

(Rev. 12 1/03)

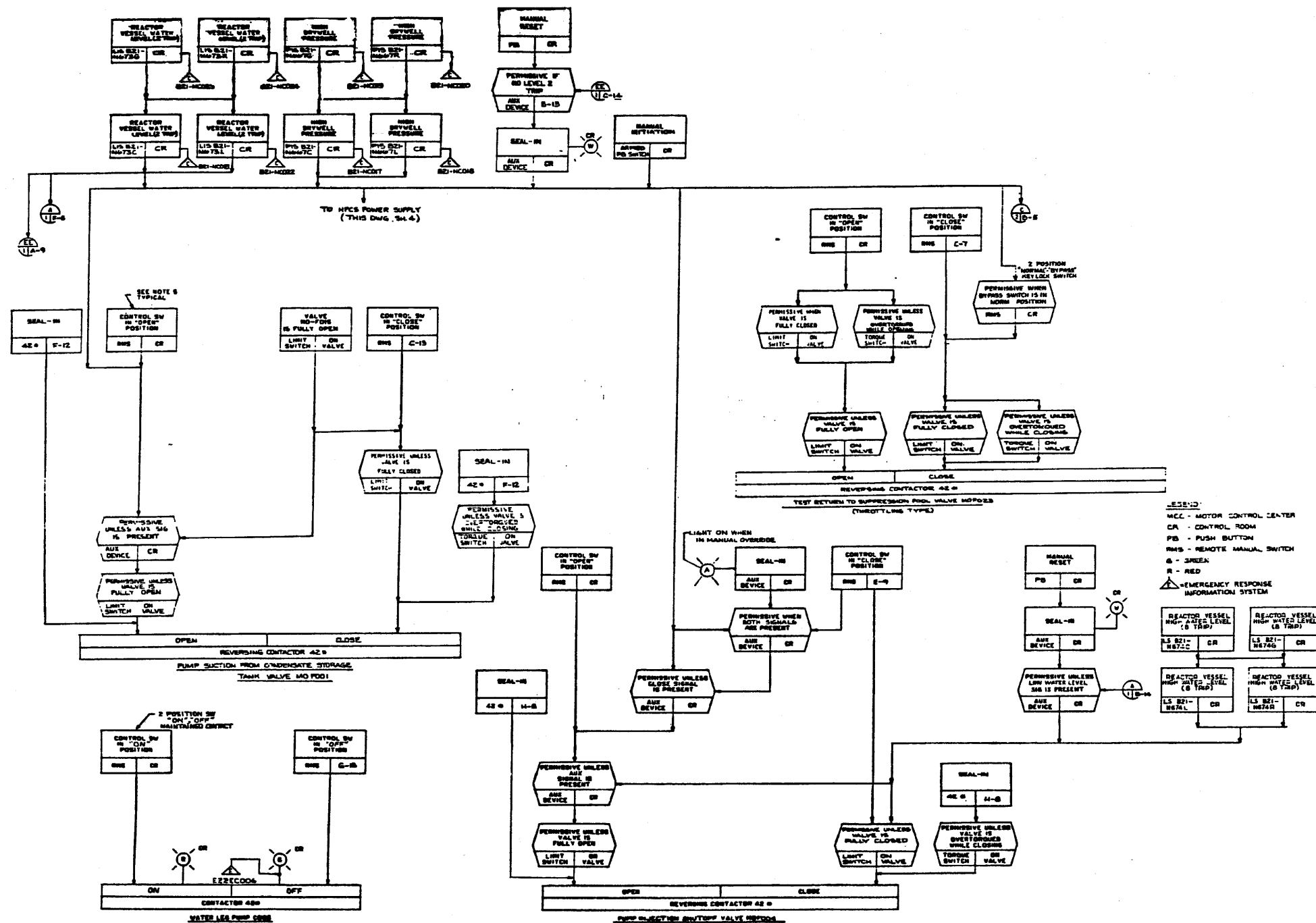


**PERRY NUCLEAR POWER PLANT**

Reactor Protection System  
Instrumentation and Electrical  
Diagram

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





- NOTES:
1. A) PUMP-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 PREDEFINED 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" - "BYPASS" RETURN TO "CLOSE" FROM "CLOSE" - "OPEN".
  6. THE HPCS SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH: (HNP-2791071) & (HNP-2791072).
  7. LAMP "2" IS PART OF LIGHT AND LOCATED BELOW REGULAR HPCS ANNUNCIATION LAMP AS SHOWN.

- REFERENCE DOCUMENTS:
- | NO. | DOCUMENT                       | REV.     | DATE    |
|-----|--------------------------------|----------|---------|
| 1.  | HPCSS POWER SUPPLY PWD         | 122-1000 | 02-1-78 |
| 2.  | REACTOR VESSEL WATER LEVEL PWD | 122-1000 | 02-1-78 |
| 3.  | DELETED                        |          |         |
| 4.  | LEAK DETECTION PWD             | 122-1000 | 02-1-78 |
| 5.  | ELECTRIC POWER SYSTEM PWD      | 122-1000 | 02-1-78 |
| 6.  | LOGIC SYMBOLS                  | 122-1000 | 02-1-78 |
| 7.  | REACTOR VESSEL WATER LEVEL PWD | 122-1000 | 02-1-78 |
| 8.  | REACTOR VESSEL WATER LEVEL PWD | 122-1000 | 02-1-78 |

NUCLEAR SAFETY RELATED

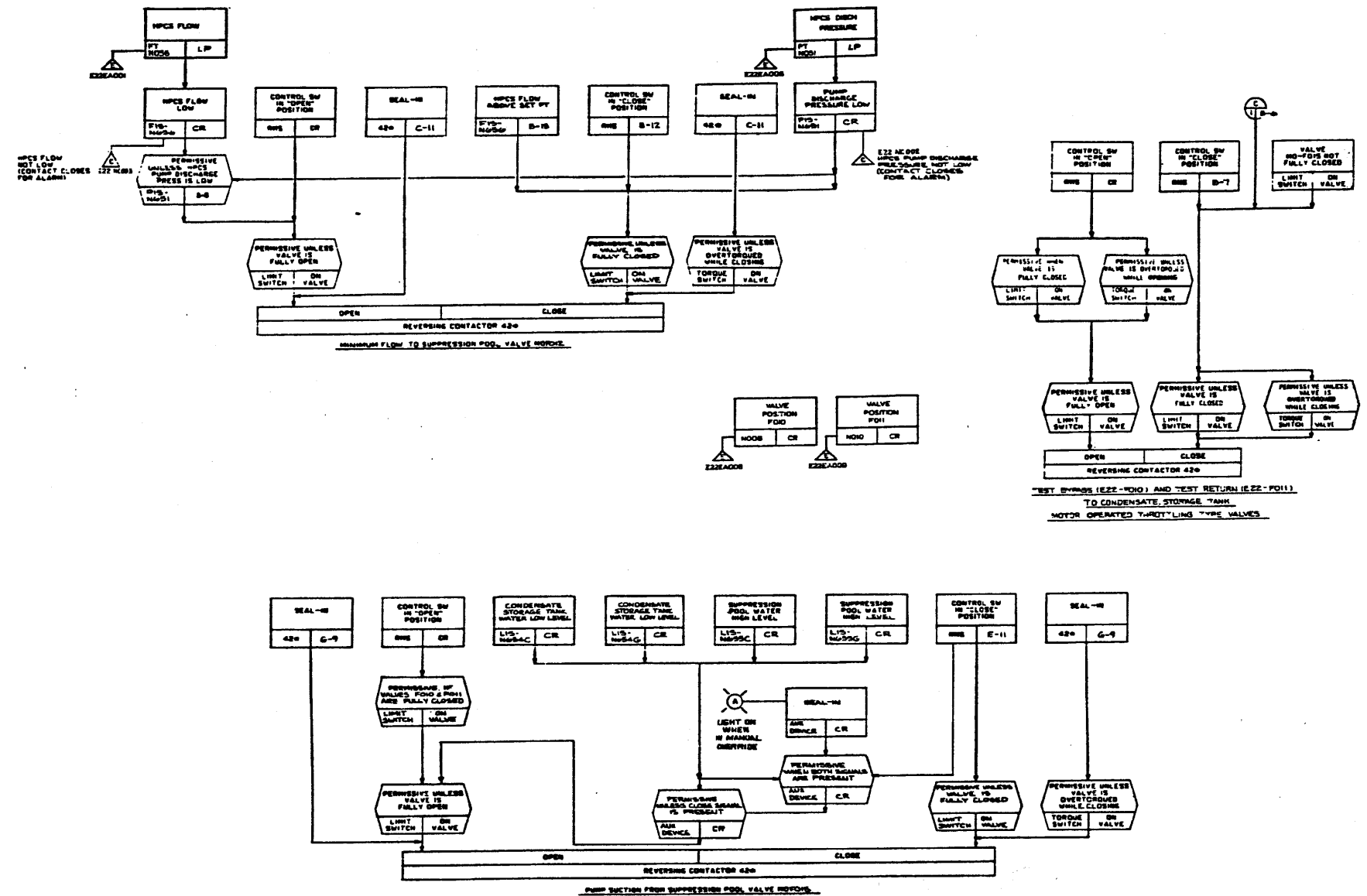
(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

High Pressure Core Spray System

Figure 7.3-1 (Sheet 1 of 3)

(Dwg. D-808-311)



NUCLEAR SAFETY RELATED

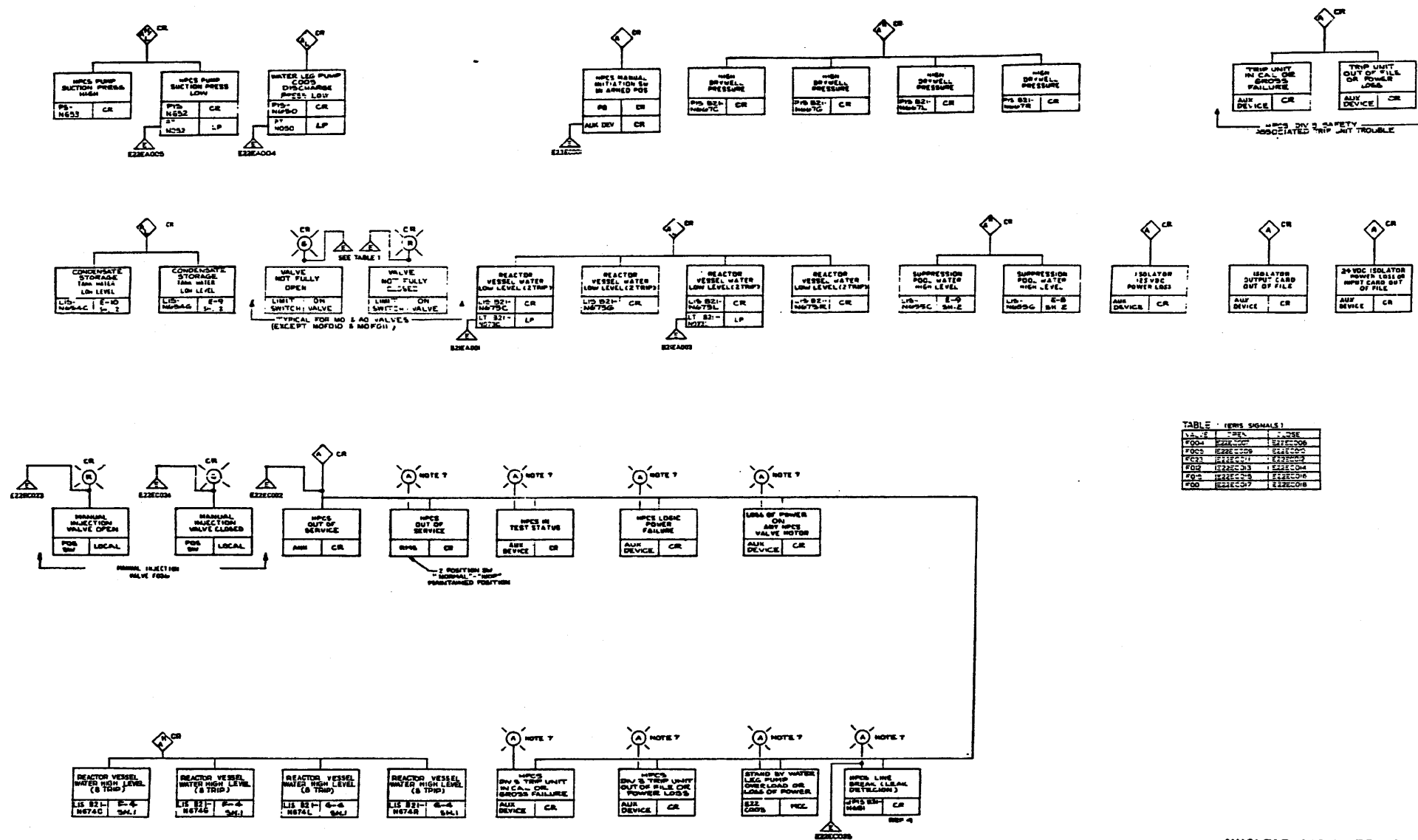
(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

High Pressure Core Spray System

Figure 7.3-1 (Sheet 2 of 3)

(Dwg. D-808-311)



NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

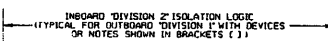
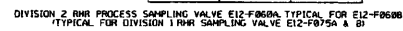
High Pressure Core Spray System

Figure 7.3-1 (Sheet 3 of 3)

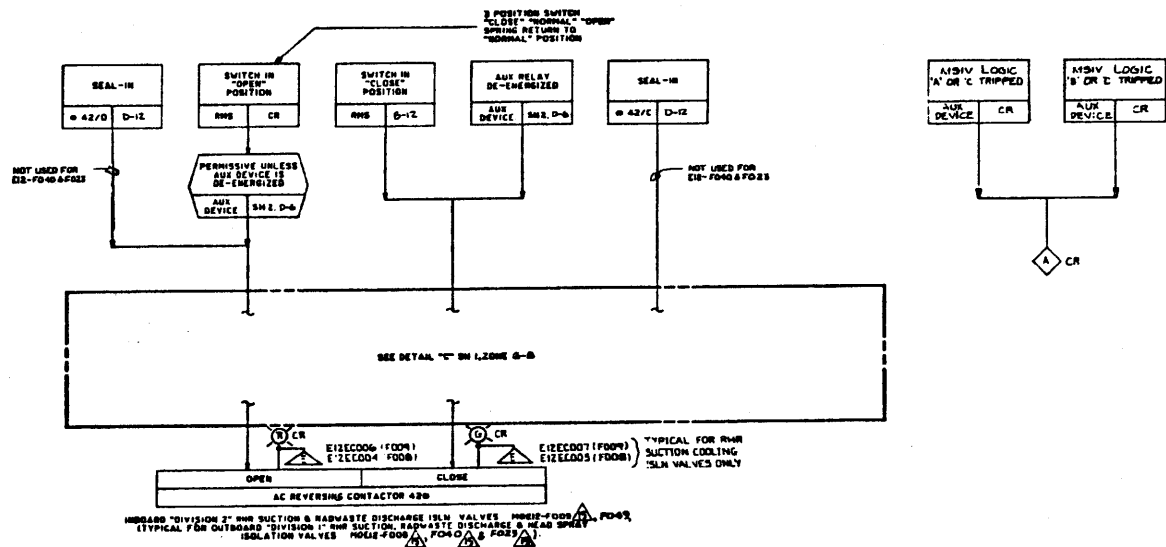
(Dwg. D-808-311)



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



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



NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

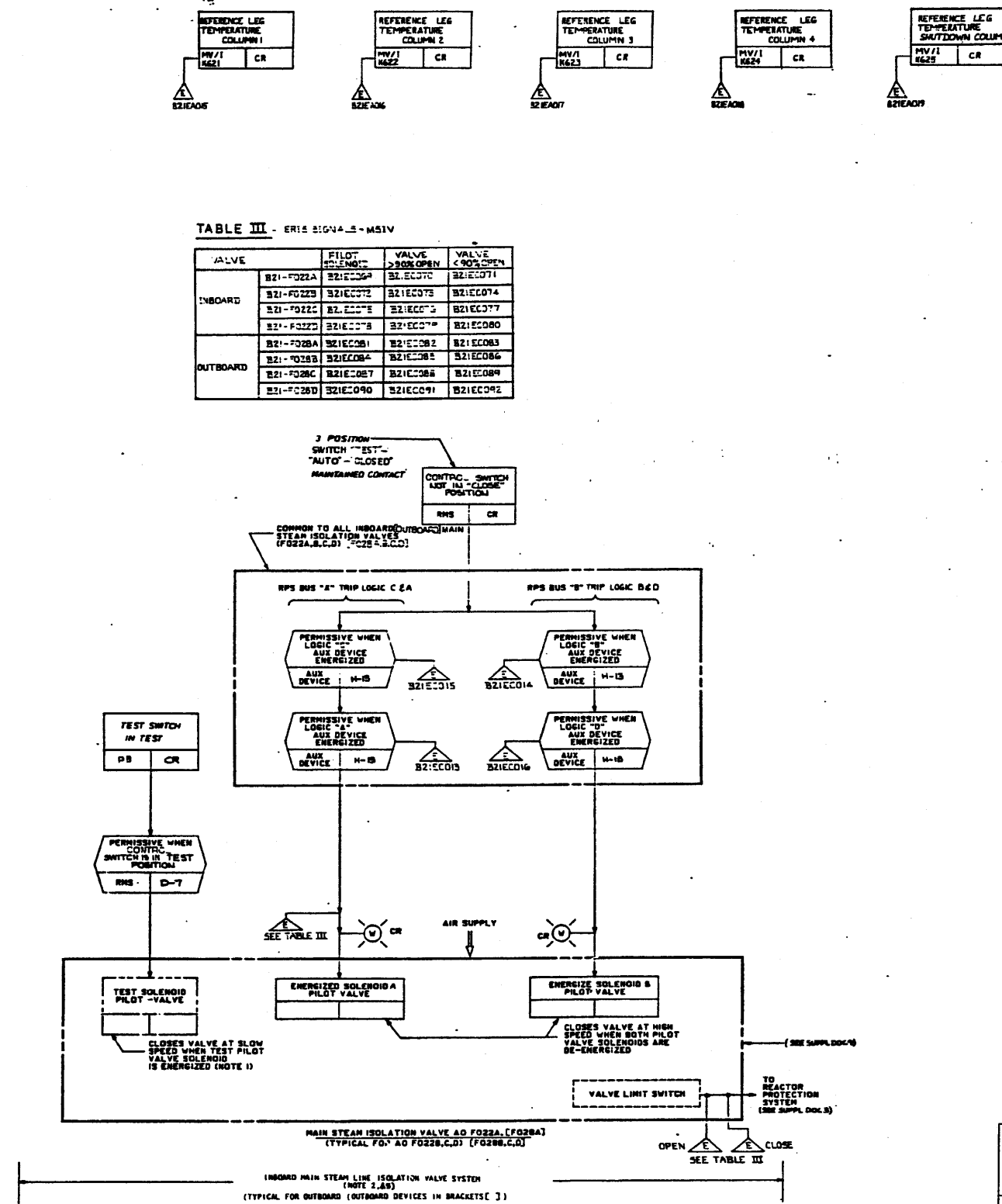


**PERRY NUCLEAR POWER PLANT**

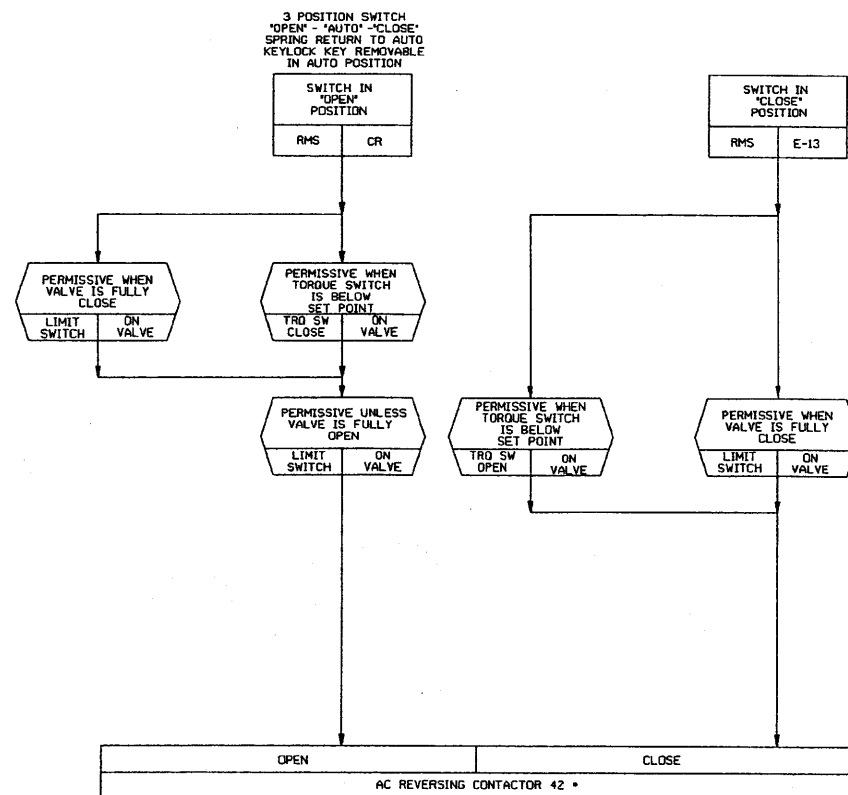
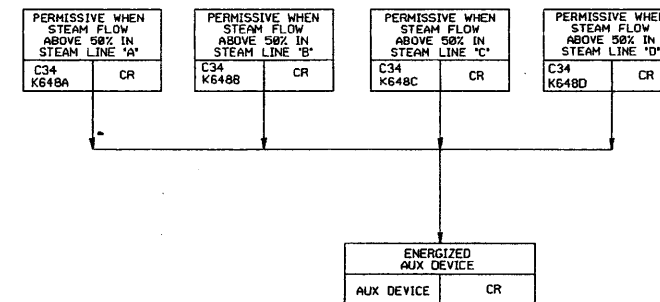
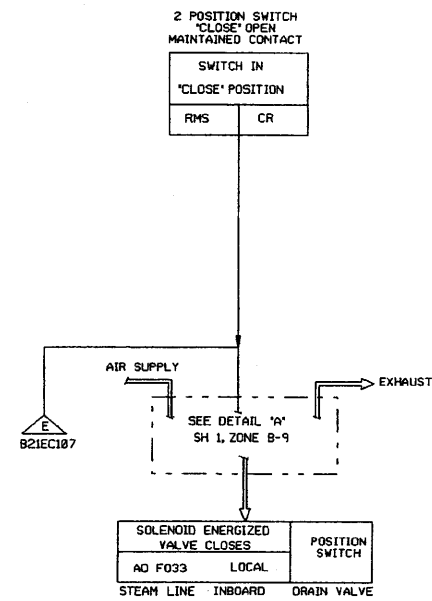
Nuclear Boiler System

Figure 7.3-3 (Sheet 3 of 7)

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



(Rev. 12 1/03)



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

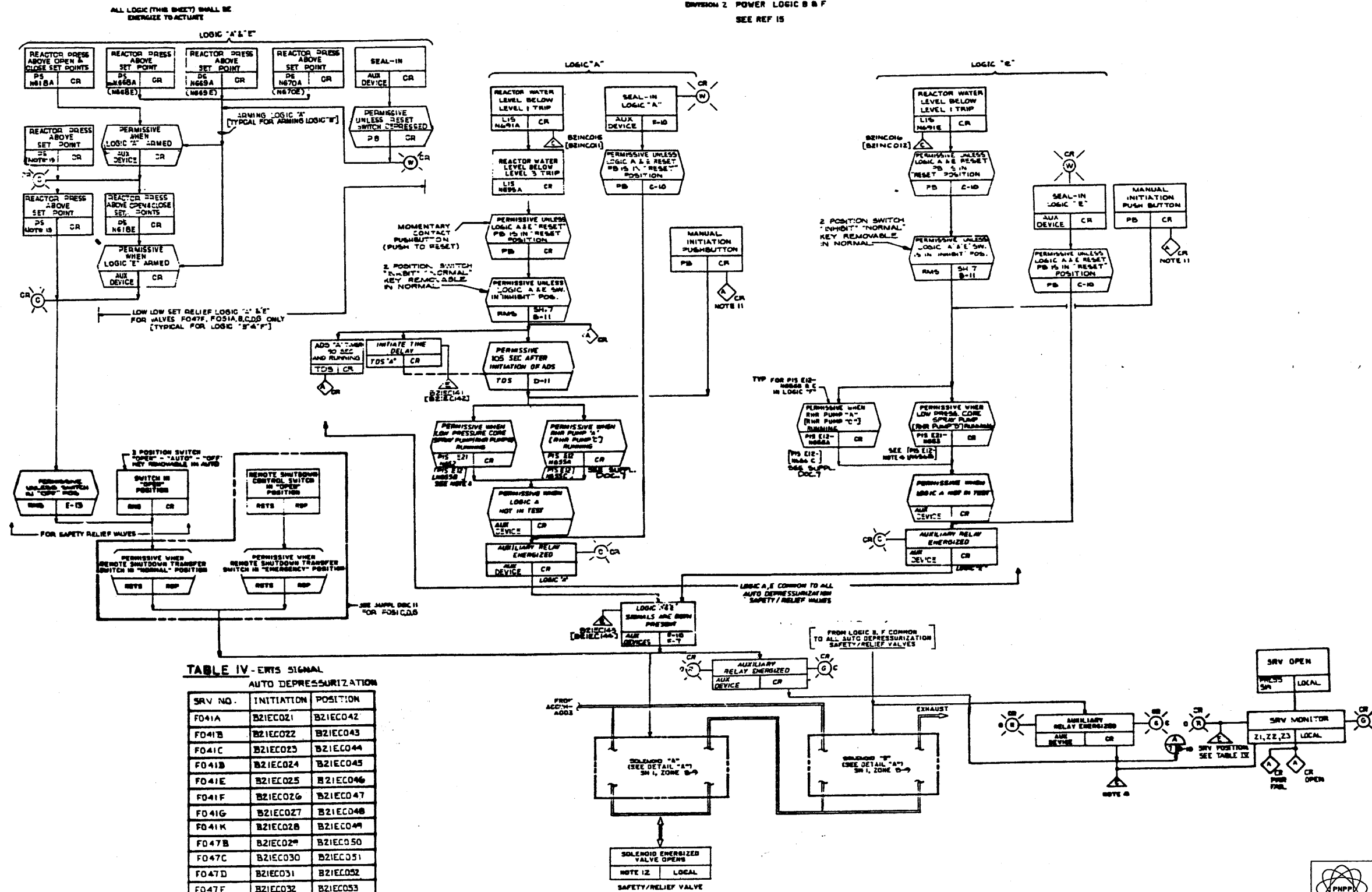
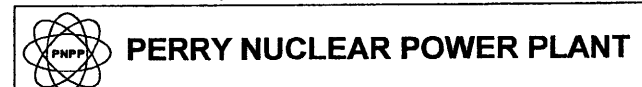


TABLE IV - ERTS SIGNAL  
 AUTO DEPRESSURIZATION

SRV NO.	INITIATION	POSITION
FO41A	B21EC021	B21EC042
FO41B	B21EC022	B21EC043
FO41C	B21EC023	B21EC044
FO41D	B21EC024	B21EC045
FO41E	B21EC025	B21EC046
FO41F	B21EC026	B21EC047
FO41G	B21EC027	B21EC048
FO41H	B21EC028	B21EC049
FO41I	B21EC029	B21EC050
FO47C	B21EC030	B21EC051
FO47D	B21EC031	B21EC052
FO47E	B21EC032	B21EC053
FO47F	B21EC033	B21EC054
FO47G	B21EC034	B21EC055
FO51A	B21EC035	B21EC056
FO51B	B21EC036	B21EC057
FO51C	B21EC037	B21EC058
FO51D	B21EC038	B21EC059
FO51E	B21EC039	B21EC060

NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

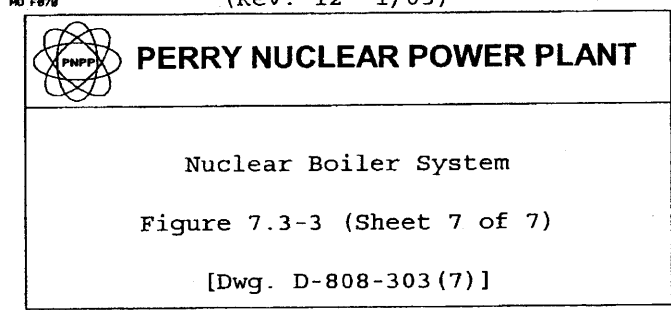


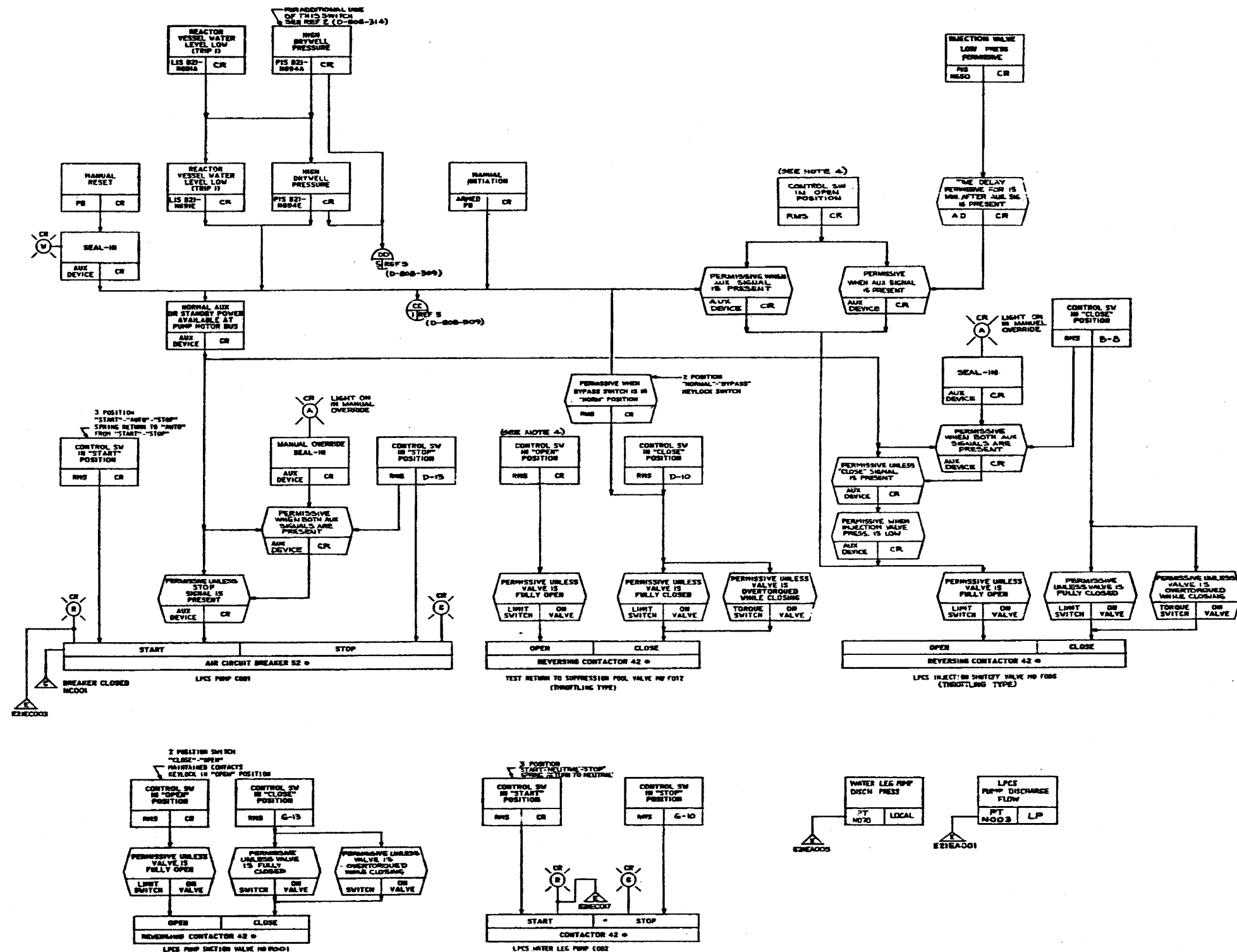
Nuclear Boiler System

Figure 7.3-3 (Sheet 6 of 7)

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

AUTO DEPRESSURIZATION SEE SUPPL  
 DOC 1, TABLE 3  
 FOR ADS VALVES  
 SAME AS LOGIC A & E RESPECTIVELY EXCEPT FOR  
 LETTER SUFFIXES OR AS NOTED.





- 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", "STOP", "OPEN". SPRING RETURN TO "STOP" FROM "CLOSE" OR "OPEN".
  5. CONTROL AND MOTIVE POWER FOR LPCS SHALL BE FROM SAME SOURCE AS THE PWB LOOP "AP EQUIPMENT" (REF. 5).
  6. THE LPCS SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH IEEE 275-1971 AND REF. 7.

REFERENCE DOCUMENTS	REF. LITER. NO.
1. LOW PRESSURE CORE SPRAY SYSTEM P&ID	E21-1010
2. REAC. COOL. WLM. 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	E21-1010
8. LEAK DETECTION SYS. (NEEP)	E21-1010
9. EPS ELEMENTARY DIAGRAM	E21-1010

**LEGEND:**  
 RMS - SWITCHING DEVICE FUNCTION NO. AND SPEC. CST. 2  
 IEEE - INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEER.  
 E21EAD01 - 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)]

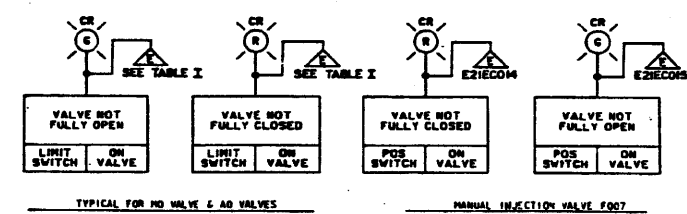
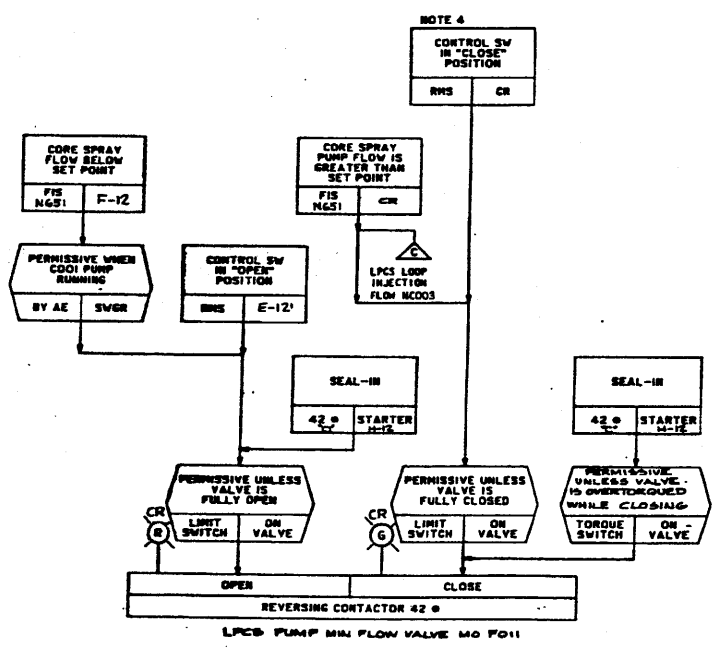
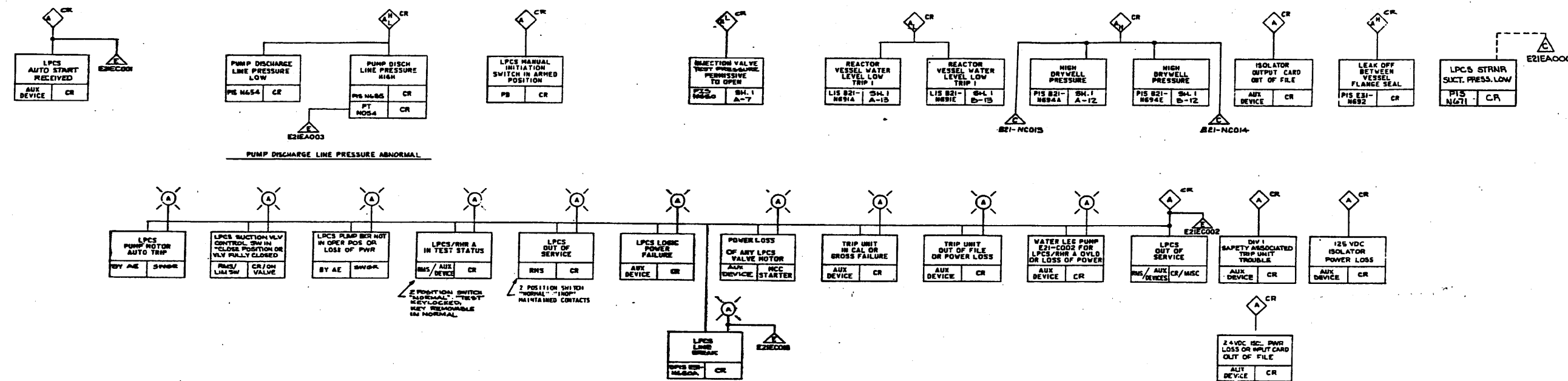


TABLE I  
ERIS SIGNALS

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

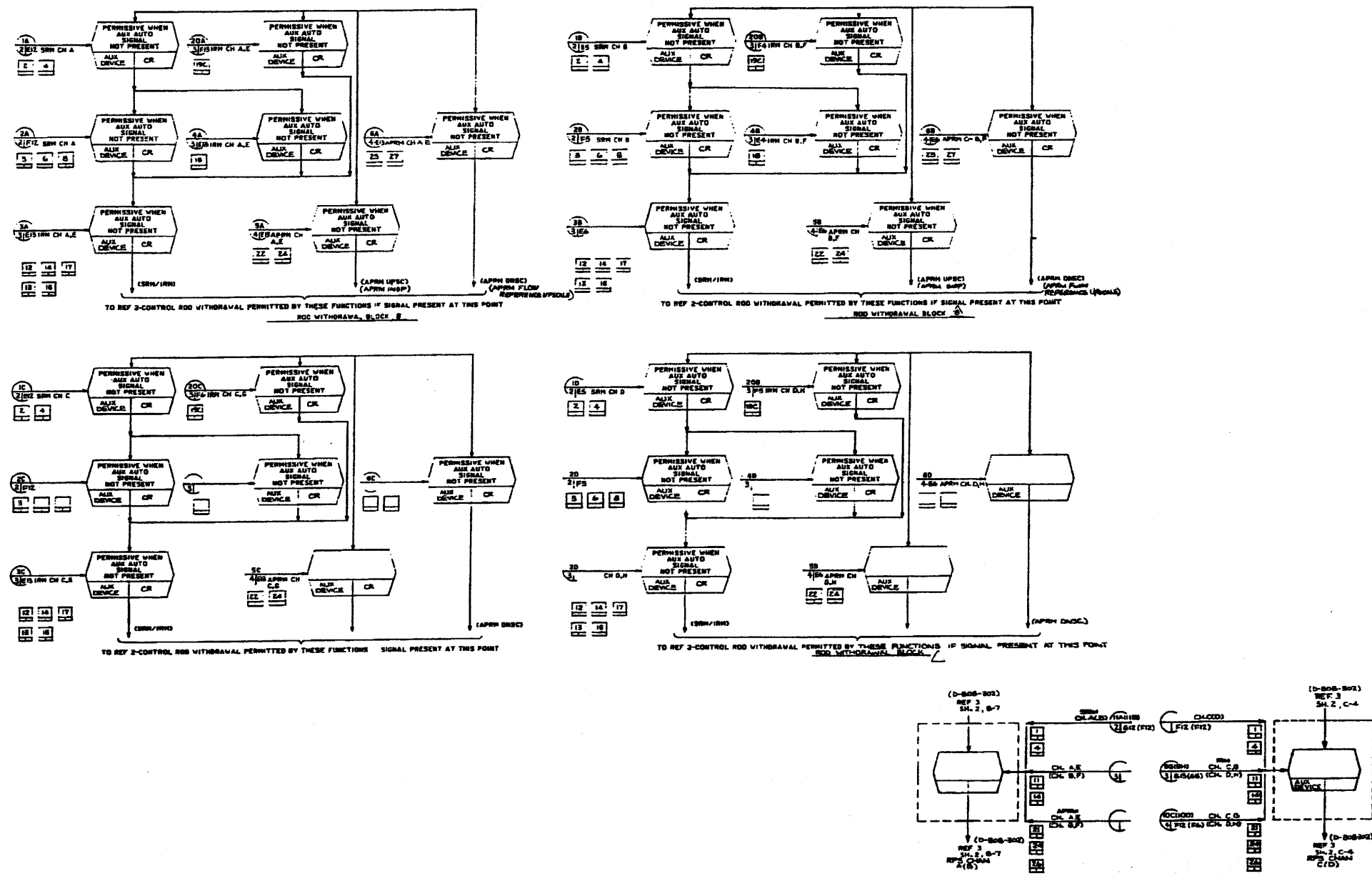
NUCLEAR SAFETY RELATED

(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 OTHERWISE.
5. CHANNELS A, C, E & G CHANNELS B, D, F & H.
- 6.
- 7.

△ 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
- | REF. NO. | DESCRIPTION                | REF. NO. | DESCRIPTION |
|----------|----------------------------|----------|-------------|
| 1.       | PERFORMANCE DESIGN SPEC    | 11-1030  | D-808-305   |
| 2.       | CONTROL ROD WTD SYS        | 11-1040  | D-808-306   |
| 3.       | REACTOR PROTE SYS          | 11-1050  | D-808-307   |
| 4.       | REDUNDANT REACTIVITY       | 11-1060  | D-808-308   |
| 5.       | DIS ELEMENT DIAGRAM        | 11-1070  | D-808-309   |
| 6.       | PERFORMANCE MONITORING SYS |          |             |

LEGEND (CONT.)

- DCU ---
- △ ---

FIGURE 3

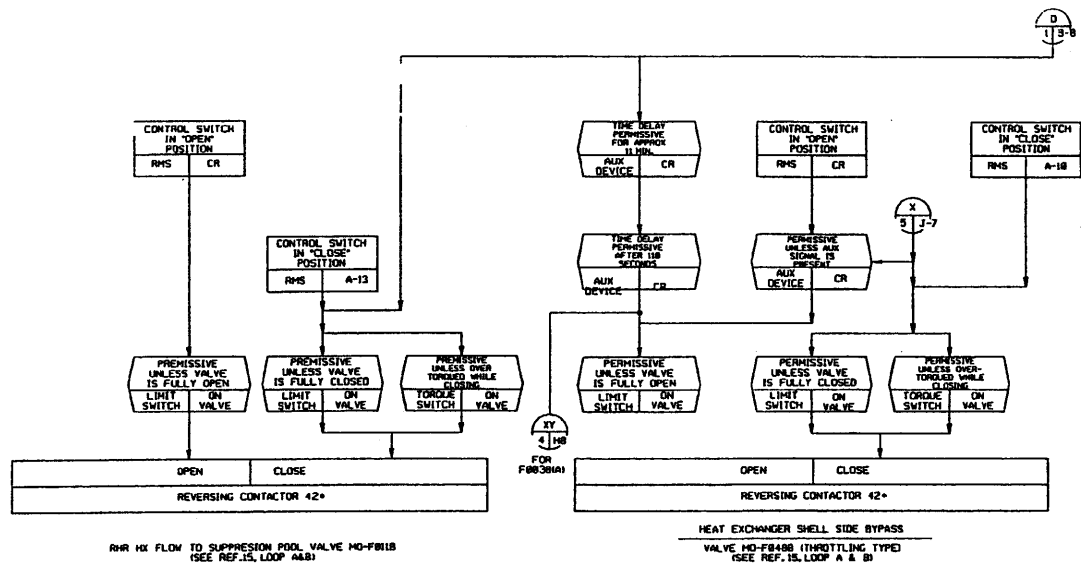
(Rev. 12 1/03)

## 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)

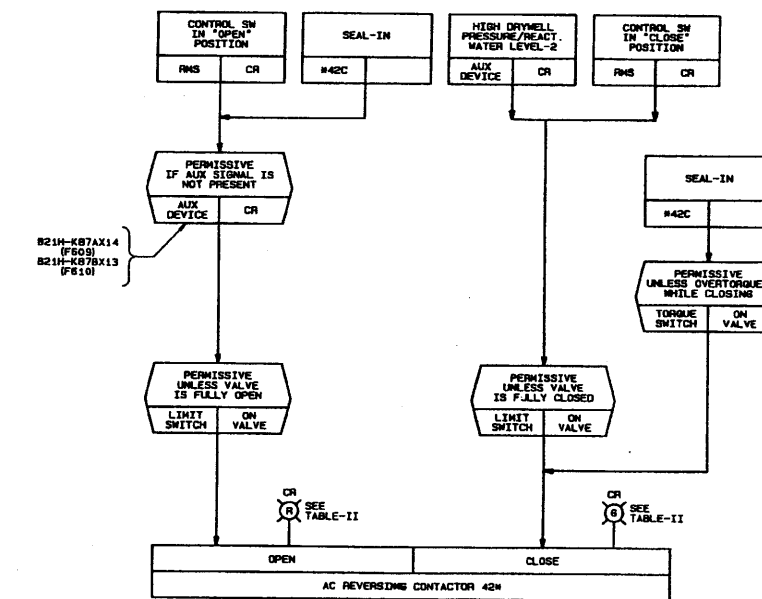
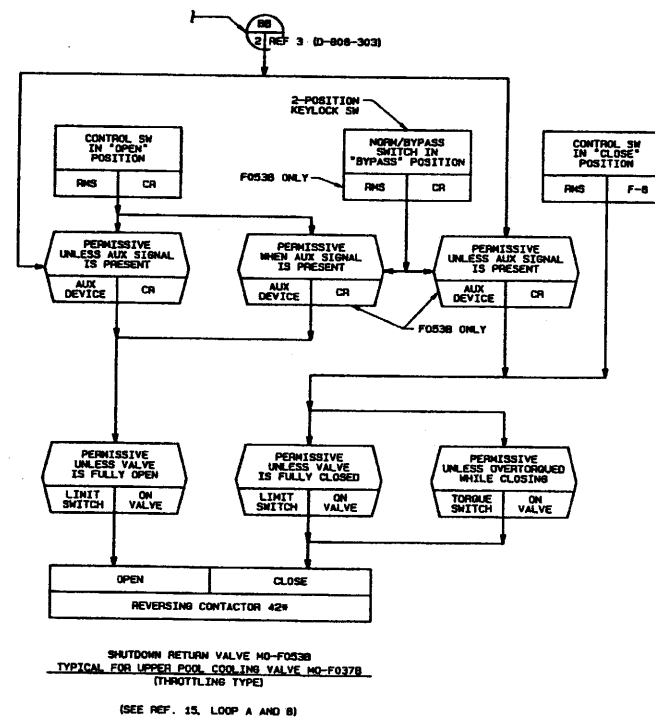
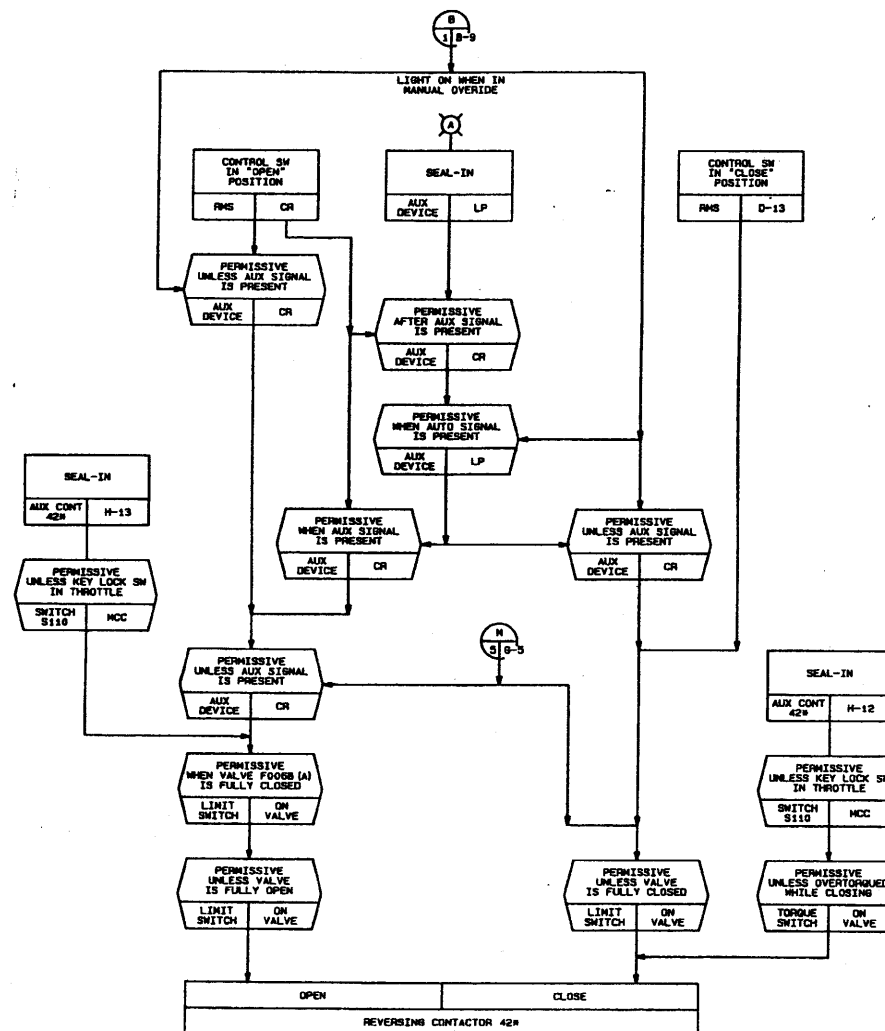
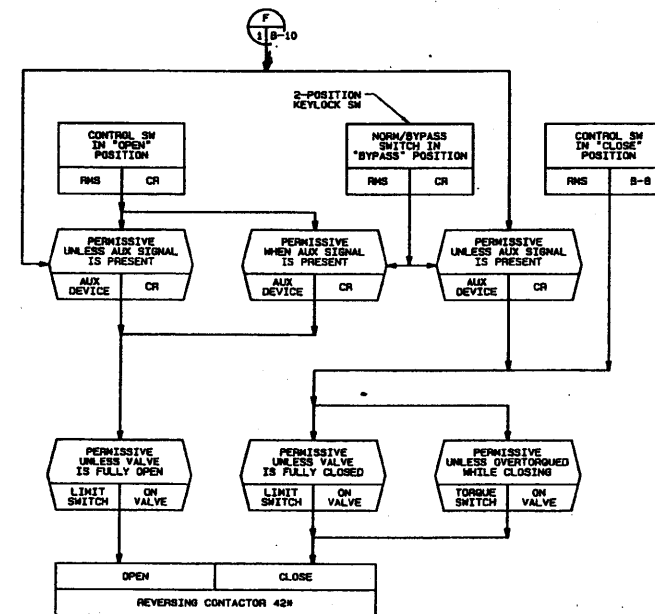
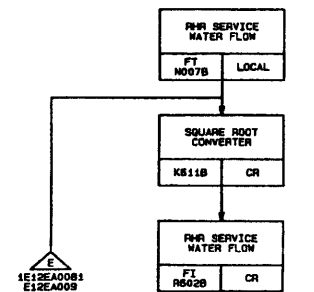


## PERRY NUCLEAR POWER PLANT

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)]

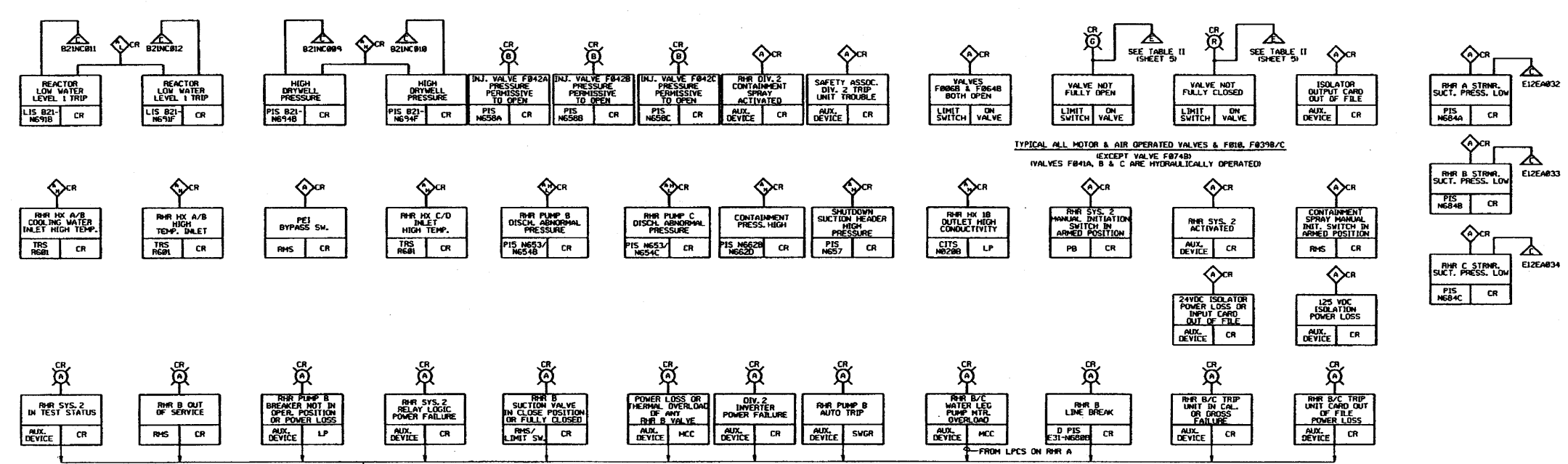


TABLE I

VALVE DESCRIPTION	VALVE NUMBER	SWITCH DESCRIPTION	NOTE
HX VENT VALVES	F874B	3 POS. SW "OPEN" - "HOLD" - "CLOSE" SPRING RETURN TO "HOLD"	
SHUTDOWN COOLING SUCTION VALVE	F886B	2 POSITION SW "CLOSE" - "OPEN" MAINTAINED CONTACTS	(SEE REF. 15, LOOP A & B)
RHRS PUMP SUCTION VALVES HX INLT. VALVE	F884A & F885 F847B	2 POSITION SW "CLOSE" - "OPEN" MAINTAINED CONTACTS KEYLOCK IN "OPEN" POSITION (NO KEYLOCK ON F847B)	(SEE REF. 15, LOOP A & B)
HX OUTLET VALVE	F883B	3 POS. SW "CLOSE" - "AUTO" - "OPEN" SPRING RETURN TO "HOLD"	
HX VENT VALVE	F873B	3 POS. SW "OPEN" - "AUTO" - "CLOSE" SPRING RETURN TO "AUTO"	

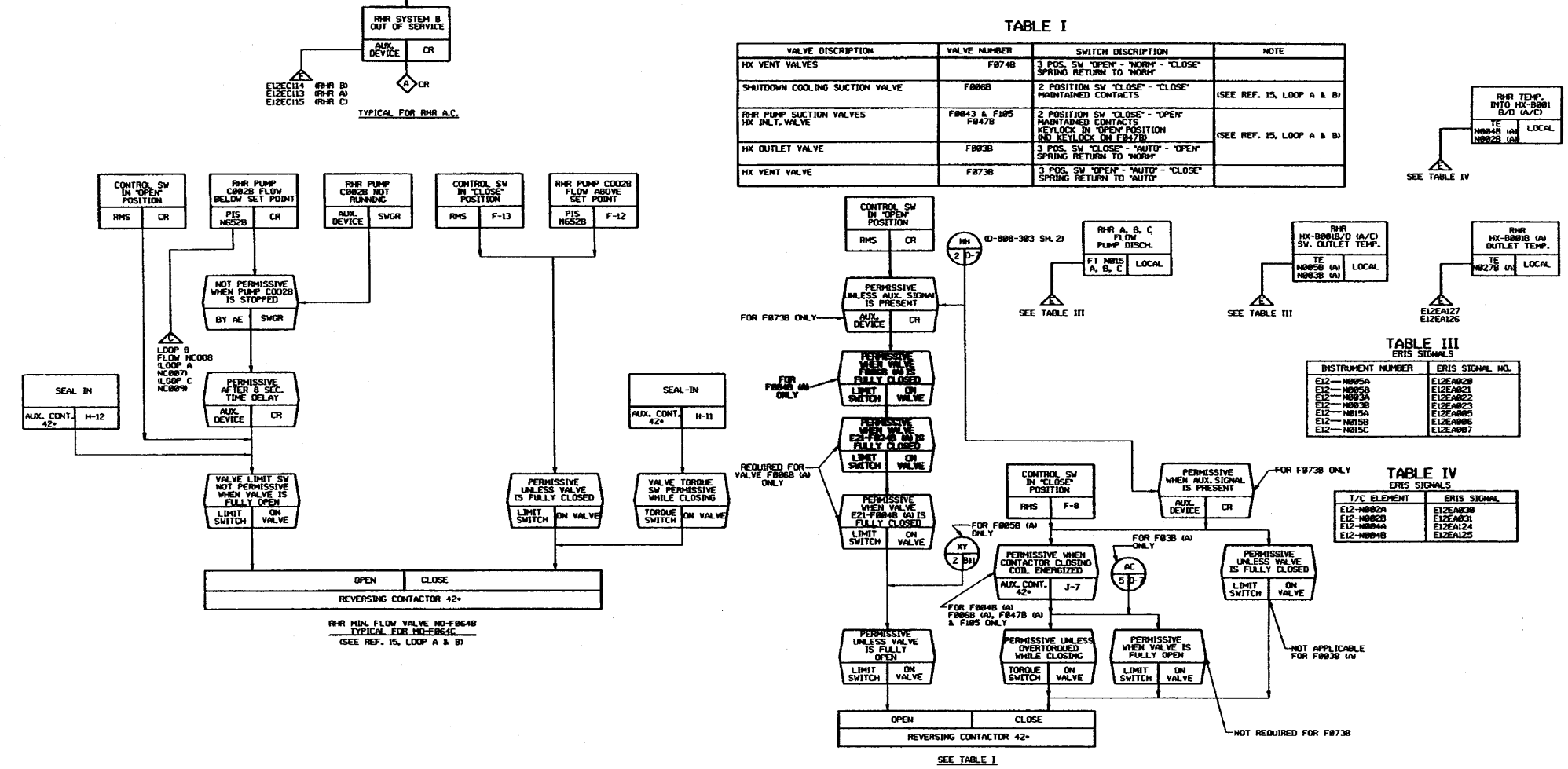


TABLE III  
ERIS SIGNALS

INSTRUMENT NUMBER	ERIS SIGNAL NO.
E12-N885A	E12E885A
E12-N885B	E12E885B
E12-N885C	E12E885C
E12-N885D	E12E885D
E12-N885E	E12E885E
E12-N885F	E12E885F
E12-N885G	E12E885G
E12-N885H	E12E885H
E12-N885I	E12E885I
E12-N885J	E12E885J

TABLE IV  
ERIS SIGNALS

T/C ELEMENT	ERIS SIGNAL
E12-N882A	E12E882A
E12-N882B	E12E882B
E12-N882C	E12E882C
E12-N882D	E12E882D
E12-N882E	E12E882E
E12-N882F	E12E882F
E12-N882G	E12E882G
E12-N882H	E12E882H
E12-N882I	E12E882I
E12-N882J	E12E882J

FOR NOTES AND LEGENDS SEE THIS DRAWING SHEET 1.

(Rev. 12 1/03)

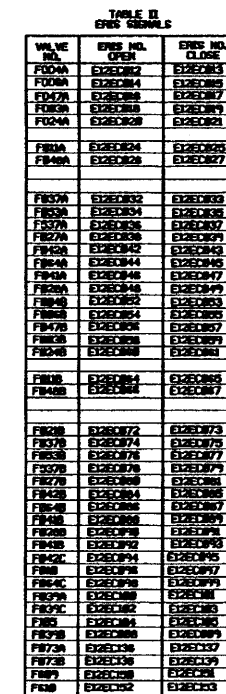
## PERRY NUCLEAR POWER PLANT

### Residual Heat Removal System

Figure 7.3-5 (Sheet 4 of 5)

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





(Rev. 12 1/03)

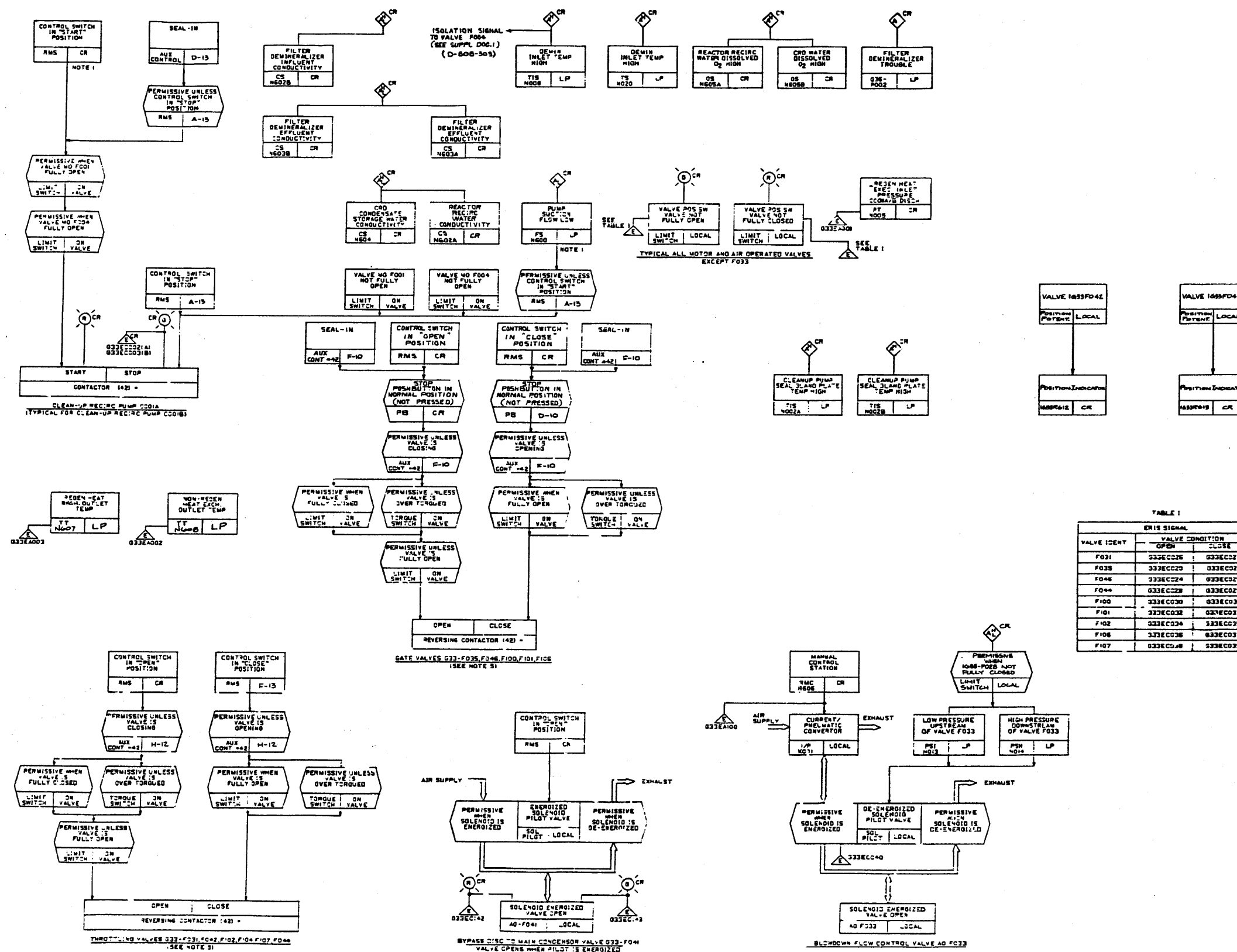


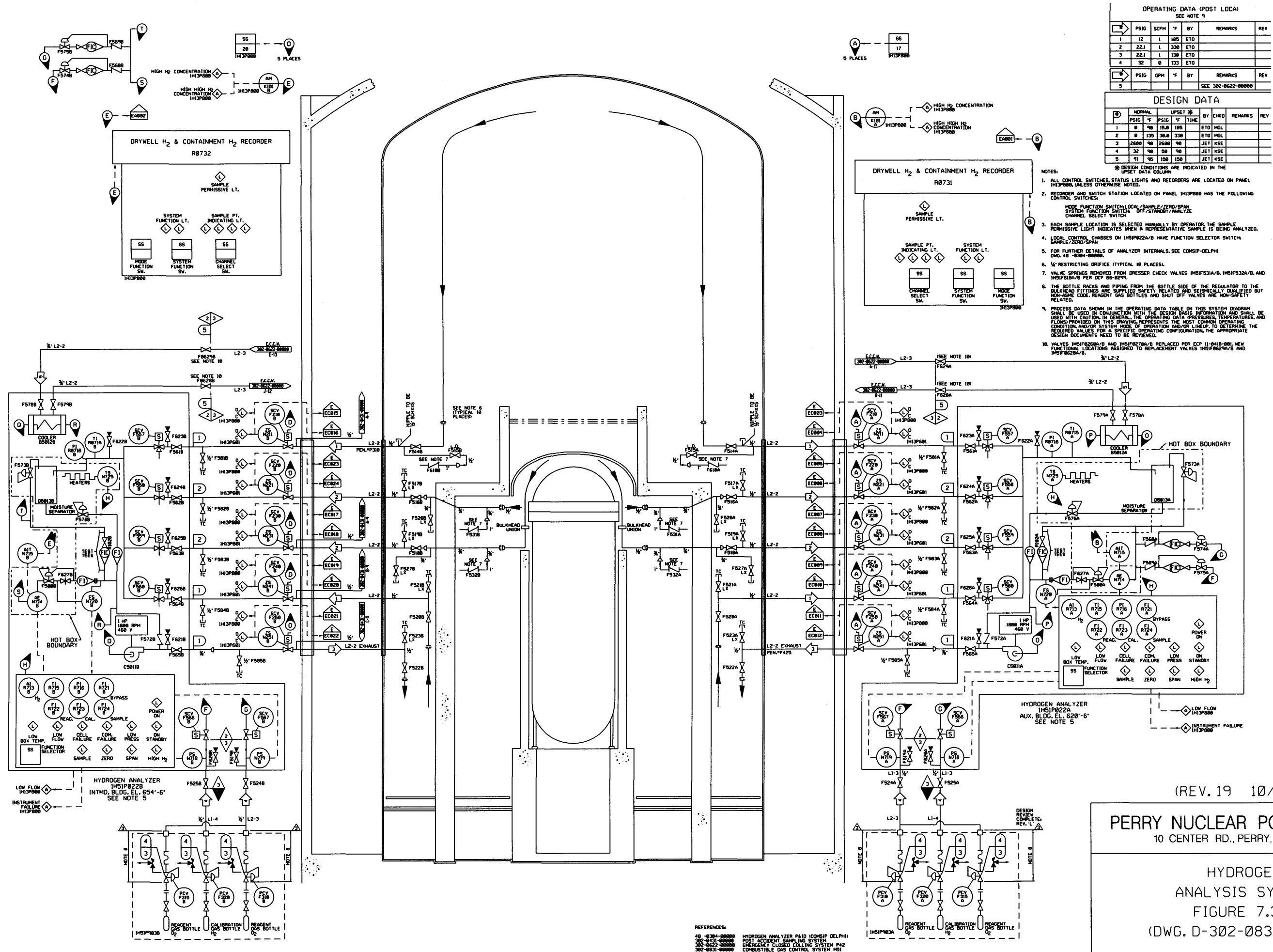
## PERRY NUCLEAR POWER PLANT

## Residual Heat Removal System

Figure 7.3-5 (Sheet 5 of 5)

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





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

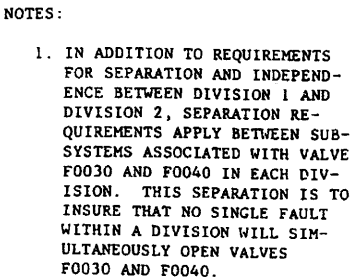
- NOTES:
1. ALL CONTROL SWITCHES, STATUS LIGHTS AND RECORDERS ARE LOCATED ON PANEL IH5IP0000 UNLESS OTHERWISE NOTED.
  2. RECORDER AND SWITCH STATION LOCATED ON PANEL IH5IP0000 HAS THE FOLLOWING CONTROL SWITCHES:  
MODE FUNCTION SWITCH: LOCAL/SAMPLE/ZERO/SPAN  
SYSTEM FUNCTION SWITCH: OFF/STANDBY/ANALYZE  
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 CHANGES ON IH5IP022A/B HAVE FUNCTION SELECTOR SWITCH.
  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 IH5IP531A/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 IH5IP5250A/B AND IH5IP5270A/B REPLACED PER ECP 11-0418-0001 NEW FUNCTIONAL LOCATIONS ASSIGNED TO REPLACEMENT VALVES IH5IP5250A/B AND IH5IP5270A/B.

(REV. 19 10/2015)

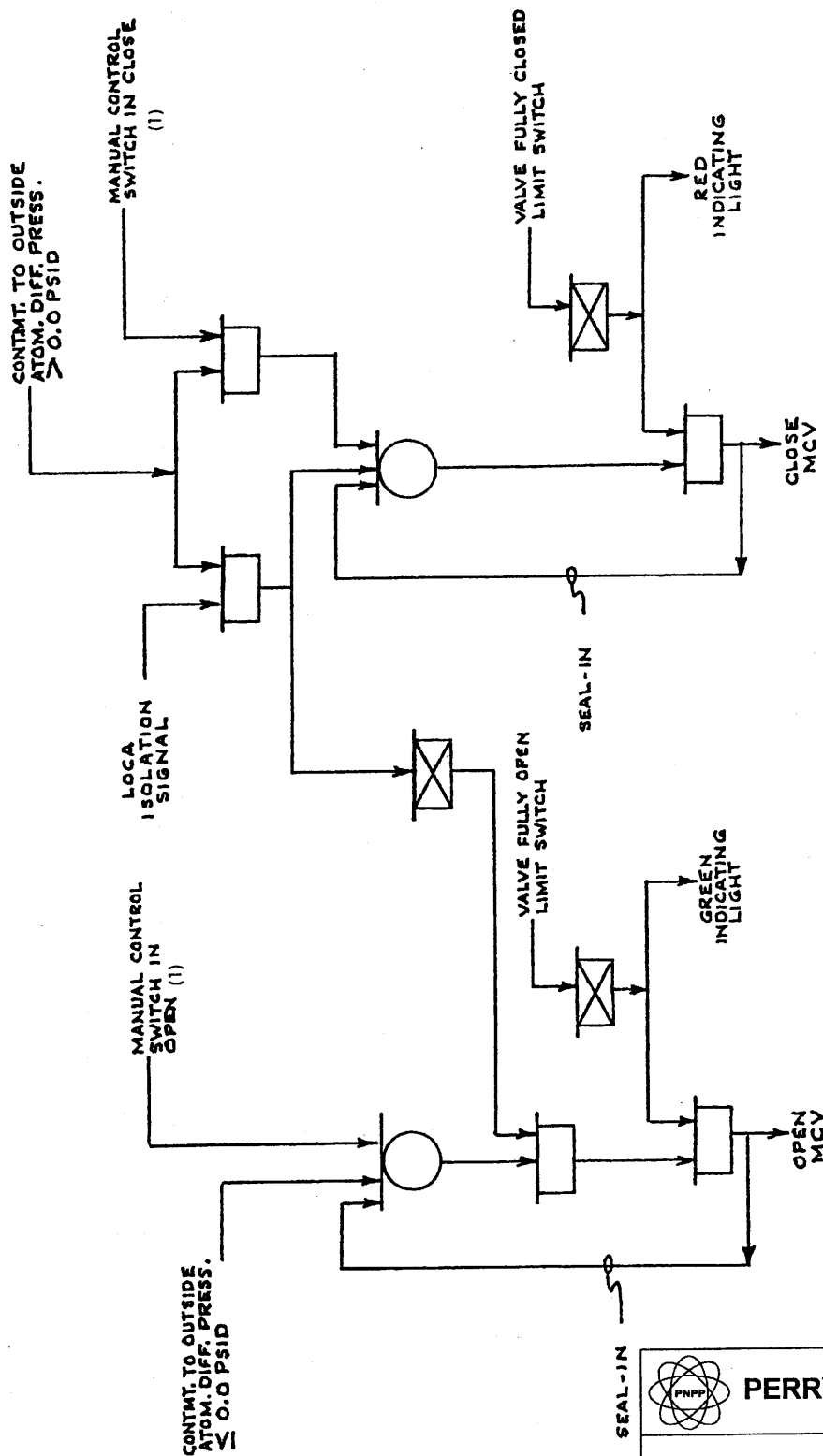
**PERRY NUCLEAR POWER PLANT**  
10 CENTER RD., PERRY, OHIO 44081

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

REFERENCES:  
48-8394-00000 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







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

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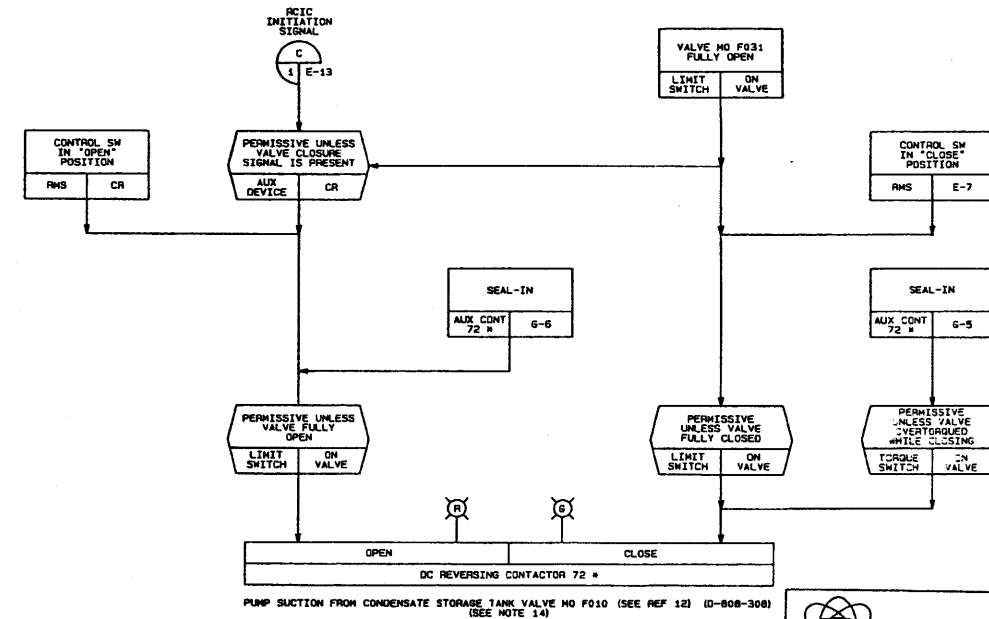
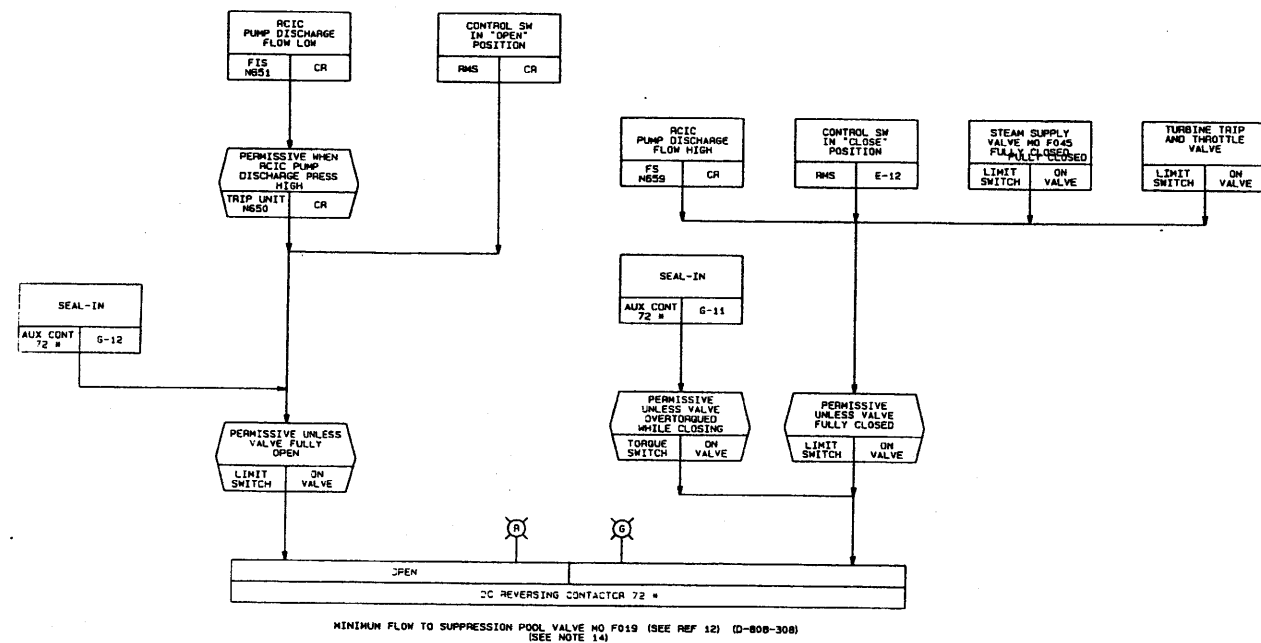
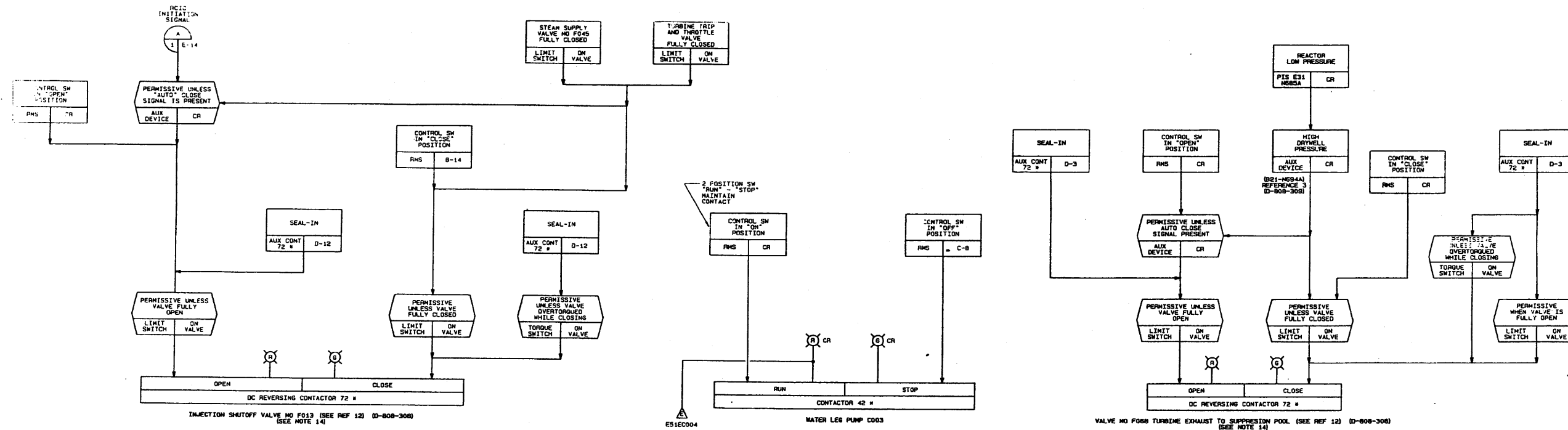


## PERRY NUCLEAR POWER PLANT

Containment Vacuum Relief  
System Control Logic

Figure 7.3-11





NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

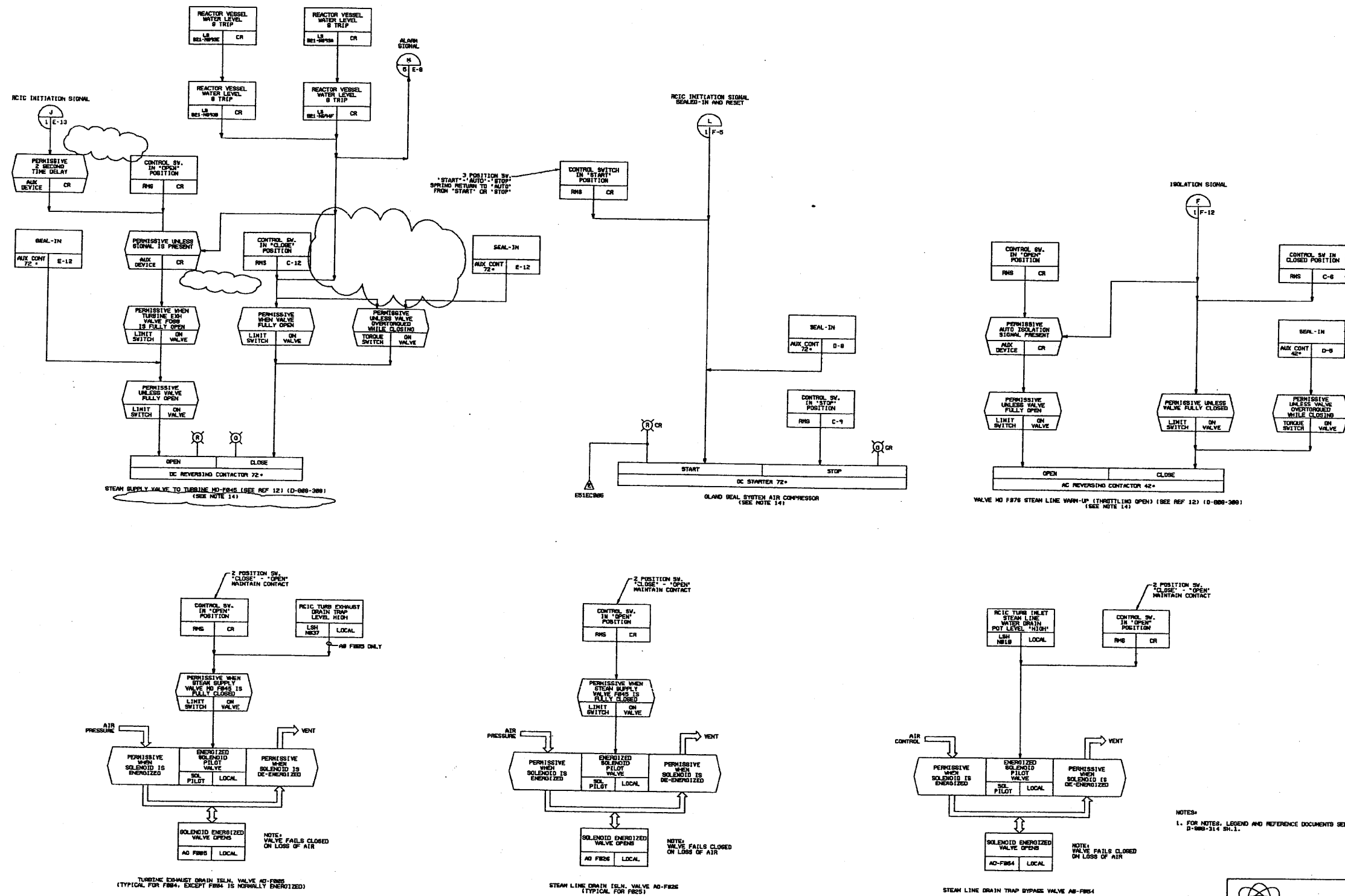
**PERRY NUCLEAR POWER PLANT**

Reactor Core Isolation  
Cooling System

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

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



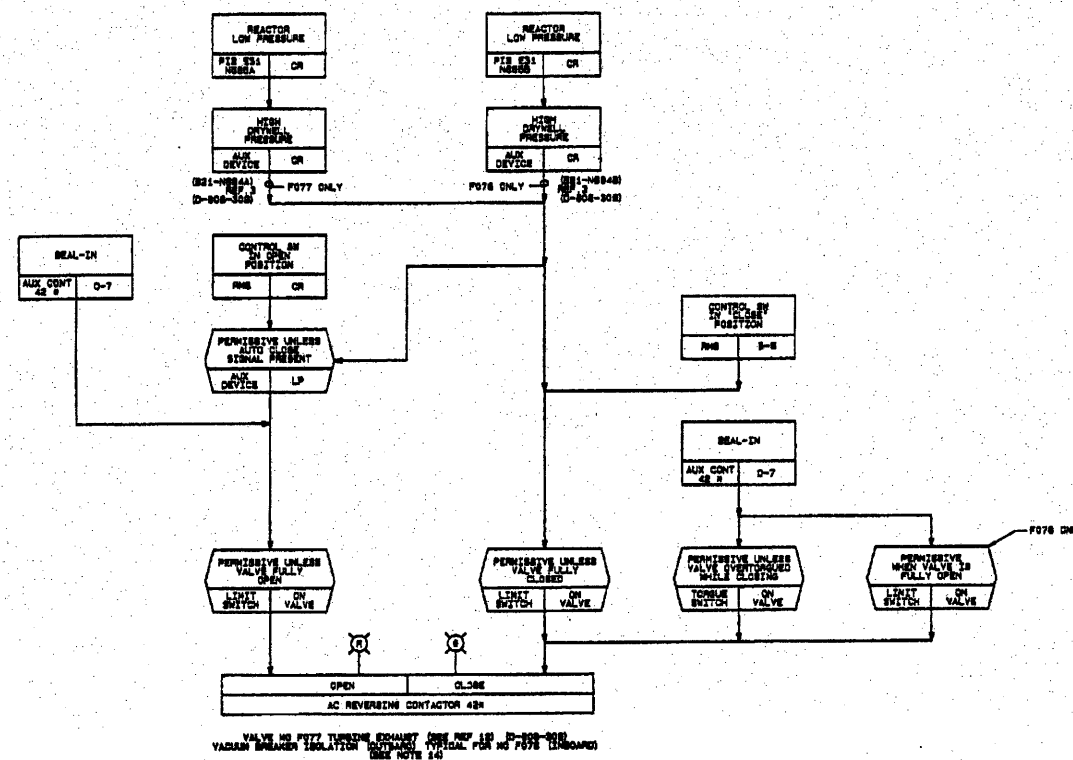
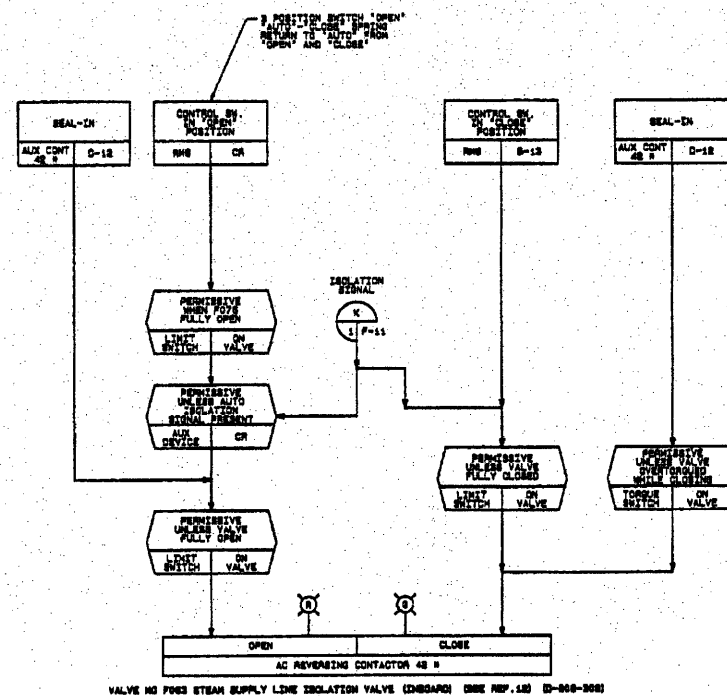


(Rev. 12 1/03)

**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

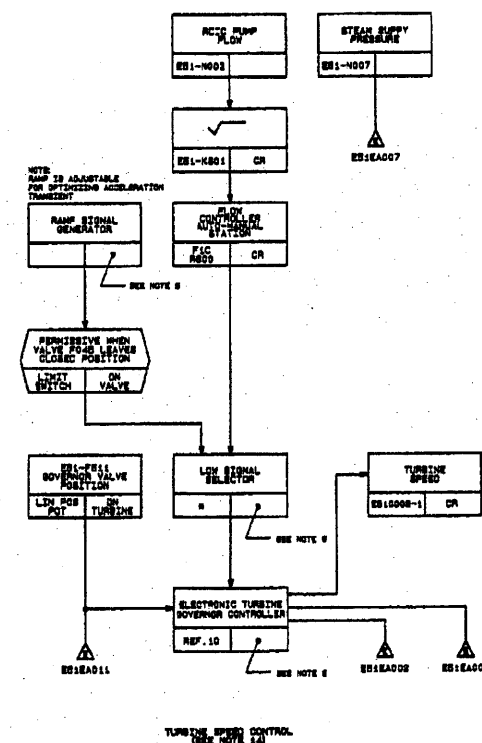
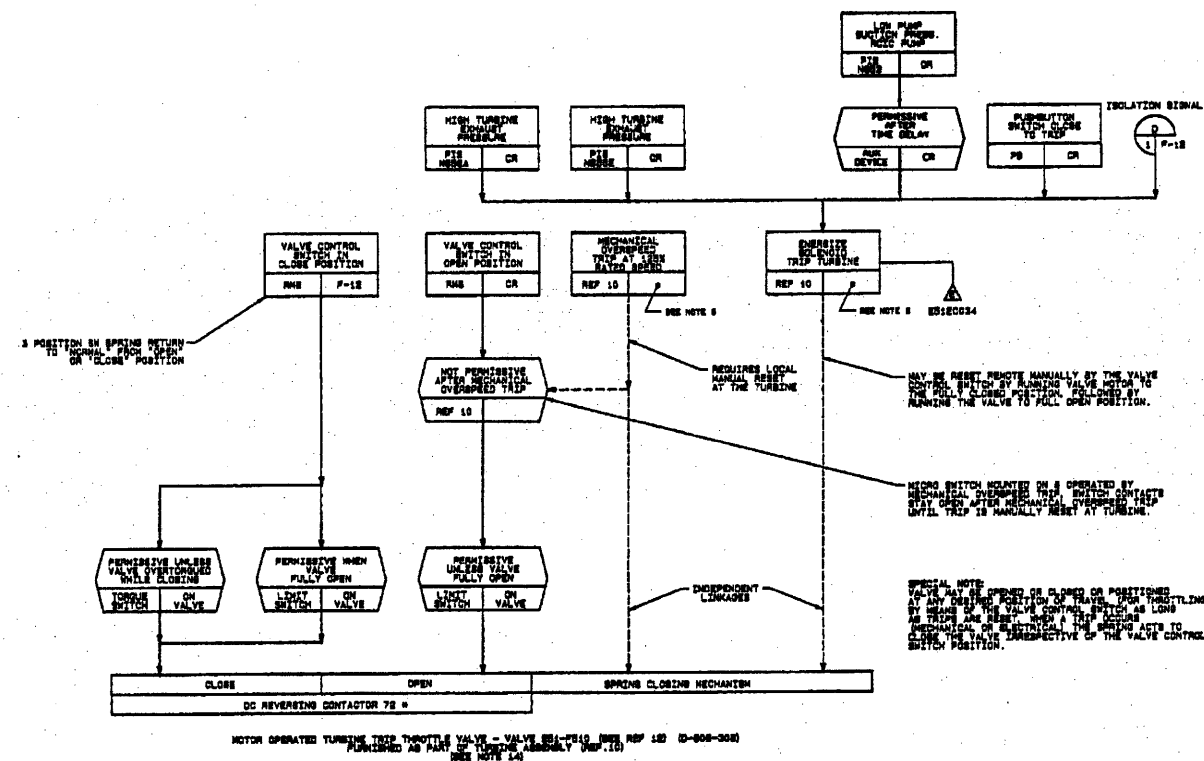
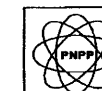


TABLE III - ERIS SIGNALS

VALVE NO.	OPEN	CLOSE
ES1-P003 (ACT)	ES1EC004	ES1EC005
ES1-P078 (ACT)	ES1EC006	ES1EC007
ES1-P084 (ACT)	ES1EC008	ES1EC009
ES1-P017 (ACT)	ES1EC00A	ES1EC00B
ES1-P079 (ACT)	ES1EC00C	ES1EC00D
ES1-P088	ES1EC010	ES1EC011
ES1-P010	ES1EC012	ES1EC013
ES1-P010	ES1EC014	ES1EC015
ES1-P088	ES1EC016	ES1EC017
ES1-P006	ES1EC018	ES1EC019
ES1-P084	ES1EC020	ES1EC021
ES1-P088	ES1EC022	ES1EC023
ES1-P004	ES1EC024	ES1EC025
ES1-P013	ES1EC026	ES1EC027
ES1-P081	ES1EC028	ES1EC029
ES1-P010	ES1EC030	ES1EC031
ES1-P088	ES1EC032	ES1EC033
ES1-P016	ES1EC034	ES1EC035
ES1-P082	ES1EC036	ES1EC037
ES1-P088	ES1EC038	ES1EC039

(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)]

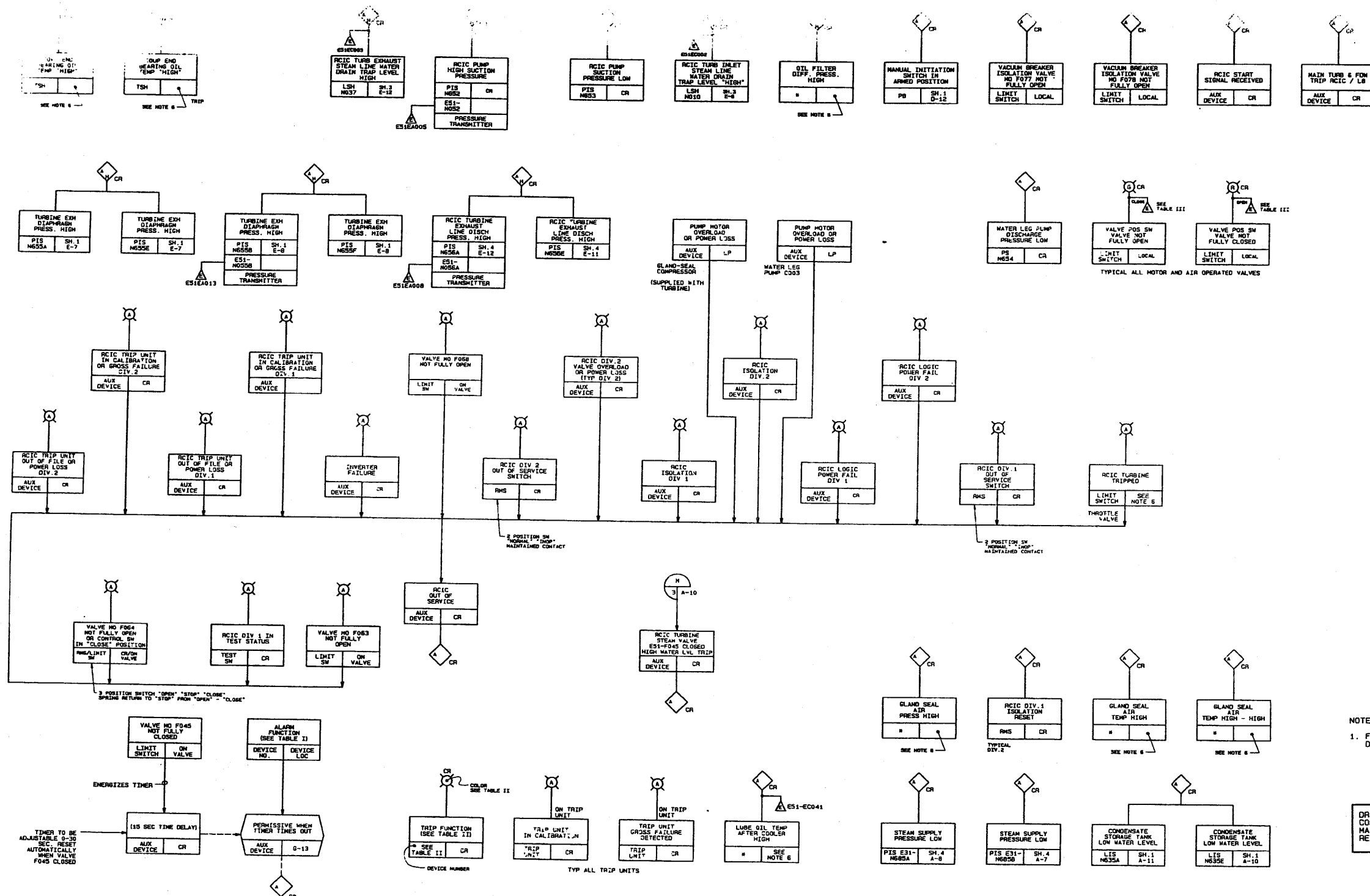


TABLE I

ALARM FUNCTION	INITIATING DEVICE NO.	DEVICE LOCATION	TYPE OF ALARM
TURBINE BRG OIL PRESSURE LOW	PS #	SEE NOTE 6	LOW
GLAND SEAL SYSTEM STEAM SEAL AIP PRESSURE LOW	SH #	SEE NOTE 6	LOW
CONDENSATE STORAGE TANK LOW WATER LEVEL	LIS NO38A	CR	LOW

TABLE II

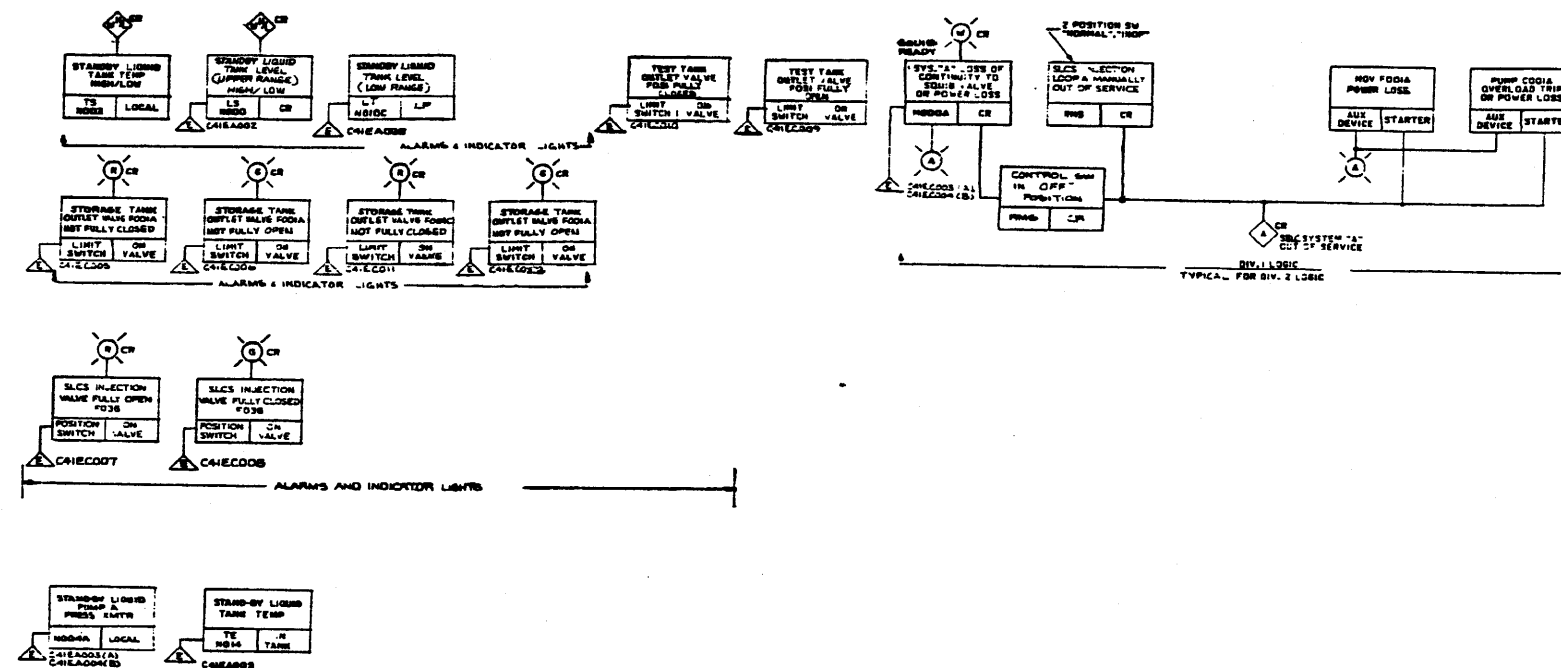
ACTUATING DEVICE	TRIP FUNCTION	COLOR
REF. 10	TRIP THROTTLE VALVE OPEN	RED
	TRIP THROTTLE VALVE CLOSED	GREEN
	GOVERNOR VALVE OPEN	RED
	GOVERNOR VALVE CLOSED	GREEN

(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

Reactor Core Isolation Cooling System

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



- NOTES
1. EACH SYSTEM CONTROL SWITCH IS KEYLOCKED IN OFF POSITION.
  2. CONTINUITY MONITOR SHALL BE CURRENT LIMITED AND WIRED TO PREVENT ACCIDENTAL FIRING OF EXPLOSIVE VALVES.
  3. SHUTTER VALVES AND SHUTTERS NOT SHOWN.
  4. STORAGE TANK OUTLET VALVES (F036) ARE INTERLOCKED WITH THE TEST TANK OUTLET VALVE (F036) TO PREVENT INJECTION OF CONTROL SYSTEM WATER INTO THE REACTOR. THE BALANCE OF THE SYSTEM IS TESTED USING THE SYSTEM CONTROL SWITCH TO INJECT TEST TANK WATER INTO THE REACTOR.
  5. SYSTEM ELECTRICAL POWER SHALL BE POWERED FROM DIV. 1 TIE 2 BUSES WITH PUMP CAL-CONTS (F036) AND VALVE CAL-CONTS (F036) ON A DIFFERENT BUS FROM PUMP CAL-CONTS (F036) AND VALVE CAL-CONTS (F036).
  6. MONITOR AND OPERATE HEATERS ARE NOT FUNCTIONAL. REDUNDANT AND NOT IN SERVICE.
  7. TEST TANK OUTLET VALVE SHALL HAVE TWO IDENTICAL LIMIT SWITCH CONFIGURATIONS. A & B TO MONITOR TANK & VALVE LOGIC.

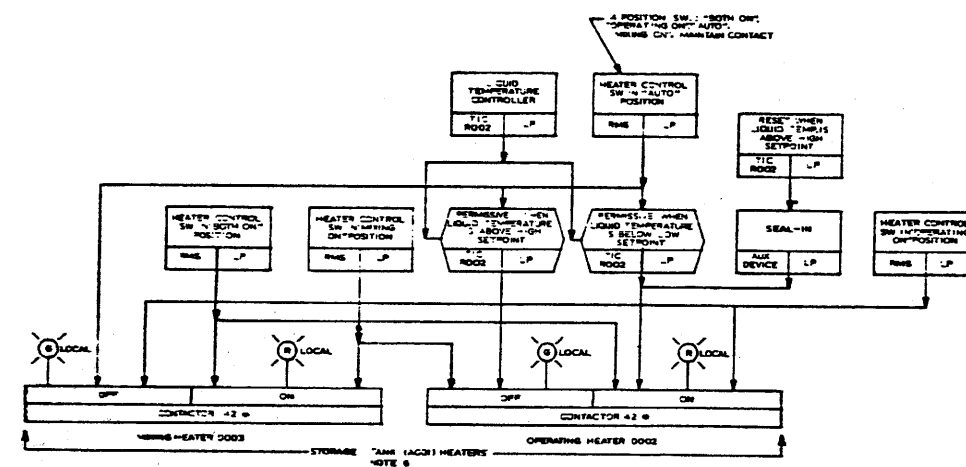
LEGEND

SW - SWITCH/GEAR DEVICE FUNCTION NUMBER - HIGH SPEC SPEC.

AL - ALARM RESPONSE INFORMATION SYS.

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

- |             |                        |
|-------------|------------------------|
| 1. 400-1050 | LOGIC SYMBOLS          |
| 2. 400-1050 | NUCLEAR POWER SYS. FCD |
| 3. 400-1050 | RACE RED               |
| 4. 400-1050 | ERMS ELEM DIAG         |



NUCLEAR SAFETY RELATED

(Rev. 12 1/03)

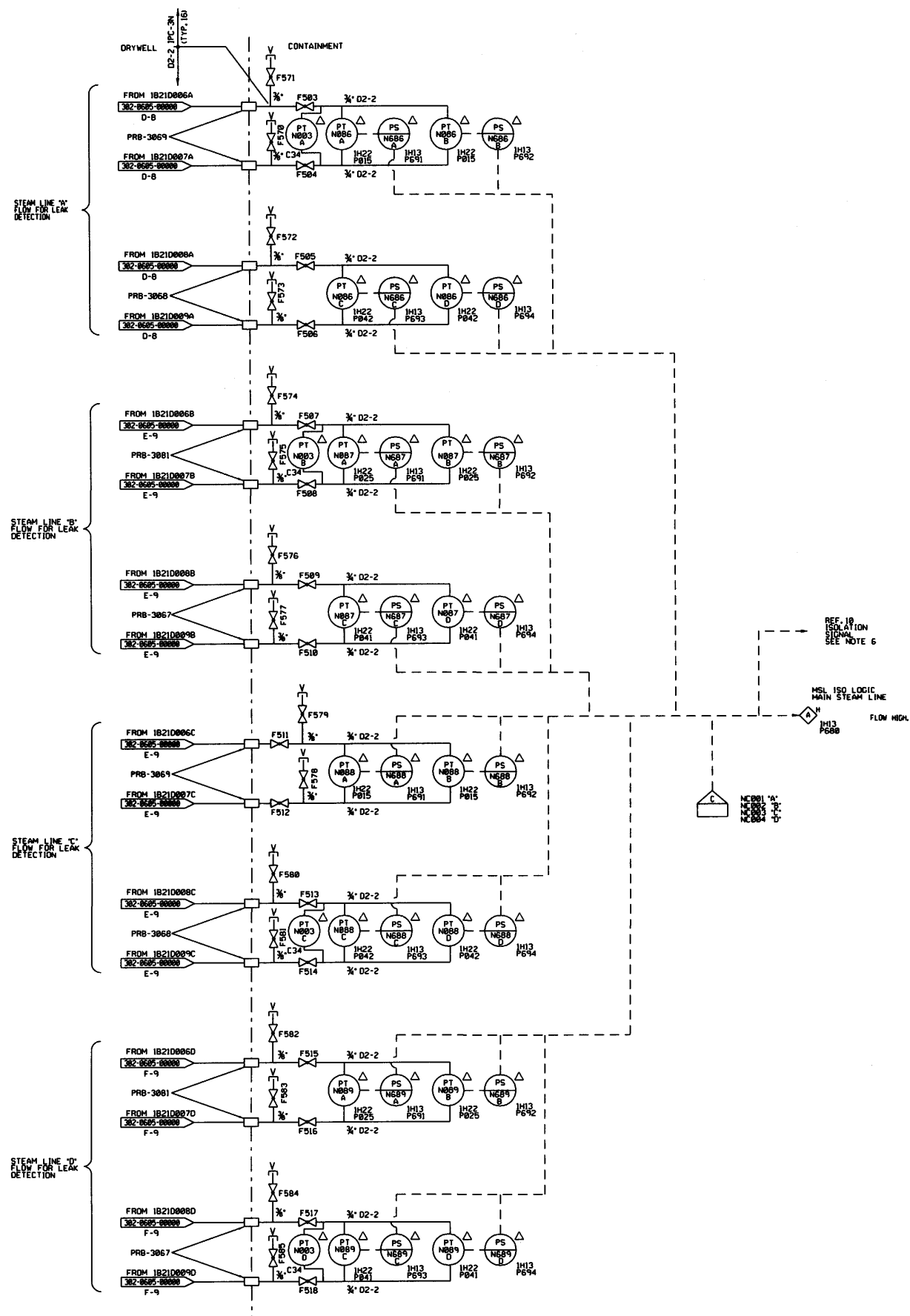
## PERRY NUCLEAR POWER PLANT

### Standby Liquid Control System

Figure 7.4-2 (Sheet 1 of 2)

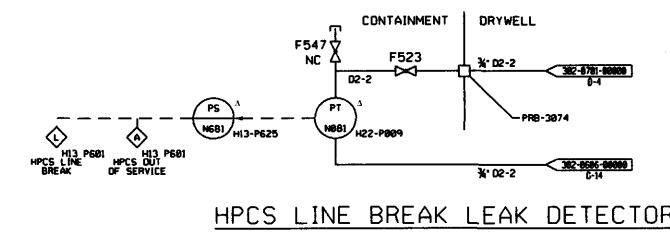
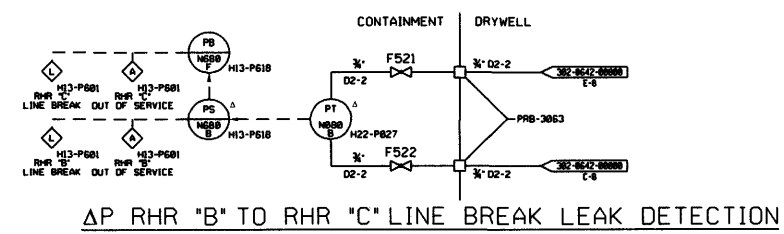
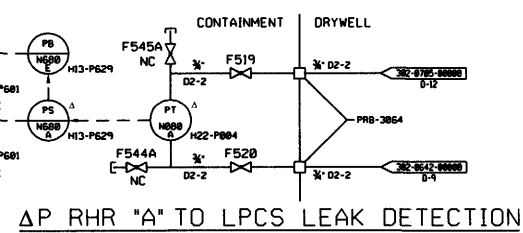
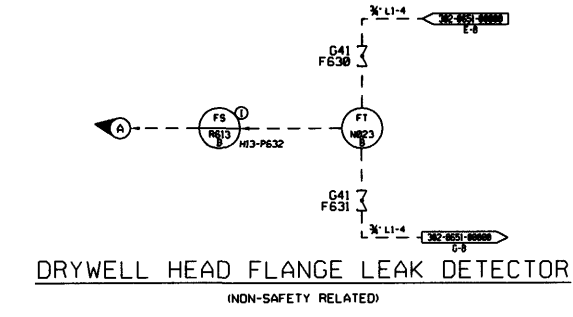
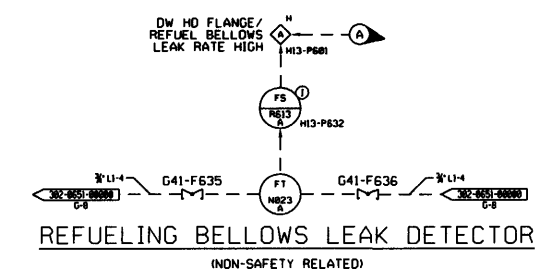
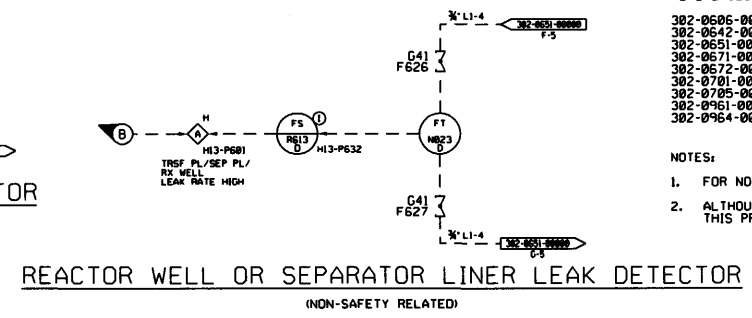
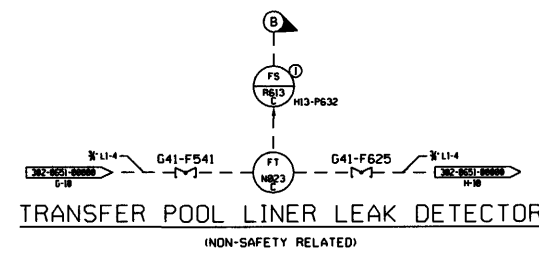
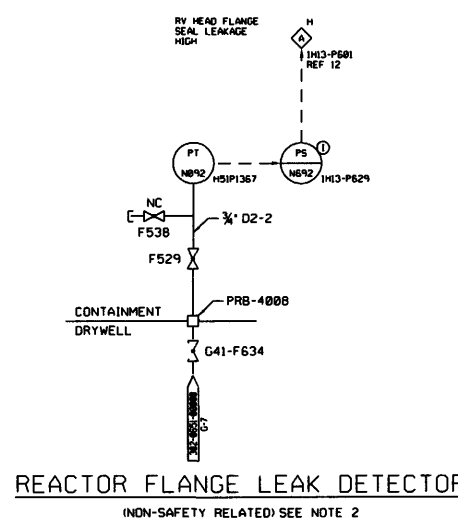
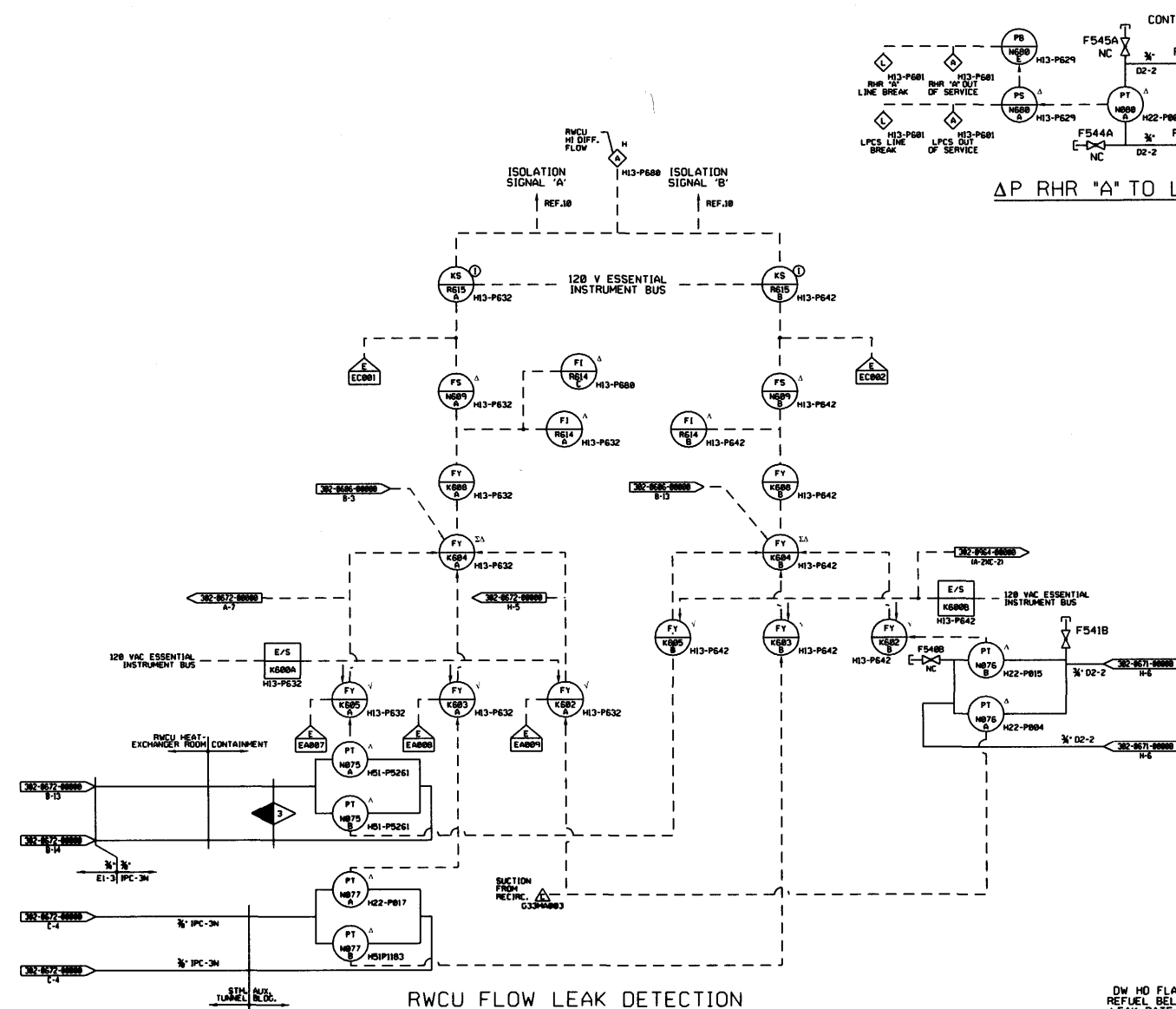
[Dwg. D-808-306(1)]





- SUPPORTING DOCUMENTS:
- | MPL NUMBER |                                                        |
|------------|--------------------------------------------------------|
| A42-1010   | PIPING AND INSTRUMENT SYMBOLS                          |
| A62-4030   | PRESSURE INTEGRITY OF NUCLEAR COMPONENTS SPECIFICATION |
| A62-1070   | PROCESS INSTRUMENT SPECIFICATION                       |
| A62-4200   | DRYWELL COOLING SYSTEM DESIGN SPECIFICATION            |
| A62-4050   | ELECTRICAL SEPARATION SPECIFICATION                    |
| A62-4350   | MECHANICAL EQUIPMENT SEPARATION                        |

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



- 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.

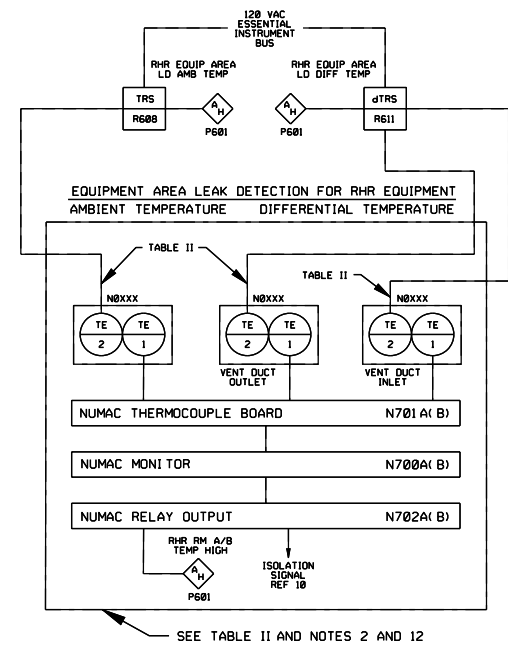
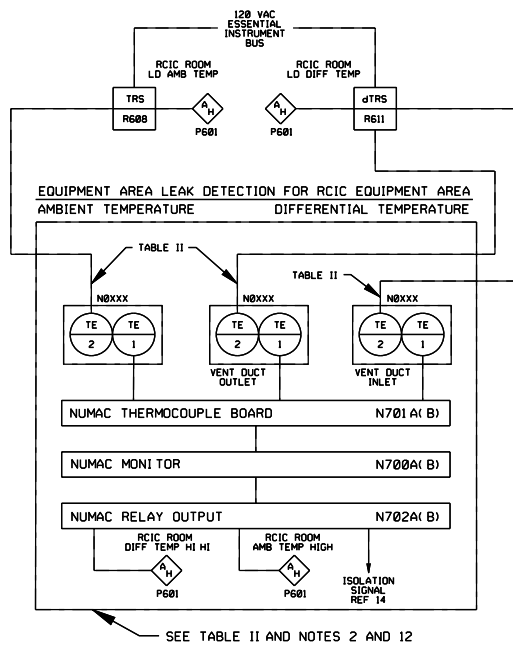
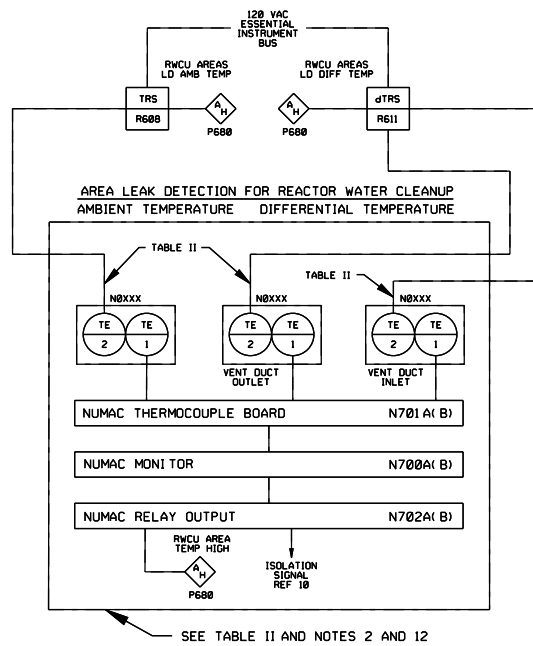
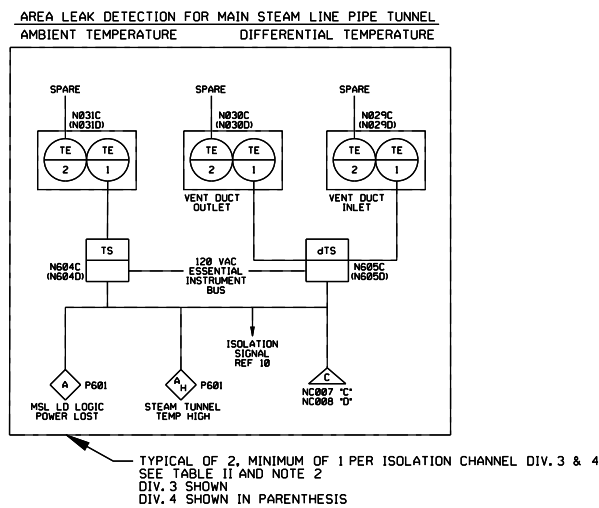
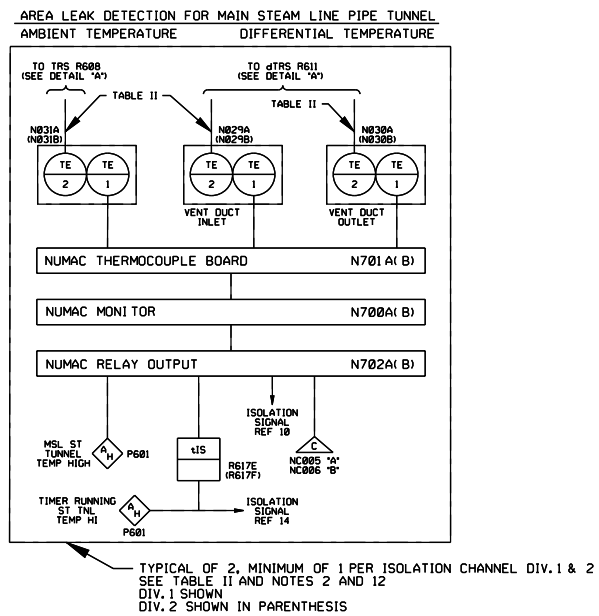
(REV. 19 10/2015)

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

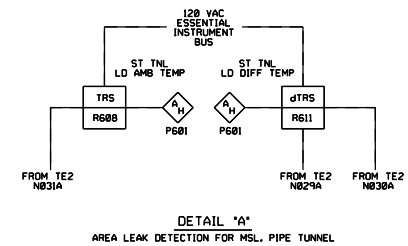
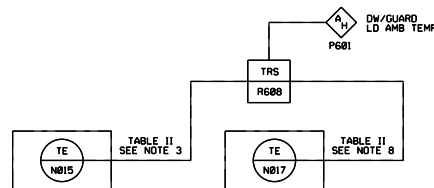
**LEAK DETECTION SYSTEM**

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	N831A	R608-1	1	N700A - A5-2, A5-3	N829A	N830A	R611-1	SW-1	B21-F082A-D, F082BA-D, F019, F067A-D, E51-F064, F031, G33-F084, F034, F039, F054	
MSL PIPE TUNNEL	2	N700B - A6-2, A6-3	N831B	R608-1		N700B - A5-2, A5-3	N829B	N830B				B21-F082A-D, F082BA-D, F016, E51-F063, F076, G33-F081, F028, F048, F053
MSL PIPE TUNNEL	3	N604C	N831C			N605C	N829C	N830C				B21-F082A-D, F082BA-D, F016
MSL PIPE TUNNEL	4	N604D	N831D			N605D	N829D	N830D				B21-F082A-D, F082BA-D, F019, F067A-D
DRYWELL	-		N817A	R608-2	2						NONE	
DRYWELL	-		N817B	R608-3								
DRYWELL	-		N817C	R608-4								
DRYWELL	-		N817D	R608-5								
RHR EQUIPMENT AREA 1	1	N700A - A6-4	N818A	R608-6	3	N700A - A5-4	N827A	N828A	R611-2	SW-3	E12-F008, F023, F037A, F048, F053A, F075A/B, E51-F031, F064	
RHR EQUIPMENT AREA 1	2	N700B - A6-4	N818B			N700B - A5-4	N827B	N828B				E12-F009, F037B, F049, F053B, F068A/B, E51-F063, F076
RHR EQUIPMENT AREA 2	1	N700A - A6-5	N801A	R608-7		N700A - A5-5	N802A	N803A	R611-3			E12-F008, F023, F037A, F048, F053A, F075A/B, E51-F031, F064
RHR EQUIPMENT AREA 2	2	N700B - A6-5	N801B			N700B - A5-5	N802B	N803B				E12-F009, F037B, F049, F053B, F068A/B, E51-F063, F076
RCIC EQUIPMENT AREA	1	N700A - A6-1	N804A	R608-9	4	N700A - A5-1	N805A	N806A	R611-4	SW-4	E51-F064, F031	
RCIC EQUIPMENT AREA	2	N700B - A6-1	N804B			N700B - A5-1	N805B	N806B				E51-F063, F076
RWCU HEAT EXCHANGER ROOM	1	N700A - A2-3	N834A	R608-10	6	N700A - A1-3	N836A	N835A	R611-5	SW-5	G33-F004, F034, F039, F054	
RWCU HEAT EXCHANGER ROOM	2	N700B - A2-3	N834B			N700B - A1-3	N836B	N835B				G33-F001, F048, F053, F028
RWCU PUMP B ROOM	1	N700A - A2-2	N837A	R608-11	5	N700A - A1-2	N838A	N839A	R611-6	SW-2	G33-F004, F034, F039, F054	
RWCU PUMP B ROOM	2	N700B - A2-2	N837B			N700B - A1-2	N838B	N839B				G33-F001, F048, F053, F028
RWCU PUMP A ROOM	1	N700A - A2-1	N848A	R608-12		N700A - A1-1	N841A	N842A	R611-7			G33-F004, F034, F039, F054
RWCU PUMP A ROOM	2	N700B - A2-1	N848B			N700B - A1-1	N841B	N842B				G33-F001, F048, F053, F028
RWCU VALVE NEST ROOM	1	N700A - A4-1	N843A	R608-13		N700A - A3-1	N844A	N845A	R611-8		G33-F004, F034, F039, F054	
RWCU VALVE NEST ROOM	2	N700B - A4-1	N843B			N700B - A3-1	N844B	N845B				G33-F001, F048, F053, F028
RWCU DEMIN ROOM 1	1	N700A - A4-2	N846A	R608-14	6	N700A - A3-2	N848A	N847A	R611-9	SW-5	G33-F004, F034, F039, F054	
RWCU DEMIN ROOM 1	2	N700B - A4-2	N846B			N700B - A3-2	N848B	N847B				G33-F001, F048, F053, F028
RWCU DEMIN ROOM 2	1	N700A - A4-3	N849A	R608-15		N700A - A3-3	N851A	N850A	R611-10			G33-F004, F034, F039, F054
RWCU DEMIN ROOM 2	2	N700B - A4-3	N849B			N700B - A3-3	N851B	N850B				G33-F001, F048, F053, F028
RWCU DEMIN VALVE ROOM	1	N700A - A4-5	N852A	R608-16		N700B - A3-5	N854A	N853A	R611-11		G33-F004, F034, F039, F054	
RWCU DEMIN VALVE ROOM	2	N700B - A4-5	N852B			N700B - A3-5	N854B	N853B				G33-F001, F048, F053, F028
RWCU DEMIN REC TANK	1	N700A - A4-4	N855A	R608-17		N700A - A3-4	N857A	N856A	R611-12			G33-F004, F034, F039, F054
RWCU DEMIN REC TANK	2	N700B - A4-4	N855B			N700B - A3-4	N857B	N856B				G33-F001, F048, F053, F028
GUARD PIPE MONITORED												
MAIN STEAM LINE "A"	-		N815A	R608-18	2						NONE	
MAIN STEAM LINE "B"	-		N815B	R608-19								
MAIN STEAM LINE "C"	-		N815C	R608-20								
MAIN STEAM LINE "D"	-		N815D	R608-21								



NOTES:

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

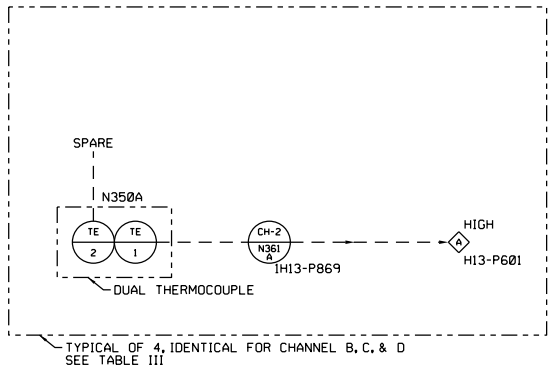
(Rev. 18 10/13)

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

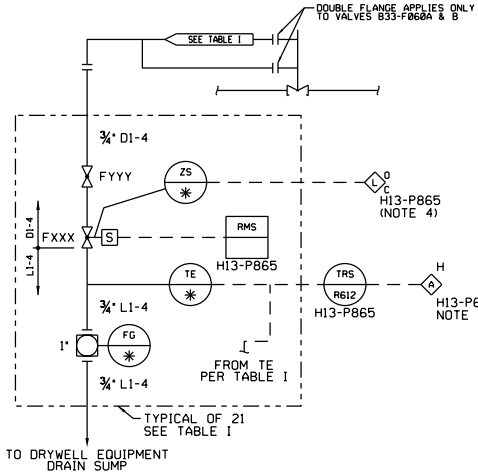
Leak Detection System  
Figure 7.6-1 (Sheet 3 of 4)  
(Dwg. 302-0963-00000)



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



DETAIL "A"  
VALVE STEM LEAK DETECTION



DETAIL "B"  
VALVE STEM LEAK DETECTION

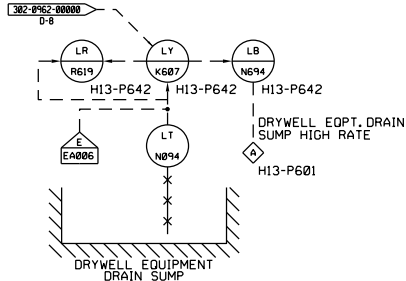
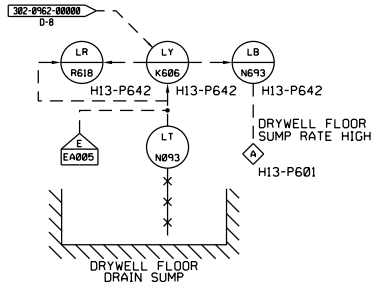
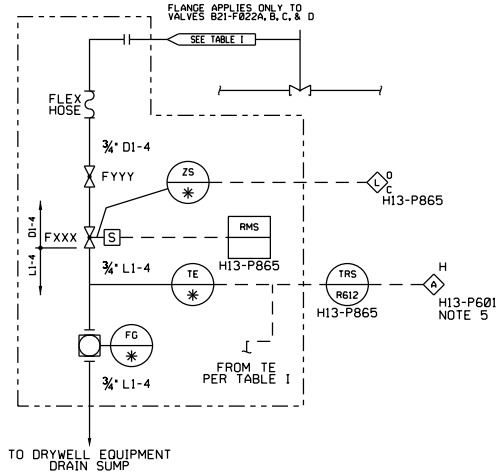
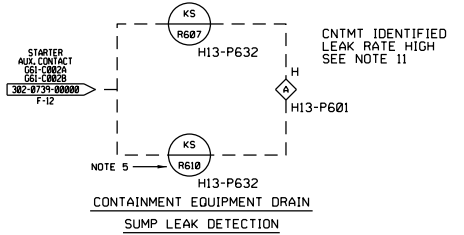
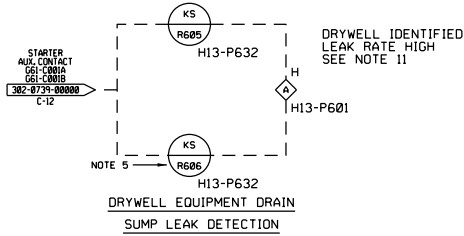
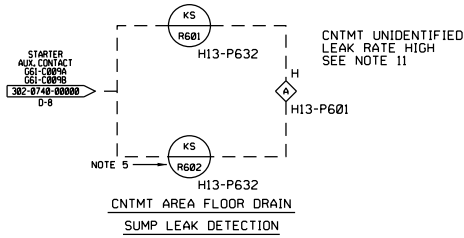


TABLE I

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

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

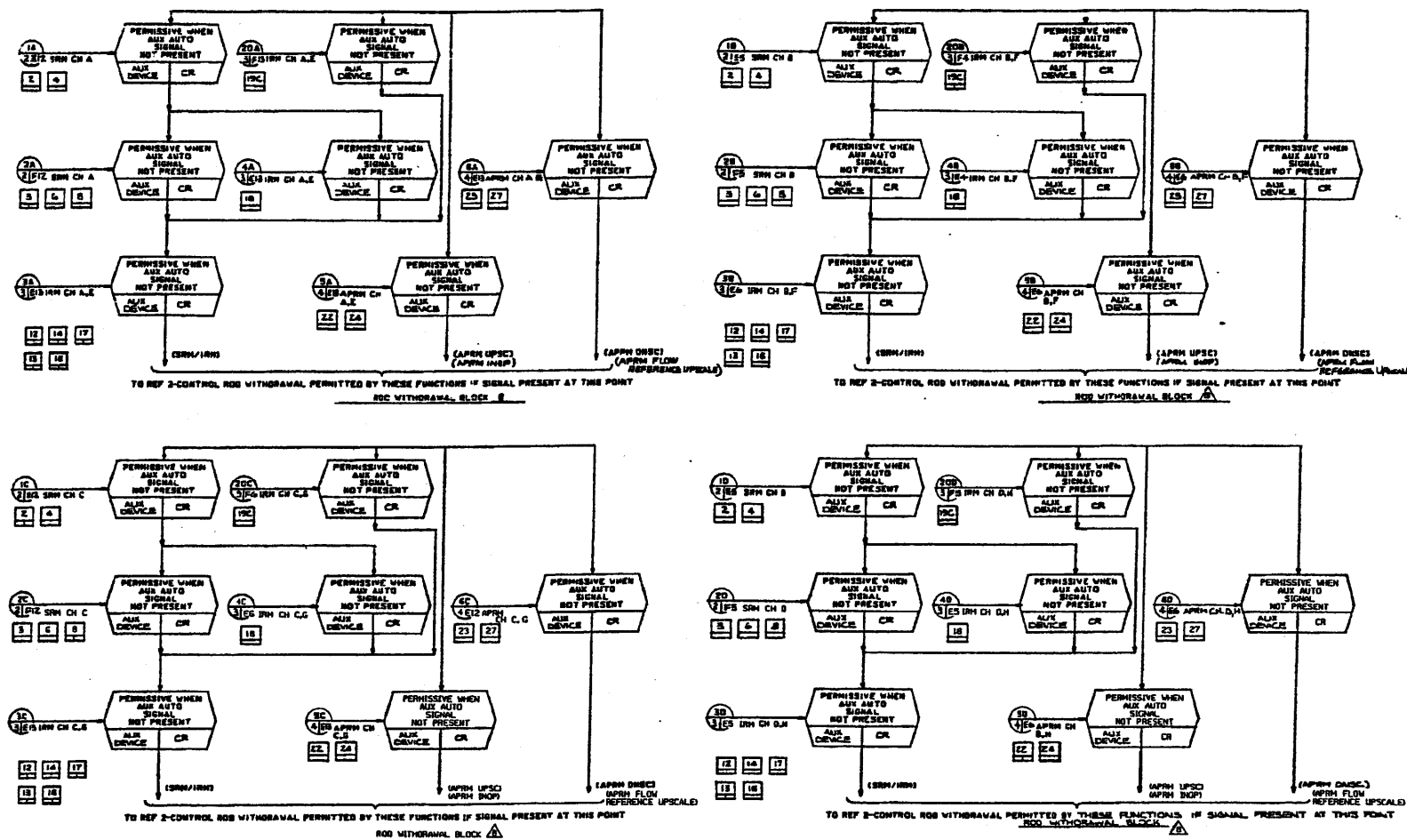
REFERENCES:  
302-0739-00000 LIQUID RADWASTE SUMPS SYSTEM EQUIPMENT  
302-0740-00000 DRAIN SUMPS AND OIL SEPARATORS G61  
302-0740-00000 LIQUID RADWASTE SUMPS SYSTEM FLOOR DRAIN SUMPS G61  
302-0962-00000 LEAK DETECTION SYSTEM E31

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 "GOOD" 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)
  - IRN -- INTERMEDIATE RANGE MONITOR
  - APRM -- AVERAGE POWER RANGE MONITOR
  - SRM -- SOURCE RANGE MONITOR
  - LPWM -- LOCAL POWER RANGE MONITOR
  - TRP -- TRIP SYSTEM
  - MOCC -- MULTIPLE OUTPUT CONTROLLER
  - RPV -- REACTOR PRESSURE VESSEL
  - △ -- EMERGENCY RESPONSE INFORMATION SYSTEM
  - OPRM -- 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. FCD --- 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 / D-808-307

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

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

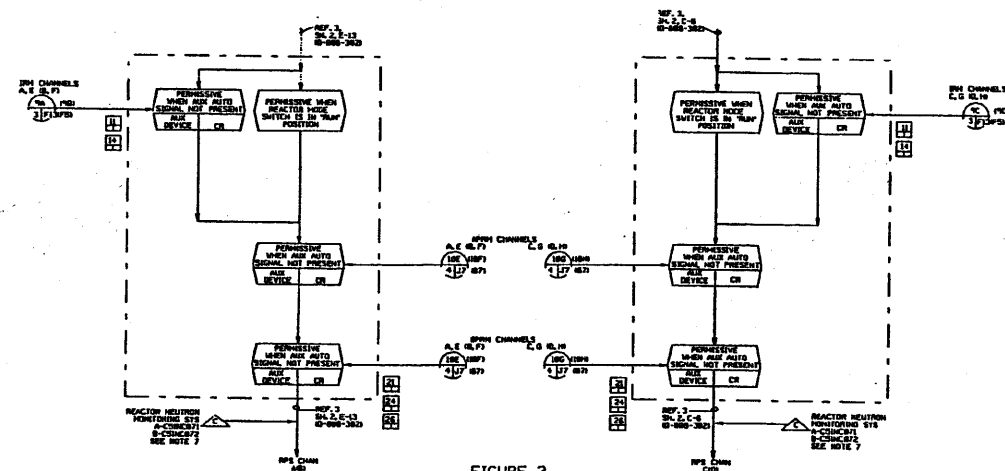
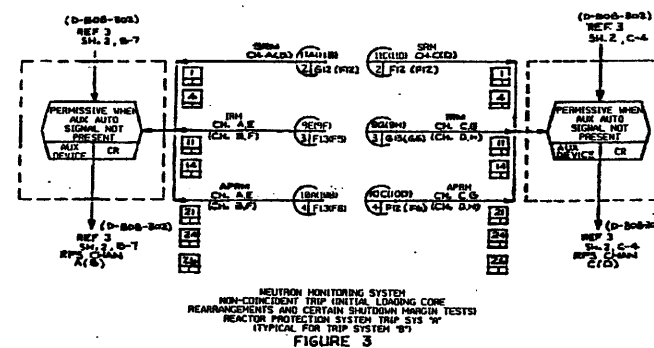
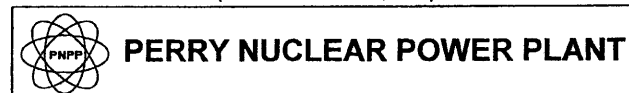


FIGURE 2  
NEUTRON MONITORING SYSTEM TRIP  
REACTOR PROTECTION SYSTEM TRIP  
SYSTEM A  
(TYP. FOR SYSTEM B)



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)

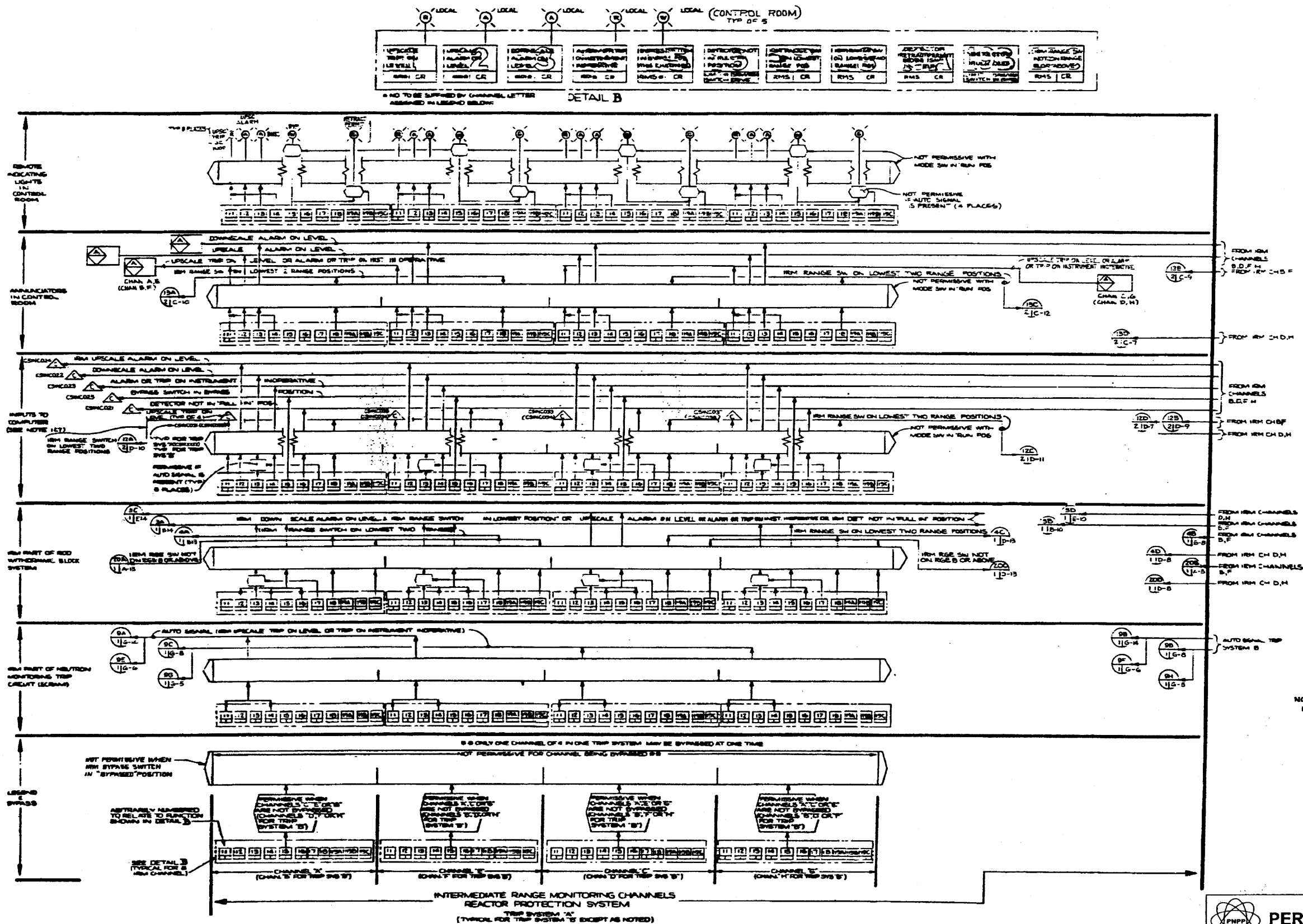


Neutron Monitoring System

Figure 7.6-2 (Sheet 1 of 7)

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





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

(Rev. 12 1/03)

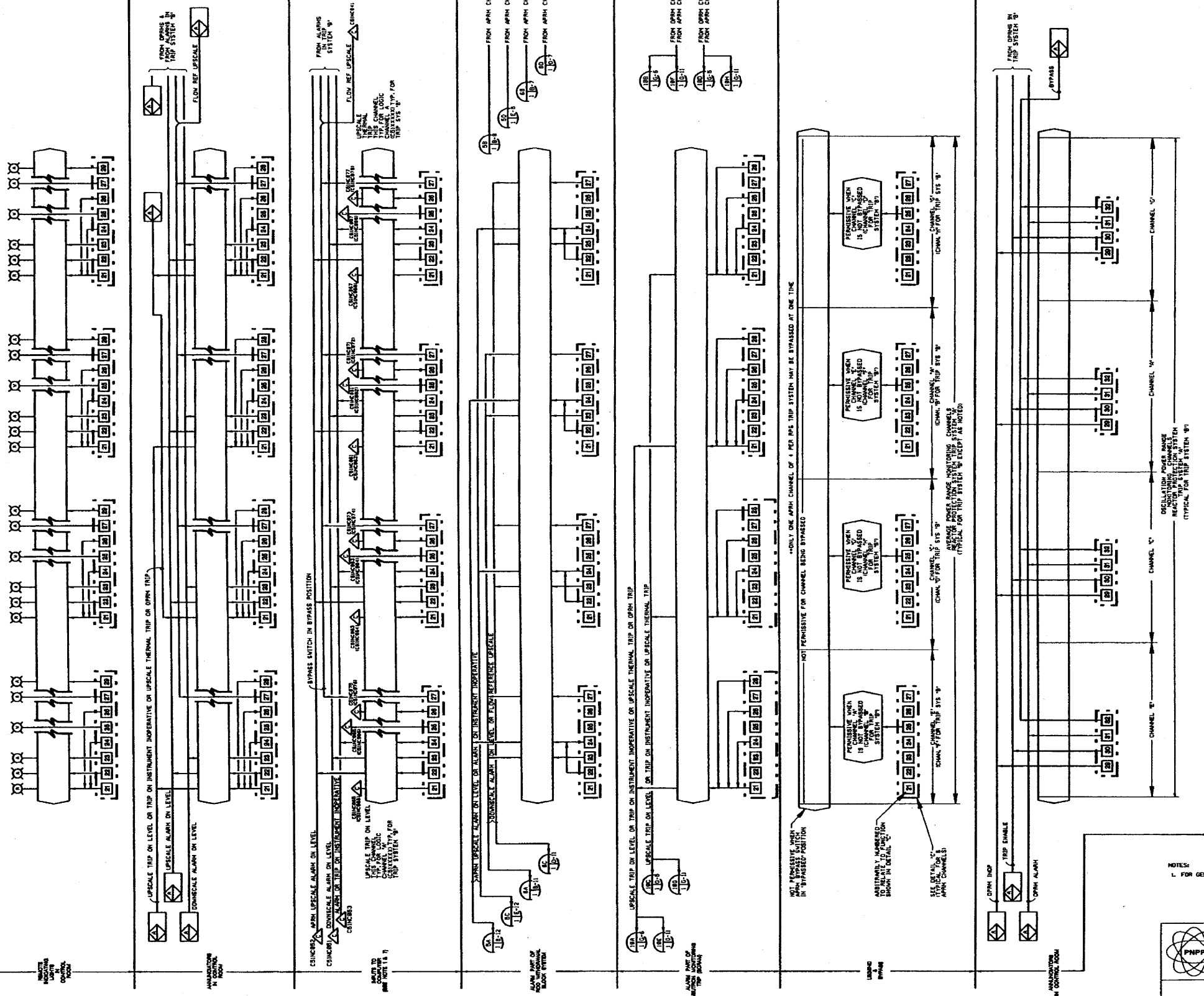


PERRY NUCLEAR POWER PLANT

Neutron Monitoring System

Figure 7.6-2 (Sheet 3 of 7)

[Dwg. D-808-307(3)]



NOTES:

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

(Rev. 12 1/03)



## PERRY NUCLEAR POWER PLANT

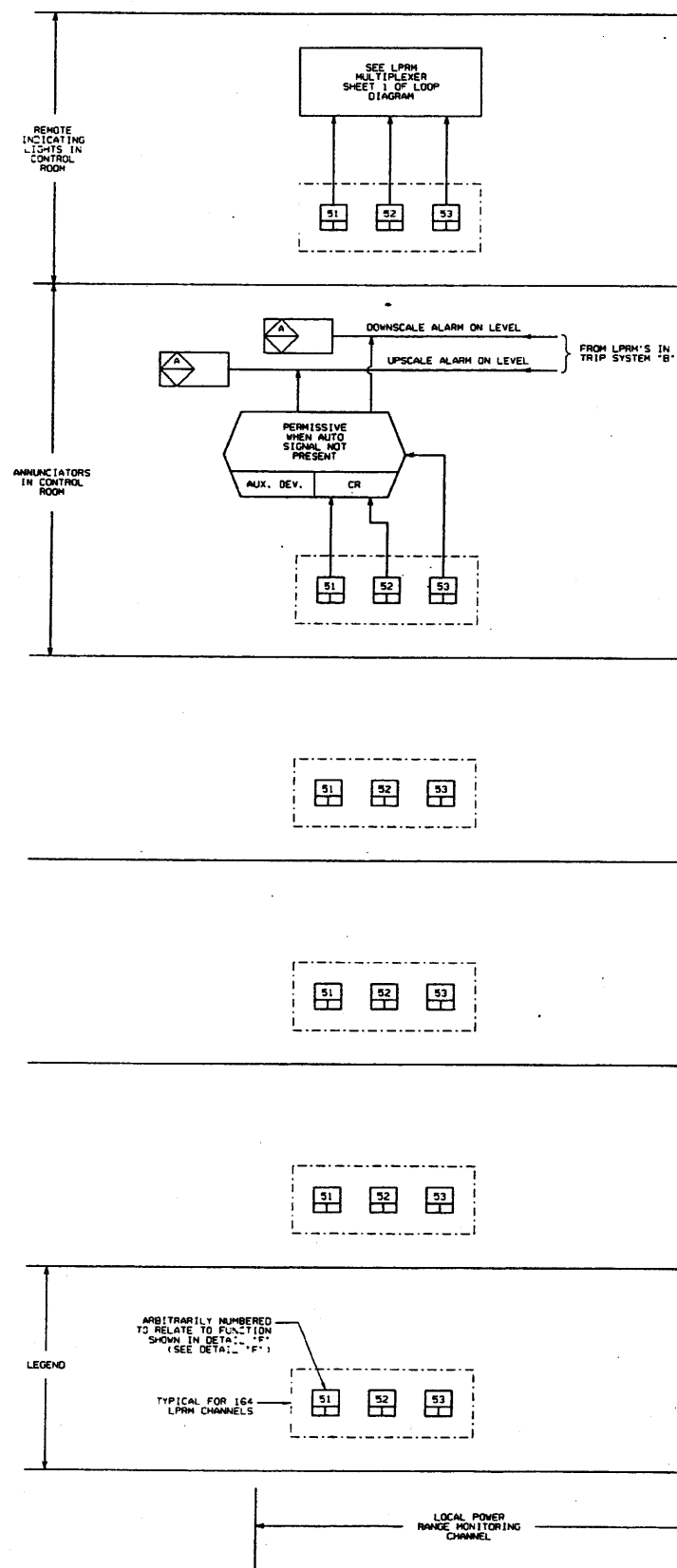
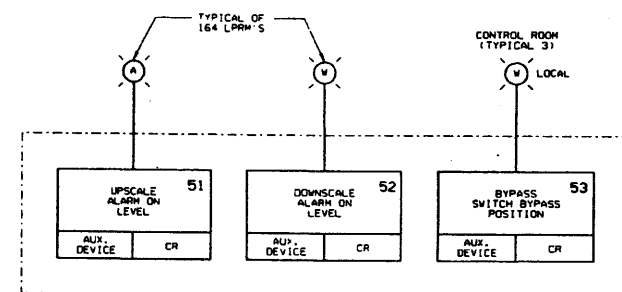
Neutron Monitoring System

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.

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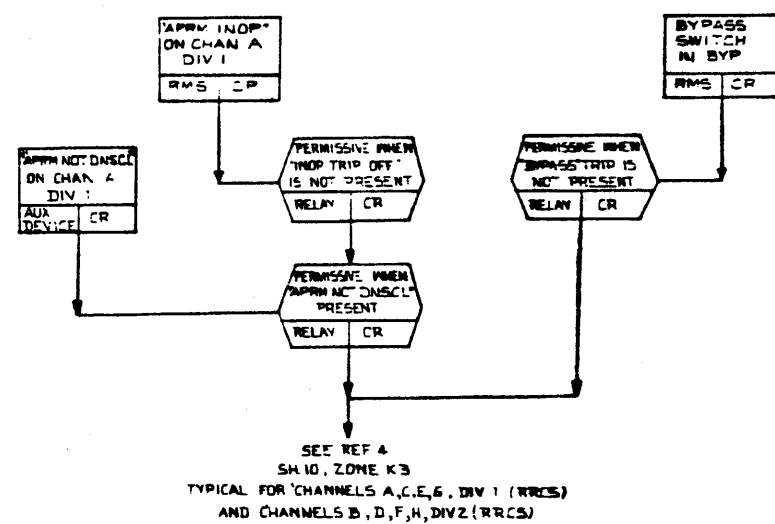
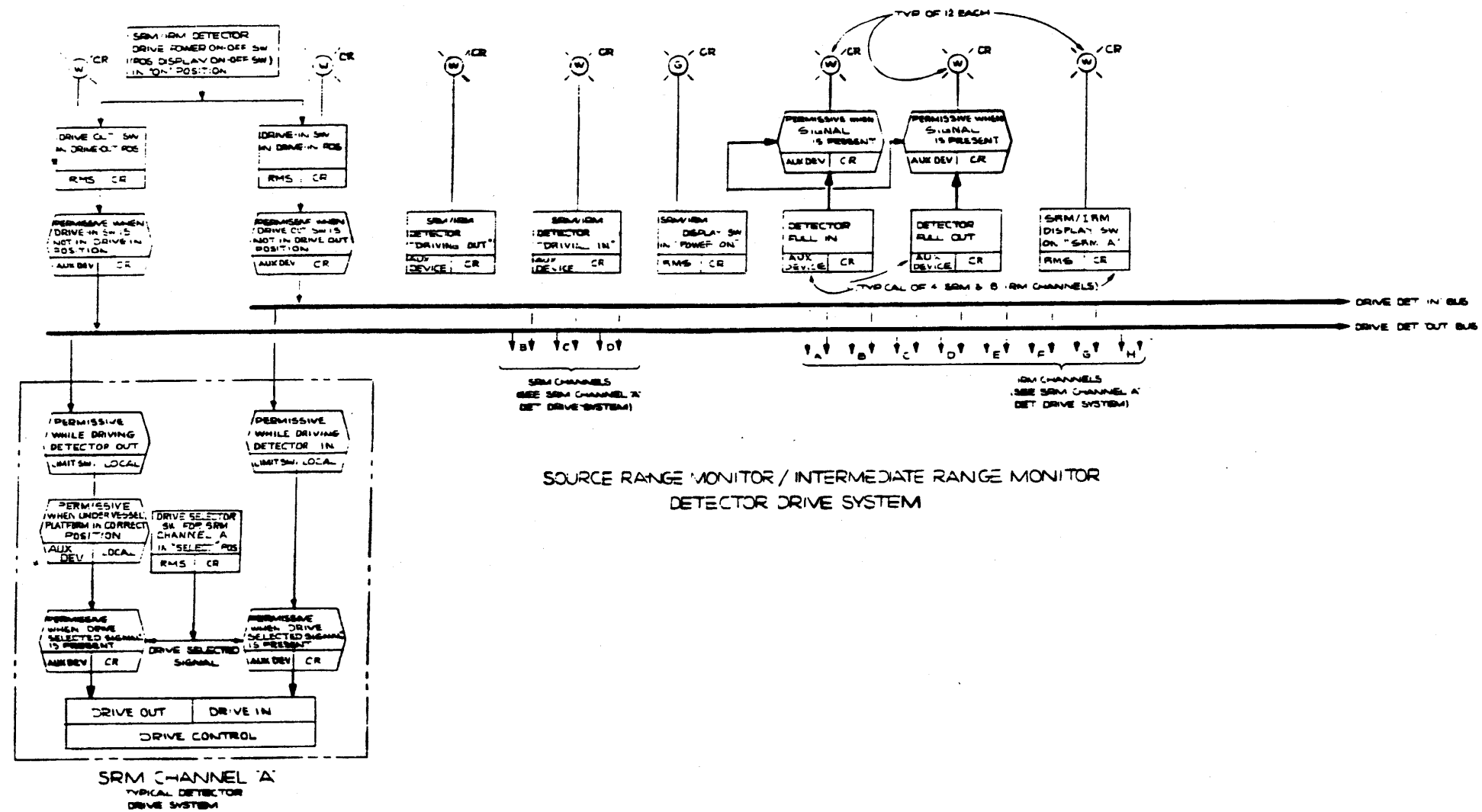


PERRY NUCLEAR POWER PLANT

Neutron Monitoring System

Figure 7.6-2 (Sheet 5 of 7)

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

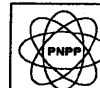


APRM NOT DOWNSCALE INPUTS TO RRCS

NOTES:

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

(Rev. 12 1/03)

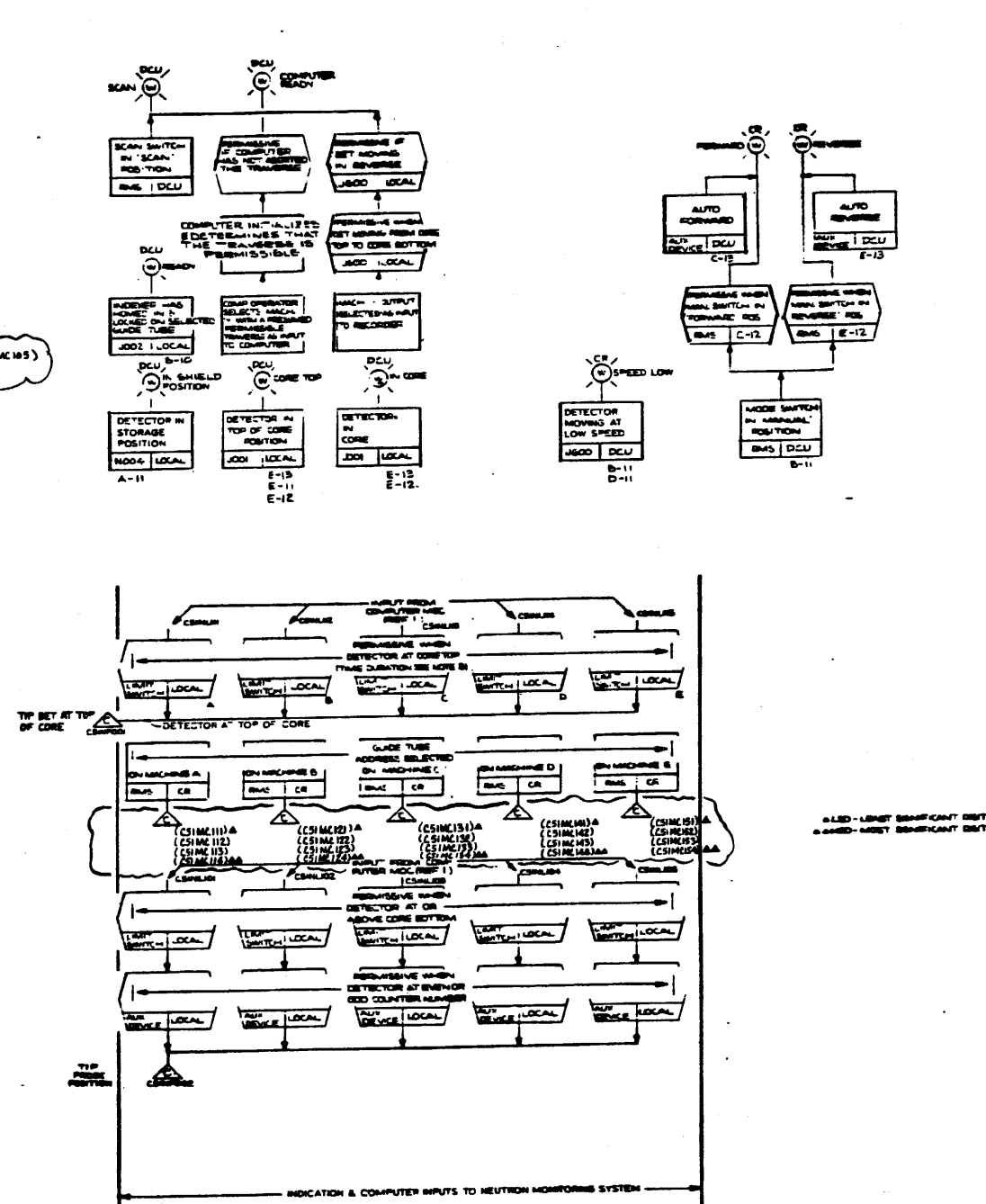
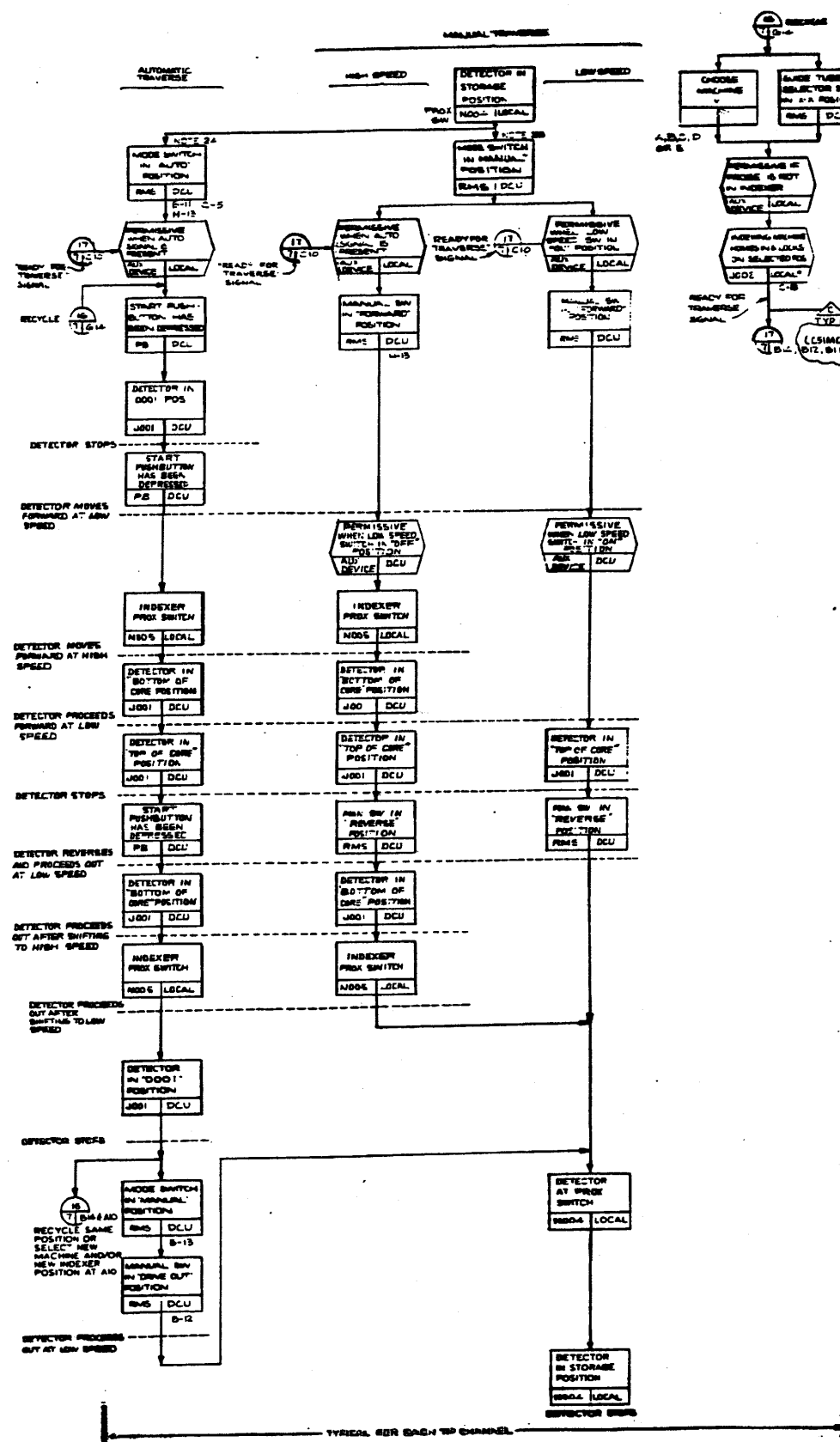


PERRY NUCLEAR POWER PLANT

Neutron Monitoring System

Figure 7.6-2 (Sheet 6 of 7)

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



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

(Rev. 12 1/03)



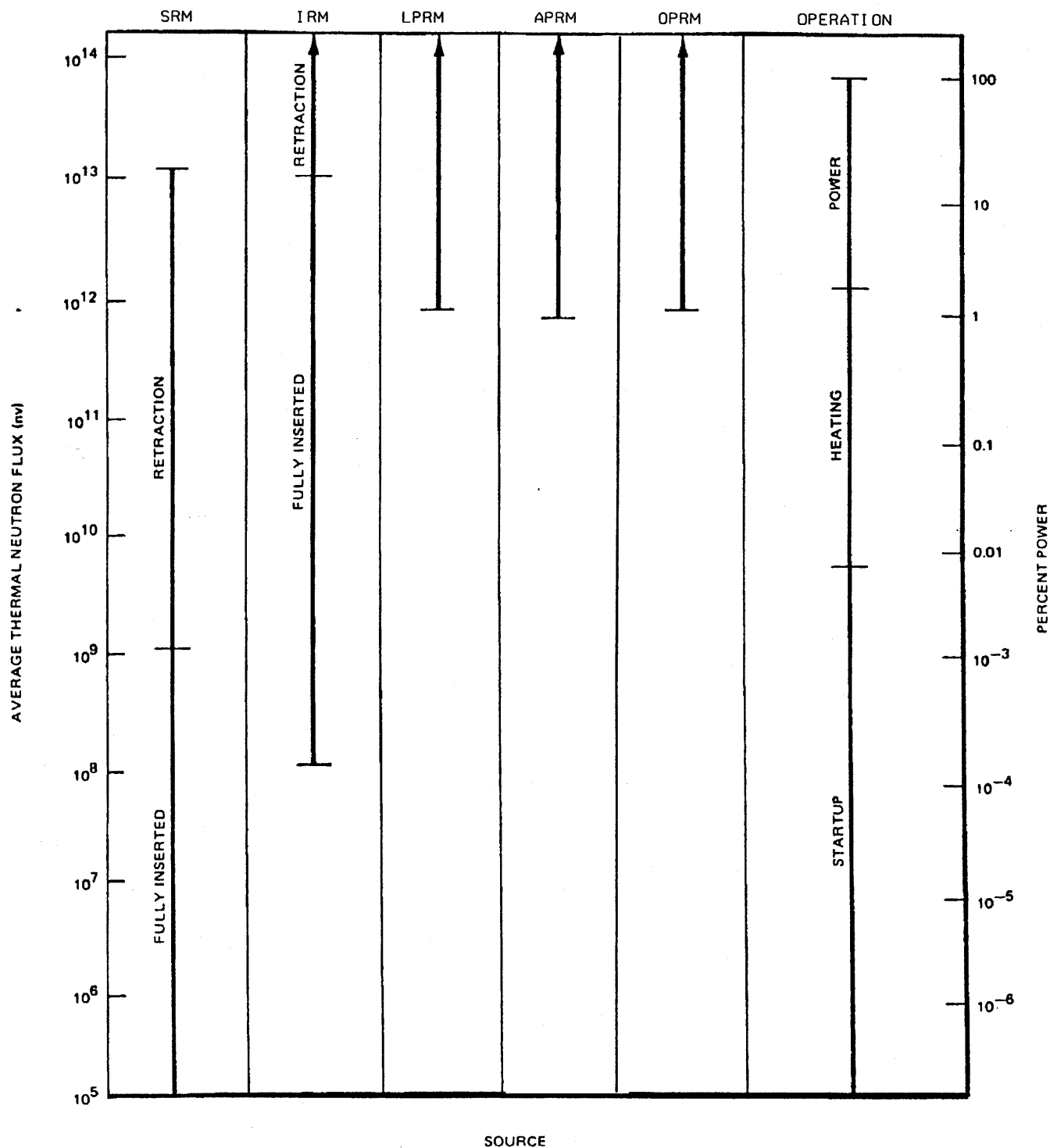
PERRY NUCLEAR POWER PLANT

Neutron Monitoring System

Figure 7.6-2 (Sheet 7 of 7)

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





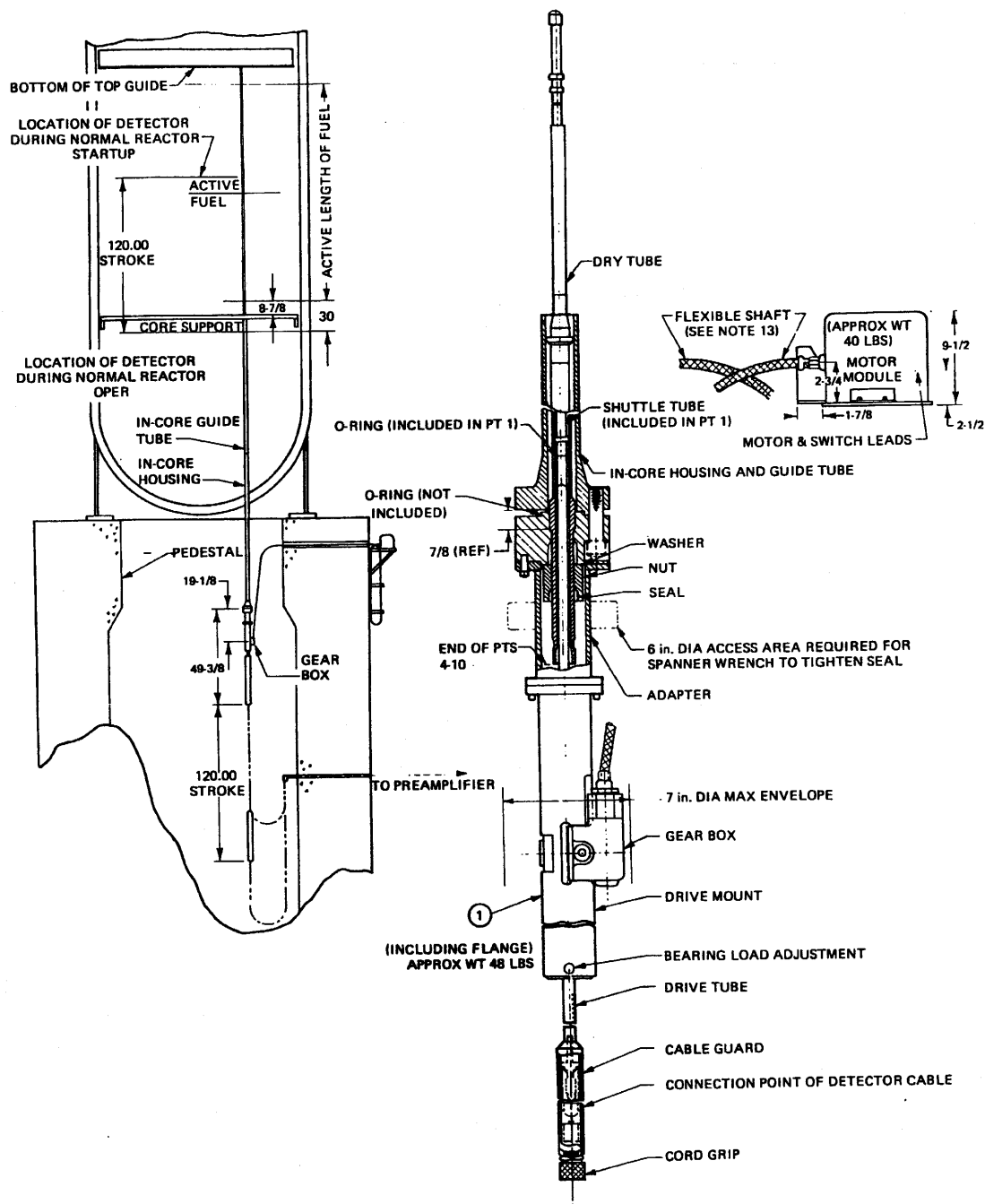
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PERRY NUCLEAR POWER PLANT

Ranges of Neutron  
Monitoring System

Figure 7.6-3



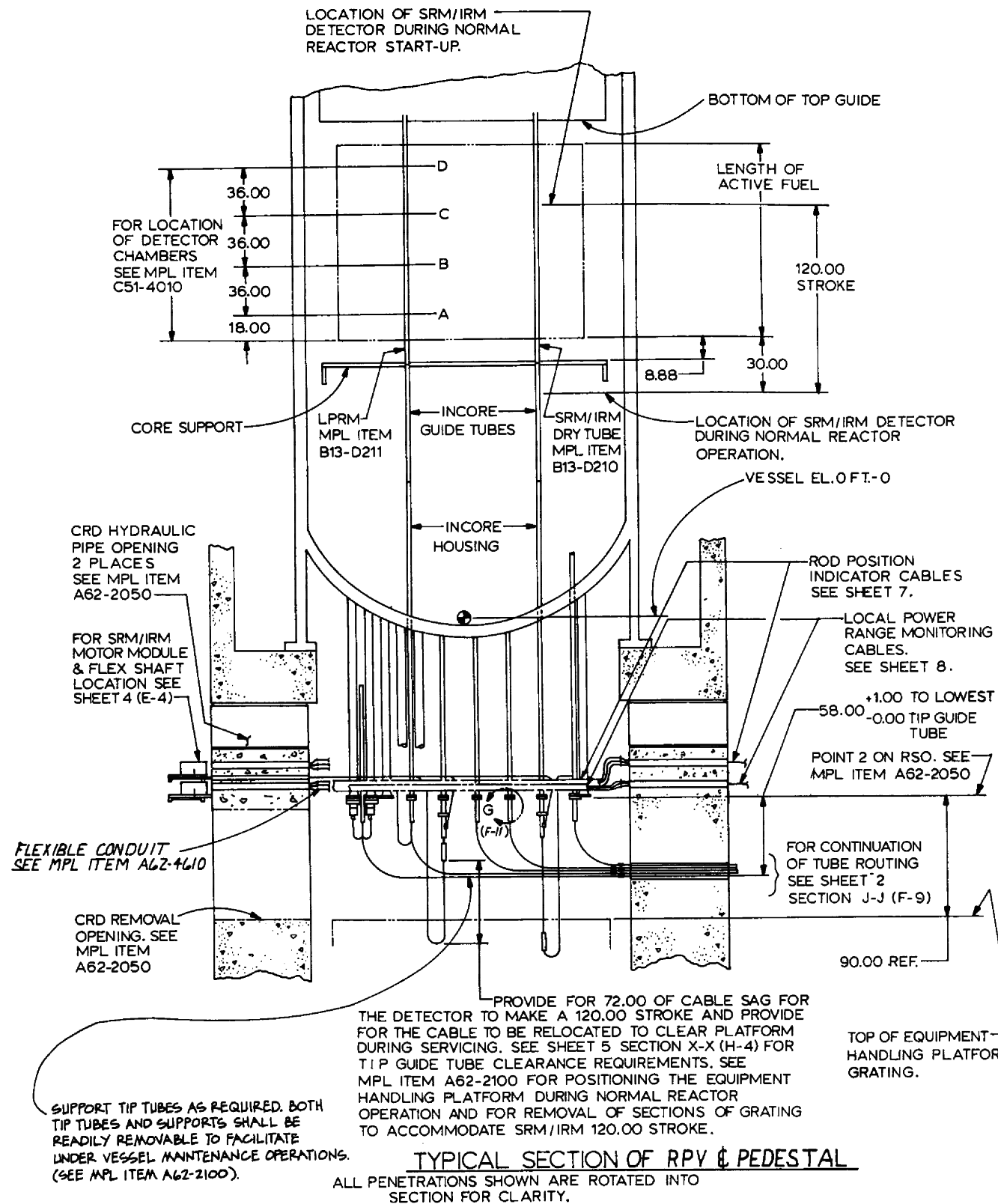
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## PERRY NUCLEAR POWER PLANT

SRM/IRM Neutron  
Monitoring Unit

Figure 7.6-4



#### NOTES:

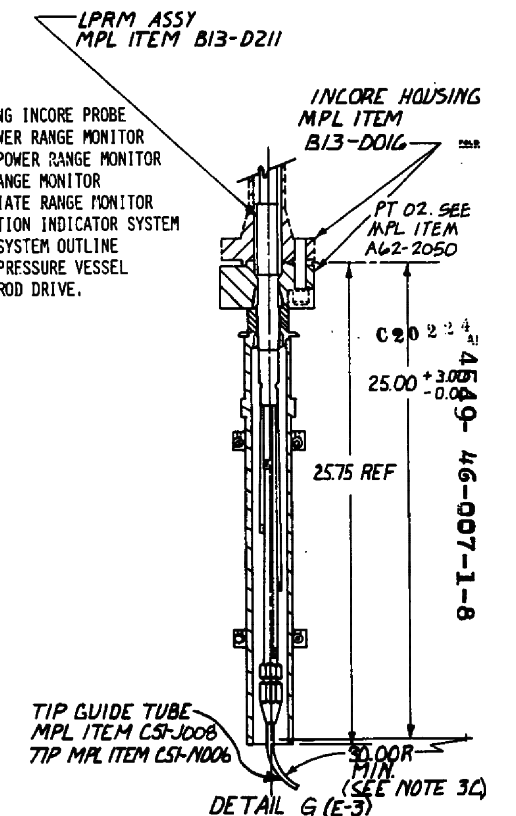
1. TIP TUBE RUN FROM IN-CORE HOUSING FLANGE TO DRIVE MECHANISM. SEE MPL ITEM C51-N006.
2. TUBE UNIONS MAY BE LOCATED AS REQUIRED BETWEEN REACTOR PEDESTAL WALL AND DRYWELL PENETRATION. THE NUMBER OF UNIONS SHALL BE HELD TO A MINIMUM.
3. THE NUMBER AND DEGREE OF BENDS FOR TIP GUIDE TUBES SHALL BE HELD 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.

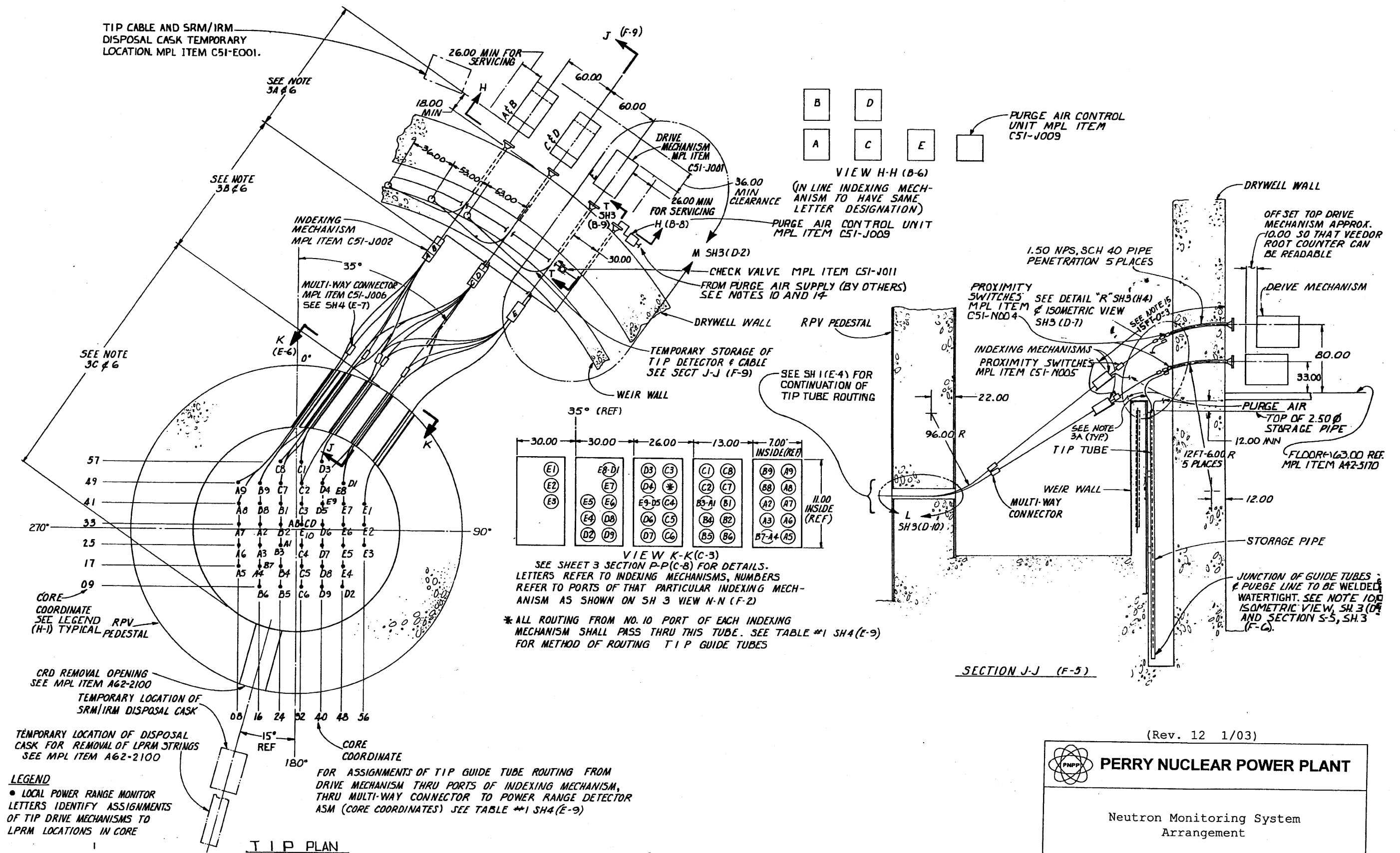


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**PERRY NUCLEAR POWER PLANT**  
 10 CENTER RD., PERRY, OHIO 44081

NEUTRON MONITORING SYSTEM  
 ARRANGEMENT

Figure 7.6-5 (SHEET 1 OF 8)

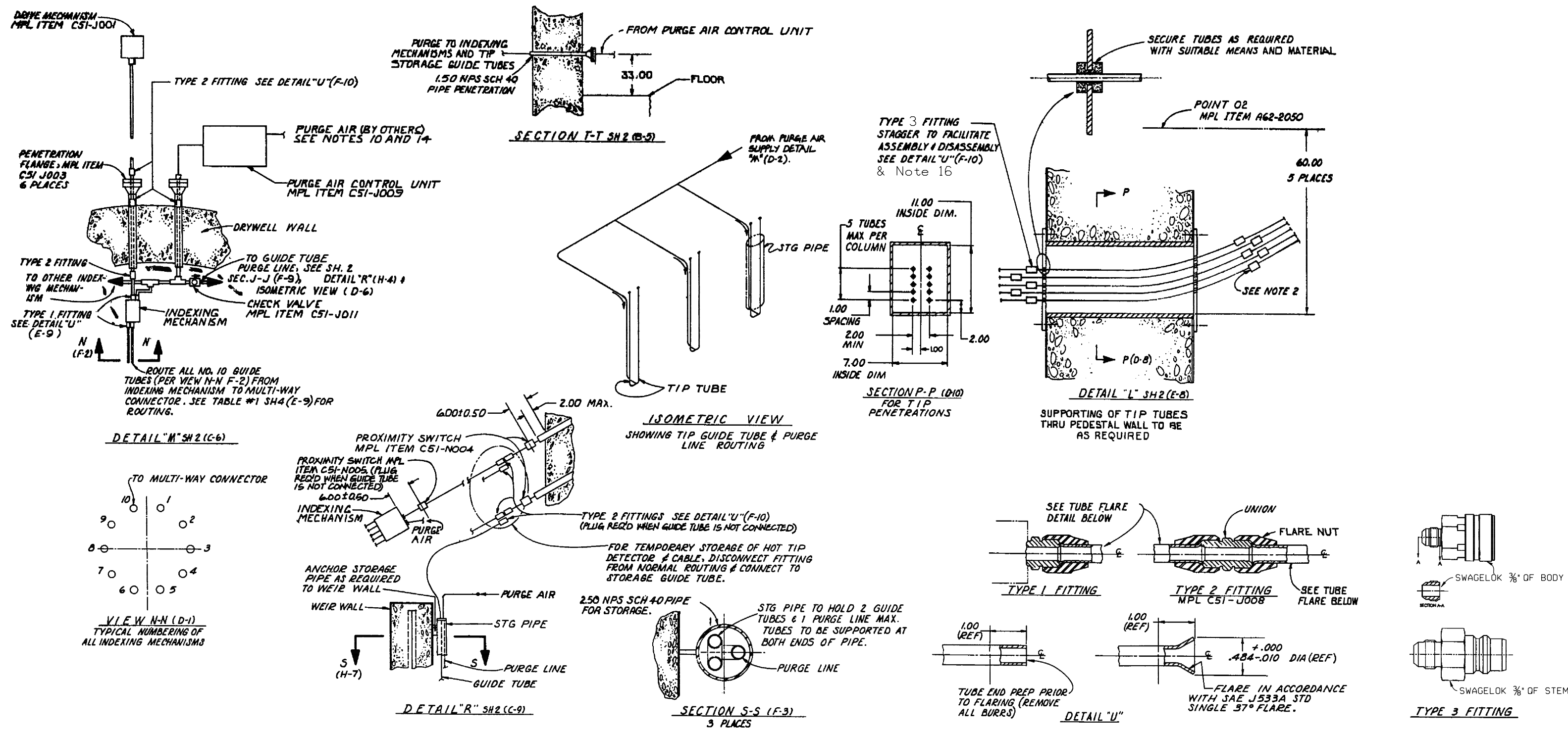


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**PERRY NUCLEAR POWER PLANT**

Neutron Monitoring System  
Arrangement

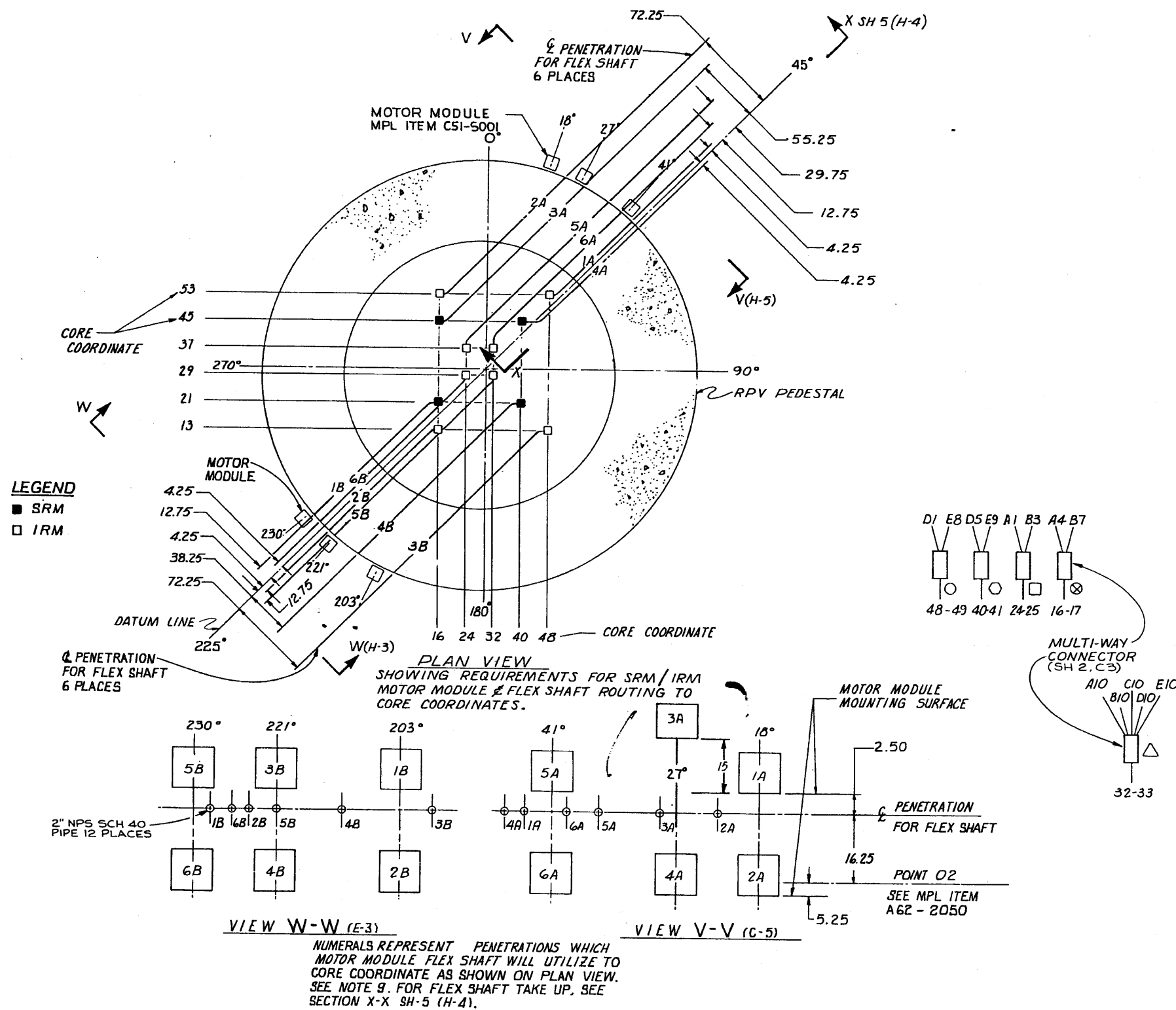
Figure 7.6-5 (Sheet 2 of 8)



(Rev. 18 10/13)

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

NEUTRON MONITORING SYSTEM  
ARRANGEMENT  
Figure 7.6-5 (SHEET 3 OF 8)



CORE COORDINATES FOR POWER RANGE DETECTOR ASSEMBLIES					
DRIVE # INDEXING MECHANISM	PORTS OF INDEXING MECHANISM	COORDINATES	DRIVE # INDEXING MECHANISM	PORTS OF INDEXING MECHANISM	COORDINATES
A	1	24-25 □	D	1	48-49 ○
	2	16-33		2	48-09
	3	16-25		3	40-57
	4	16-17 ⊗		4	40-49
	5	08-17		5	40-41 ○
	6	08-25		6	40-33
	7	08-33		7	40-25
	8	08-41		8	40-17
	9	08-49		9	40-09
	10	32-33 △		10	32-33 △
B	1	24-41	E	1	56-41
	2	24-33		2	56-33
	3	24-25 □		3	56-25
	4	24-17		4	48-17
	5	24-09		5	48-25
	6	16-09		6	48-33
	7	16-17 ⊗		7	48-41
	8	16-41		8	48-49 ○
	9	16-49		9	40-41 ○
	10	32-33 △		10	32-33 △
C	1	32-57			
	2	32-49			
	3	32-41			
	4	32-25			
	5	32-17			
	6	32-09			
	7	24-49			
	8	24-57			
	9				
	10	32-33 △			

TABLE #1 SEE SH 2(H-4) & VIEW K-K(E-6)

**T I P GUIDE TUBE ROUTING**

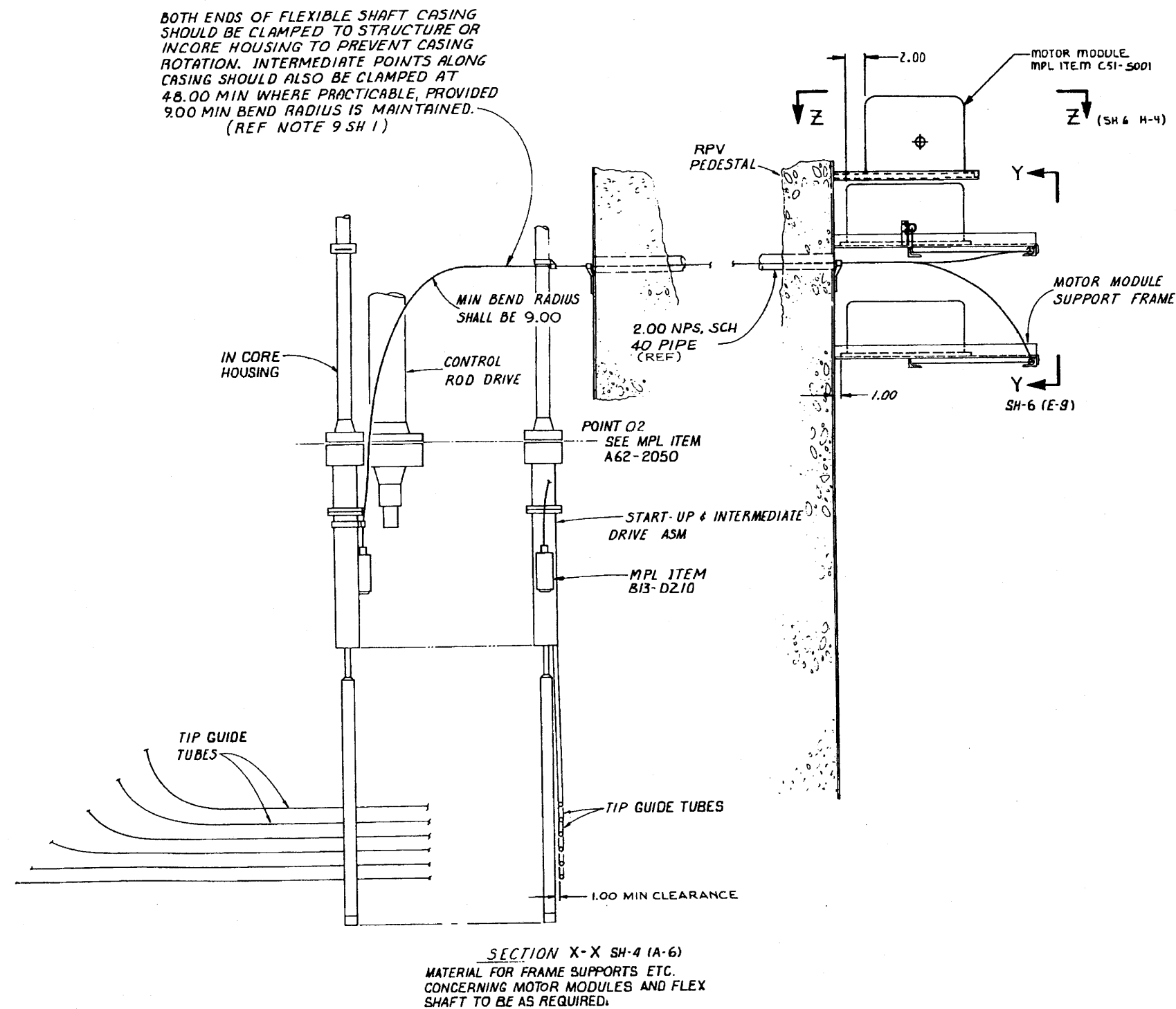
- ROUTE THRU MULTI-WAY CONNECTOR (UTILIZE 2 OUT OF 5 PORTS) FROM PORTS OF INDEXER WHICH HAVE IDENTICAL SYMBOLS (SEE TABULATION ABOVE), THEN ROUTE TO SPECIFIED CORE COORDINATE
- △ ROUTE THRU MULTI-WAY CONNECTOR (UTILIZE ALL 5 PORTS) FROM PORTS OF INDEXER WHICH HAVE IDENTICAL SYMBOLS (SEE TABULATION ABOVE), THEN ROUTE TO SPECIFIED CORE COORDINATE

(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

Neutron Monitoring System  
 Arrangement

Figure 7.6-5 (Sheet 4 of 8)



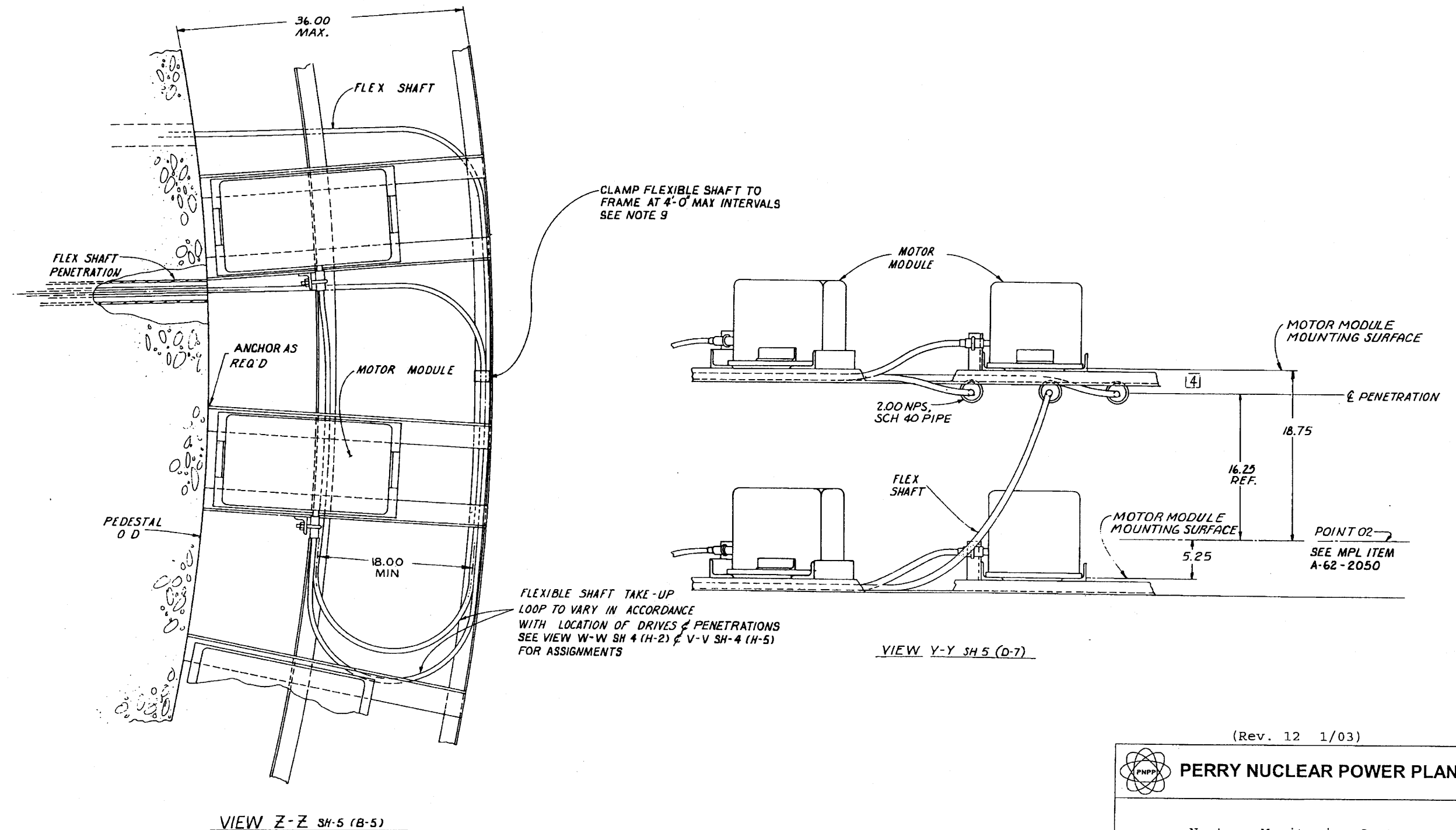
(Rev. 12 1/03)



PERRY NUCLEAR POWER PLANT

Neutron Monitoring System  
Arrangement

Figure 7.6-5 (Sheet 5 of 8)



(Rev. 12 1/03)

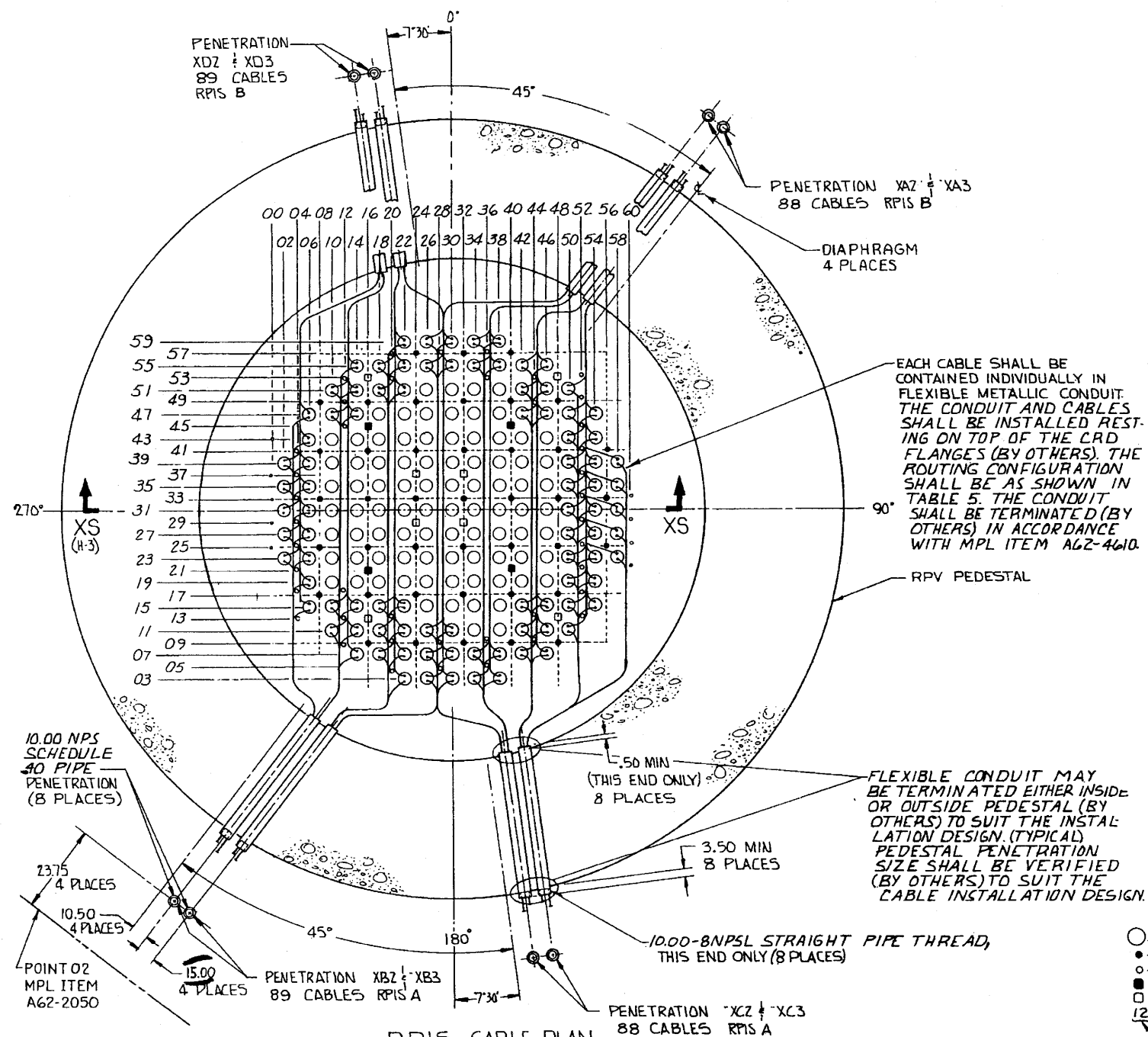


**PERRY NUCLEAR POWER PLANT**

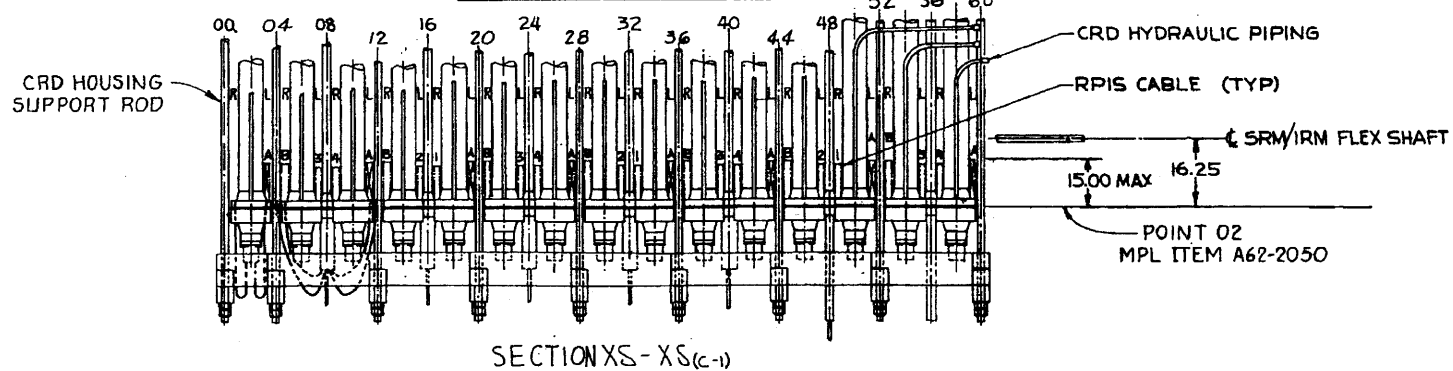
Neutron Monitoring System  
Arrangement

Figure 7.6-5 (Sheet 6 of 8)





RPIS CABLE PLAN



SECTION XS-XS(-1)

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	XB2, XB3	PENETRATION	XD2, XD3	XB2, XB3	PENETRATION	XA2, XA3	XC2, XC3	PENETRATION	XA2, XA3	XC2, XC3
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		
15			35			51			27		
19			39			55			31		
23			43			38-59	36R	36L	35		
27			47			42-07	44R	44L	39		
31			51			11			43		
35			55			15			47		
39			26-59			19			54-47		
43			30-03			23			58-23		
47			07			27			27		
51			11			31			31		
14-55	12R	12L	15			35			35		
18-07	20R	20L	19			39			58-39	52R	60L
11			23			43			30-35	28R	60L
15			27			47			39		
19			31			51			43		
23			35			55			47		
27			39			42-55	44R	44L	51		
31			18-43	20R	20L				55		
35									30-59	28R	28L
39											

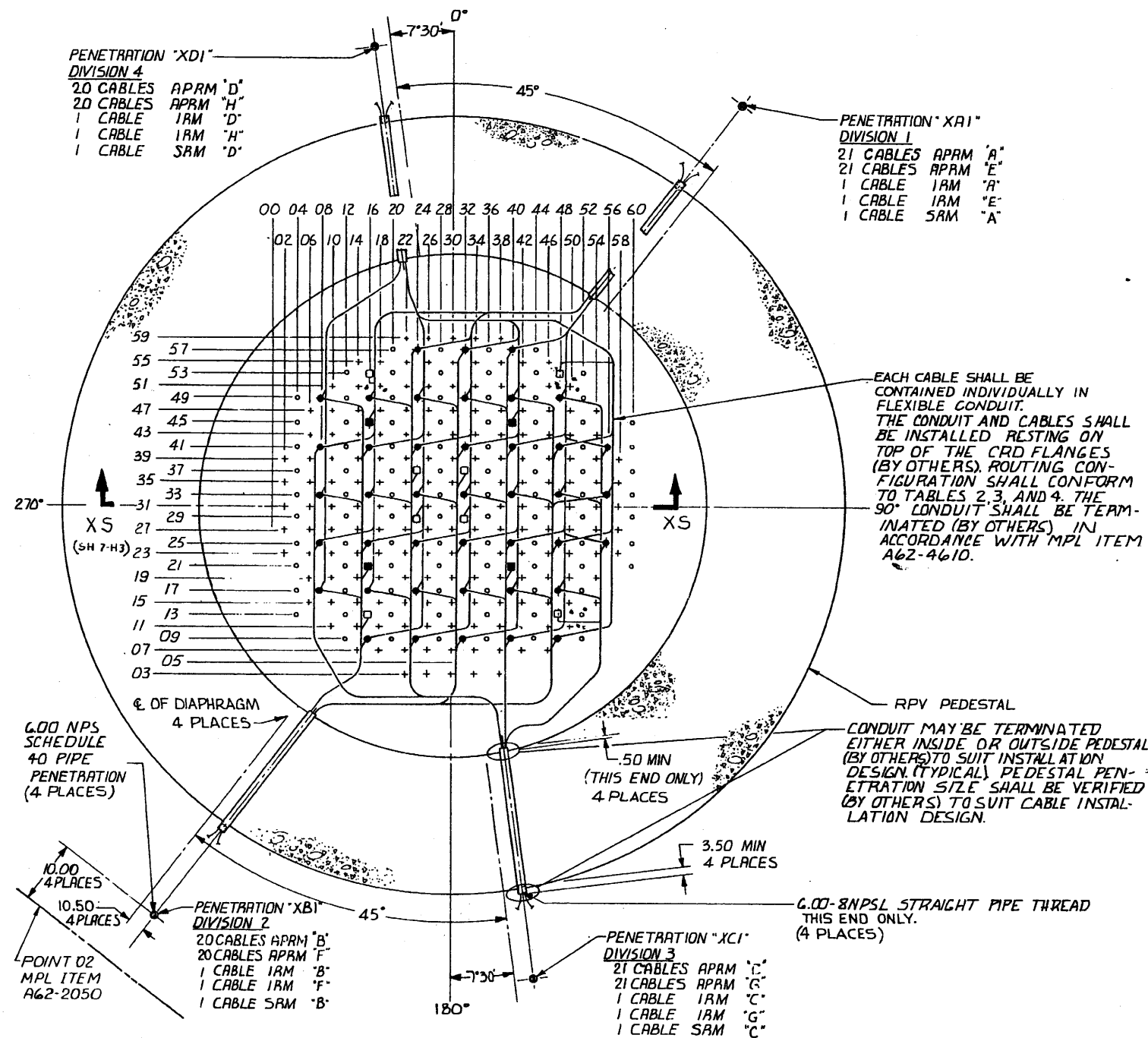
LEGEND  
 ○ - CONTROL ROD DRIVE.  
 ● - LOCAL POWER RANGE MONITOR.  
 ○ - CRD HOUSING SUPPORT ROD.  
 ● - SOURCE RANGE MONITOR.  
 ○ - INTERMEDIATE RANGE MONITOR.  
 12L - INDICATES AREA TO LEFT OF COORDINATE LOOKING TOWARD 0° AZIMUTH.  
 NUMERIC COORDINATE LOCATOR.

(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

Neutron Monitoring System  
Arrangement

Figure 7.6-5 (Sheet 7 of 8)



POWER RANGE MONITORING PLAN

TABLE 2  
ROUTING OF CABLES  
FROM LPRM DETECTORS TO APRM CHANNELS

(APRM TRIP SYSTEM A)

CHANNEL- DIV. PEN-	APRM "A" 1 XAI	APRM "C" 3 XCI	APRM "E" 1 XAI	APRM "G" 3 XCI
LPRM DET LOCATION	LPRM DET WAY NO.	LPRM DET WAY NO.	LPRM DET WAY NO.	LPRM DET WAY NO.
08-25	C 16R	D 08L	A 16R	B 08L
41	A	B	C	D 08L
16-17	D	A 24L	B	C 24L
33	B	C	D	A
49	D 16R	A	B 16R	C
24-09	C 32R	D	A 32R	B
25	A	B	C	D
41	C	D	A	B
57	A	B 24L	C	D 24L
32-17	B	C 40L	D	A 40L
33	D	A	B	C
49	B 32R	C	D 32R	A
40-09	A 48R	B	C 48R	D
25	C	D	A	B
41	A	B	C	D
57	C	D 40L	A	B 40L
48-17	D	A 56L	B	C 56L
33	B	C	D	A
49	D	A	B	C
56-25	A	B	C	D
41	C 48R	D 56L	A 48R	B 56L

(APRM TRIP SYSTEM B)

CHANNEL- DIV. PEN-	APRM "B" 2 XBI	APRM "D" 4 XDI	APRM "F" 2 XBI	APRM "H" 4 XDI
LPRM DET LOCATION	LPRM DET WAY NO.	LPRM DET WAY NO.	LPRM DET WAY NO.	LPRM DET 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

TABLE 3  
ROUTING OF CABLES  
FROM IRM DETECTOR TO IRM CHANNELS

CHANNEL- DIV. PEN-	IRM "A" 1 XAI	IRM "B" 2 XBI	IRM "C" 3 XCI	IRM "D" 4 XDI	IRM "E" 1 XAI	IRM "F" 2 XBI	IRM "G" 3 XCI	IRM "H" 4 XDI
IRM DET. LOCATION	IRM DET. WAY NO.	IRM DET. WAY NO.	IRM DET. WAY NO.	IRM DET. WAY NO.	IRM DET. WAY NO.	IRM DET. WAY NO.	IRM DET. WAY NO.	IRM DET. WAY NO.
16-13	(16R)*	16L						
24-29			24L	24R				
37					32R			
32-29						32L		
37							56L	
48-13								56R

\* 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-	SRM "A" 1 XAI	SRM "B" 2 XBI	SRM "C" 3 XCI	SRM "D" 4 XDI
SRM DET. LOCATION	SRM DET. WAY NO.	SRM DET. WAY NO.	SRM DET. WAY NO.	SRM DET. 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)

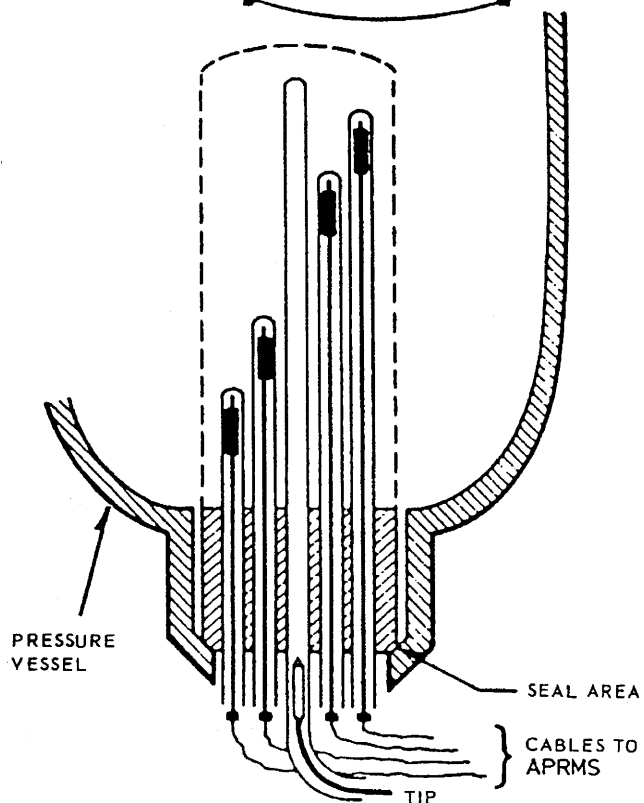
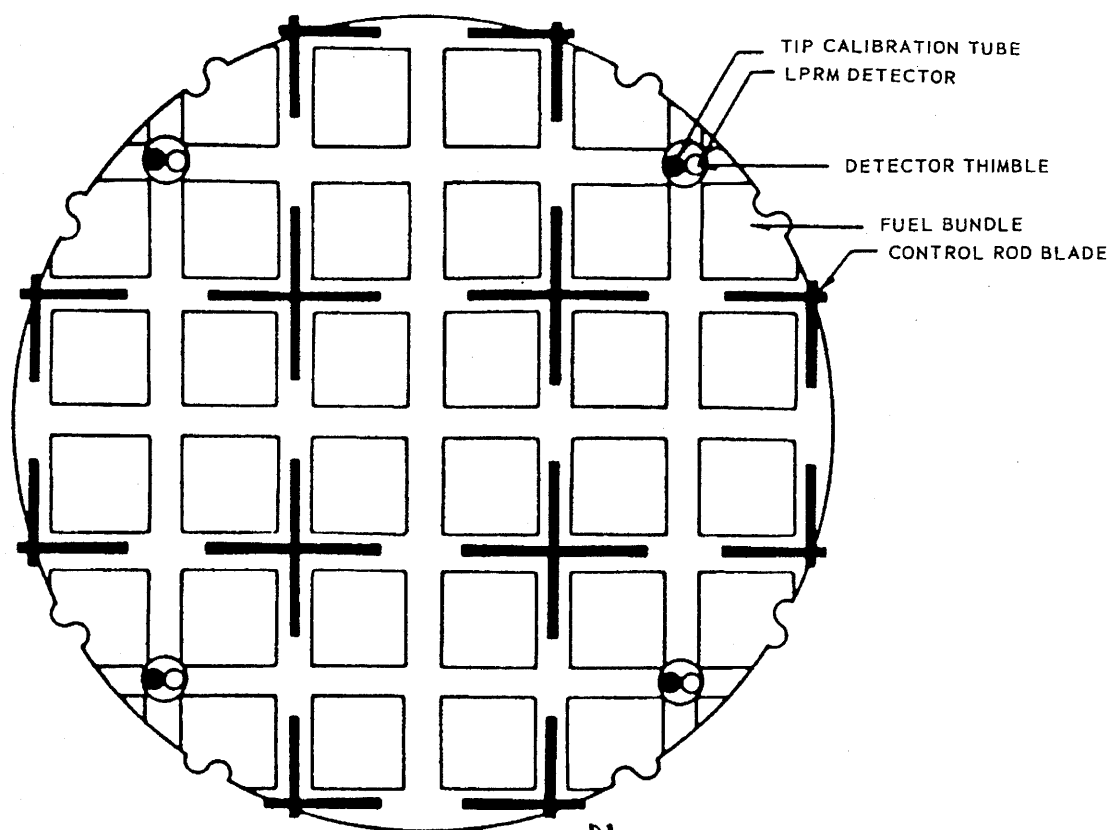
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**PERRY NUCLEAR POWER PLANT**

Neutron Monitoring System  
Arrangement

Figure 7.6-5 (Sheet 8 of 8)



(Rev. 12 1/03)

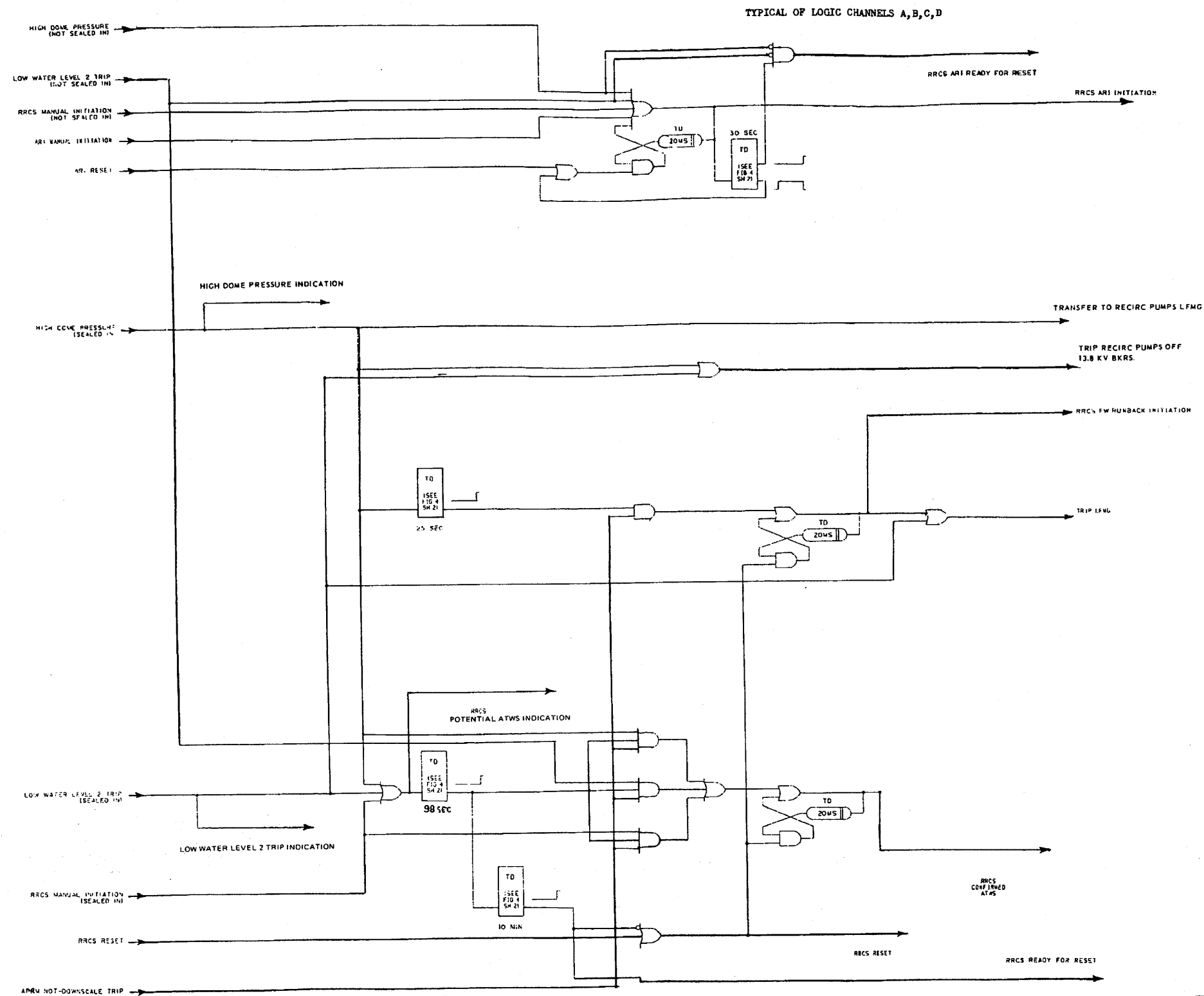


**PERRY NUCLEAR POWER PLANT**

Power Range Monitor  
Director Assembly Location

Figure 7.6-6





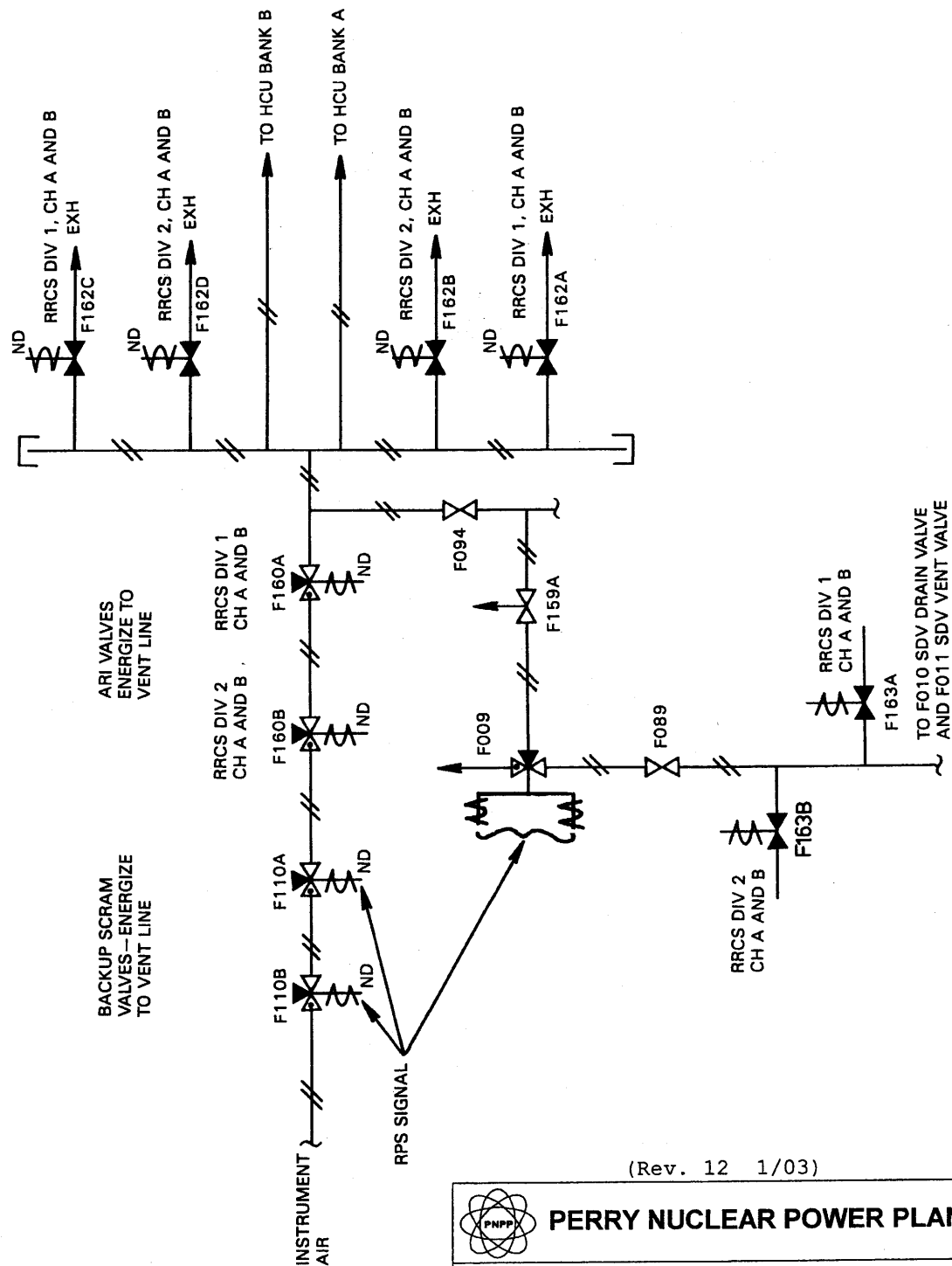
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**PERRY NUCLEAR POWER PLANT**

RRCS Initiation Logic

Figure 7.6-8



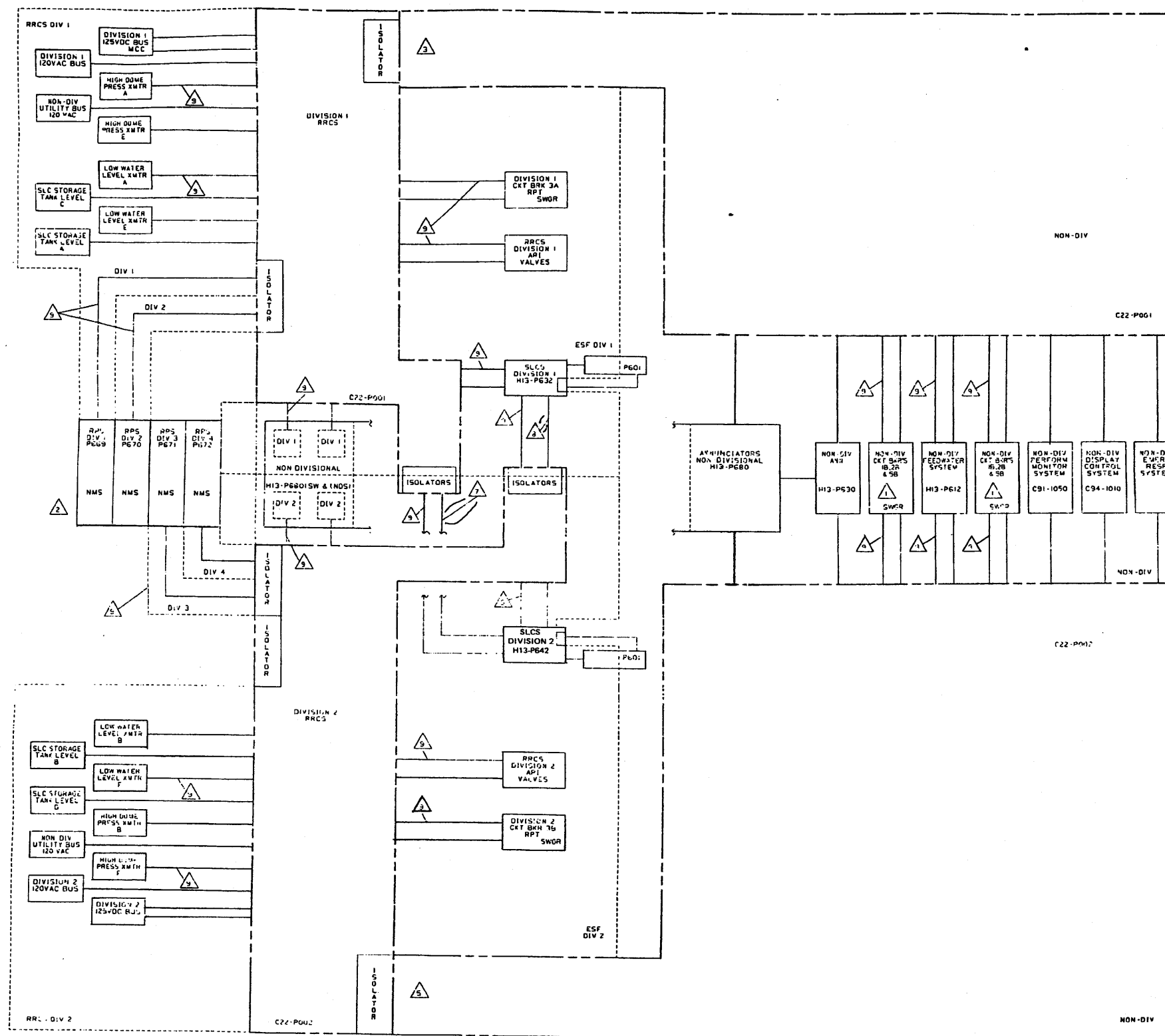
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## PERRY NUCLEAR POWER PLANT

Perry RRCS ARI Valves

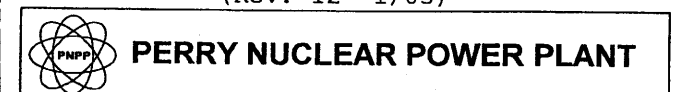
Figure 7.6-9



# 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

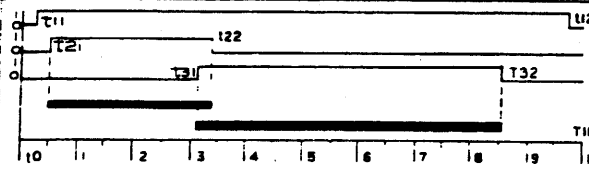
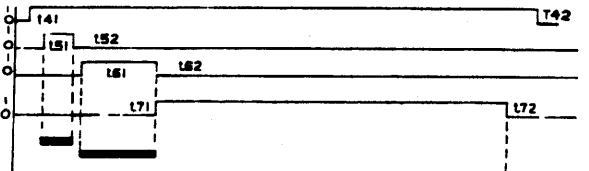
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RRCS Separation Block Diagram

Figure 7.6-10

TABLE 1

TIME DEPENDENT INTERMEDIATE VARIABLES		
SYM.	DESCRIPTION	DEFINITION
T	INTERNALLY GENERATED TIME REFERENCE FUNCTION	
TIC	INSERT CYCLE ACTIVE	 <p>ABSCISSA INDICATES TIME ELAPSED WHILE ADVANCING THE INSERT CYCLE IS CONTROLLED BY TIC AND TIT AS FOLLOWS:</p> <ol style="list-style-type: none"> <li>1. WHEN TIC TIT = 1 THE CYCLE IS ADVANCING WITH TIME.</li> <li>2. WHEN TIC = 0, THE CYCLE IS RESET TO 10</li> <li>3. WHEN TIC TIT = 1, THE CYCLE STOPS, BUT DOES NOT RESET.</li> </ol>
T11	INSERT PERIOD OF INSERT CYCLE	
T12	SETTLE PERIOD OF INSERT CYCLE	
T13	ROD INSERT CONTROL	
T14	SETTLE CONTROL	
TOC	WITHDRAW CYCLE ACTIVE	 <p>ABSCISSA INDICATES TIME ELAPSED WHILE ADVANCING THE WITHDRAW CYCLE IS CONTROLLED BY IOC AND IOT AS FOLLOWS:</p> <ol style="list-style-type: none"> <li>1. WHEN IOC IOT = 1, THE CYCLE IS ADVANCING WITH TIME.</li> <li>2. WHEN IOC = 0, THE CYCLE IS RESET TO 10.</li> <li>3. WHEN IOC IOT = 1, THE CYCLE STOPS, BUT DOES NOT RESET.</li> </ol>
TO1	INSERT PERIOD OF WITHDRAW CYCLE	
TO2	WITHDRAW PERIOD OF WITHDRAW CYCLE	
TO3	SETTLE PERIOD OF WITHDRAW CYCLE	
T50	UNLATCH CONTROL	
T51	ROD WITHDRAW CONTROL	
T52	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, 1 = TIME WHEN CONTINUOUS INSERT CAN BE REQUESTED

I31 &lt; I22, 1 = 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, 1 = TIME WHEN CONTINUOUS WITHDRAW CAN BE REQUESTED

I71 &lt; I52, 1 = 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
I1	ROD WITHDRAWAL IS REQUESTED
I2	ROD INSERT REQUESTED
I3	IN-CLOCK IS ACTIVE
I4	A ROD IS IN MOTION
K0	REFUEL ROD SELECT IS UNINHIBITED
K1	REFUEL PLATFORM CONTROL PERMISSIVE
K2	REACTOR SYSTEM MODE SWITCH IN START-UP
K3	REACTOR SYSTEM MODE SWITCH IN "REFUEL"
K4	REACTOR SYSTEM MODE SWITCH IN "RUN"
K5	NMS DOWNSCALE PRM EQUIPMENT IS IN THE ROD WITHDRAWAL PERMITTED STATE
K6	NMS UPSCALE PRM EQUIPMENT IS IN THE ROD WITHDRAWAL PERMITTED STATE
K7	NMS STARTUP RANGE EQUIPMENT IS IN THE ROD WITHDRAWAL PERMITTED STATE
K8	ROD MOTION PERMISSIVE
K9	RPM IS OPERABLE
P0	REFUEL PLATFORM OVER CORE AREA
P1	REFUEL PLATFORM GRAPPLE LOADED
R0	REQUESTED ROD IDENT
S0	ROD IS BEING DRIVEN
T1	INSERT CYCLE ACTIVE
T2	INSERT PERIOD OF INSERT CYCLE
T3	SETTLE PERIOD OF INSERT CYCLE
T4	WITHDRAW CYCLE ACTIVE
T5	INSERT PERIOD OF WITHDRAW CYCLE
T6	WITHDRAW PERIOD OF WITHDRAW CYCLE
T7	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 "ODD".

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 SINGLE 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 =  $\overline{a} = \neg a$

AND GATE =  $a \cdot b = a \text{ AND } b$

OR GATE =  $a + b = a \text{ OR } b$

NAND GATE =  $\overline{a \cdot b} = \neg(a \text{ AND } b)$

NOR GATE =  $\overline{a + b} = \neg(a \text{ OR } b)$

EXCLUSIVE OR GATE =  $a \oplus b = a \text{ XOR } b$

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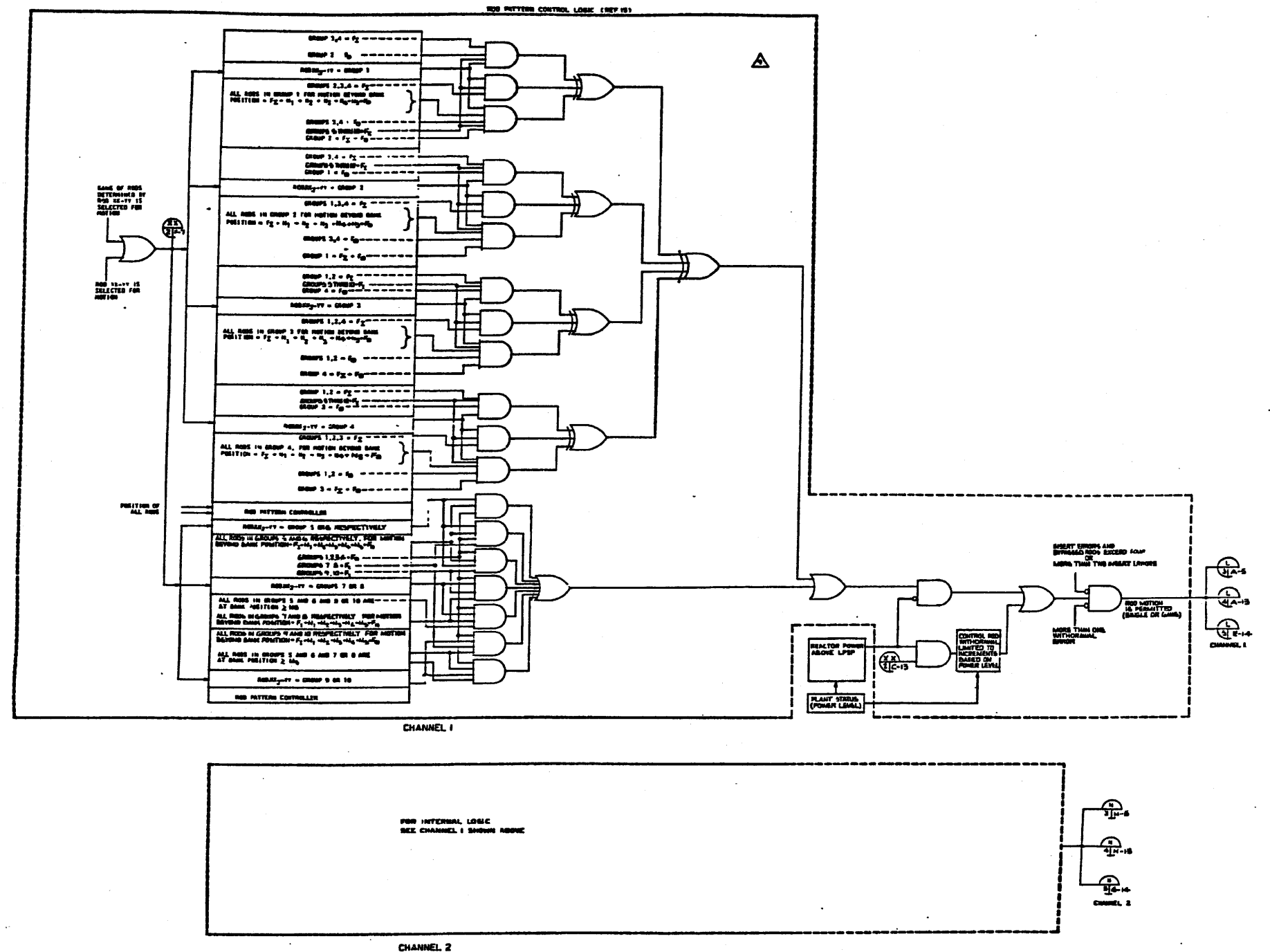
NUCLEAR SAFETY RELATED



PERRY NUCLEAR POWER PLANT

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





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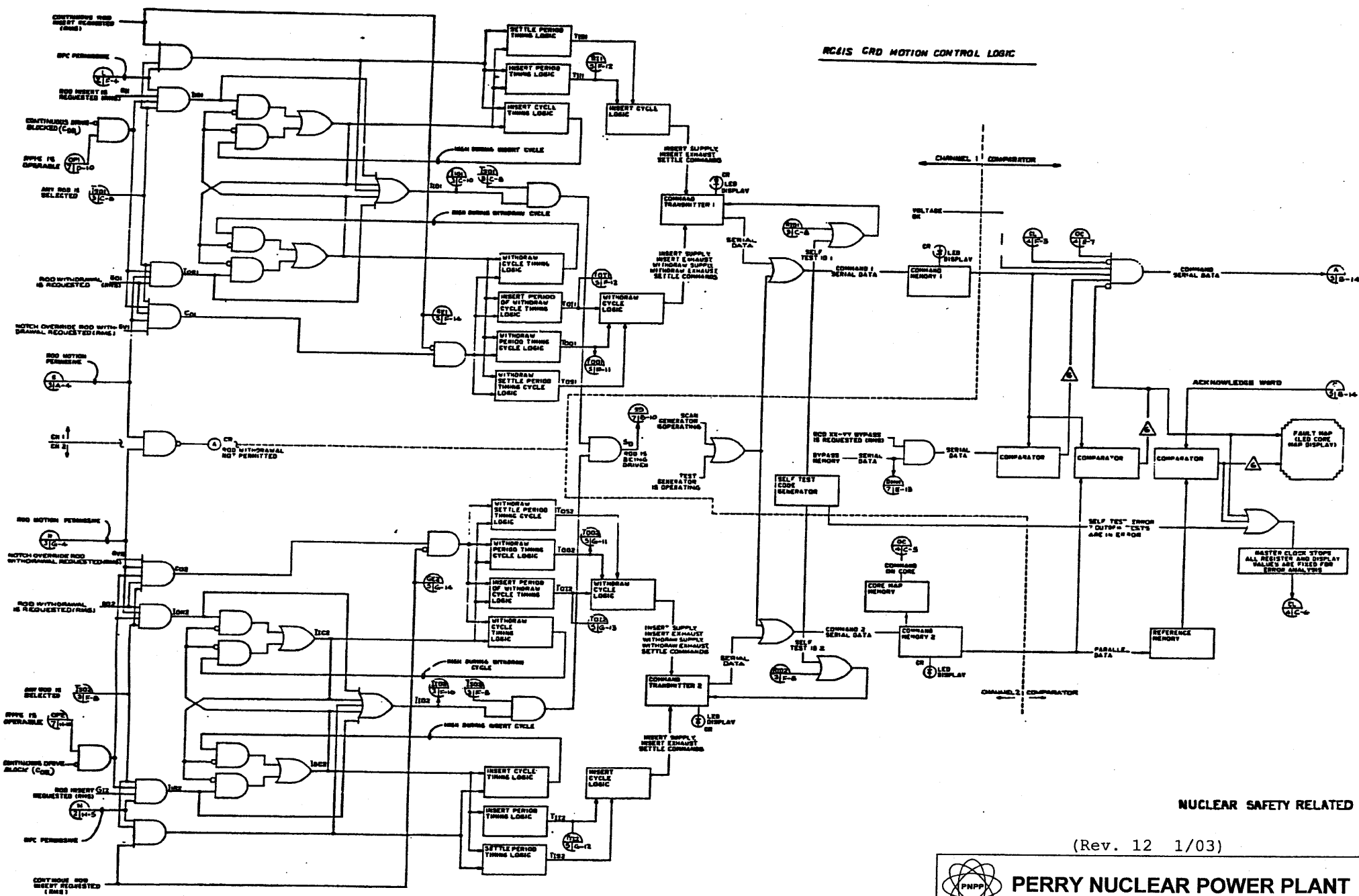


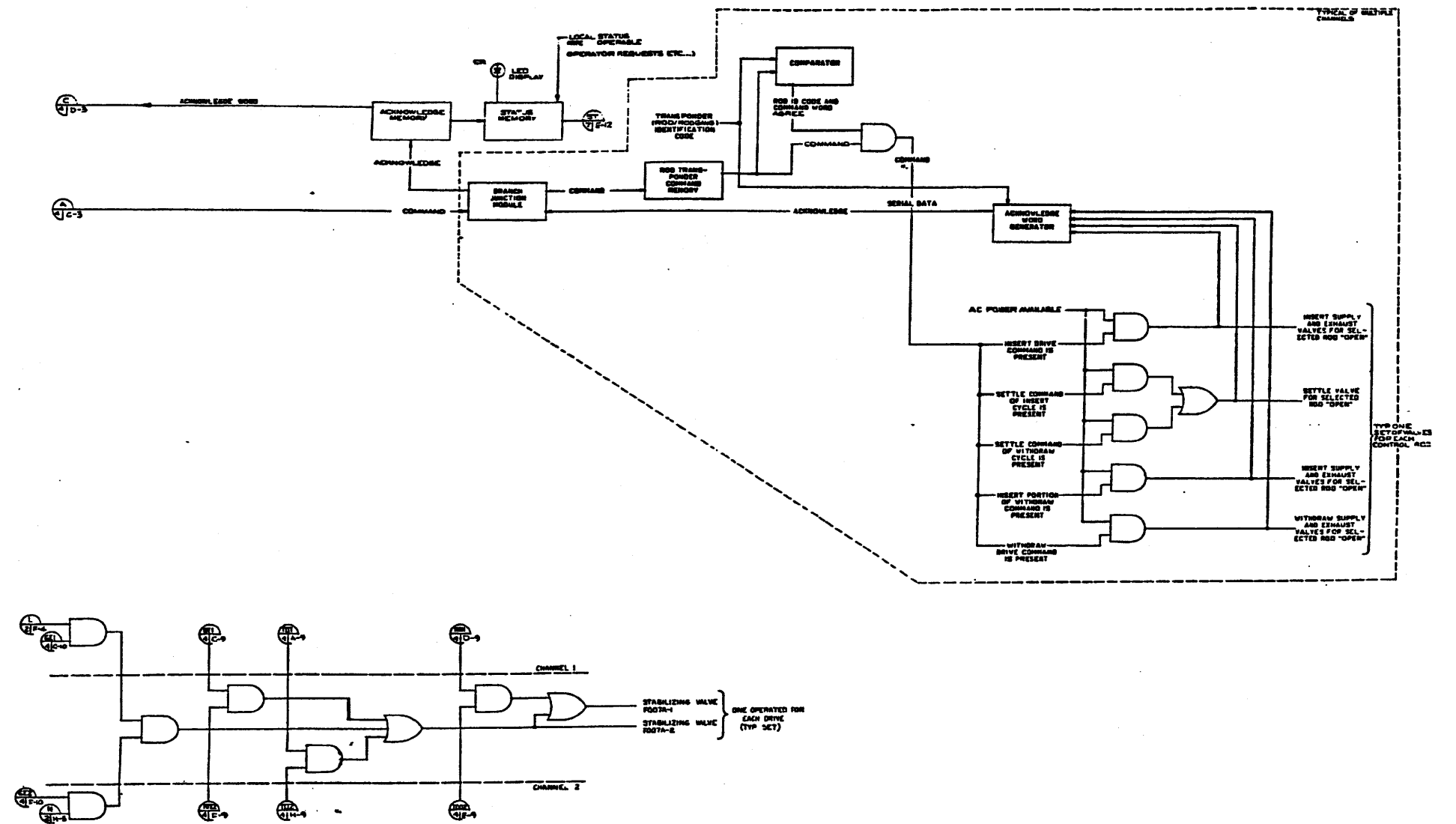
**PERRY NUCLEAR POWER PLANT**

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)]




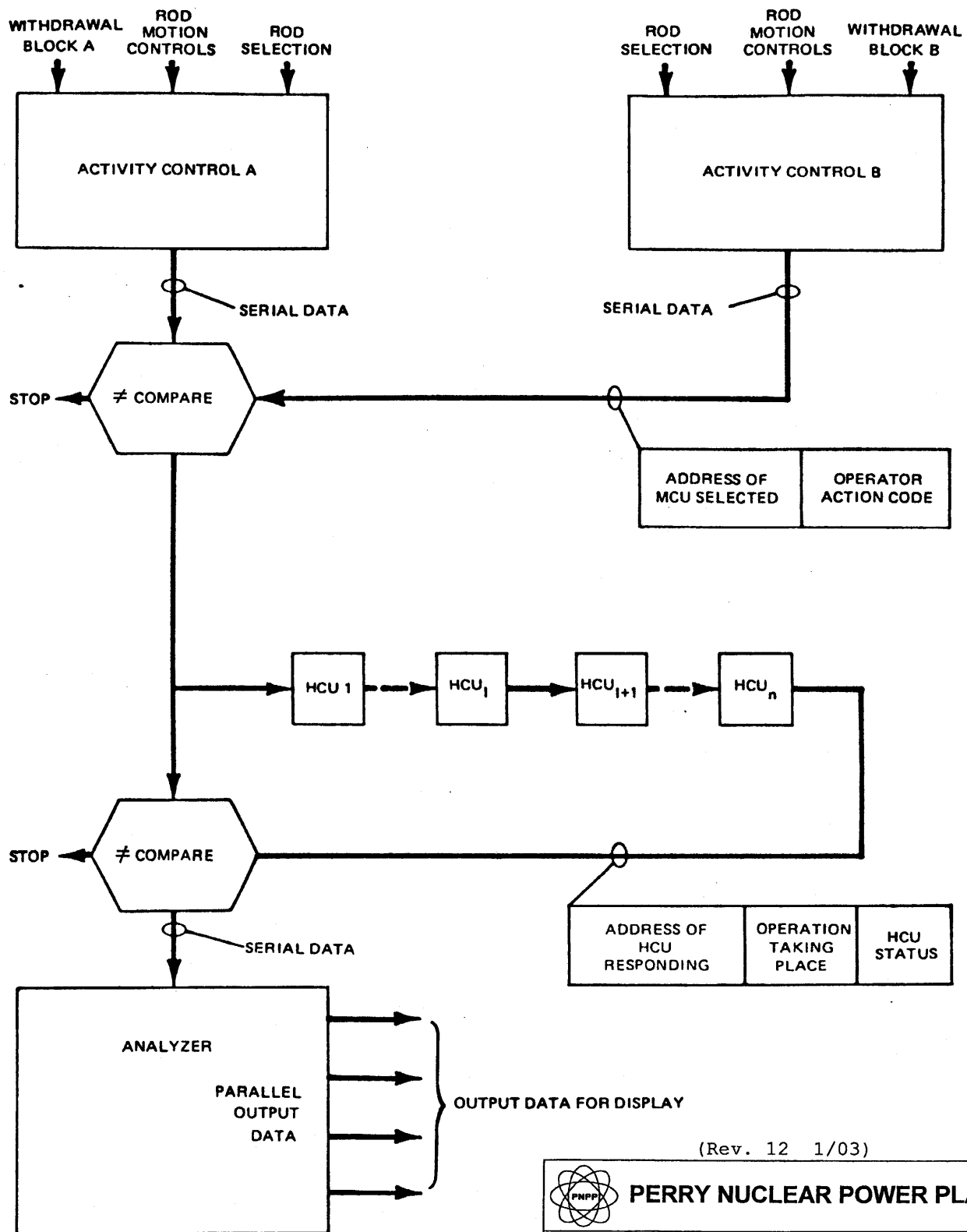


Figure 7.7-1 (Sheet 7 of 7)  
[Dwg. D-808-305(7)]



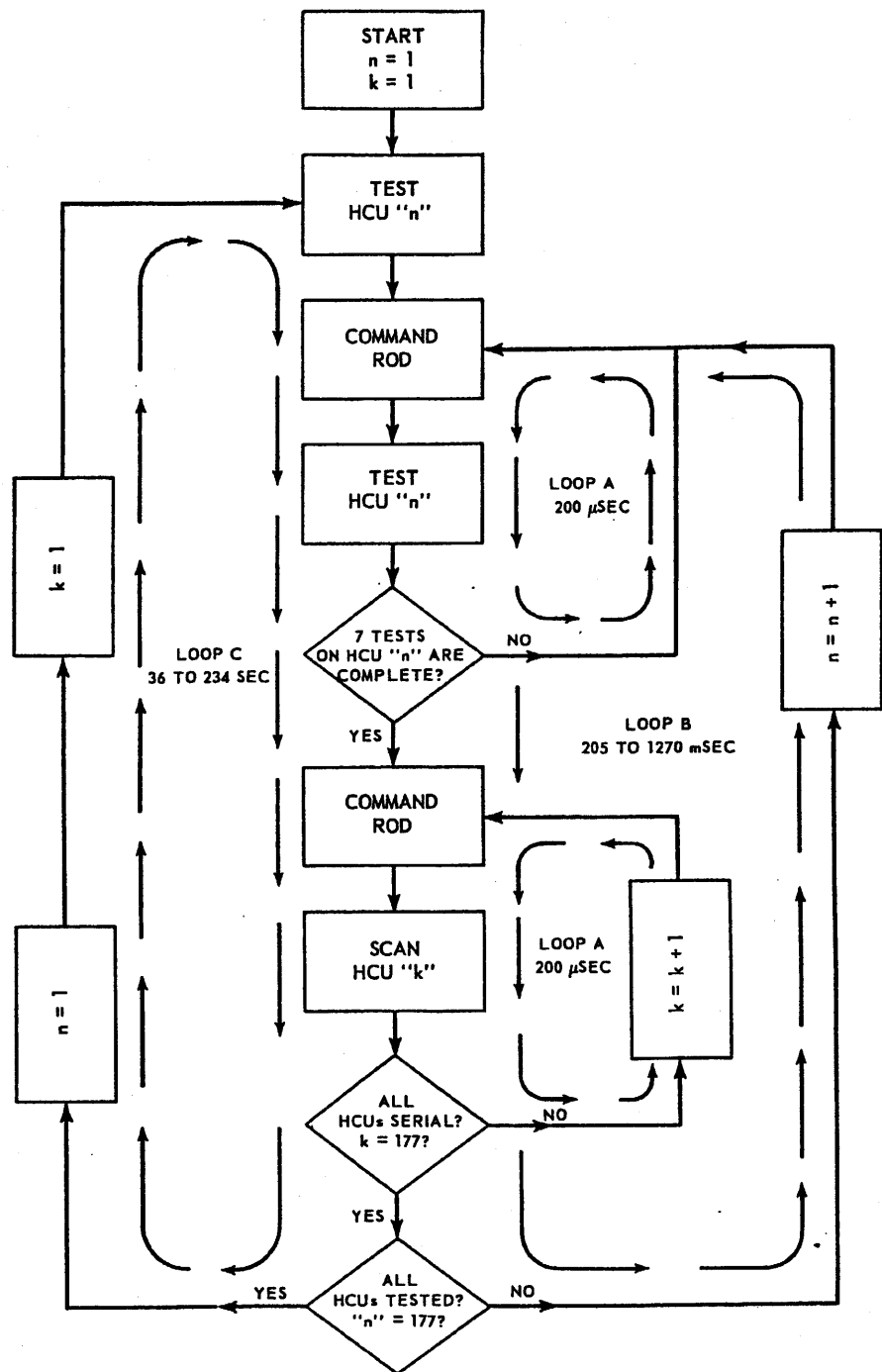
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**PERRY NUCLEAR POWER PLANT**

Rod Control and Information  
System Logic Diagram

Figure 7.7-2



(Rev. 12 1/03)

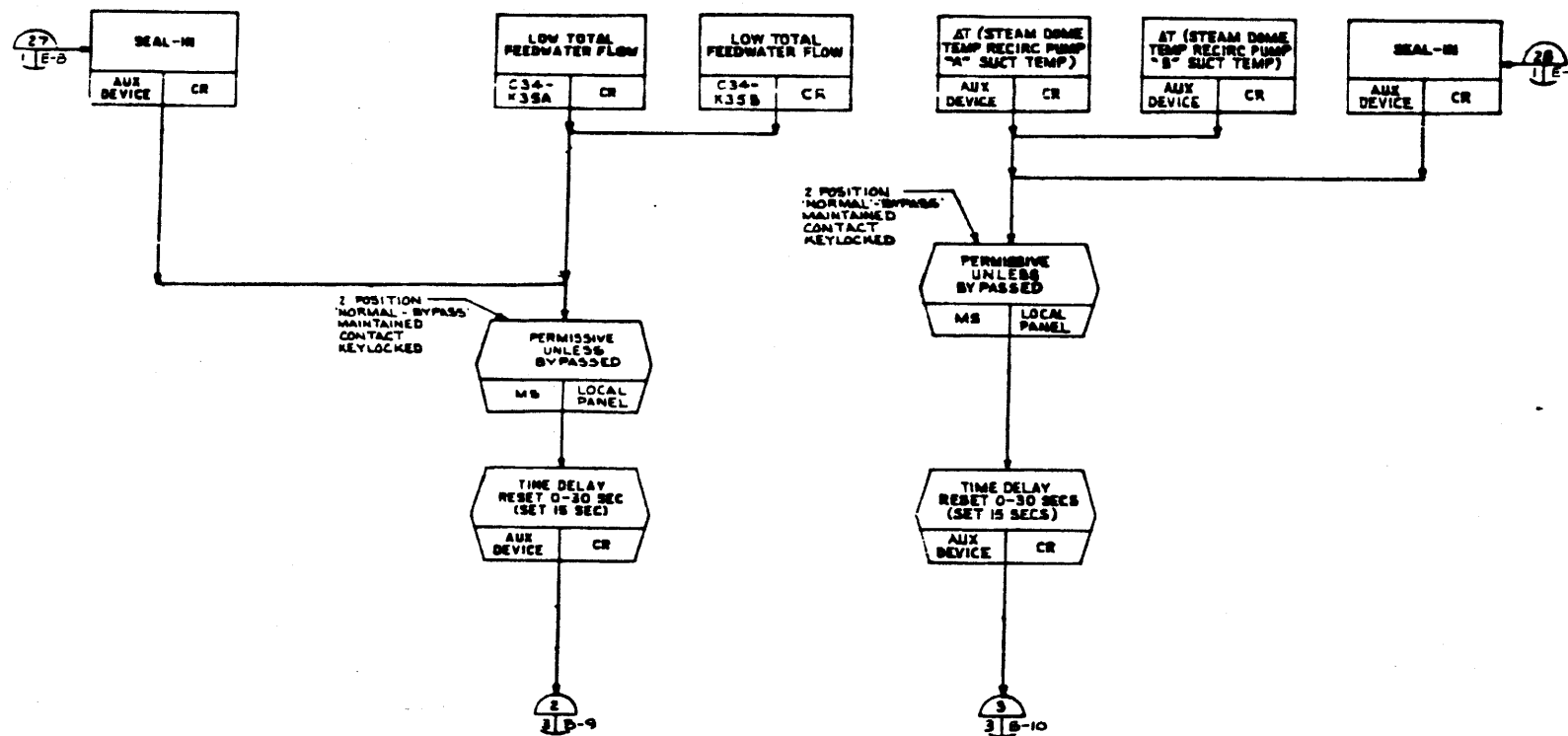


## PERRY NUCLEAR POWER PLANT

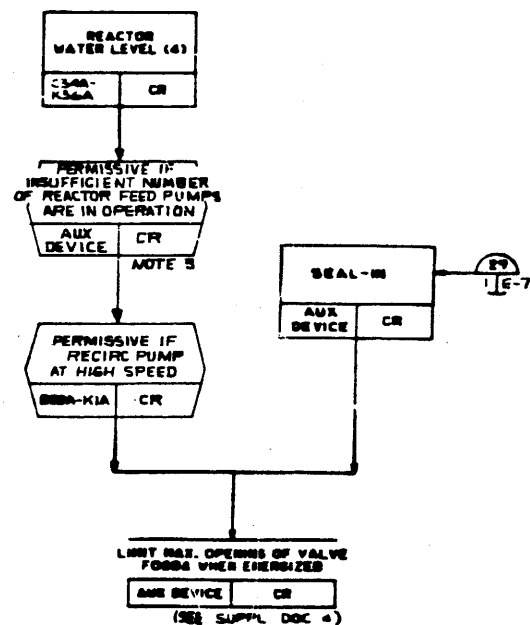
Rod Control and Information  
System Self-Test Provisions

Figure 7.7-3

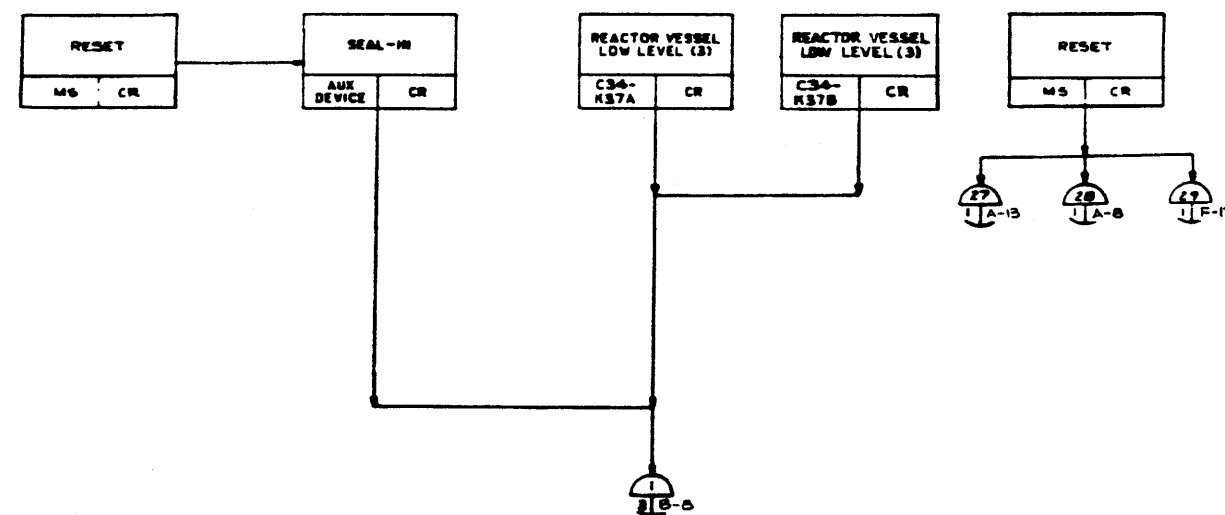




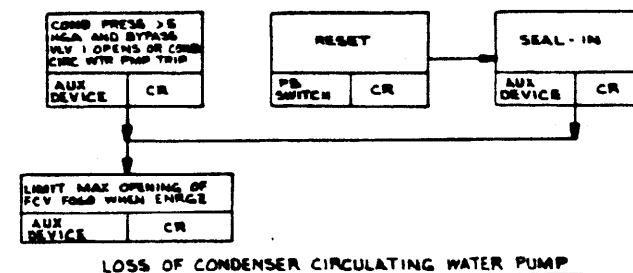
PUMP SPEED INTERLOCKS, PUMP SUCTION TO STEAM DOME  $\Delta T$ , LOW TOTAL FEEDWATER FLOW



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

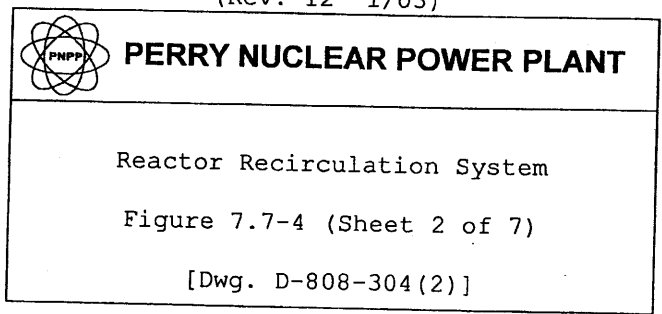
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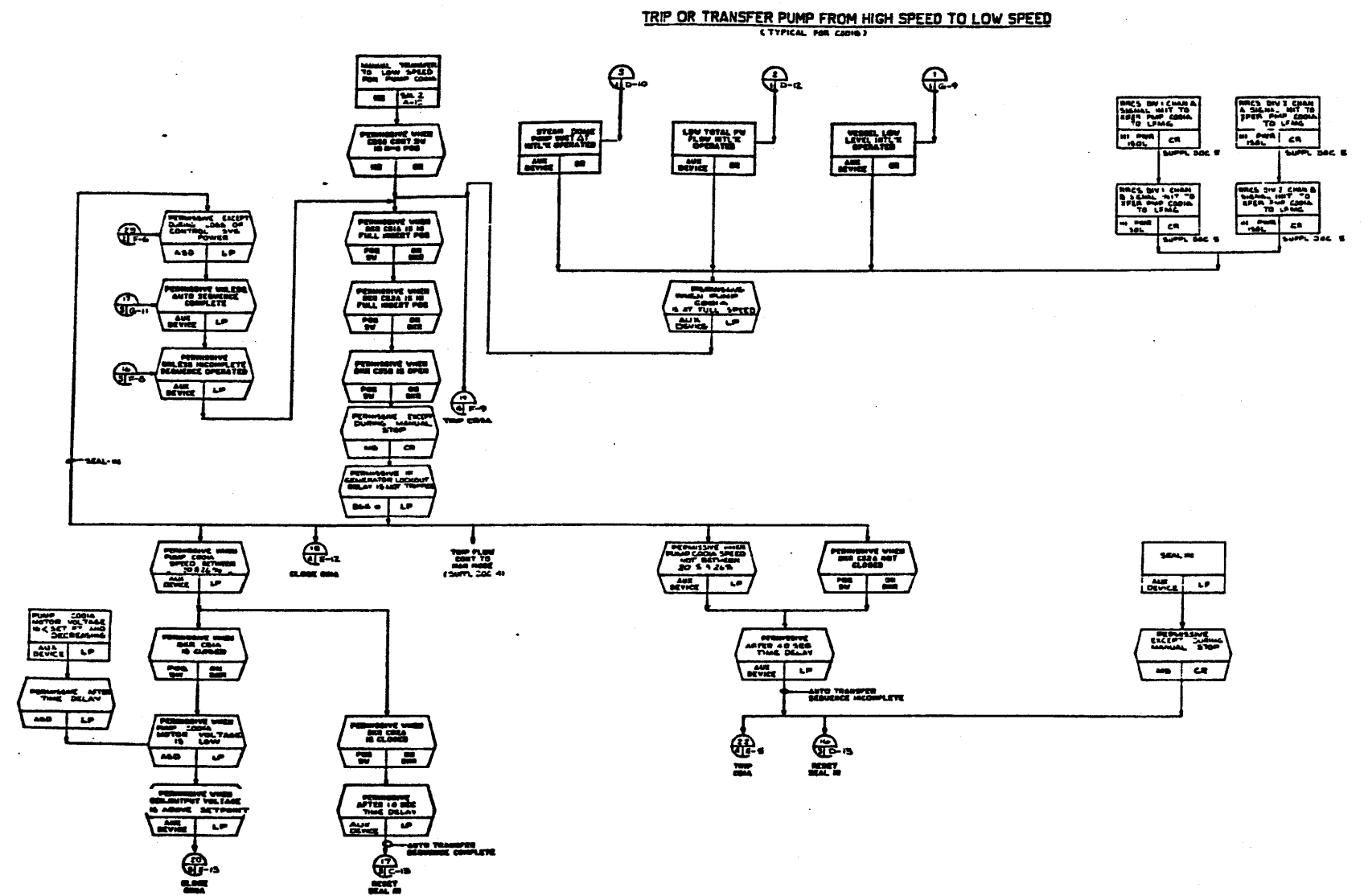
**PERRY NUCLEAR POWER PLANT**

Reactor Recirculation System

Figure 7.7-4 (Sheet 1 of 7)

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





(Rev. 12 1/03)



**PERRY NUCLEAR POWER PLANT**

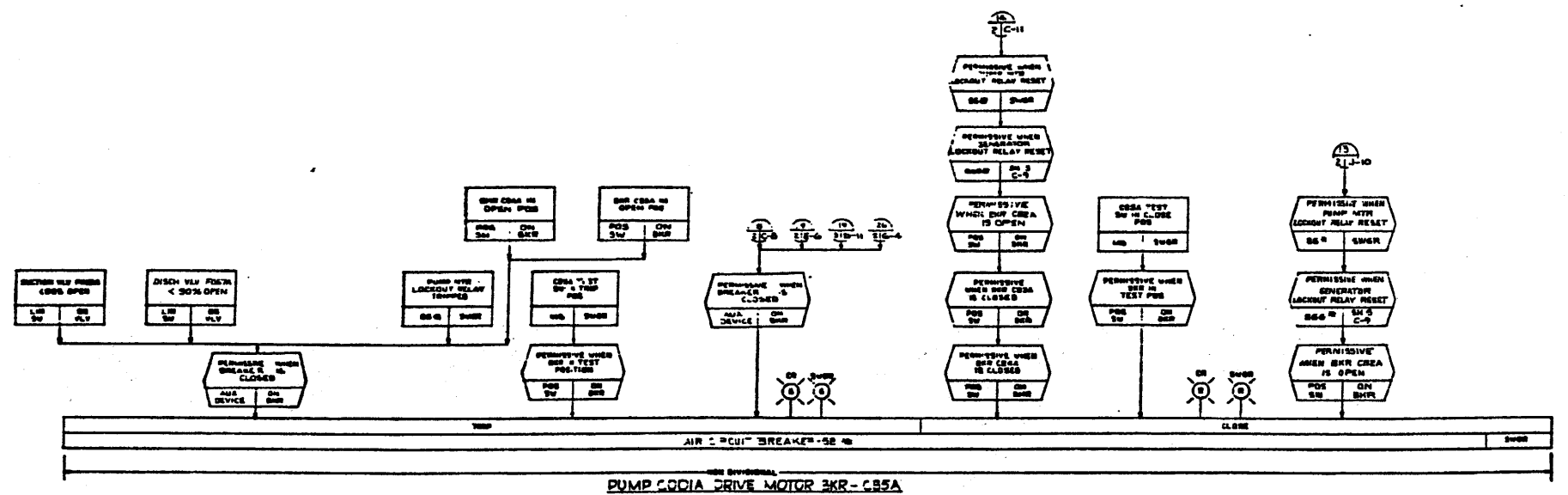
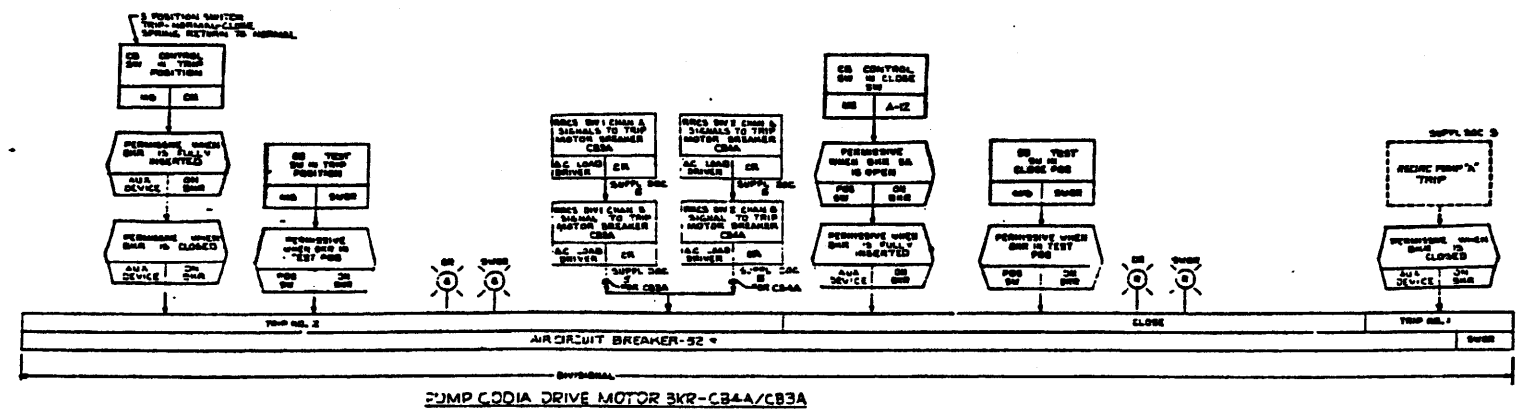
Reactor Recirculation System

Figure 7.7-4 (Sheet 3 of 7)

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

[Dwg. D-808-304 (4)]





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**PERRY NUCLEAR POWER PLANT**

Reactor Recirculation System

Figure 7.7-4 (Sheet 6 of 7)

[Dwg. D-808-304(6)]

Figure 1 shows 14 typical P&ID symbols for instrumentation, organized into three rows. Each symbol includes a process variable indicator (diamond), a function block (rectangle), and a device block (rectangle).

**Row 1:**

- Symbol 1:** PUMP MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 2:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 3:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 4:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 5:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 6:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.

**Row 2:**

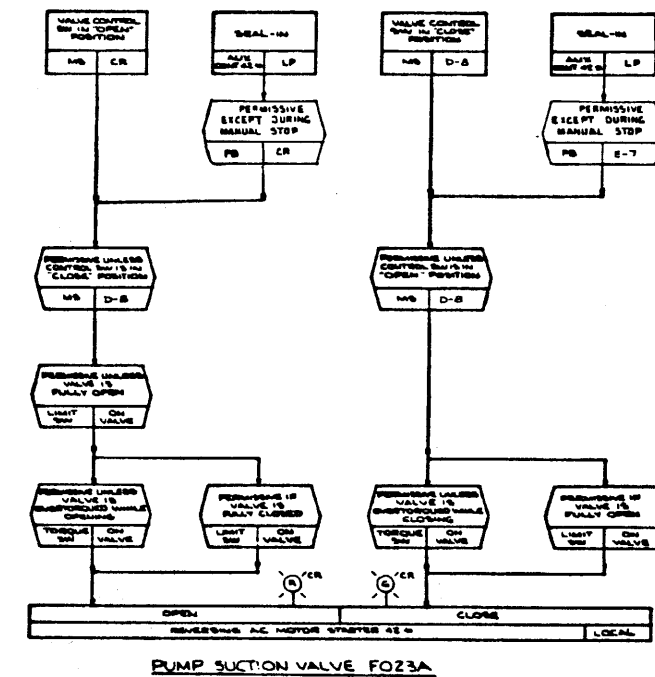
- Symbol 7:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 8:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 9:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 10:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 11:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 12:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.


**Row 3:**

- Symbol 13:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 14:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.

**Legend:**

- Symbol 1:** PUMP MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 2:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 3:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 4:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 5:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 6:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 7:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 8:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 9:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 10:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 11:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 12:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 13:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.
- Symbol 14:** REACTOR MOTOR A' LOCKOUT UNDERVOLTAGE. Device: AIR, SHUT.





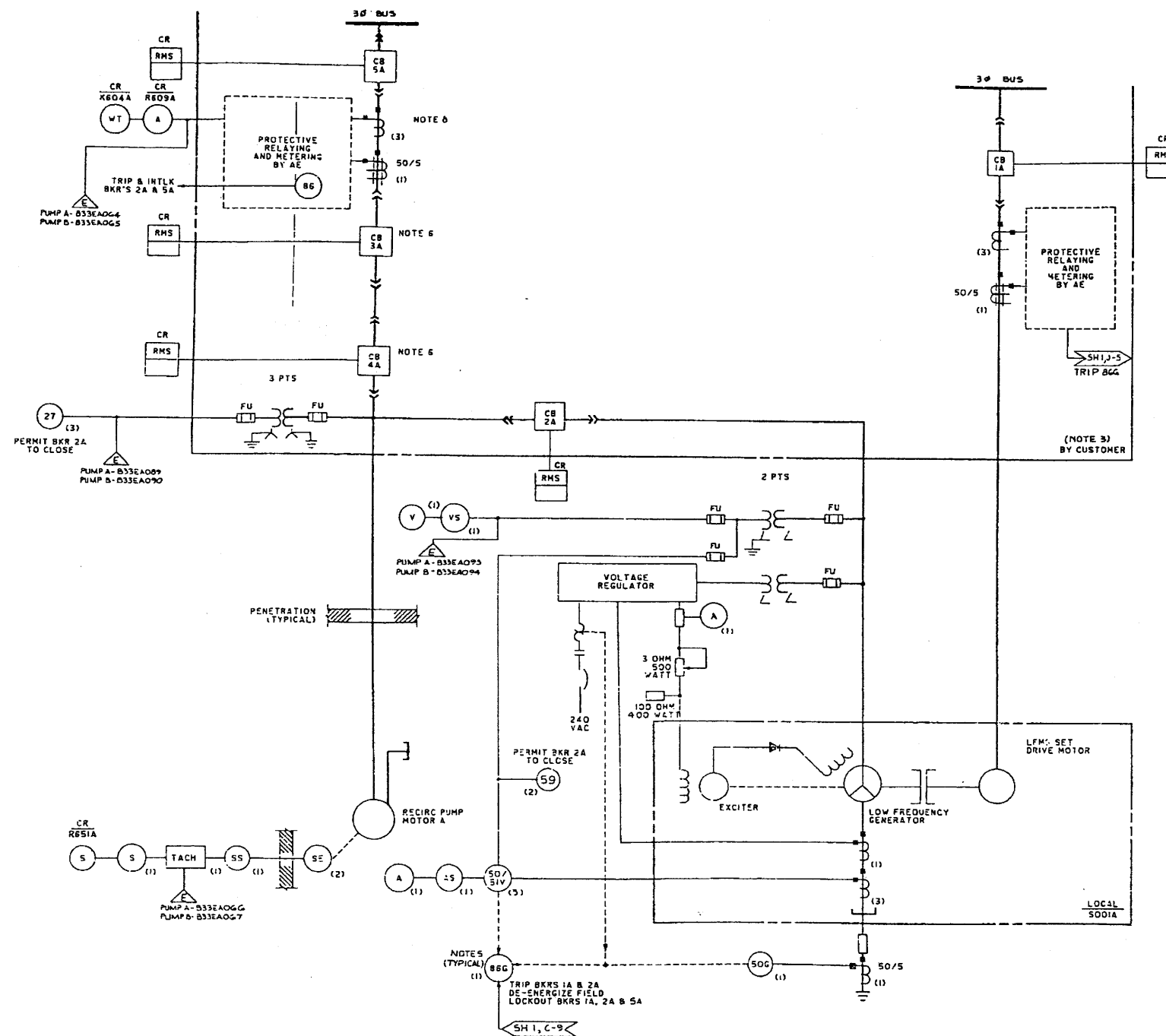
# PERRY NUCLEAR POWER PLANT

## 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 POOLIA.
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
- △ = ANALOG SIGNAL GENERATOR
- = HYDRAULIC LINE
- POS = POSITION SWITCH
- POT = POSITION TRANSMITTER
- VET = VELOCITY TRANSMITTER
- ⚡ = EMERGENCY RESPONSE INFORMATION SYSTEM

## REFERENCE DOCUMENTS:

1. 833-1010 REACTOR RECIRCULATION SYS P210
2. 221-1010 NUCLEAR BOILER SYSTEM P510
3. C51-1010 NEUTRON MONITORING SYS 1ED
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 1ED
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)

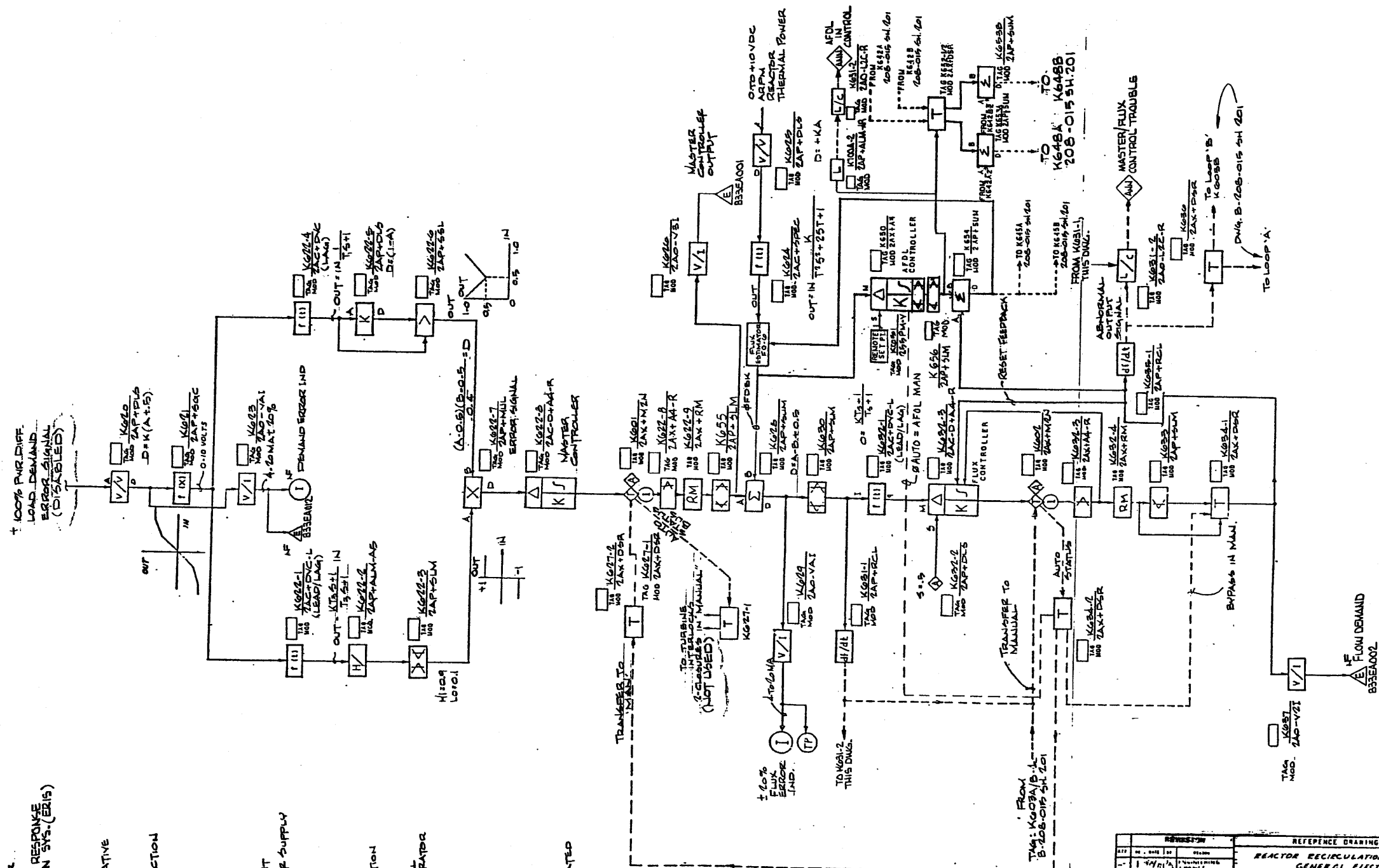


**PERRY NUCLEAR POWER PLANT**

Recirculation Flow Control  
Illustrations


Figure 7.7-5 (Sheet 1 of 6)





REF ID: A66283			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.	REACTOR RECIRCULATION SYSTEM
5	5	5/14/43	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
6	6	6/14/43	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
7	7	7/14/43	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
8	8	8/14/43	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
9	9	9/14/43	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
10	10	10/14/43	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
11	11	11/14/43	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
12	12	12/14/43	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
13	13	1/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
14	14	2/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
15	15	3/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
16	16	4/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
17	17	5/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
18	18	6/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
19	19	7/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
20	20	8/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
21	21	9/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
22	22	10/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
23	23	11/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
24	24	12/14/44	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
25	25	1/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
26	26	2/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
27	27	3/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
28	28	4/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
29	29	5/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
30	30	6/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
31	31	7/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
32	32	8/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
33	33	9/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
34	34	10/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
35	35	11/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
36	36	12/14/45	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
37	37	1/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
38	38	2/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
39	39	3/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
40	40	4/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
41	41	5/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
42	42	6/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
43	43	7/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
44	44	8/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
45	45	9/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
46	46	10/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
47	47	11/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
48	48	12/14/46	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
49	49	1/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
50	50	2/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
51	51	3/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
52	52	4/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
53	53	5/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
54	54	6/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
55	55	7/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
56	56	8/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
57	57	9/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
58	58	10/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
59	59	11/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
60	60	12/14/47	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
61	61	1/14/48	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
62	62	2/14/48	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
63	63	3/14/48	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
64	64	4/14/48	W. J. H. H.	REACTOR RECIRCULATION SYSTEM
65	65	5/14/48	W. J. H. H.	REACTOR

1000-12-1703



# 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

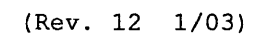
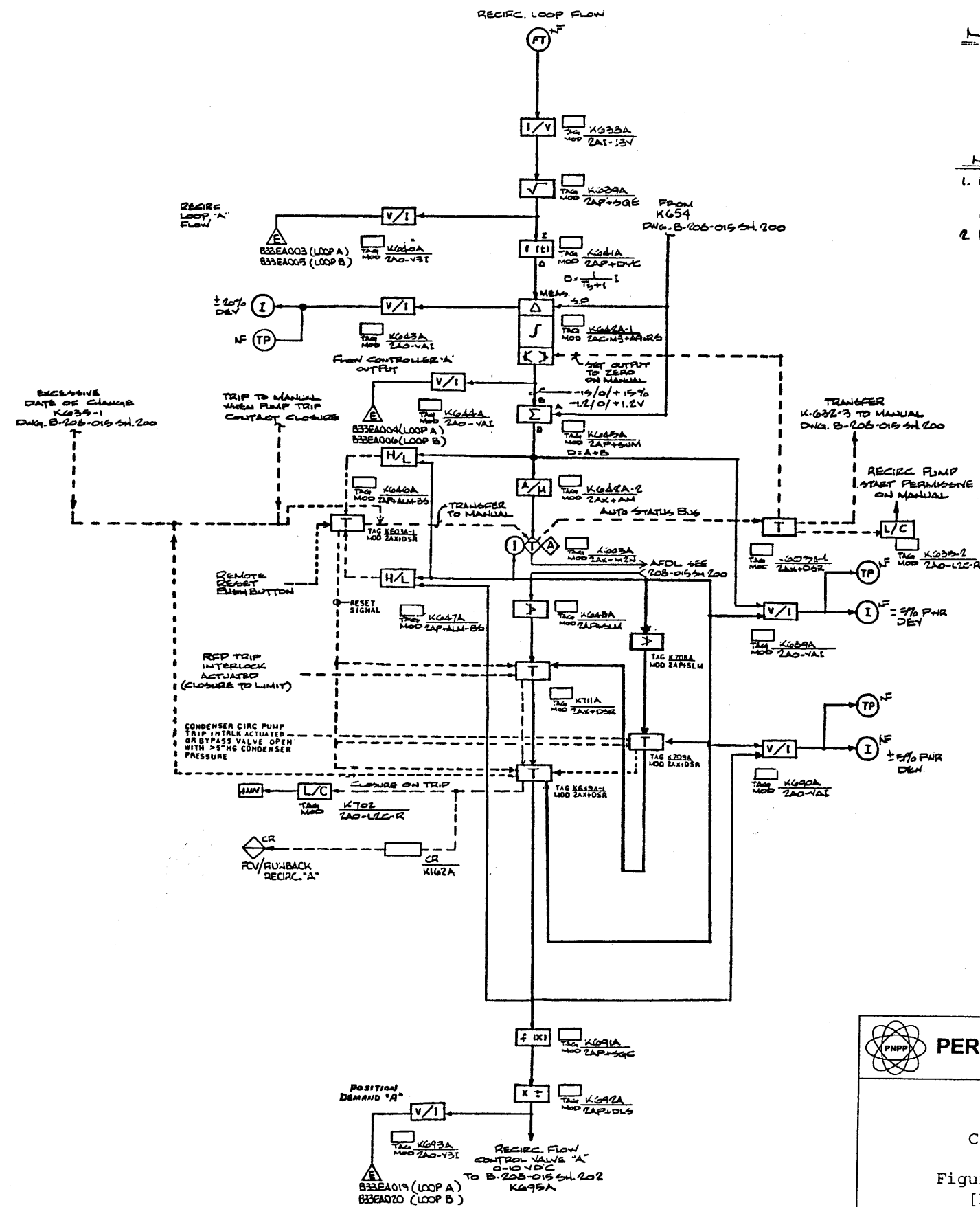


Figure 7.7-5 (Sheet 3 of 6)  
[Dwg. B-208-015(205)]



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

- NOTES:
1. LOOP 'B' SAME AS LOOP 'A' EXCEPT FOR TAGS.  
LOOP 'A' LOOP 'B'  
K652A CHANGES TO K652B
  2. FOR LEGEND SEE DWG. B-208-015 SH.200

(Rev. 12 1/03)

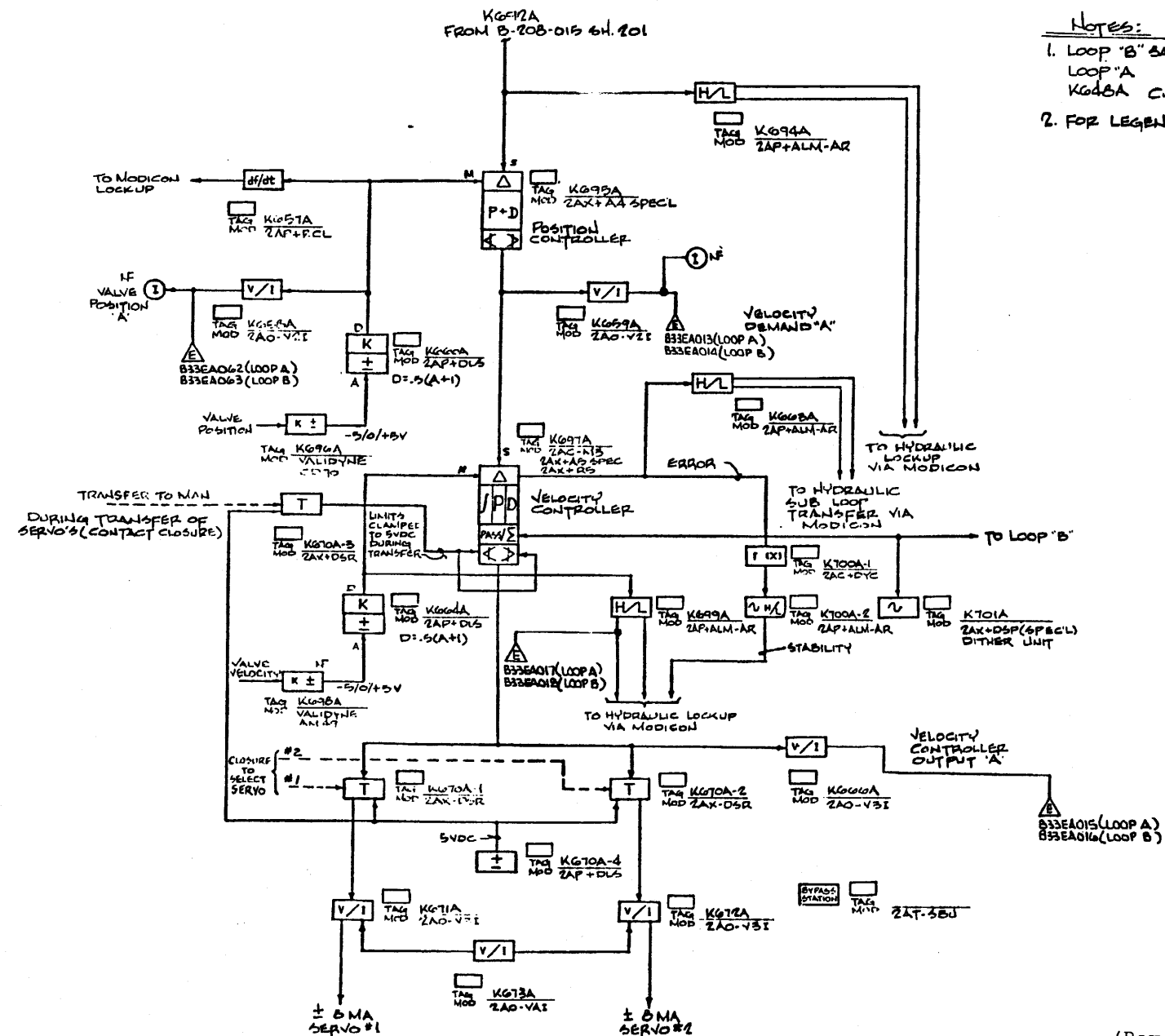
**PERRY NUCLEAR POWER PLANT**

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

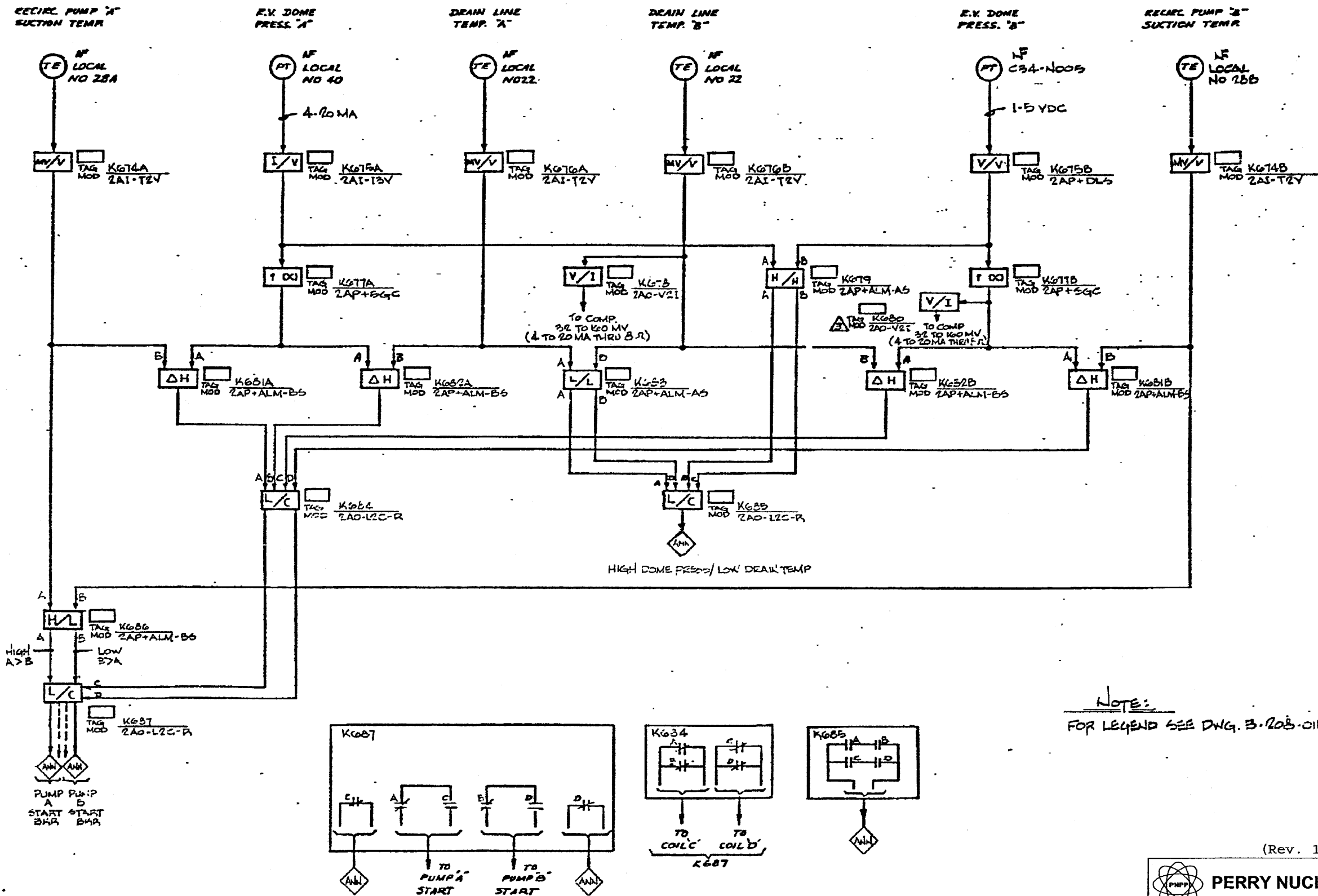


(Rev. 12 1/03)

**PERRY NUCLEAR POWER PLANT**

Recirculation Flow  
Control Illustrations

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



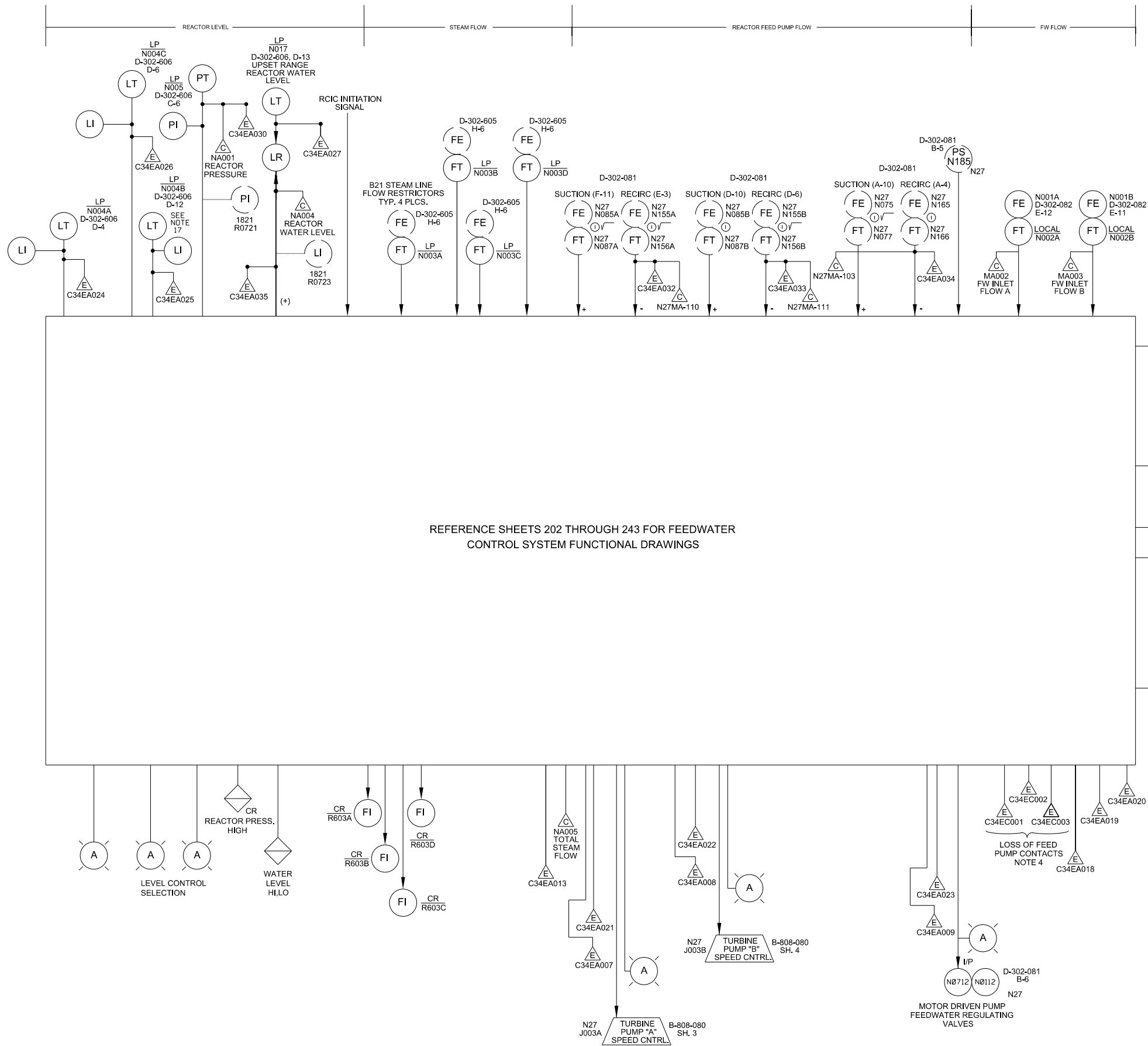
(Rev. 12 1/03)



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 H.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 1H13-P68B.

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 ELEMENTARY DIAGRAM

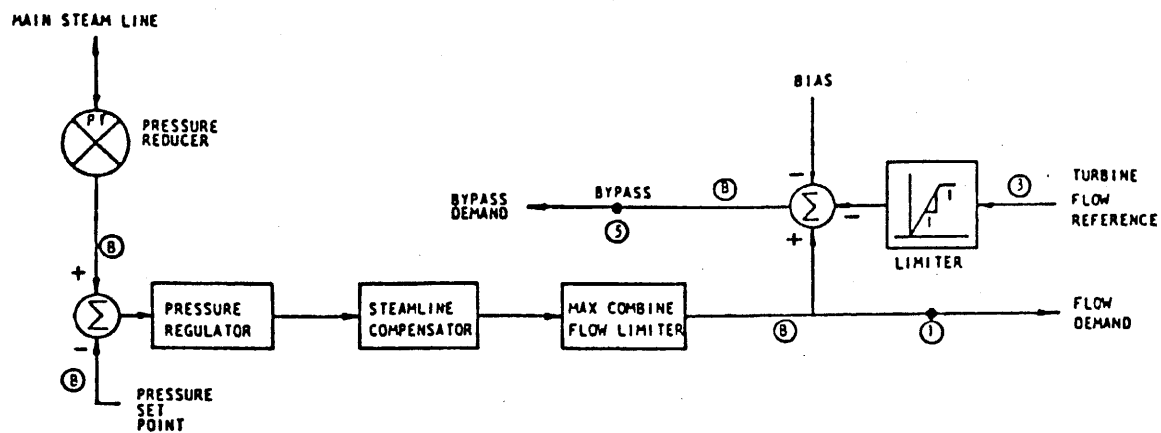
NOTE:  
THIS DRAWING REPLACES DRAWING  
D-808-0081 SH. 1.

(REV. 20 10/2017)

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

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





(Rev. 12 1/03)

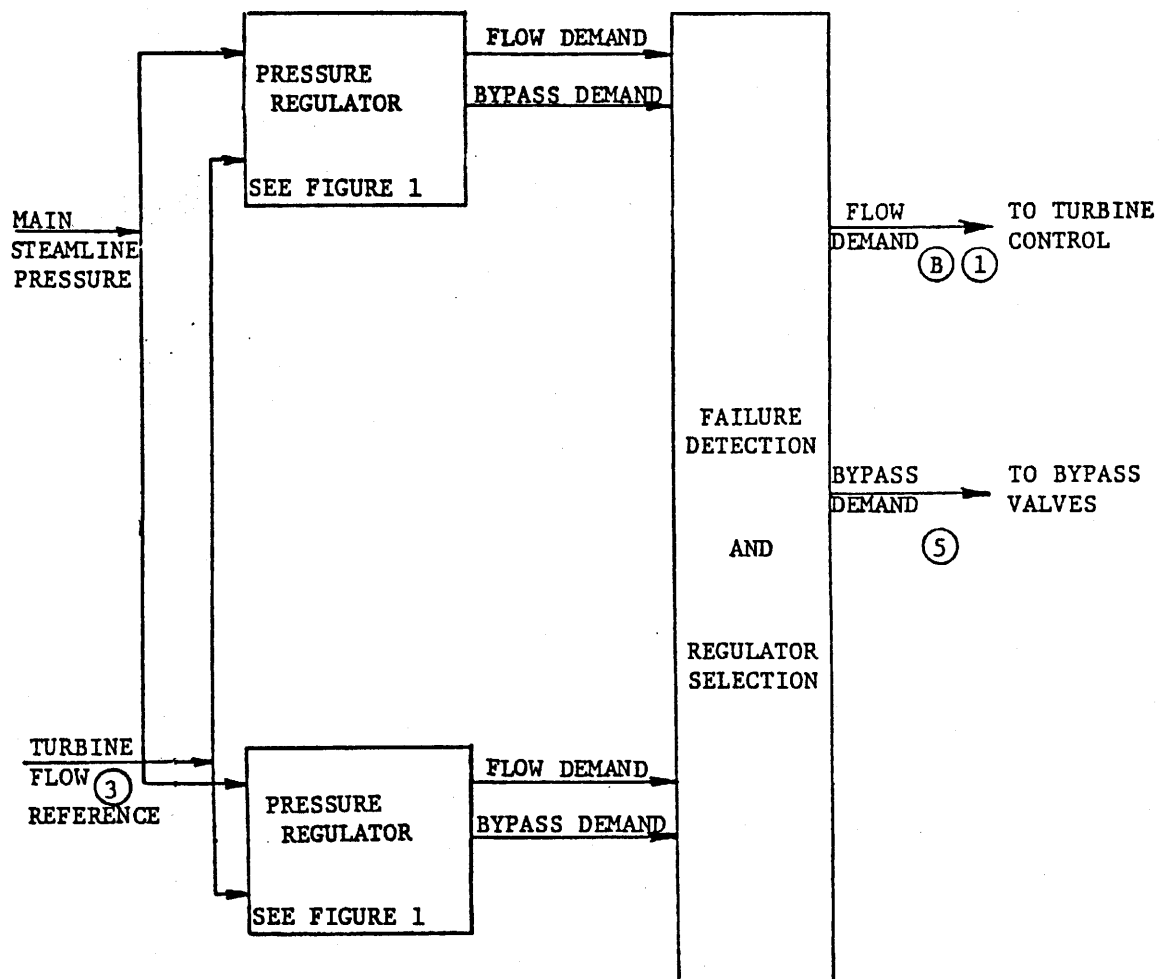


## PERRY NUCLEAR POWER PLANT

Pressure Regulator/Turbine Control  
System Diagram

Figure 7.7-7 (Sheet 1 of 2)





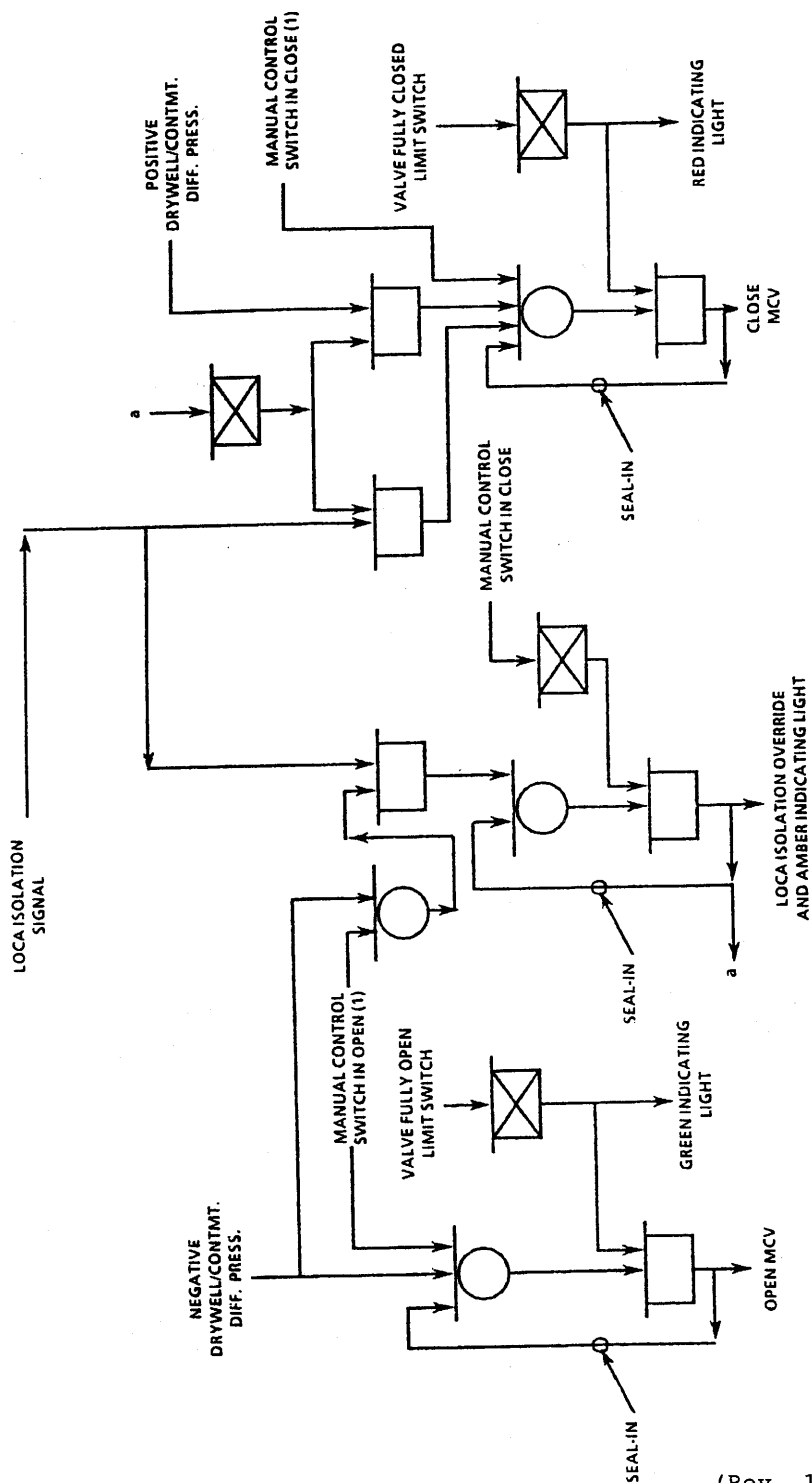
(Rev. 12 1/03)



## 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.

(Rev. 12 1/03)



## PERRY NUCLEAR POWER PLANT

Drywell Vacuum Relief System  
Control Logic for  
Motor Operated Isolation Valves

Figure 7.7-8