	1.12		
	I62	2.62		
	I71	2.52		
	I72	8.62	± 0.02	SEC.

## INSERT CYCLE

I21-I11 = DELAY UNTIL ROD MOTION BEGINS

I22-I21 = DRIVE IN TIME

I32-I22 = SETTLE TIME

I10 &lt; I22, t = TIME WHEN CONTINUOUS INSERT CAN BE REQUESTED

I31 &lt; I22, t = CYCLE STOP POINT FOR CONTINUOUS INSERT

## WITHDRAW CYCLE

I51-I41 = DELAY UNTIL ROD MOTION BEGINS

I52-I51 = DRIVE IN TIME (UNLATCH)

I51-I52 = DELAY AFTER UNLATCH

I52-I51 = DRIVE OUT TIME

I72-I62 = SETTLE TIME

I10 &lt; I52, t = TIME WHEN CONTINUOUS WITHDRAW CAN BE REQUESTED

I71 &lt; I52, t = CYCLE STOP POINT FOR CONTINUOUS WITHDRAW

TABLE 4

SYMBOL	DESCRIPTION
C0	ROD BEING CONTINUOUSLY WITHDRAWN
F1	ALL RODS FULLY IN
G0	ROD WITHDRAWAL IS REQUESTED
G1	ROD INSERT REQUESTED
G2	NOTCH OVERRIDE ROD WITHDRAWAL REQUESTED
G3	CONTINUOUS ROD INSERT REQUESTED
H0	SCRAM DISCHARGE VOLUME HIGH LEVEL TRIP "BYPASS" REQUESTED
H1	SCRAM DISCHARGE VOLUME HI WATER LEVEL
I0	ANY ROD SELECTED
I0R	ROD WITHDRAWAL IS REQUESTED
I1R	ROD INSERT REQUESTED
I1C	IN-CLOCK IS ACTIVE
I10	A ROD IS IN MOTION
K0	REFUEL ROD SELECT IS UNINHIBITED
K1	REFUEL PLATFORM CONTROL PERMISSIVE
M0	REACTOR SYSTEM MODE SWITCH IN START-UP
M1	REACTOR SYSTEM MODE SWITCH IN "REFUEL"
M2	REACTOR SYSTEM MODE SWITCH IN "RUN"
M3	NMS DOWNSCALE PRM EQUIPMENT IS IN THE ROD WITHDRAWAL PERMITTED STATE
M4	NMS UPSCALE PRM EQUIPMENT IS IN THE ROD WITHDRAWAL PERMITTED STATE
M5	NMS STARTUP RANGE EQUIPMENT IS IN THE ROD WITHDRAWAL PERMITTED STATE
M6	ROD MOTION PERMISSIVE
Op	RPM IS OPERABLE
PC	REFUEL PLATFORM OVER CORE AREA
P0	REFUEL PLATFORM GRAPPLE LOADED
R0	REQUESTED ROD IDENT
S0	ROD IS BEING DRIVEN
TIC	INSERT CYCLE ACTIVE
TII	INSERT PERIOD OF INSERT CYCLE
TIS	SETTLE PERIOD OF INSERT CYCLE
TOC	WITHDRAW CYCLE ACTIVE
TOI	INSERT PERIOD OF WITHDRAW CYCLE
TOO	WITHDRAW PERIOD OF WITHDRAW CYCLE
TOS	SETTLE PERIOD OF WITHDRAW CYCLE

## LEGEND:

- = SWITCHGEAR DEVICE FUNCTION NUMBER ANSI SPEC C37.2
- RMS = REMOTE MANUAL SWITCH
- RPI = ROD POSITION INFORMATION SYSTEM
- NMS = NEUTRON MONITORING SYSTEM
- PRM = POWER RANGE MONITOR

△ = PMS INPUT (PERFORMANCE MONITORING SYSTEM)

LPSP = LOW POWER SET POINT

HPSP = HIGH POWER SET POINT

RPC = ROD PATTERN CONTROLLER

△ = EMERGENCY RESPONSE INFORMATION SYSTEM

## NOTES

1. 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 "FULL-OUT" RESPECTIVELY. TWO POSITIONS ARE CALLED "FULL-OUT" AND "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, ..., 40) AND ANY ODD SWITCH WILL INDICATE "000".

2. WIRING FROM HCU (SCRAM VALVES AND ACCUMULATOR) TO CONTROL ROOM FOR ANNUNCIATION SHALL BE IN SERIES CONNECTION FOR ALL HCU'S.

3. WIRING FROM HCU (ROD SCRAM TEST SWITCH IN TEST POSITION) SHALL BE IN SERIES CONNECTION FOR ALL HCU'S.

4. 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 ANNUNCIATOR TROUBLE WILL CLEAR THE INDIVIDUAL INDICATORS.

5. SEE TABLE 4 FOR DEFINITIONS OF VARIABLES APPEARING ON THIS FCD.

△ A LOGICAL "1" INDICATES A FAILED COMPARISON

7. GROUP 1 THRU 10 REFERS TO ROD ASSIGNMENTS WHICH ARE PRE-DETERMINED AND FIXED.

8. TERMS F<sub>1</sub> = FULL IN  
F<sub>2</sub> = FULL OUT  
N<sub>1</sub>, N<sub>2</sub>, N<sub>3</sub>, N<sub>4</sub>, N<sub>5</sub> = 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 SAME ROD MODE (REF. 15)

## REFERENCE DOCUMENTS:

	MPL ITEM NUMBERS	DWG. NR.
1. CONTROL ROD DRIVE HYDRAULIC SYS. PMS	—	—
2. NEUTRON MONITORING SYS. IED	—	—
3. REMOVED	—	—
4. REMOVED	—	—
5. CONTROL ROD DRIVE HYDRAULIC SYS. DESIGN SPEC.	—	—
6. PERFORMANCE MONITORING SYS. INPUT/OUTPUT REQUIREMENTS	—	—
7. POSITION INDICATOR PROBE CONNECTION DIAG.	—	—
8. ROD CONTROL AND INFORMATION SYS. ELEM. DIAG.	—	—
9. NEUTRON MONITORING SYS. FCD	—	—
10. REACTOR PROTECTION SYS. IED	—	—
11. DISPLAY CONTROL SYSTEM I/O LISTING	—	—
12. MOV. AND MCC STANDARDS	—	—
13. CRD ELEMENTARY	—	—
14. RPS ELEMENTARY	—	—
15. REACTIVITY CONTROL	—	—
16. ERIS ELEMENTARY DIAGRAM	—	—

## SYMBOL DEFINITIONS:

INVERTER =  $\left[ \begin{array}{c} a \\ \text{---} \end{array} \right] \rightarrow Y = [Y = \bar{a}] = [Y = \text{NOT } a]$

AND GATE =  $\left[ \begin{array}{cc} a & b \\ \text{---} \end{array} \right] \rightarrow Y = [Y = a \cdot b] = [Y = a \text{ AND } b]$

OR GATE =  $\left[ \begin{array}{cc} a & b \\ \text{---} \end{array} \right] \rightarrow Y = [Y = a + b] = [Y = a \text{ OR } b]$

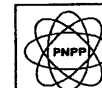
NAND GATE =  $\left[ \begin{array}{cc} a & b \\ \text{---} \end{array} \right] \rightarrow Y = [Y = \bar{a} \cdot \bar{b}] = [Y = \text{NOT } a \text{ AND NOT } b]$

NOR GATE =  $\left[ \begin{array}{cc} a & b \\ \text{---} \end{array} \right] \rightarrow Y = [Y = \bar{a} + \bar{b}] = [Y = \text{NOT } a \text{ OR NOT } b]$

EXCLUSIVE OR GATE =  $\left[ \begin{array}{cc} a & b \\ \text{---} \end{array} \right] \rightarrow Y = [Y = a \cdot \bar{b} + \bar{a} \cdot b] = [Y = a \text{ AND NOT } b \text{ OR } b \text{ AND NOT } a]$

(Rev. 12 1/03)

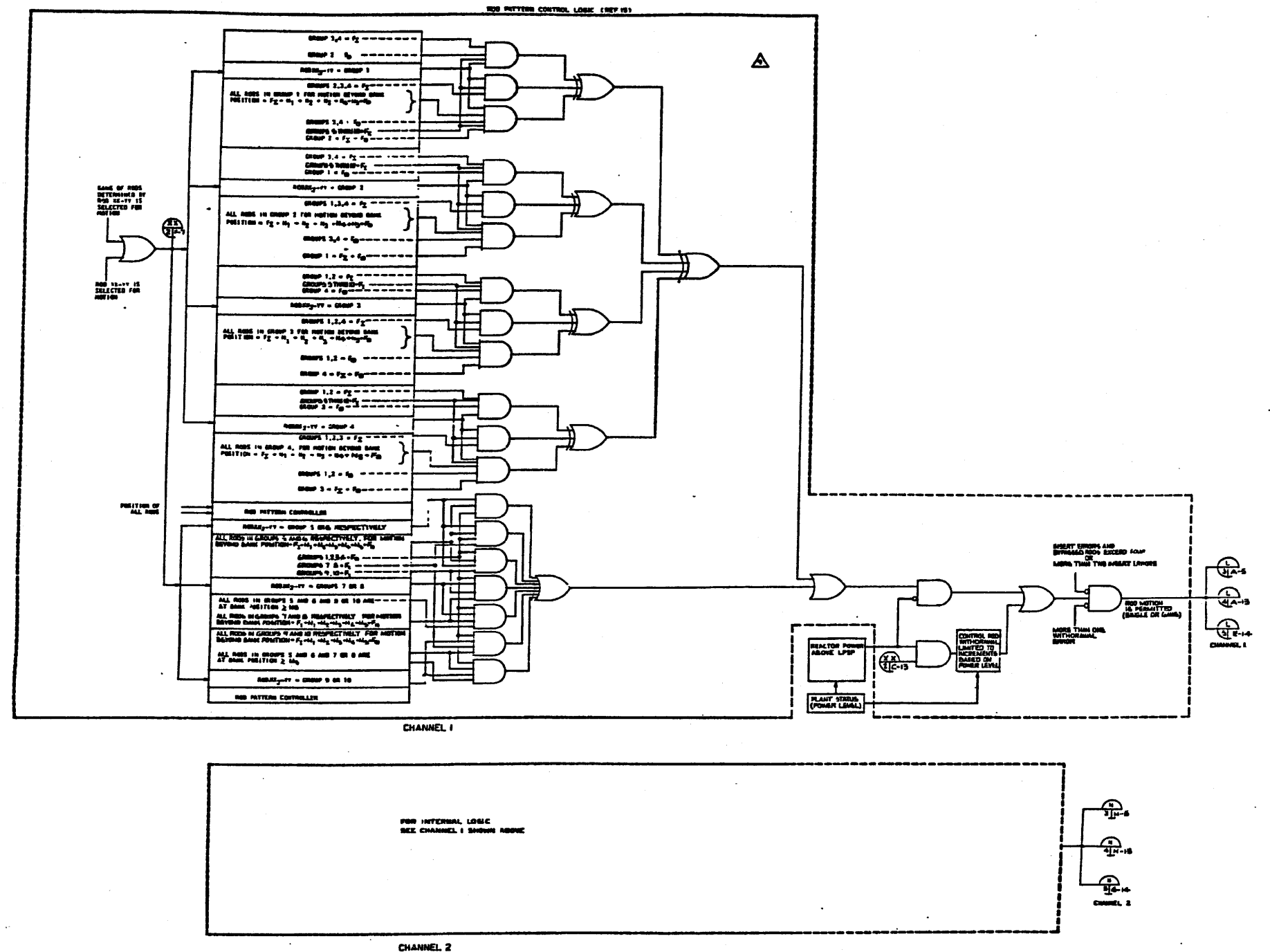
NUCLEAR SAFETY RELATED



PERRY NUCLEAR POWER PLANT

Control Rod Drive  
Hydraulic SystemFigure 7.7-1 (Sheet 1 of 7)  
[Dwg. D-808-305(1)]





NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

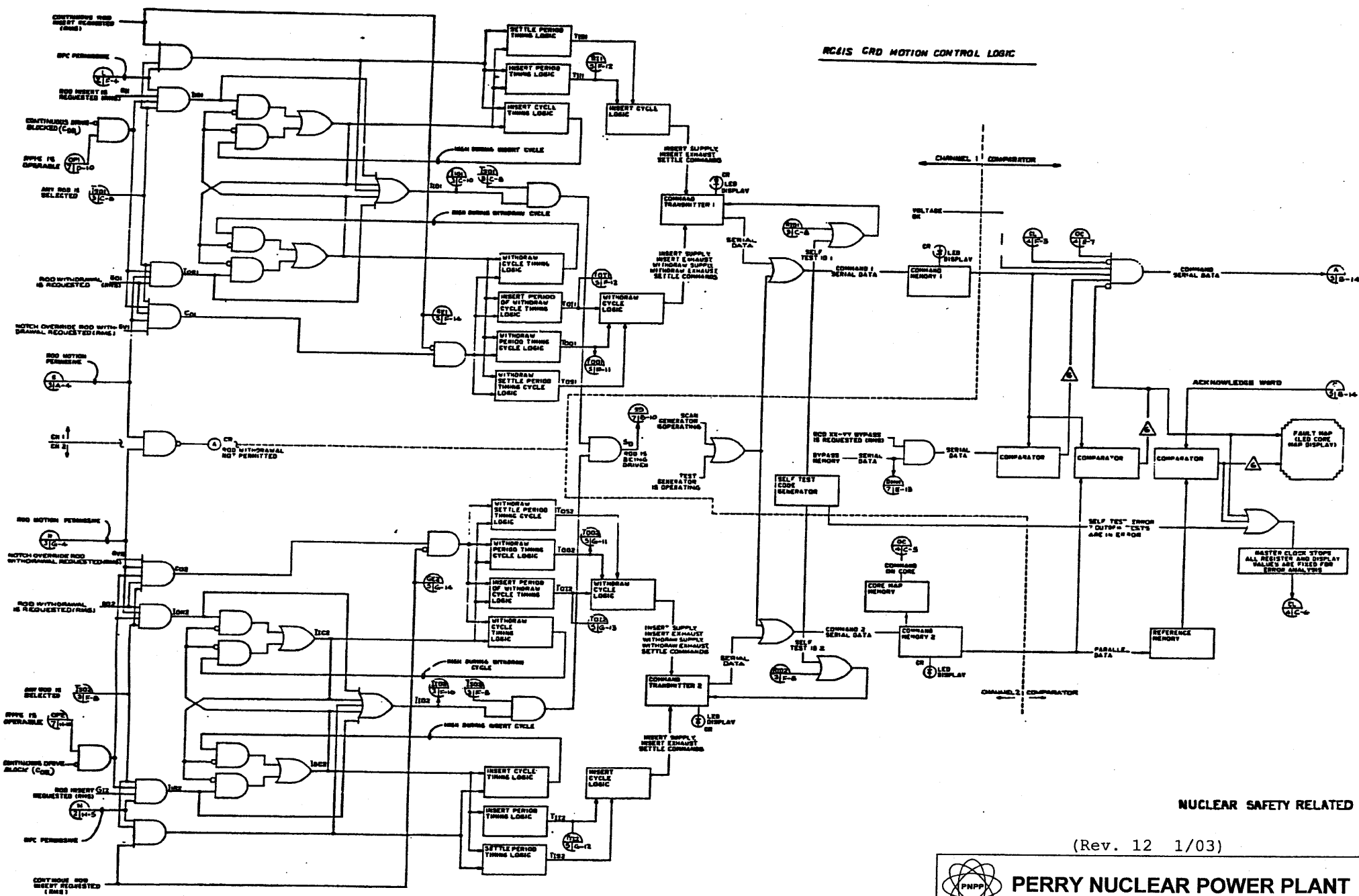


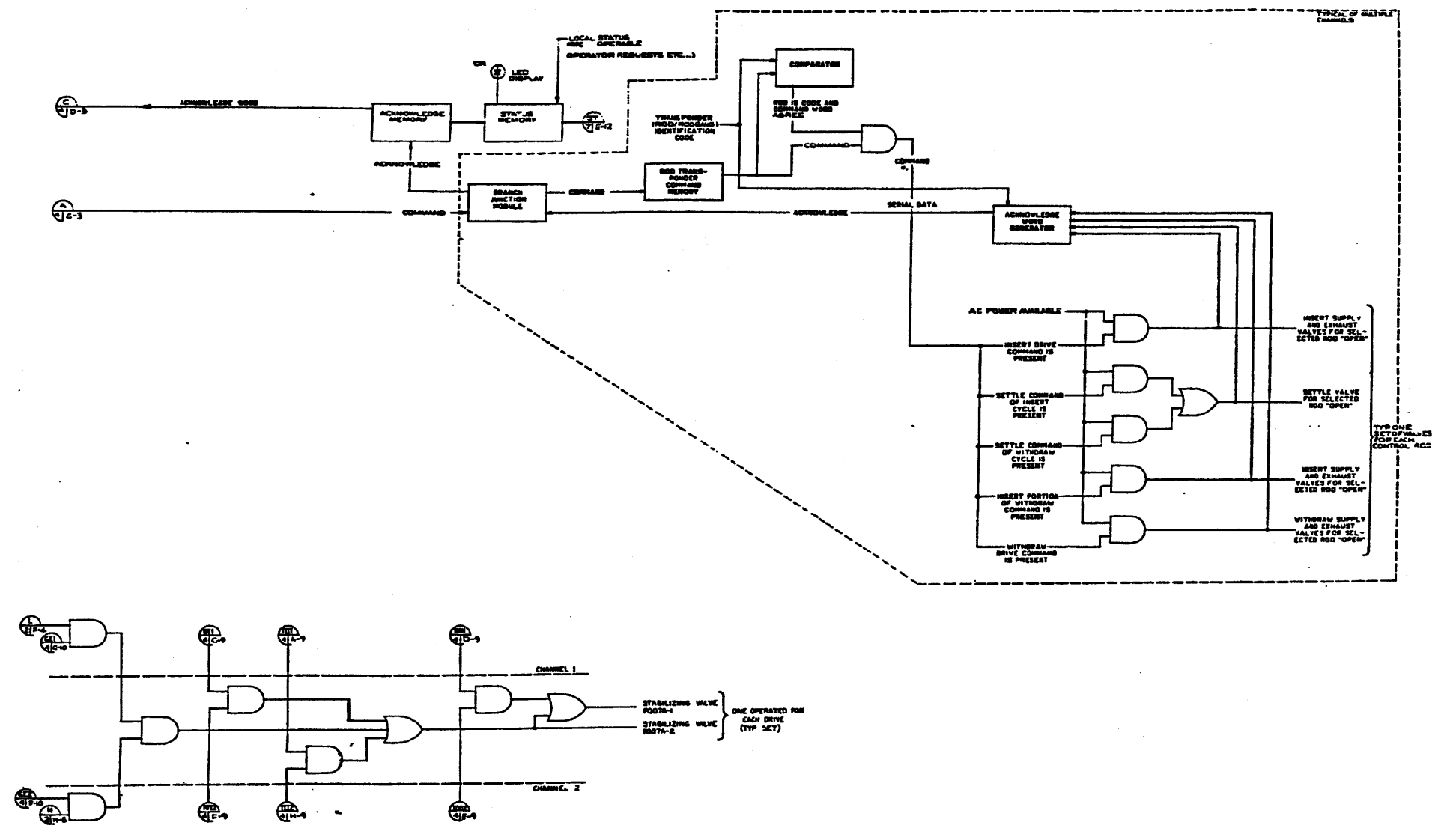
PERRY NUCLEAR POWER PLANT

Control Rod Drive  
Hydraulic System

Figure 7.7-1 (Sheet 2 of 7)  
[Dwg. D-808-305(2)]







NUCLEAR SAFETY RELATED

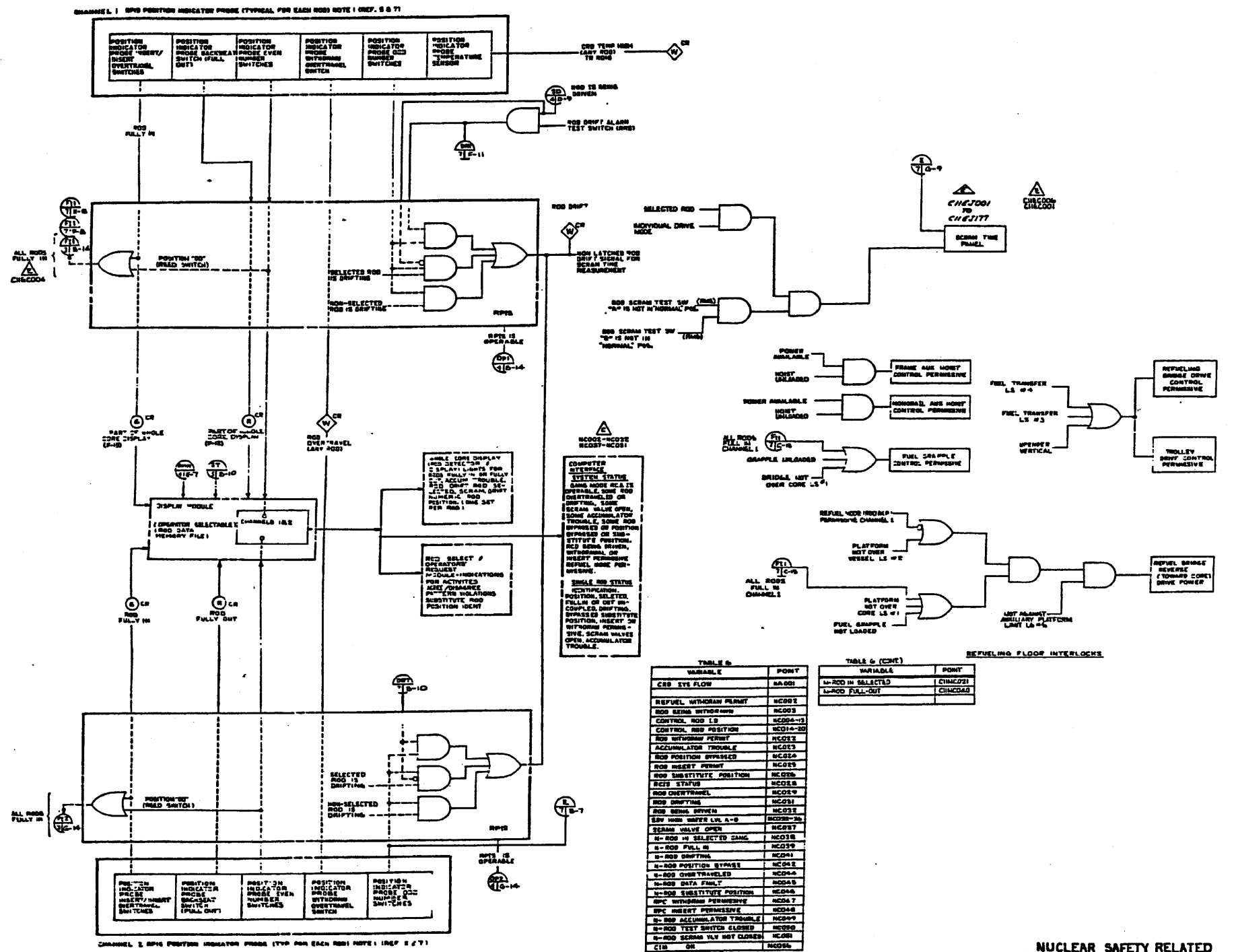
(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

Control Rod Drive  
Hydraulic System

Figure 7.7-1 (Sheet 5 of 7)  
[Dwg. D-808-305(5)]





NUCLEAR SAFETY RELATED

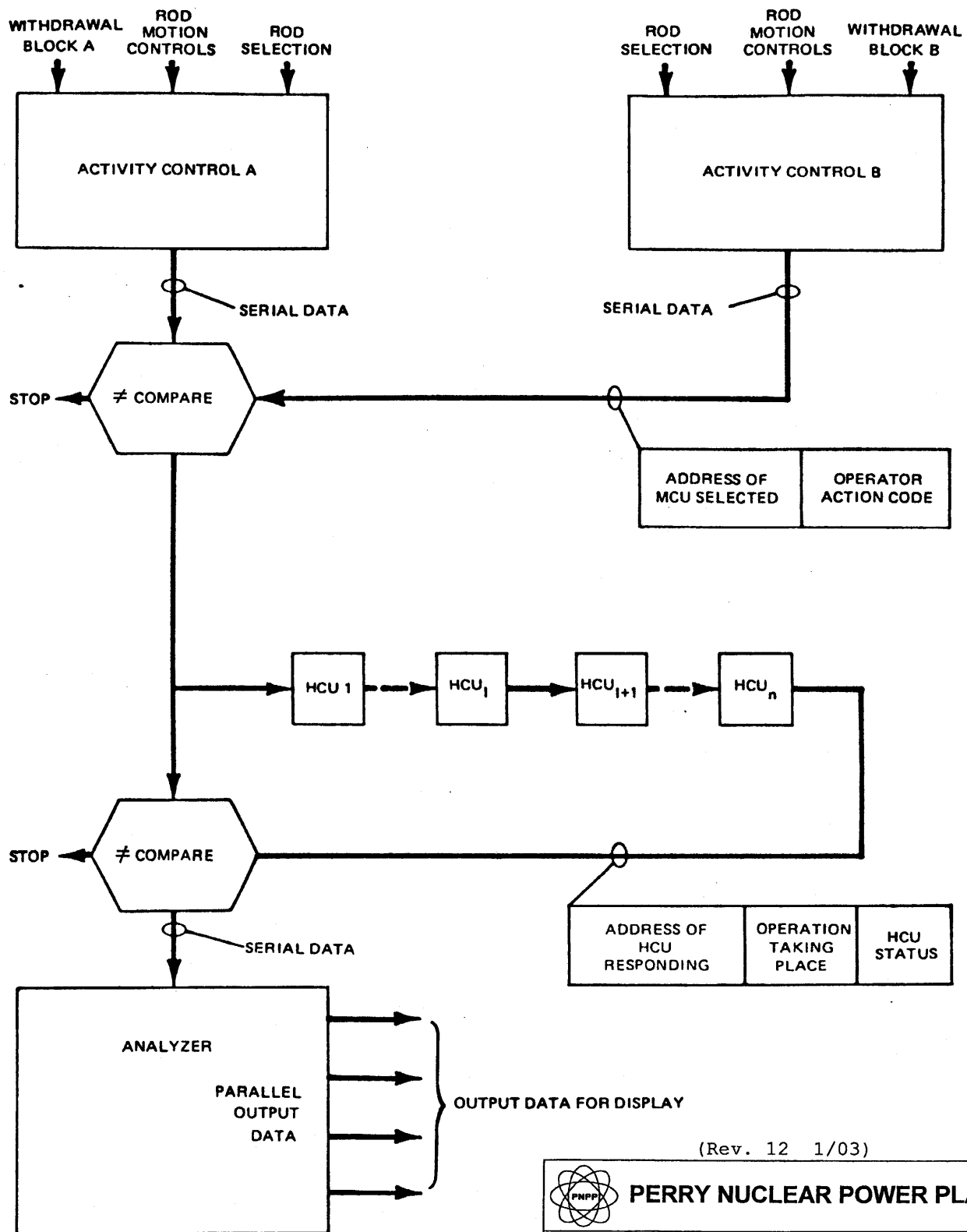
(Rev. 12 1/03)

## PERRY NUCLEAR POWER PLANT

### Control Rod Drive Hydraulic System

Figure 7.7-1 (Sheet 7 of 7)

[Dwg. D-808-305(7)]



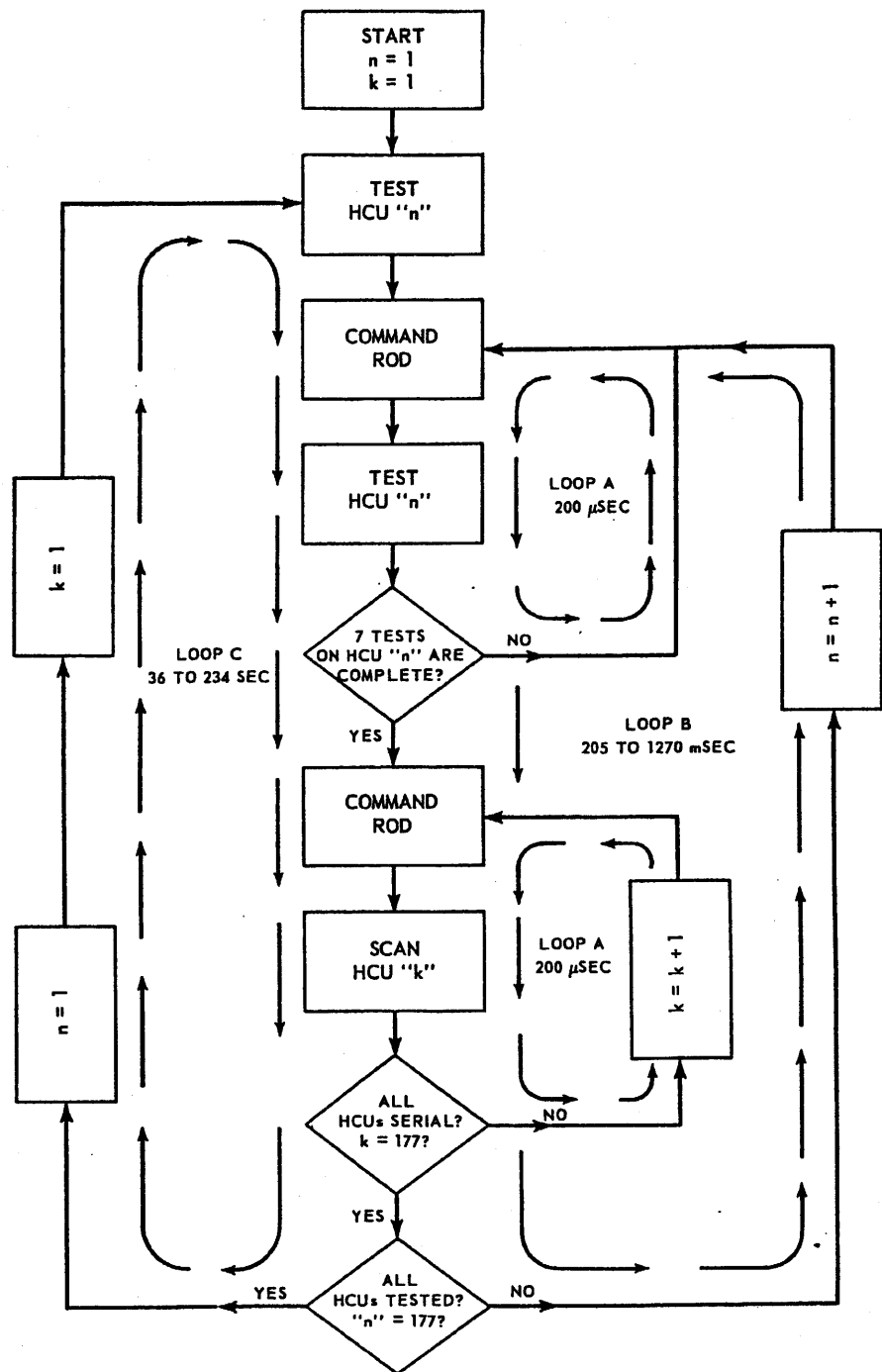
(Rev. 12 1/03)



**PERRY NUCLEAR POWER PLANT**

Rod Control and Information  
System Logic Diagram

Figure 7.7-2



(Rev. 12 1/03)

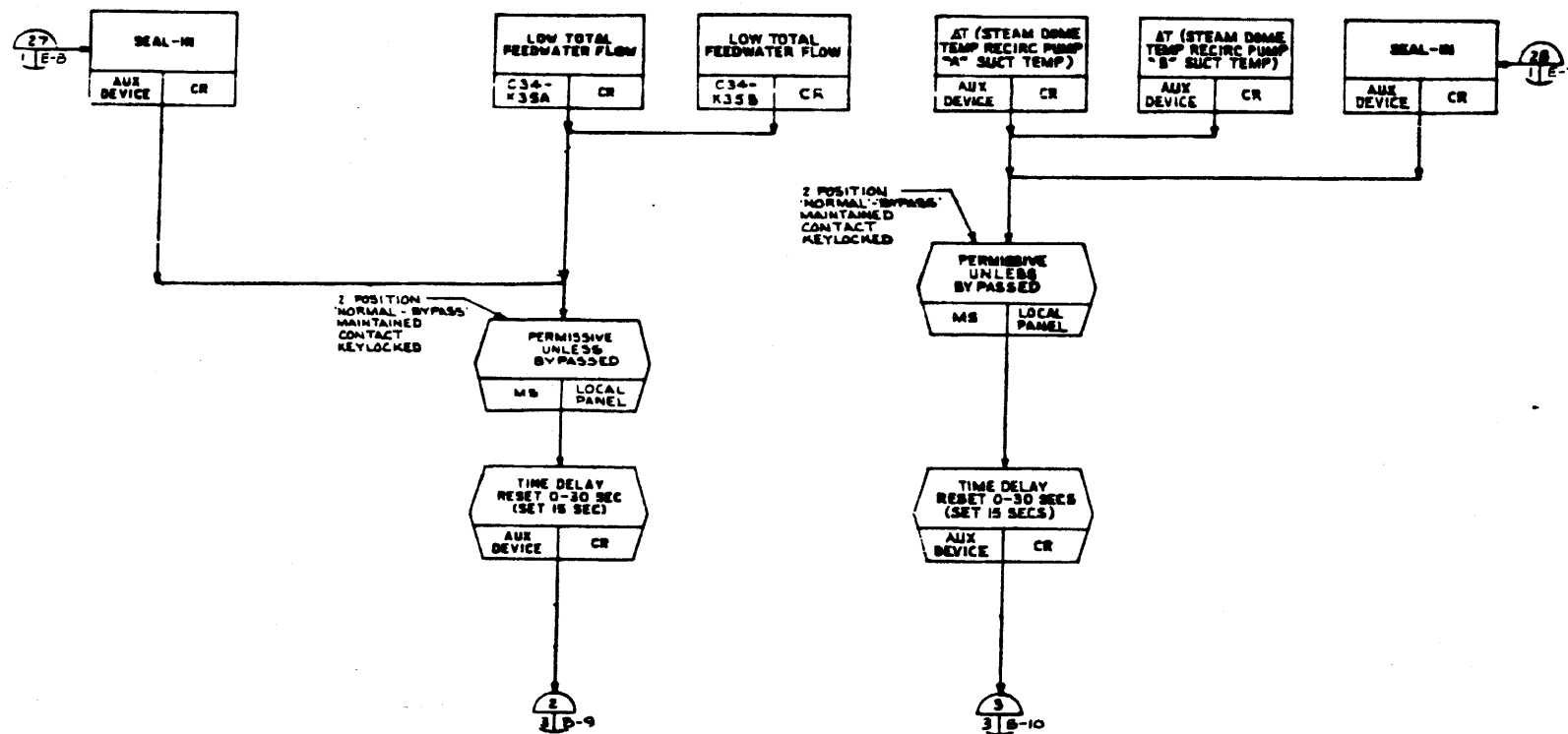


## PERRY NUCLEAR POWER PLANT

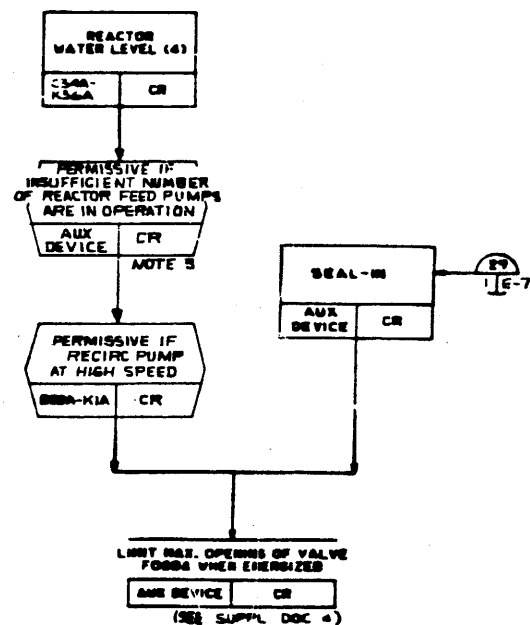
Rod Control and Information  
System Self-Test Provisions

Figure 7.7-3

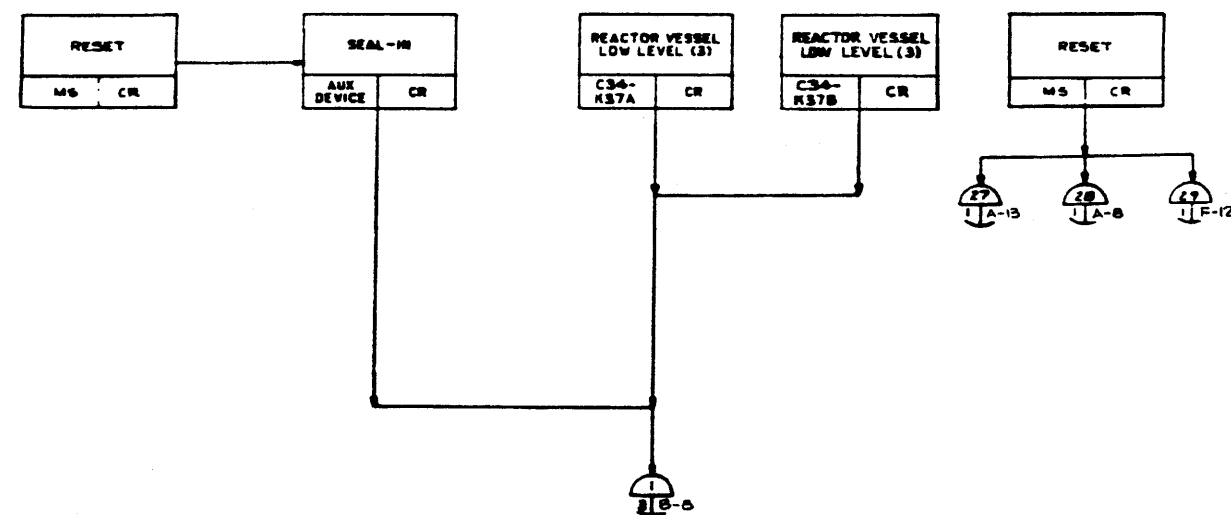




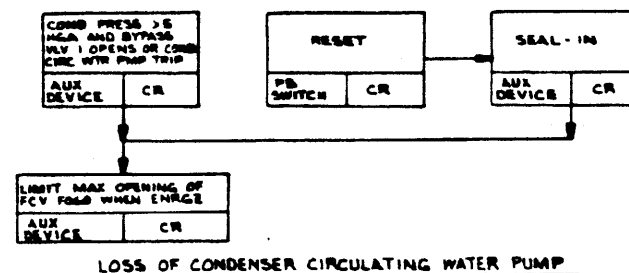
PUMP SPEED INTERLOCKS, PUMP SUCTION TO STEAM DOME  $\Delta T$ , LOW TOTAL FEEDWATER FLOW



INSUFFICIENT NUMBER OF REACTOR FEED PUMPS  
REACTOR WATER LEVEL AUX DEVICE



REACTOR VESSEL LOW LEVEL  
AUX DEVICE



LOSS OF CONDENSER CIRCULATING WATER PUMP

#### 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 N13-P834 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. C34-1040 | FEEDWATER CONTROL SYS IED            |           |
| 2. B33-1010 | REACTOR RECIRC SYS PSD               | D-302-601 |
| 3. C71-1010 | REACTOR PROTECTION SYS IED           |           |
| 4. B33-1030 | REACTOR RECIRC SYS IED               |           |
| 5. C22-1030 | REDUNDANT REACTIVITY CONTROL SYS FCD |           |
| 6. C95-1050 | ERIS ELEMENTARY DIAGRAM              | B-208-046 |

#### SUPPORTING DOCUMENTS:

1. Z0944756 LOGIC SYMBOLS
2. Z1A3580AU PURCHASE SPECIFICATION DATA SHEET
3. Z1A3580 PURCHASE SPECIFICATION

#### CODES AND STANDARDS

1. ANSI / IEEE C37.2 1979 ELECTRICAL POWER SYS DEVICE FUNCTION NUMBERS

#### LEGEND:

- 27 1E-8 MATCH NUMBER
- 1 1E-6 ZONE
- SEAL-IN SHEET NO.
- 27 1E-8 MATCH CIRCLE LAST USED 3'
- 1 1E-6 SWITCHGEAR DEVICE FUNCTION (SEE CODES AND STDS 1)
- CR - CONTROL ROOM
- LP - LOCAL PANEL
- SW - PUMP DRIVE MOTOR SWITCH GEAR
- MS - MANUAL SWITCH
- PS - PUSHBUTTON
- SOL - SOLENOID
- POS - POSITION
- ASD - AUTOMATIC SWITCHING DEVICE
- SUCT-SUCTION
- 1 1E-6 - EMERGENCY RESPONSE INFORMATION SYSTEM (SEE NOTE 5) TYP

(Rev. 12 1/03)

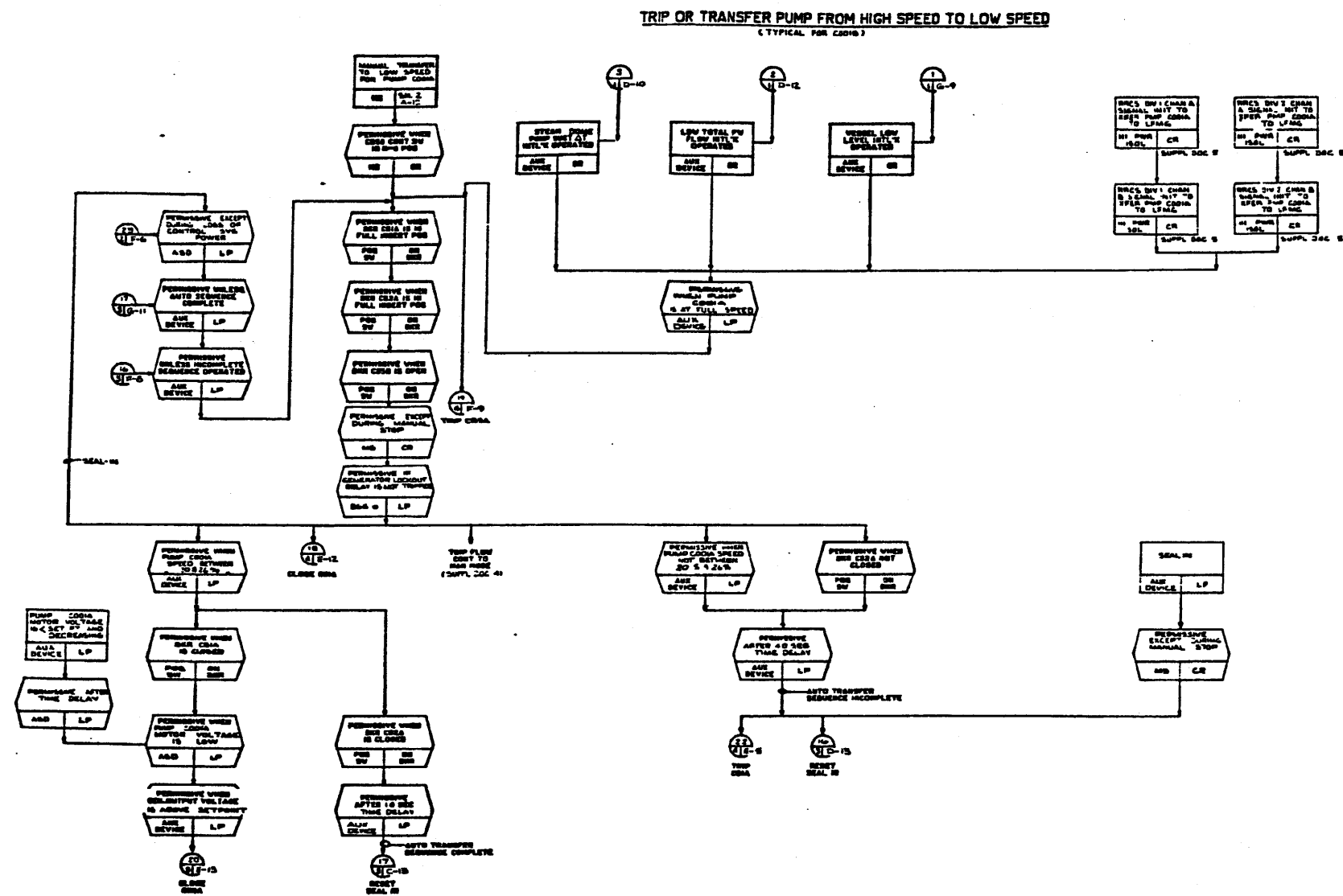
**PERRY NUCLEAR POWER PLANT**

Reactor Recirculation System

Figure 7.7-4 (Sheet 1 of 7)

[Dwg. D-808-304(1)]





(Rev. 12 1/03)



**PERRY NUCLEAR POWER PLANT**

Reactor Recirculation System

Figure 7.7-4 (Sheet 3 of 7)

[Dwg. D-808-304(3)]

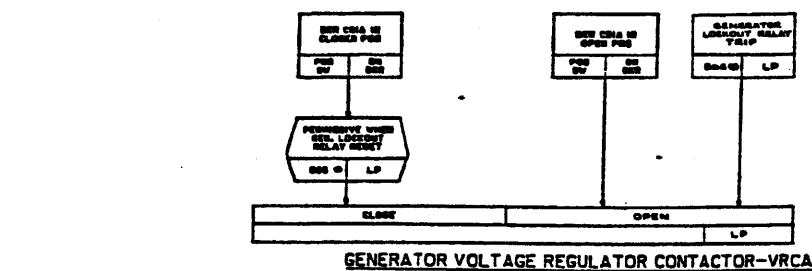
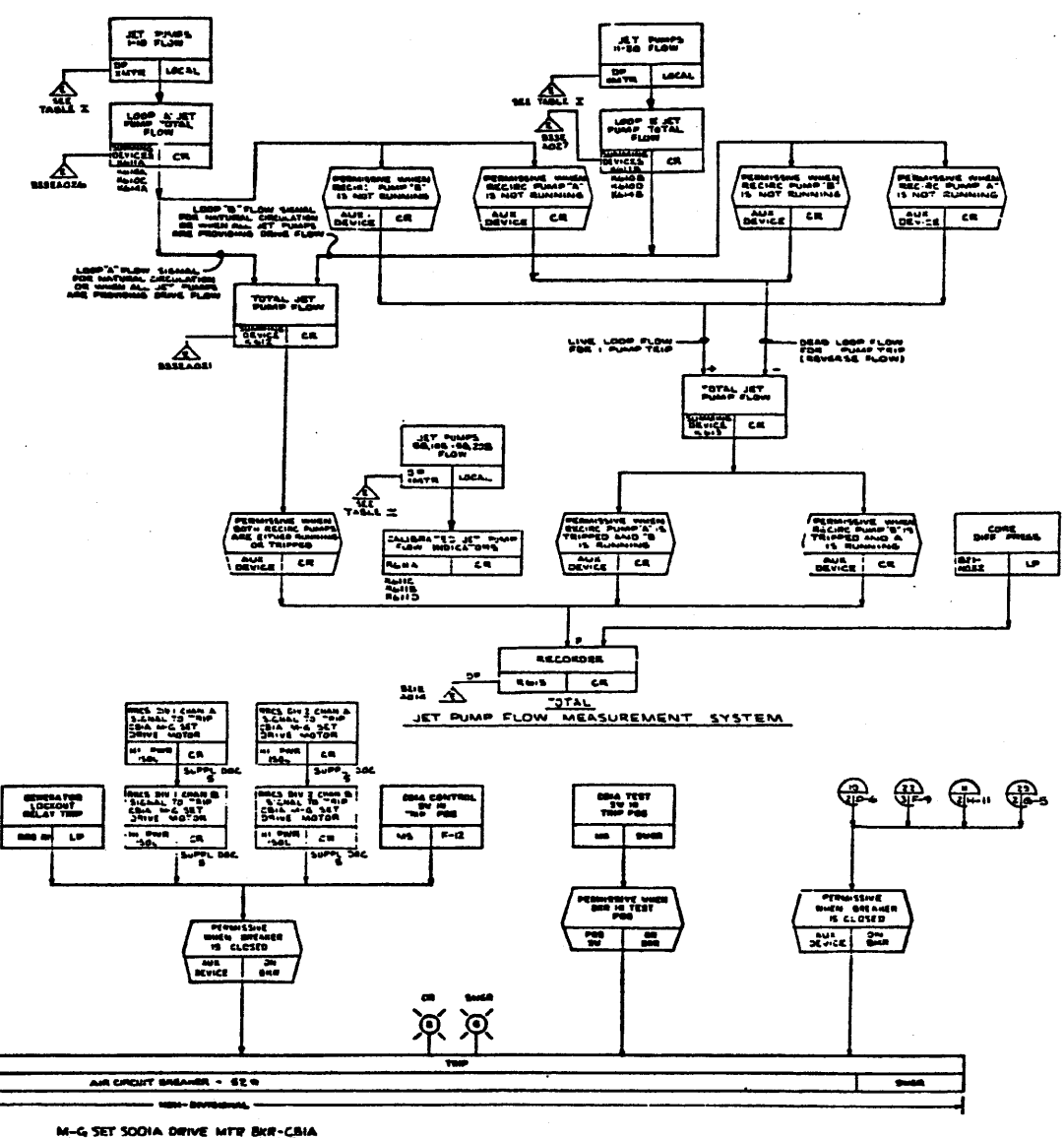
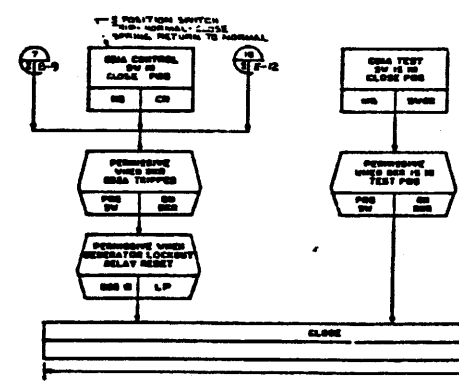
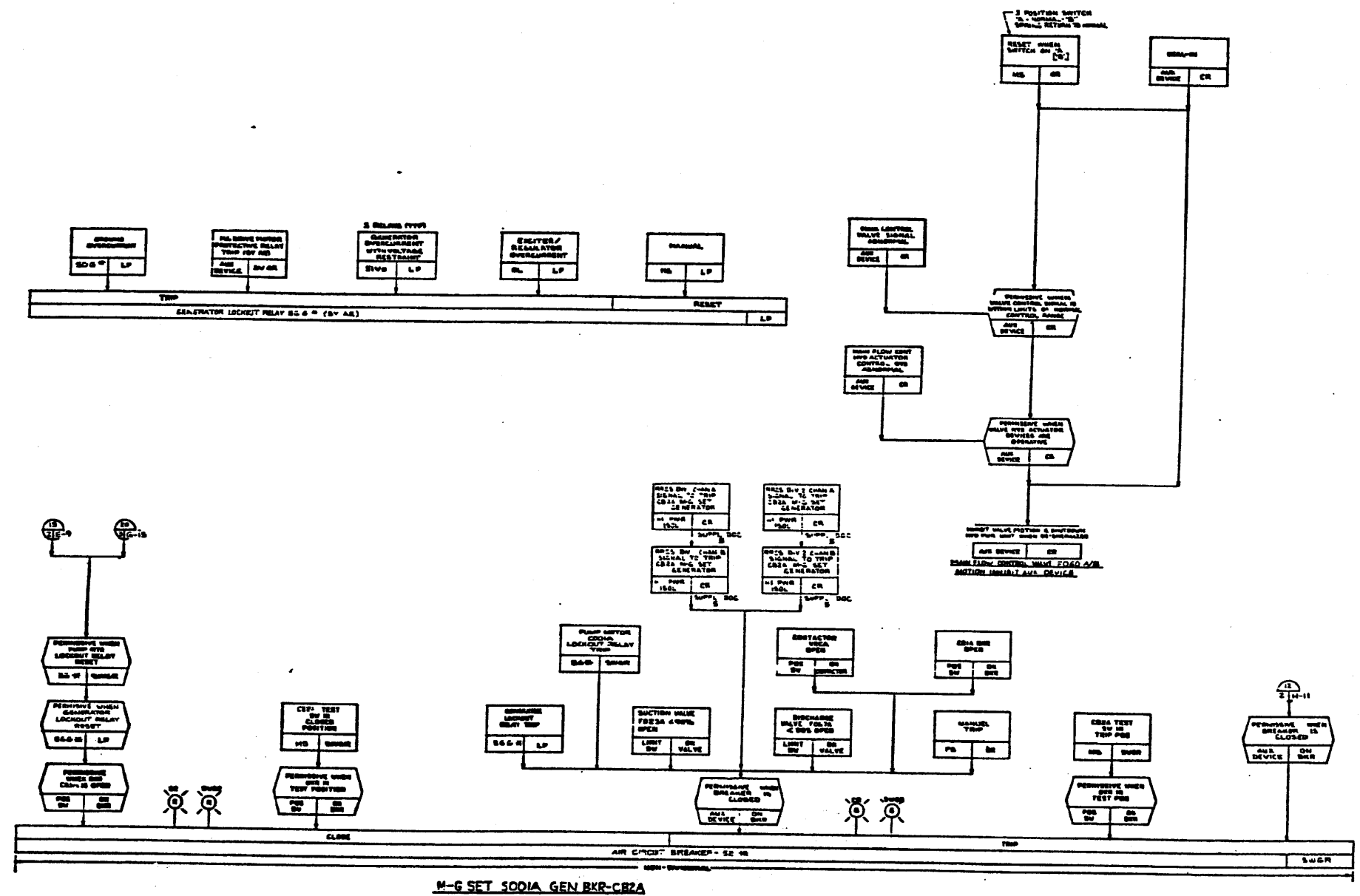


TABLE I

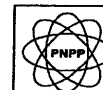
GEN SIGNALS - JET PUMP DIFFERENTIAL PRESSURE			
LOOP A		LOOP B	
JET PUMP	SVTR	GEN SIGNAL	JET PUMP
JPI	NO37A	B33EA032	JPI
JPI	NO37E	B33EA033	JPI
JPI	NO37J	B33EA034	JPI
JPI	NO37N	B33EA035	JPI
JPI	NO37T	B33EA036	JPI
JPI	NO37C	B33EA037	JPI
JPI	NO37G	B33EA038	JPI
JPI	NO37L	B33EA039	JPI
JPI	NO37H	B33EA040	JPI
JPI	NO37V	B33EA041	JPI
JPI	NO37Y	B33EA042	JPI

GEN SIGNALS - JET PUMP DIFFERENTIAL PRESSURE			
LOOP A		LOOP B	
JET PUMP	SVTR	GEN SIGNAL	JET PUMP
JPI	NO37A	B33EA032	JPI
JPI	NO37E	B33EA033	JPI
JPI	NO37J	B33EA034	JPI
JPI	NO37N	B33EA035	JPI
JPI	NO37T	B33EA036	JPI
JPI	NO37C	B33EA037	JPI
JPI	NO37G	B33EA038	JPI
JPI	NO37L	B33EA039	JPI
JPI	NO37H	B33EA040	JPI
JPI	NO37V	B33EA041	JPI
JPI	NO37Y	B33EA042	JPI





(Rev. 12 1/03)



**PERRY NUCLEAR POWER PLANT**

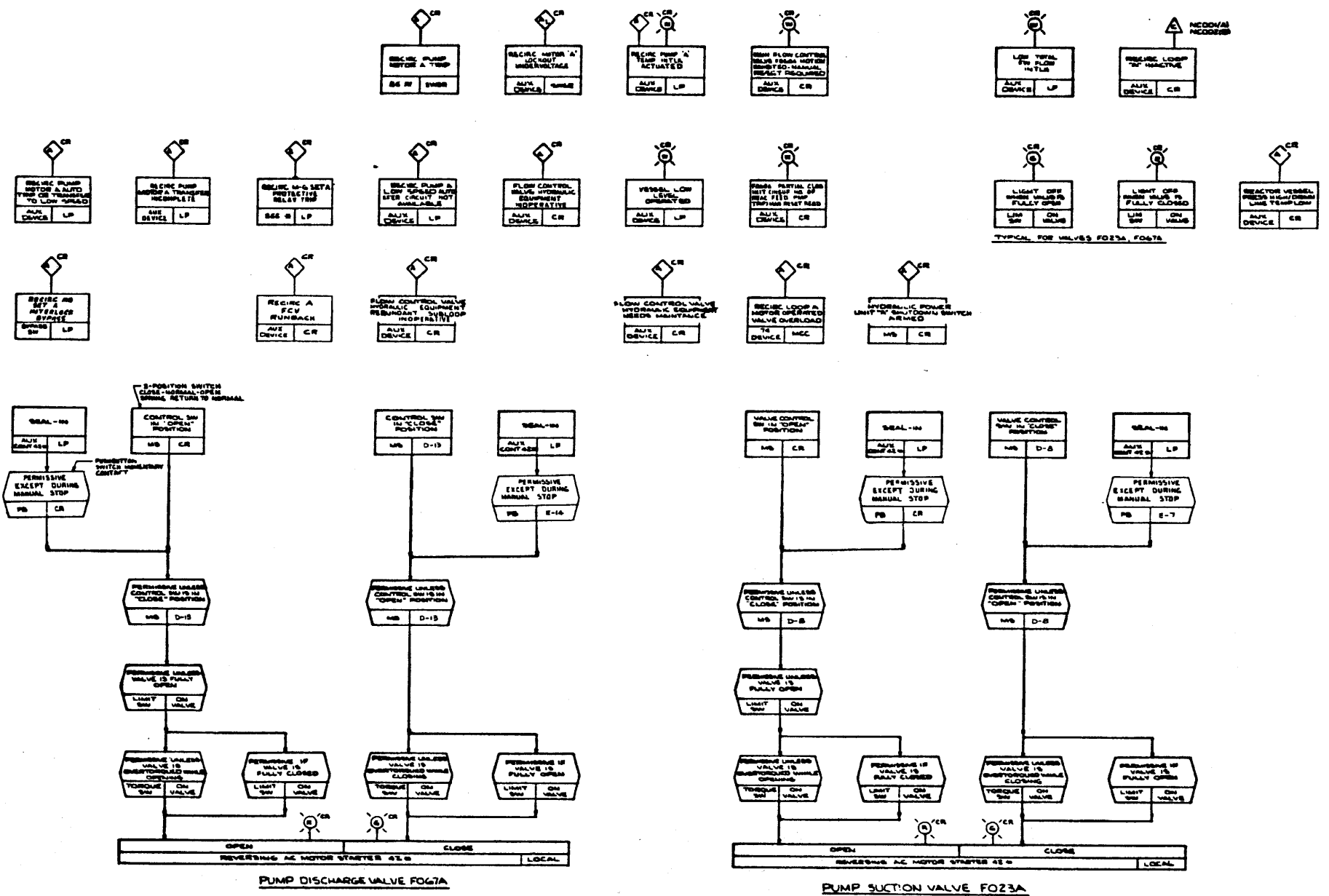
Reactor Recirculation System

Figure 7.7-4 (Sheet 5 of 7)

[Dwg. D-808-304(5)]



FOR ADDITIONAL ALARM AND INDICATION REQUIREMENTS SEE SUPPLY SPEC. 1 AND 2



(Rev. 12 1/03)

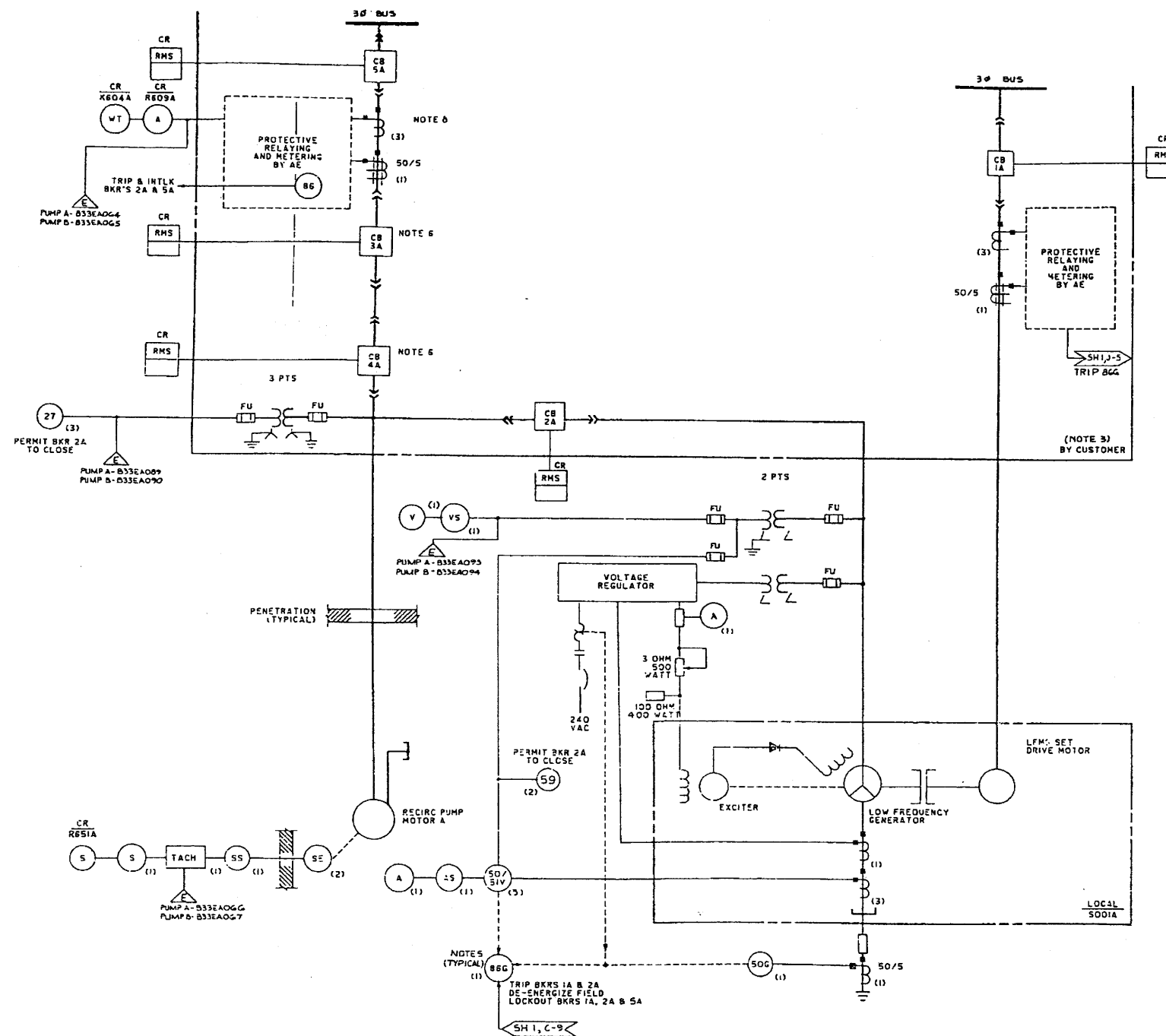
**PERRY NUCLEAR POWER PLANT**

Reactor Recirculation System

Figure 7.7-4 (Sheet 7 of 7)

[Dwg. D-808-304(7)]

# CNE LINE DIAGRAM



MPL NO: (833-1010)

## 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 MG SET CONTROL CUBICLE POOLA.
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 1 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 RED 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. / SELECTS 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. / 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 EXCITER COUNTS THE NUMBER OF TIMES (ON 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
- WT = WATT TRANSDUCER
- SE = SPEED SENSOR
- S = SPEED INDICATOR
- SS = SPEED SENSOR SWITCH
- VS = VOLTMETER SWITCH
- A = ANALOG SIGNAL GENERATOR
- HYDRAULIC LINE
- POS = POSITION SWITCH
- POT = POSITION TRANSMITTER
- VEI = VELOCITY TRANSMITTER
- EMERGENCY RESPONSE INFORMATION SYSTEM

## REFERENCE DOCUMENTS:

1. 833-1010 REACTOR RECIRCULATION SYS P&ID
2. 221-1010 NUCLEAR BOILER SYSTEM P&ID
3. C51-1010 NEUTRON MONITORING SYS IED
4. 833-1030 REACTOR RECIRCULATION SYS ELEM DIAG
5. 833-1020 REACTOR RECIRCULATION SYSTEM TCO
6. C95-1050 EAS ELEMENTARY DIAG.
7. C33/C34-1010 FEEDWATER SYSTEM IED
8. 442-1050 INSTRUMENT SYMBOLS
9. 833-1060 RPI INTERCONNECTION DIAGRAM
10. 402-412C TURBINE GENERATOR CONTROL REQUIREMENTS
11. 833-1010 REACTOR RECIRCULATION SYS VALVE FLOW CONT. DESIGN SPEC.

(Rev. 12 1/03)

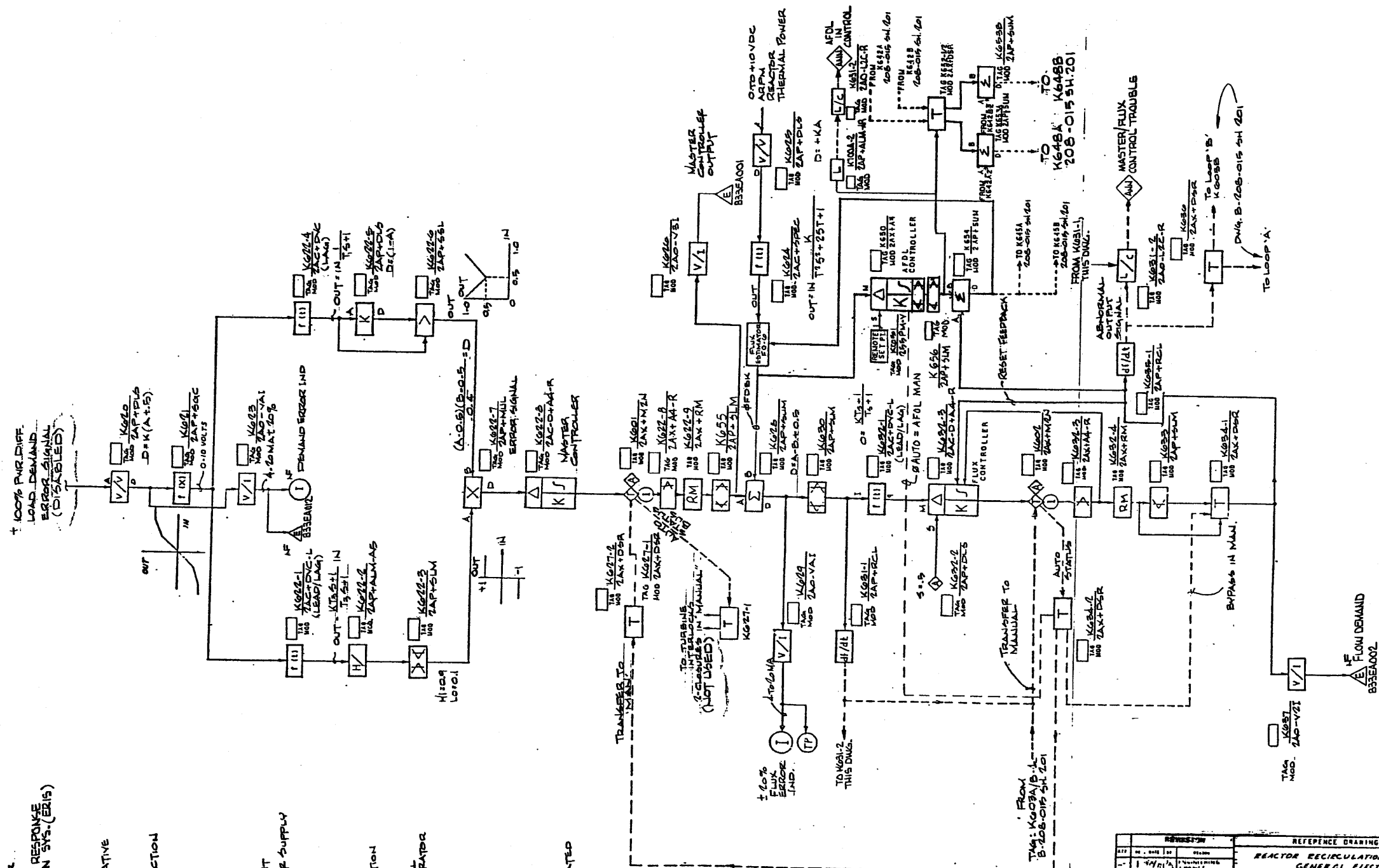


**PERRY NUCLEAR POWER PLANT**

Recirculation Flow Control  
Illustrations


Figure 7.7-5 (Sheet 1 of 6)





REF ID: A66023			REFERENCE DRAWINGS	
ATTN	NO.	DATE	BY	REASON
1	1	1/14/43	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
2	2	2/10/43	W. J. H. H.	GENERAL ELECTRIC
3	3	3/14/43	W. J. H. H.	SAN JOSE CALIF.
4	4	4/14/43	W. J. H. H.	
5	5	5/14/43	W. J. H. H.	
6	6	6/14/43	W. J. H. H.	
7	7	7/14/43	W. J. H. H.	
8	8	8/14/43	W. J. H. H.	
9	9	9/14/43	W. J. H. H.	
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11	11	11/14/43	W. J. H. H.	
12	12	12/14/43	W. J. H. H.	
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20	20	8/14/44	W. J. H. H.	
21	21	9/14/44	W. J. H. H.	
22	22	10/14/44	W. J. H. H.	
23	23	11/14/44	W. J. H. H.	
24	24	12/14/44	W. J. H. H.	
25	25	1/14/45	W. J. H. H.	
26	26	2/14/45	W. J. H. H.	
27	27	3/14/45	W. J. H. H.	
28	28	4/14/45	W. J. H. H.	
29	29	5/14/45	W. J. H. H.	
30	30	6/14/45	W. J. H. H.	
31	31	7/14/45	W. J. H. H.	
32	32	8/14/45	W. J. H. H.	
33	33	9/14/45	W. J. H. H.	
34	34	10/14/45	W. J. H. H.	
35	35	11/14/45	W. J. H. H.	
36	36	12/14/45	W. J. H. H.	
37	37	1/14/46	W. J. H. H.	
38	38	2/14/46	W. J. H. H.	
39	39	3/14/46	W. J. H. H.	
40	40	4/14/46	W. J. H. H.	
41	41	5/14/46	W. J. H. H.	
42	42	6/14/46	W. J. H. H.	
43	43	7/14/46	W. J. H. H.	
44	44	8/14/46	W. J. H. H.	
45	45	9/14/46	W. J. H. H.	
46	46	10/14/46	W. J. H. H.	
47	47	11/14/46	W. J. H. H.	
48	48	12/14/46	W. J. H. H.	
49	49	1/14/47	W. J. H. H.	
50	50	2/14/47	W. J. H. H.	
51	51	3/14/47	W. J. H. H.	
52	52	4/14/47	W. J. H. H.	
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56	56	8/14/47	W. J. H. H.	
57	57	9/14/47	W. J. H. H.	
58	58	10/14/47	W. J. H. H.	
59	59	11/14/47	W. J. H. H.	
60	60	12/14/47	W. J. H. H.	
61	61	1/14/48	W. J. H. H.	
62	62	2/14/48	W. J. H. H.	
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67	67	7/14/48	W. J. H. H.	
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71	71	11/14/48	W. J. H. H.	
72	72	12/14/48	W. J. H. H.	
73	73	1/14/49	W. J. H. H.	
74	74	2/14/49	W. J. H. H.	

1000-22-1703



# PERRY NUCLEAR POWER PLANT

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## Recirculation Flow Control Illustrations

Figure 7.7-5 (Sheet 2 of 6)  
[Dwg. B-208-015(200)]

NOTES:  
1. LIGHTS ARE LOCATED  
IN K713-4

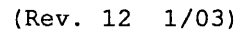
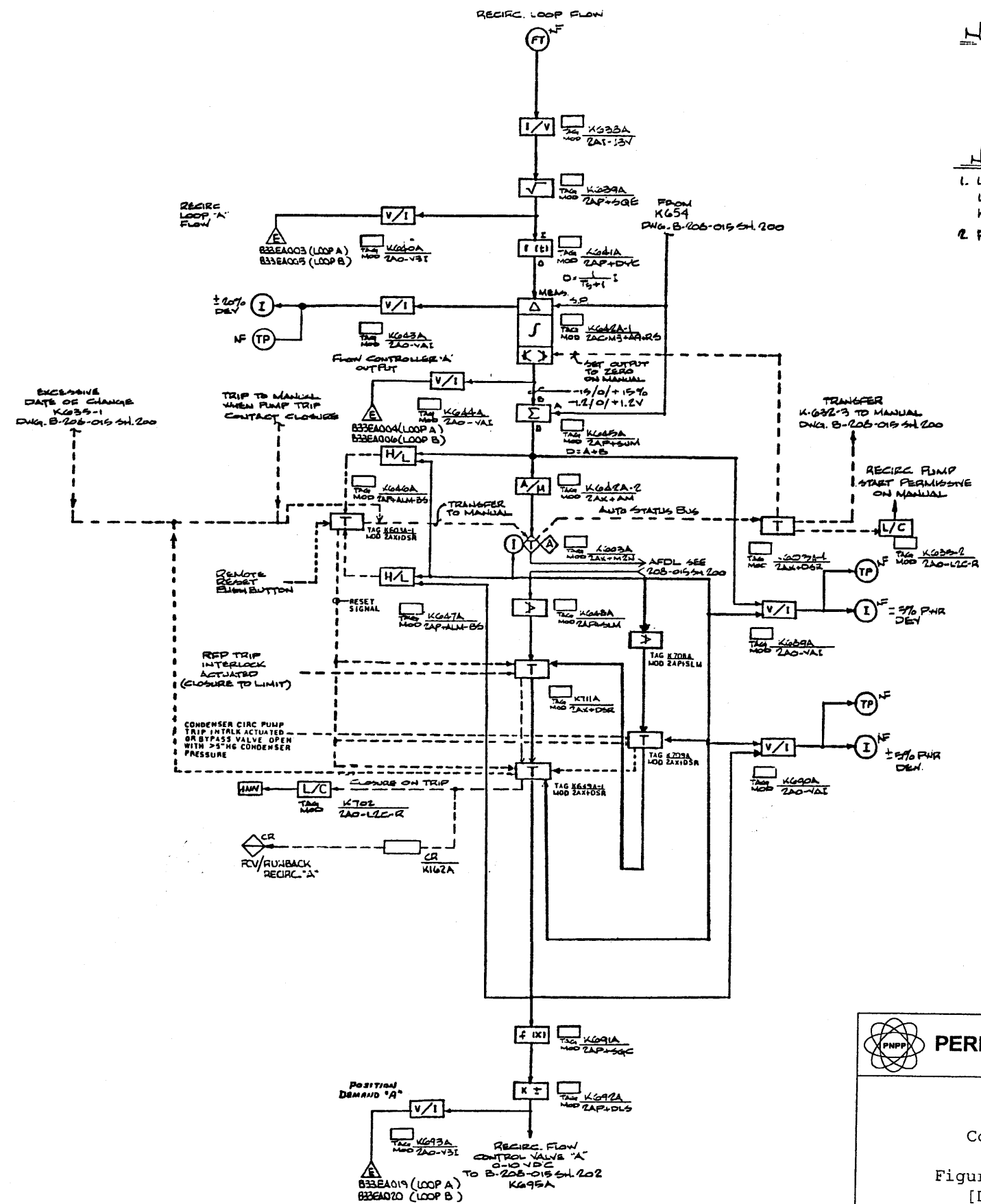


Figure 7.7-5 (Sheet 3 of 6)  
[Dwg. B-208-015(205)]



NOTE:  
THIS DRAWING AS BUILT REV(-) PER  
ENGINEERING REVIEW

NOTES:  
1. LOOP 'B' SAME AS LOOP 'A' EXCEPT FOR TAGS.  
LOOP 'A' LOOP 'B'  
K632A CHANGES TO K632B  
2. FOR LEGEND SEE DWG. B-208-015 SH.200

(Rev. 12 1/03)

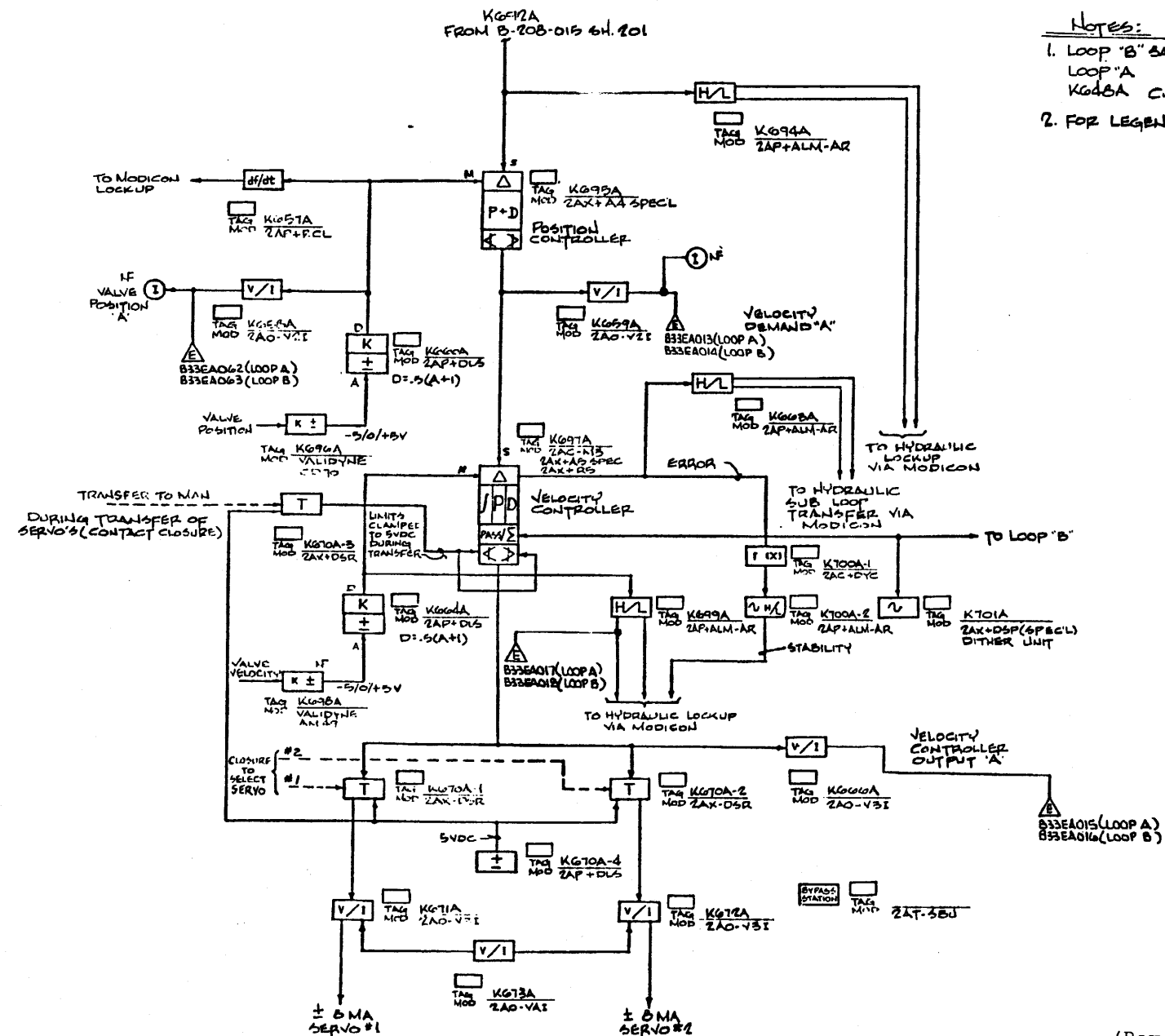
**PERRY NUCLEAR POWER PLANT**

Recirculation Flow  
Control Illustrations

Figure 7.7-5 (Sheet 4 of 6)  
[Dwg. B-208-015(201)]

NOTE:  
THIS DRAWING AS BUILT REV (L) PER  
ENGINEERING REVIEW

- NOTES:
1. LOOP "B" SAME AS LOOP "A" EXCEPT FOR TAGS.  
LOOP "A" LOOP "B"  
K648A CHANGES TO K648B
  2. FOR LEGEND SEE DWG. B-208-015 SH. 200

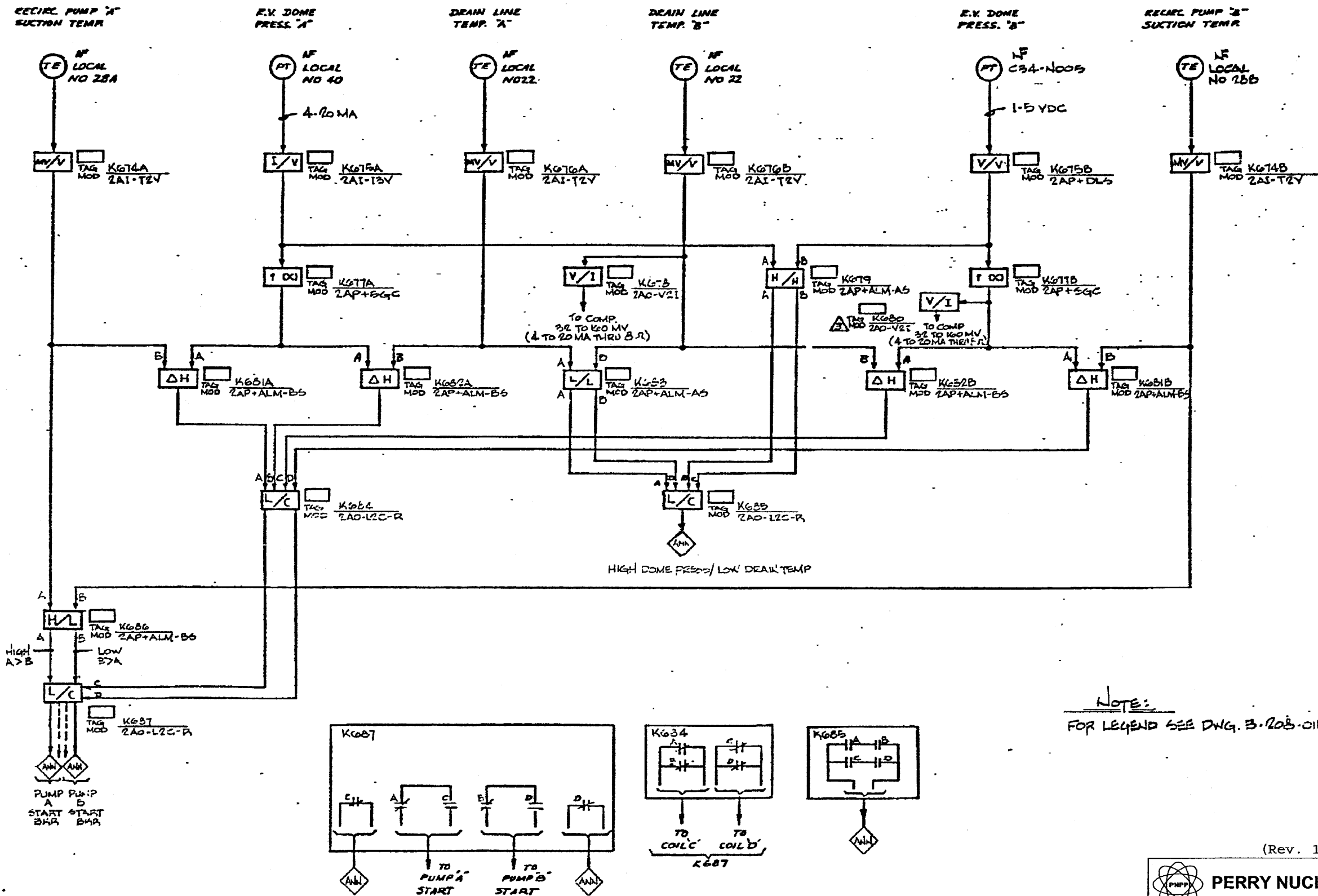


(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

Recirculation Flow  
Control Illustrations

Figure 7.7-5 (Sheet 5 of 6)  
[Dwg. B-208-015(202)]



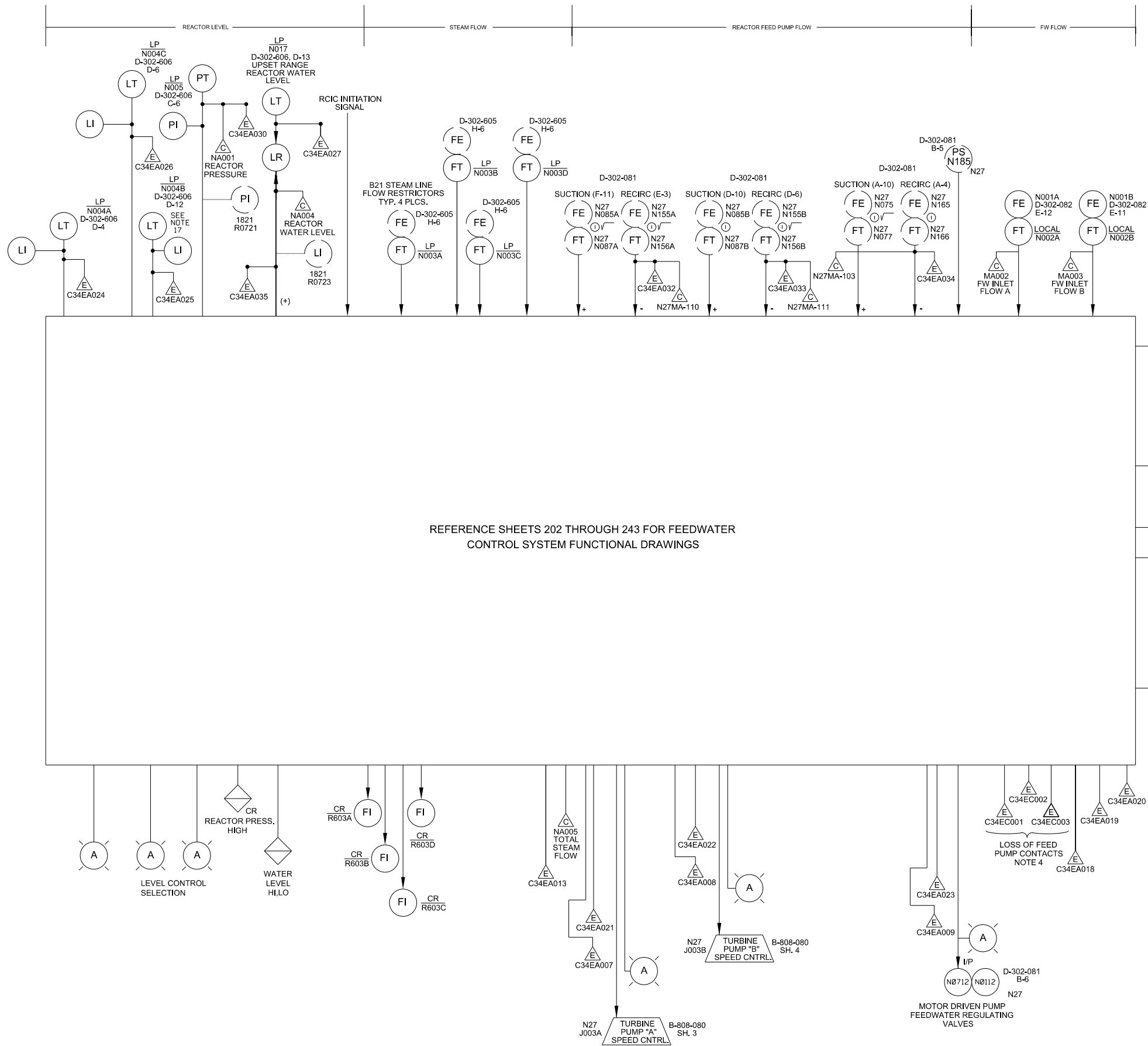
(Rev. 12 1/03)



PERRY NUCLEAR POWER PLANT

Recirculation Flow  
Control Illustrations

Figure 7.7-5 (Sheet 6 of 6)  
[Dwg. B-208-015(203)]



- NOTES:
1. ALL EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NO. C34, UNLESS OTHERWISE NOTED.
  2. DEVICES K624A, B AND C TRIP CONTACTS TO BE WIRED IN 2/3 LOGIC SO THAT ANY 2 DEVICES MUST TRIP TO INITIATE MAIN AND AUXILIARY TURBINE STEAM STOP VALVE TRIP. POWER SOURCES TO THE LEVEL TRIP CHANNELS MUST BE FROM INDEPENDENT SOURCES.
  3. THE POWER SOURCE FOR THE FEEDWATER INSTRUMENTATION AND CONTROL SYSTEM SHALL HAVE AT LEAST THE SAME DEGREE OF RELIABILITY AS THE POWER SOURCE FOR THE REACTOR FEED/BOOSTER/CONDENSATE PUMPS.
  4. CONTACTS FROM EACH TORFP AND DISCHARGE VALVE INDICATE WHEN PUMP IS OPERATING AND CAPABLE OF DELIVERING WATER. THE LOGIC TO INDICATE THE TORFP IS OPERATING UTILIZES THE TRIP SYSTEM OIL PRESSURE SWITCH. THE L.P. STOP VALVE CLOSES PARTIALLY DURING VALVE TESTING; WHEREAS THE M.P. STOP VALVE CLOSES COMPLETELY WHEN TESTED.
  5. SWITCHES SHALL BE SNAP ACTION SWITCHES, CONTACT OPERATION BEING INDEPENDENT OF SPEED OF CONTROL ROOM OPERATOR ACTION TO AVOID CONTROL SYSTEM TRANSIENTS DURING SWITCHING.
  6. FUNCTION GENERATORS SPECIALLY CHARACTERIZED BASED ON TURBINE RF PUMP UNIT MA SIGNAL VS FW FLOW LB/MH CHARACTERISTICS TO BE SUBMITTED TO G.E. BY CUSTOMER/A.E. FOR G.E. DESIGN COMPLETION.
  7. FOR LOCATION AND IDENTIFICATION OF INSTRUMENTS, SEE INSTRUMENT DATA SHEET C34-3050.
  8. INITIATING SIGNAL FOR SET POINT SET DOWN SHALL BE LEVEL 3 (K626A) UNTIL SCRAM SIGNAL ISOLATION DEVICE BECOMES AVAILABLE.

13. THIS SYSTEM DIAGRAM IS A PHOTOGRAPHIC REPRODUCTION OF G.E. DRAWING B51E567, SHEETS 1 AND 2. SPECIFIC REVISION IS SHOWN BENEATH GAI TITLE BLOCK.
14. REFER TO INSTRUMENT INDEX FOR INSTRUMENT RACK AND PANEL IDENTIFICATION NUMBERS.
15. SELECTOR SWITCHES, INDICATING LIGHTS, AND ANNUNCIATOR POINTS SHOWN ON THESE DIAGRAMS, ARE LOCATED ON 1M13-P680.

16.  SYMBOL = EMERGENCY RESPONSE INFORMATION SYSTEM (ERIS).

17. THIS SIGNAL MAY BE DELAYED BY A MAXIMUM OF 5 MINUTES WHEN STEAM LINE FLOWS ARE  $\geq 100$  FEET/SECOND, AS SENSED BY MAIN TURBINE FIRST STAGE PRESSURE.

REFERENCES:-

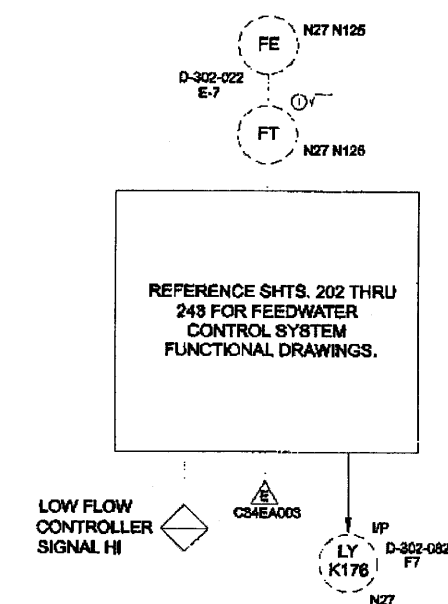
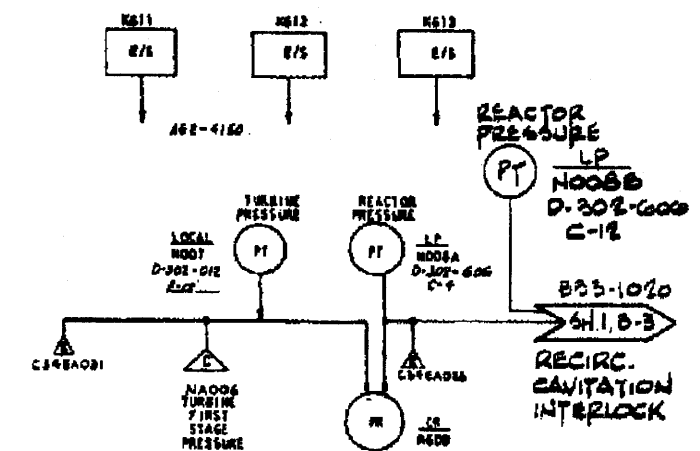
C34-4010	FEEDWATER CONTROL SYSTEM DESIGN SPECIFICATION
D-302-605	NUCLEAR BOILER SYSTEM B21
D-302-606	NUCLEAR BOILER SYSTEM B21
D-302-607	NUCLEAR BOILER SYSTEM B21
B33-1020	REACTOR RECIRCULATION SYSTEM FCO
A62-4150	AUXILIARY AND STANDBY AC POWER
D-302-081	FEEDWATER SYSTEM N27
D-302-082	FEEDWATER SYSTEM N27
D-802-009	REACTOR - TURBINE - GENERATOR TRIP DIAGRAM
D-302-121	MAIN, REHEAT, EXTRACTION AND MISCELLANEOUS DRAINS N22
D-302-012	REHEAT STEAM SYSTEM N11
B-808-080	FEEDWATER SYSTEM LOOP DIAGRAM
B-808-101	CONDENSATE SYSTEM LOOP DIAGRAM
A42-1030	LOGIC SYMBOLS
A42-1050	INSTRUMENT SYMBOLS
C34-3050	INSTRUMENT DATA SHEETS
C91-4030	COMPUTER I/O LIST
B-208-025	FEEDWATER CONTROL SYSTEM ELEMENTARY DIAGRAM (C34)
B-208-149	FEEDWATER SYSTEM ELEMENTARY DIAGRAM (N27)
D-302-124	MAIN, REHEAT, EXTRACTION AND MISCELLANEOUS DRAINS N22
A62-4530	TRANSIENT TEST INSTRUMENTATION REQUIREMENTS
C95-1050	ERIS ELEMENTRY DIAGRAM

NOTE:  
THIS DRAWING REPLACES DRAWING  
D-808-0081 SH. 1.

(REV. 20 10/2017)


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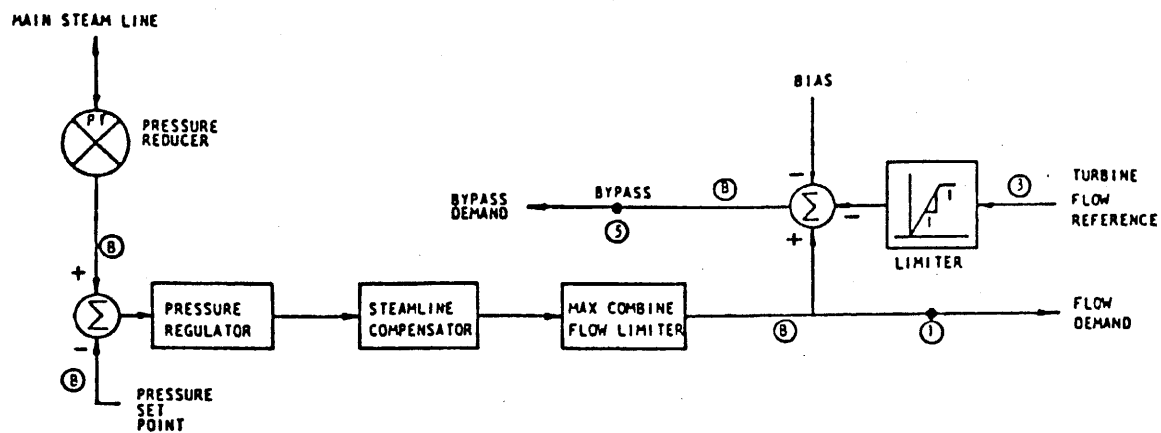
FEEDWATER CONTROL  
SYSTEM INSTRUMENTATION  
AND ELECTRICAL DIAGRAM  
FIGURE 7.7-6 (SHEET 1 OF 2)  
(DWG. B-208-0025-00200)



NOTE:  
THIS DRAWING REPLACES DRAWING  
D-302-081 SH. 2

(Rev. 14 10/05)

	<b>PERRY NUCLEAR POWER PLANT</b>
	Feedwater Control System Instrumentation and Electrical Diagram
	Figure 7.7-6 (Sheet 2 of 2) [Dwg. B-208-025(A201)]



(Rev. 12 1/03)

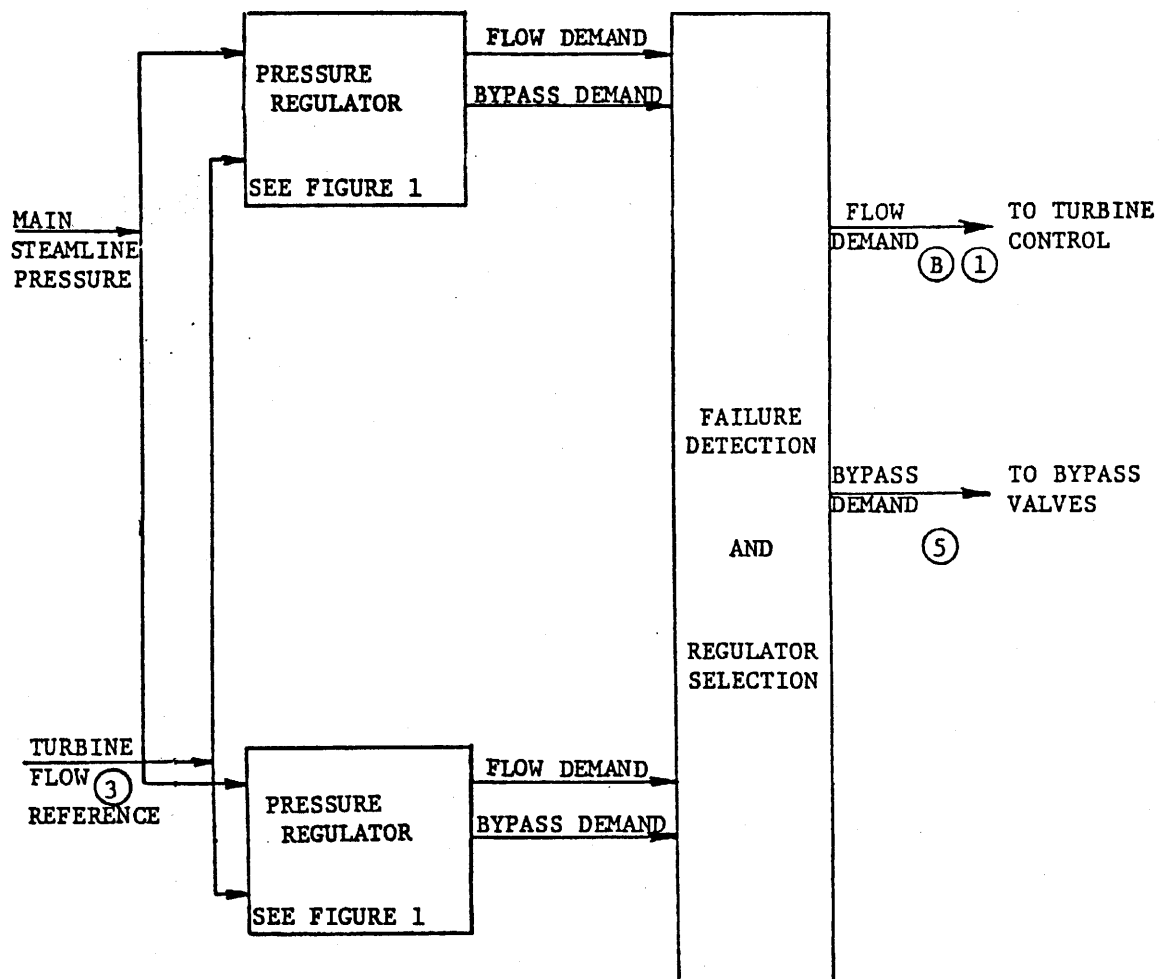


## PERRY NUCLEAR POWER PLANT

Pressure Regulator/Turbine Control  
System Diagram

Figure 7.7-7 (Sheet 1 of 2)





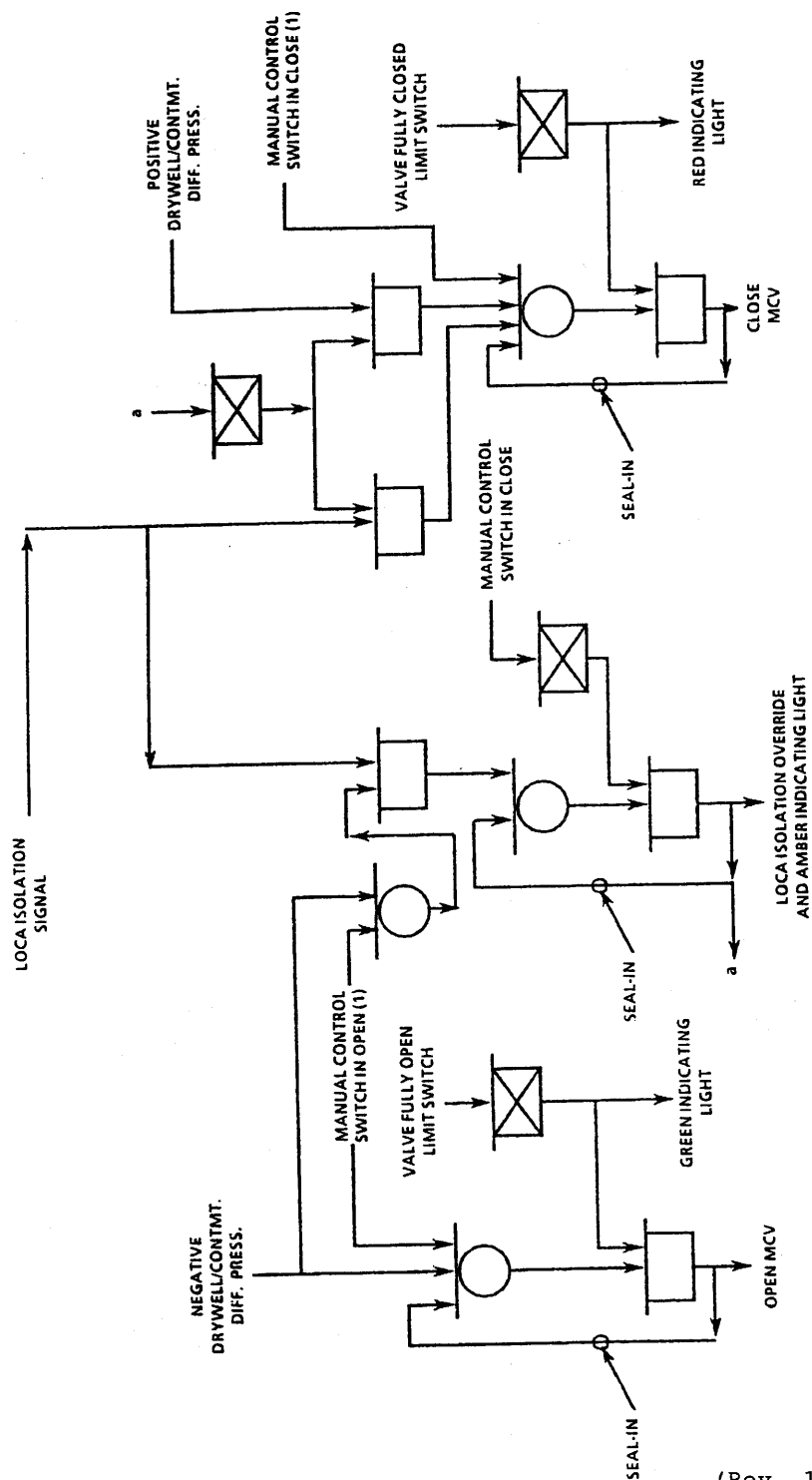
(Rev. 12 1/03)



## PERRY NUCLEAR POWER PLANT

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.

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## PERRY NUCLEAR POWER PLANT

Drywell Vacuum Relief System  
Control Logic for  
Motor Operated Isolation Valves

Figure 7.7-8