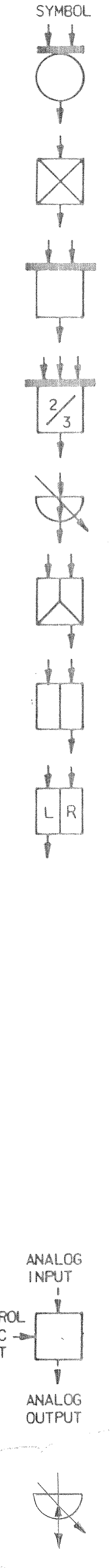
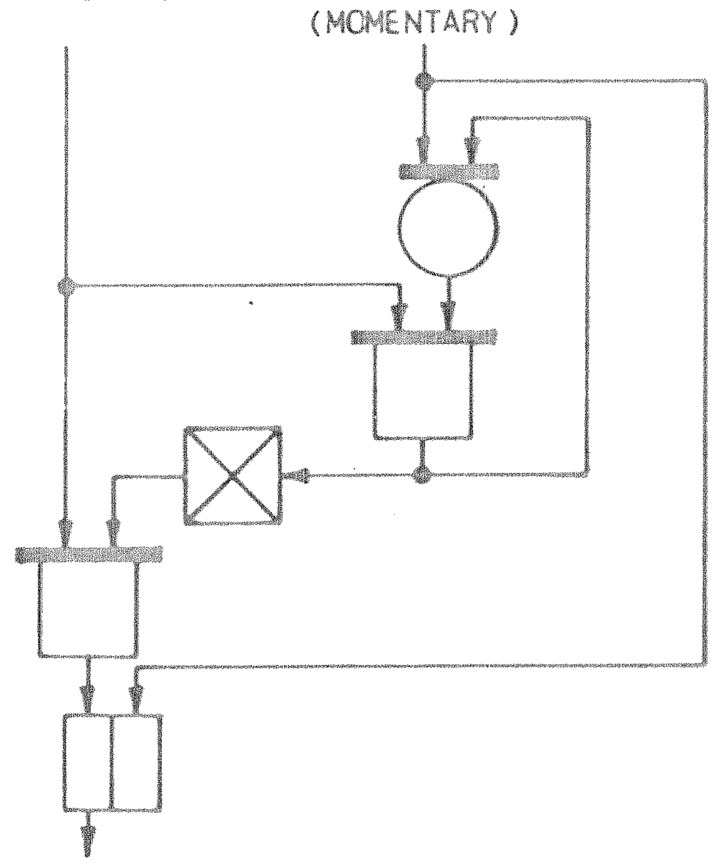
LOGIC SYMBOLS

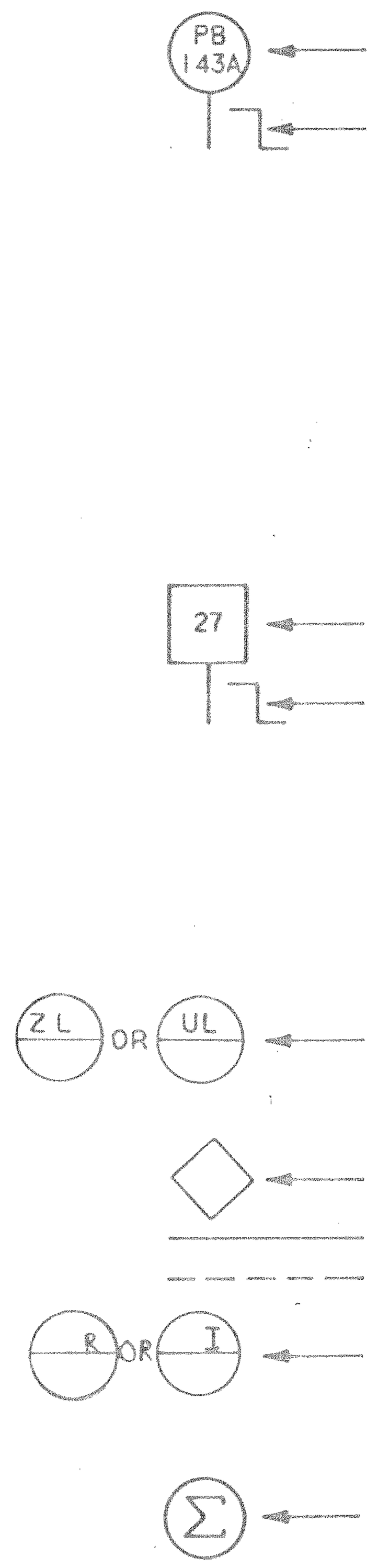


LOGIC FUNCTION	DESCRIPTION
OR	A DEVICE WHICH PRODUCES AN OUTPUT ONLY WHEN ONE INPUT (OR MORE) EXISTS.
NOT	A DEVICE WHICH PRODUCES AN OUTPUT ONLY WHEN THE INPUT DOES NOT EXIST.
AND	A DEVICE WHICH PRODUCES AN OUTPUT ONLY WHEN EVERY INPUT EXISTS
COINCIDENCE (2 OUT OF 3 SHOWN)	A DEVICE WHICH PRODUCES AN OUTPUT WHEN THE PRESCRIBED NUMBER OF INPUTS EXIST (EXAMPLE 2 INPUTS MUST EXIST FOR AN OUTPUT).
ADJUSTABLE TIME DELAY	A DEVICE WHICH PRODUCES AN OUTPUT FOLLOWING DEFINITE INTENTIONAL TIME DELAY AFTER RECEIVING AN INPUT.
OFF RETURN MEMORY	A DEVICE WHICH RETAINS THE CONDITION OF OUTPUT CORRESPONDING TO THE LAST ENERGIZED INPUT, EXCEPT UPON INTERRUPTION OF POWER IT RETURNS TO THE OFF CONDITION.
RETENTIVE MEMORY	A DEVICE WHICH RETAINS THE CONDITION OF OUTPUT CORRESPONDING TO THE LAST ENERGIZED INPUT (ALSO UPON INTERRUPTION OF POWER).
RETENTIVE MEMORY WITH ACTUATION BLOCK	A DEVICE HAVING RETENTIVE MEMORY AND ACTUATION SIGNAL BLOCK LOGIC FUNCTIONS AS INDICATED BY THE DIAGRAM BELOW.
ANALOG GATE	A DEVICE WHICH PERMITS AN ANALOG SIGNAL TO PASS IN AN ISOLATED CIRCUIT IF THE CONTROL LOGIC INPUT EXISTS.
ADJUSTABLE TIME DELAY	A DEVICE WHICH REMOVES AN OUTPUT FOLLOWING A DEFINITE INTENTIONAL TIME DELAY AFTER REMOVAL OF THE INPUT



ANALOG INPUT / CONTROL LOGIC INPUT / ANALOG OUTPUT

ADDITIONAL SYMBOLS



- INSTRUMENT CHANNEL BISTABLE
- OUTPUT INDICATOR
  - BISTABLE OUTPUT IS A LOGIC "1" WHEN THE MEASURED PARAMETER IS GREATER THAN THE SETPOINT VALUE.
  - BISTABLE OUTPUT IS A LOGIC "1" WHEN THE MEASURED PARAMETER IS LESS THAN THE SETPOINT VALUE.
  - BISTABLE OUTPUT IS A LOGIC "1" WHEN THE MEASURED PARAMETER DEVIATES FROM THE NORMAL VALUE BY MORE THAN THE SETPOINT AMOUNTS.
  - OR / OR — SAME AS ABOVE EXCEPT WITH AN AUTOMATICALLY ADJUSTED SETPOINT
  - OR / OR — SAME AS ABOVE EXCEPT WITH REQUIRED HYSTERESIS
- NON-INSTRUMENT BISTABLE
- OUTPUT INDICATOR (SAME AS EXPLAINED ABOVE)
- INDICATOR LAMP (SUPPLIED BY UE&C) (F.P. 5-70073, 30001, 51029)
- COMPUTER INPUT (SUPPLIED BY UE&C) (F.P. 5-70073, 30001, 51029)
- LOGIC INFORMATION TRANSMISSION
- ANALOG INFORMATION TRANSMISSION
- ANALOG DISPLAY (SUPPLIED BY UE&C)
- ANALOG SUMMER

DEVICE FUNCTION LETTERS AND NUMBERS

FB	FLOW CHANNEL
LB	LEVEL CHANNEL
NC	NUCLEAR CHANNEL
PB	PRESSURE CHANNEL
RC	RADIATION CHANNEL
SB	SPEED CHANNEL
TB	TEMPERATURE CHANNEL
ZB	POSITION CHANNEL
20	ELECTRIC OPERATED VALVE
27	UNDERVOLTAGE RELAY
33	POSITION SWITCH
52	AC CIRCUIT BREAKER
63	PRESSURE SWITCH
71	LEVEL SWITCH
80	FLOW SWITCH
81	UNDERFREQUENCY RELAY

DWG. 509041 THRU C509056 ARE UE&C REDRAWS OF THE WESTINGHOUSE FUNCTIONAL DIAGRAMS.-AS REFERENCED BELOW, UE&C HAS ADDED MAIN CONTROL BOARD(MCB) LOCATIONS, COMPUTER ID NUMBERS, MONITORINGS LIGHT NUMBERS, RECORDER NUMBERS, CONTROL SWITCH NUMBERS, REFERENCE DRAWINGS AND APPLICABLE UE&C INTERFERACE.

GENERAL NOTES: (FOR ALL SHEETS)

1. IN ALL LOGIC CIRCUITS, THE INDICATED ACTUATION OF A SYSTEM OR DEVICE OCCURS WHEN A LOGIC "1" SIGNAL IS PRESENT. EXCEPT WHERE INDICATED OTHERWISE, ALL BISTABLES ARE "DE-ENERGIZE TO ACTUATE" SUCH THAT A LOGIC 1 SIGNAL IS DEFINED TO BE PRESENT WHEN THE BISTABLE OUTPUT VOLTAGE IS OFF.
2. EXCEPT WHERE INDICATED OTHERWISE, THE FOLLOWING IS TRUE: ALL LOGIC CIRCUITS ARE REDUNDANT THAT IS EVERY LOGIC CIRCUIT SHOWN HAS A DUPLICATE LOCATED IN A SEPARATE CABINET. ALL INSTRUMENT CHANNELS, BISTABLES, COMPUTER INPUTS AND INDICATOR LAMPS ARE NOT REDUNDANT. MANUAL CONTROLS DO NOT HAVE REDUNDANT ACTUATORS, BUT DO HAVE REDUNDANT CONTACTS WHERE LOGIC IS REDUNDANT. ALL INDICATOR LAMPS, AND COMPUTOR INPUTS ARE CONNECTED TO BOTH TRAINS (WHERE LOGIC IS REDUNDANT) SO THAT A SIGNAL IN EITHER TRAIN WILL ACTUATE.
3. WHENEVER A PROCESS SIGNAL IS USED FOR CONTROL AND IS DERIVED FROM A PROTECTION CHANNEL, ISOLATION MUST BE PROVIDED. COMPUTER INPUTS ARE NOT A REQUIREMENT OF THE REACTOR CONTROL AND PROTECTION OR ENGINEERED SAFEGUARDS SYSTEMS AND ARE SHOWN FOR INFORMATION ONLY.
4. THIS SET OF DRAWINGS AND THE ASSOCIATED REACTOR CONTROL AND PROTECTION SYSTEM FUNCTIONAL REQUIREMENTS DOCUMENTS ILLUSTRATE THE FUNCTIONAL REQUIREMENTS OF THE REACTOR CONTROL AND PROTECTION SYSTEM, INCLUDING ENGINEERED SAFEGUARDS. THESE DRAWINGS SHOULD NOT BE USED WITHOUT THE ASSOCIATED FUNCTIONAL REQUIREMENTS DOCUMENT AND THEY DO NOT REPRESENT ACTUAL HARDWARE IMPLEMENTATION. FOR HARDWARE IMPLEMENTATION, REFER TO THE FOLLOWING REFERENCE DRAWINGS:

   LATER SOLID STATE PROTECTION SYSTEM SCHEMATIC
   7247D91 SOLID STATE PROTECTION SYSTEM INTERCONNECTION — (FP-70073)
   5655D49 NUCLEAR INSTRUMENTATION SOURCE RANGE — (FP-70147)
   5655D50 NUCLEAR INSTRUMENTATION INTERMEDIATE RANGE — (FP-70148)
   5655D51 NUCLEAR INSTRUMENTATION POWER RANGE — (FP-70149)
   5655D52 NUCLEAR INSTRUMENTATION AUXILIARY CHANNELS — (FP-70150)
   8756D51 PROCESS CONTROL SYSTEMS BLOCK DIAGRAM — (FP-70001)
   271C339 ELEMENTARY WIRING DIAGRAM — (FP-30001)
   1189E15 REACTOR TRIP SWITCHGEAR ELEMENTARY — (FP-30591)
   OTHERS CONTROL BOARD SOLID STATE PROTECTION SYSTEM WIRING.
5. THIS SET OF DRAWINGS IS IDENTICAL FOR MULTIPLE UNITS EXCEPT FOR THE TAG NUMBERS; FOR UNIT 1 TAG NUMBERS ADD A "1" (EXAMPLE: 1RC-PB-455E) FOR UNIT 2 TAG NUMBERS ADD A "2" (EXAMPLE: 2-RC-PB-455E)
6. FOR GENERAL NOTES AND REFERENCE DWGS SEE. 9763-M-503100
7. FOR SET POINTS REFERENCE SET POINT DATA LIST 9763-M-500376.

INDEX

TITLE	SH. NO.	W DWG	SHEET	UE&C F.P.	REV
INDEX AND SYMBOLS	C509041	7246D02	1	70313	9
REACTOR TRIP SIGNALS	42		2	14	7
NUCLEAR INSTR. AND MANUAL TRIP SIGNALS	43		3	15	4
NUCLEAR INSTR. PERMISSIVES AND BLOCKS	44		4	16	4
PRIMARY COOLANT SYSTEM TRIP SIGNALS	45		5	17	6
PRESSURIZER TRIP SIGNALS	46		6	18	3
STEAM GENERATOR TRIP SIGNALS	47		7	19	6
SAFEGUARDS ACTUATION SIGNALS	48		8	20	9
ROD CONTROLS & ROD BLOCKS	49		9	21	4
STEAM DUMP CONTROL	50		10	22	3
PRESSURIZER PRESSURE & LEVEL CONTROL	51		11	23	3
PRESSURIZER HEATER CONTROL	52		12	24	4
FEEDWATER CONTROL & ISOLATION	53		13	25	3
FEEDWATER CONTROL & ISOLATION	54		14	26	2
EMERGENCY FEEDWATER PUMPS STARTUP	55		15	27	6
TURBINE TRIPS, RUNBACKS & OTHER SIGNALS	56		16	28	4

DWG. TRANSFERRED TO CUSTODY OF NHY AT REV. 11 LTR. SBU #A0722 DTD. 10/14/86

ISSUED-FOR-CONSTRUCTION

REV	DATE	DESCRIPTION	PE	DWN. BY	CKD. BY	RES. ENG.	SDE	QAE	PEM
11	8/12/86	ECA 99/113274C ECA 05/117361C ECA 98/117498A ECA 05/116991A ECA 05/113093G							
10	5/21/86	ECA 99/115386A		LGI				—	
9	1/28/86	ECA 05104449A ECA 05111763A ECA 99100679D ECA 99111518B ECA 99109947A SB-19809	RPN				RPN	—	
8	5-22-85	REV'D C509042,43	RPN	ZH		LRN	RPN	—	
7	3/22/85	REV'D C-509042	RPN				RPN	—	
6	1-4-85	REV'D C-509048	RPN					—	
5	7/2/84	REV'D C-509042,44,45,48,49,52 55. ADDED NOTE 7 PER SB-16055	RPN				RPN	—	
4	6-12-84	REV'D C-509047						—	
3	1/13/84	REV'D C-509048	RPN					—	
	8-21-81	FIRST ISSUE						—	

REV	DATE	DRWN	CHKD	CE	LDE	DESCRIPTION
13	12/6/95	MRB	JNB			INCORP DCR 94-039, CA-3
12	10/30/86	CCM		RRL	NA	9763-C-509041 SUPERCEDES UE&C DWG:

INDEX & SYMBOLS
W FUNCTIONAL DIAGRAMS

New Hampshire Yankee — Seabrook Station

1-NHY- 509041 REV 13

bdr file: N:\FUNC\WORK

REDUNDANT

STEAM DUMP INTERLOCK SELECTOR SWITCH (NOTE 3 & 9)

OFF RESET T AVG BYPASS | ON | BYPASS INTERLOCK (MOMENTARY)

P-12 LO-LO T AVG (C-509045)

CONDENSER AVAILABLE SIGNALS

CONDENSER PRESSURE SWITCH AR PSL 3017 A / AR PSL 3017 B / AR PSL 3017 C

CIRCULATION WATER PUMP BREAKERS CLOSED: CW-P-39A 52 CLOSED; CW-P-39B 52 CLOSED; CW-P-39C 52 CLOSED

2/3

BY UE&C (1-NHY-503665)

FROM PQY-506 (C-509025) TURBINE IMPULSE CHAMBER PRESSURE (NOTE 4)

P-4 REACTOR TRIP (C-509042) TRAIN A TRAIN B

FROM RC-TY-505A (NOTE 11) T REFERENCE FROM TURBINE PRESSURE (C-509049) (NOTE 4)

AVERAGE T AVG (C-509049)

REFERENCE T AVG INTERNAL SETPOINT

(NOTE 11)

LOAD REJECTION CONTROLLER

PLANT TRIP CONTROLLER

RC TC 500A

RC TC 500D

S.P.

PY 506C

(NOTE 6) PB 506C

RC TB 500B HI 1

RC TB 500C HI 2

RC TB 500E HI 1

RC TB 500F HI 2

STEAM DUMP CONTROL MODE SELECTOR SWITCH (NOTE 9)

RESET | T AVG | STEAM PRESSURE

MS CS 3056 MCB-FF

MS PT 507 STEAM HEADER PRESSURE

STEAM HEADER PRESSURE CONTROLLER K1 (1+1/2.155)

PC 507

STEAM LINE PRESSURE

LOOP 1 | LOOP 2 (NOTE 8) | LOOP 3 | LOOP 4

STEAM GENERATOR PRESSURE CONTROLLER K12 (1+1/2.155)

MS PC 3001 CP-153

MS PC 3002 (CP-152B)

MS PC 3003 CP-153

MS PC 3004 CP-152B

MODULATE THE LOOP 1 ATMOSPHERIC RELIEF VALVE MS-PV-3001 (NOTE 10)

MODULATE THE LOOP 2 ATMOSPHERIC RELIEF VALVE MS-PV-3002 (NOTE 10)

MODULATE THE LOOP 3 ATMOSPHERIC RELIEF VALVE MS-PV-3003 (NOTE 10)

MODULATE THE LOOP 4 ATMOSPHERIC RELIEF VALVE MS-PV-3004 (NOTE 10)

MS 2L 3058 C MCB-FF

MS C-9

MS C-7A

(NOTE 8)

MS 2L 3058 A MCB-FF

MS 2L 3058 F

MS UJ 500 MCB-FF

BLOCK STM. DUMP TO 3 COOLDOWN CONDENSER DUMP VALVES MS-PV-3011, 3015, 3019 (NOTE 1)

BLOCK STM. DUMP TO CONDENSER DUMP VALVES MS-PV-3009, 3010, 3012, 3013, 3014, 3016, 3017, 3018, 3020 (NOTE 1)

BLOCK STM. DUMP TO ALL CONDENSER DUMP VALVES (NOTE 1)

REDUNDANT

TRIP OPEN 1/2 CONDENSER DUMP VALVES MS-PV-3010, 3011, 3014, 3015, 3018, 3019

TRIP OPEN 1/2 CONDENSER DUMP VALVES MS-PV-3009, 3012, 3013, 3016, 3017, 3020 (NOTE 7)

MODULATE THE DUMP VALVES ACCORDING TO THE FOLLOWING SEQUENCE:

STEAM DUMP DEMAND	VALVES MODULATED OPEN OR CLOSED (ZERO TO FULL OPEN)
0-25 %	MS-PV-3011, 3015, 3019
25-50 %	MS-PV-3010, 3014, 3018
50-75 %	MS-PV-3009, 3013, 3017
75-100 %	MS-PV-3012, 3016, 3020

NOTES:

1. STEAM DUMP IS BLOCKED BY BLOCKING AIR TO THE DUMP VALVES AND VENTING THE DIAPHRAGMS. THE REDUNDANT LOGIC OUTPUT OPERATES TWO SOLENOID VENT VALVES IN SERIES TO REDUNDANTLY INTERLOCK THE AIR LINE BETWEEN EACH VALVE DIAPHRAGM AND ITS ASSOCIATED POSITIONER. THE NON-REDUNDANT LOGIC OUTPUT OPERATES ONE SOLENOID VENT VALVE TO INTERLOCK THE AIR LINE BETWEEN EACH VALVE DIAPHRAGM AND ITS ASSOCIATED POSITIONER. THE SOLENOID VALVES ARE DE-ENERGIZE TO VENT, CAUSING THE MAIN DUMP VALVE TO CLOSE IN FIVE SECONDS. EITHER OF THE TWO REDUNDANT BLOCK SIGNALS OR THE NON-REDUNDANT BLOCK SIGNAL WILL BLOCK STEAM DUMP INDEPENDENT OF THE OTHERS.
2. CIRCUITRY ON THIS SHEET IS NOT REDUNDANT EXCEPT WHERE INDICATED REDUNDANT.
3. SELECTOR SWITCH WITH THE FOLLOWING THREE POSITIONS.
   ON - STEAM DUMP IS PERMITTED.
   BYPASS - T AVG INTERLOCK IS BYPASSED FOR LO-LO T AVG.
   SPRING RETURN TO ON POSITION.
   OFF STEAM DUMP IS NOT PERMITTED AND RESET T AVG BYPASS.
   THE REDUNDANT INTERLOCK SELECTOR SWITCH CONSISTS OF TWO CONTROLS ON THE CONTROL BOARD, ONE FOR EACH TRAIN. TRAIN "B" IS SHOWN AS ( ).
4. THE TWO ANALOG SIGNAL INPUTS COMING FROM TURBINE PRESSURE MUST COME FROM DIFFERENT PRESSURE TAPS TO MEET THE SINGLE FAILURE CRITERION.
5. SYSTEM PREFIX IS "FW" UNLESS OTHERWISE NOTED.
6. ALL TEMPERATURE BISTABLES ON THIS SHEET AND THE TURBINE IMPULSE CHAMBER PRESSURE BISTABLES NO. PB-506C IS "ENERGIZE" TO ACTUATE."
7. LIGHTS SHOULD BE PROVIDED IN THE CONTROL ROOM FOR EACH DUMP VALVE TO INDICATE WHEN THE VALVE IS FULLY CLOSED OR FULLY OPEN.
8. RELAY CARD MS-TY-500Y, MS-TY-500Z.
9. THESE CONTROLS ON THE CONTROL BOARD ARE SUPPLIED BY OTHERS.
10. REFER TO MS-M-506551 THRU M-506554 FOR CONTROL OF MS-PV-3001 THRU 3004
11. REFER TO C-509025 FOR ADDITIONAL INFORMATION

REFERENCE DRAWINGS:

C-509025 F.P. 70001 SH. 25

REV	DATE	DRWN	CHKD	CE	LOE	DESCRIPTION
5	12/11/12	TLM	JWB	RCD	MW	INCORP EC2275
4	4/22/05	MRB	TLM	RCD	CM	INCORP DCR 04-001, DCN-007

FPL Energy Seabrook Station

MS DUMP CONTROL W FUNCTIONAL DIAGRAMS

1-NHY-509050 REV 05

ISSUED-FOR-CONSTRUCTION

509050.dgn 12/20/2012 6:05:31 PM

1-NHY-509051

PRESSURIZER PRESSURE CHANNELS

FROM PQY 458 IC 589812 IV — PZ 458 MCB-CF
FROM PQY 457 IC 589812 III — PZ 457 MCB-CF
FROM PQY 456 IC 589812 II — PS 456 MCB-CF
FROM PQY 455 IC 589812 I — PZ 455A MCB-CF

SS 455G MCB-CF (NOTE 7) — RED PEN — PR 455 MCB DF

PRESSURE CHANNEL SELECTOR SWITCH (NOTE 5 & 7) — SS 455F MCB-DF

(P-P REF) — PRESSURE REFERENCE (NOTE 6)

$K_{22}\left(1+\frac{1}{\tau_{21}s}\right)$

PK 455A MCB-DF (NOTE 2)

INTERLOCK (NOTE 2)

PB 455B — PB 457E — PB 456E — PB 456F — PB 455E — PB 455C (NOTE 2)

C D4362 2 (NOTE 2)
C D4328 3
C D4326 1
C D4327 1
C D4329 1

COLD OVERPRESSURE CONTROL SYSTEM

POWER RELIEF VALVE CONTROL MODE SELECTOR SWITCH
CS 456G A1 MCB-CF
OPEN | AUTO | CLOSE (NOTE 7)

POWER RELIEF VALVE CONTROL MODE SELECTOR SWITCH
CS 456G B1 MCB-CF
OPEN | AUTO | CLOSE (NOTE 7)

CLOSE — OPEN
POWER RELIEF VALVE PCV-456A (NOTE 3)

OPEN — CLOSE
POWER RELIEF VALVE PCV-456B (NOTE 3)

NOTES

1 ALL CIRCUITS ON THIS SHEET ARE NOT REDUNDANT
2 PRESSURE BISTABLES NO PB-455E, PB-455G, PB-456E, PB-457E, & PB-458B AND LEVEL BISTABLES NO LB-459C, LB-459E, & LB-460D ARE ENERGIZE TO ACTUATE.
3 OPEN/SHUT INDICATION IN CONTROL ROOM
4 A LIGHT SHOULD BE PROVIDED IN THE CONTROL ROOM FOR EACH SPRAY VALVE TO INDICATE WHEN IT IS NOT FULLY CLOSED.
5 CENTER POSITION NORMALLY SELECTED
6 ADJUSTABLE SETPOINT WITHIN CONTROLLER
7 THESE CONTROLS ON THE CONTROL BOARD ARE SUPPLIED BY UE&C
8 NEEDLE VALVES SHOULD BE SUPPLIED IN THE AIR SUPPLY TO THE AIR OPERATORS ON VALVES LCV-459 AND LCV-460 TO SLOW THEIR OPENING AND CLOSING TIME.
9 SYSTEM PREFIX IS "RC" UNLESS OTHERWISE NOTED

REFERENCE DWGS#

M-503745, 6	FP70001 SH 26, 27
M-503758	C-509027
M-503373 (CS)	C-509026
M-503367 (CS)	
M-506276 (CS)	
M-506637	
M-506638	
M-506639	
M-506641	

AVERAGE T AVG (<-589849)
NO LOAD T AVG (NOTE 6)
LEVEL PROGRAM CONTROLLER
(L REF)

PRESSURIZER LEVEL CHANNELS
I — III — II
LT 460B IR-17
LEVEL CHANNEL SELECTOR SWITCH (NOTE 5 & 7)
SS 459D MCB-DF — SS 459E MCB-DF (NOTE 7)
BLUE PEN
LR 459 MCB-DF — RED PEN

(L-L REF)
$K_{22}\left(1+\frac{1}{\tau_{23}s}+\tau_{24}s\right)$
LK 459 MCB-DF

SPRAY CONTROLLER
SPRAY CONTROLLER

AUTO-MANUAL CONTROL STATION

LB 459 B — LB 459 C — LB 459 E — LB 460 D — LB 460 C (NOTE 2)
C D4435 2
C D4440 1
C D4436 1
C D4461 1

FROM FY-121A (<-509027)
$K\left(1+\frac{1}{\tau s}\right)$

PK 455 B MCB-CF — AUTO-MANUAL CONTROL STATION (CONTROL ROOM)
PK 455 C MCB-CF — AUTO-MANUAL CONTROL STATION (CONTROL ROOM)
AUTO-MANUAL CONTROL STATION (CONTROL ROOM)
FK 121 MCB-DF
SPEED CONTROLLER

TO TURN-ON ALL BACK-UP HEATERS (C-509052)
TO VARIABLE HEATER CONTROL SIGNAL (C-509052)
MODULATE SPRAY VALVE NO 1 PCV-455A (NOTE 4)
MODULATE SPRAY VALVE NO 2 PCV-455B (NOTE 4)
CHARGING FLOW CONTROL CS-FCV 121
TO TURN-ON ALL BACKUP HEATERS (C-509052)
TO HEATER INTERLOCK (BLOCK ALL EXCEPT LOCAL CONTROL) (C-509052)

AUTO-MANUAL CONTROL STATION
SK 459 A MCB-DF
SPEED CONTROL TO POSITIVE DISPL PUMP CS-P-128

CLOSE LETDOWN CONTROL VALVES ISOLATION VALVE 1-8148 (NOTE 3) CS-V149

LETDOWN CONTROL VALVES ISOLATION VALVE 1-8149 CLOSED CS-V145

LETDOWN LINE ISOLATION VALVE CONTROL SELECTOR SWITCH
CS 459 MCB-DF
AUTO | OPEN MOMENTARY (NOTE 7)

LETDOWN LINE ISOLATION VALVE CONTROL SELECTOR SWITCH
CS 460 MCB-DF
AUTO | OPEN MOMENTARY (NOTE 7)

CLOSE — OPEN
LETDOWN LINE ISOLATION VALVE LCV-459 (NOTE 3)
VALVE FULL OPEN SIGNAL

CLOSE — OPEN
LETDOWN LINE ISOLATION VALVE LCV-460 (NOTE 3)
VALVE FULL OPEN SIGNAL

REDRAW OF FP70323
W 7245002 SHT. 11

DWG TRANSFERRED TO CUSTODY OF NHY AT REV 3
LTR SBA 4A122 DTD 10/14/96

REV	DATE	DRWN	CHK'D	CE	LDE	DESCRIPTION
7	04/22/05	MRB	TJM	RCD	CM	INCORP DCR 04-001, DCN-007
6	1/31/03	SAC	JWB	ARB	CM	CORRECTIVE UPDATE REF CR 02-09613

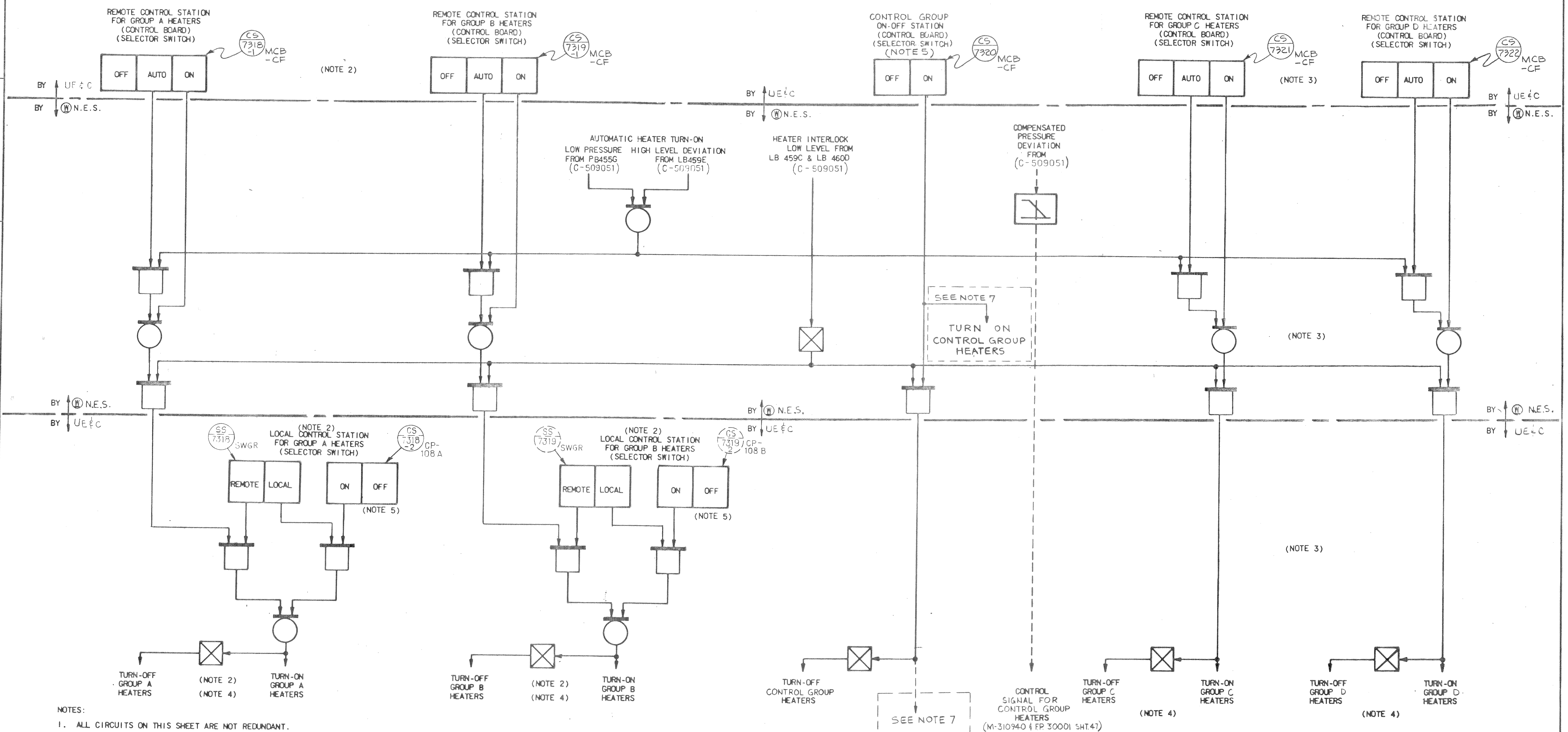
ISSUED-FOR-CONSTRUCTION

RC PRZR PRESS & LVL CTL W FUNCTIONAL DIAGRAM

FPL Energy Seabrook Station

1-NHY-509051

c:\dgn\funcwork\509051.dgn Mar. 22, 2005 12:55:16



NOTES:

1. ALL CIRCUITS ON THIS SHEET ARE NOT REDUNDANT.
2. GROUP A AND GROUP B HEATERS MUST BE ON SEPARATE VITAL POWER SUPPLIES WITH THE LOCAL CONTROL SEPARATED SO THAT ANY SINGLE FAILURE DOES NOT DEFEAT BOTH. SHOW TRAIN 'B' SWITCH AS
3. THE NUMBER OF BACK-UP HEATER GROUPS IS TYPICAL. THE ACTUAL NUMBER OF GROUPS MAY DIFFER DEPENDING ON ELECTRICAL LOADING REQUIREMENTS.
4. BACK-UP HEATER STATUS INDICATION IN CONTROL ROOM.
5. PRECAUTIONS SHOULD BE TAKEN TO AVOID MANUAL HEATER OPERATION, WHICH WOULD CAUSE HEATER DAMAGE, IF THE WATER LEVEL UNCOVERS THE HEATERS. PRECAUTIONS SHOULD ALSO BE TAKEN TO VERIFY THAT PRZR LOW LEVEL ALARMS HAVE CLEARED BEFORE RECLOSING THE CONTROL GROUP BKR AFTER A LOW BKR TRIP.
6. SYSTEM PREFIX IS 'RC' UNLESS OTHERWISE NOTED.
7. WESTINGHOUSE DID NOT PROVIDE PRZR LOW LEVEL INTERLOCK CONTACTS FOR USE IN THE CONTROL GROUP BKR CLOSING CIRCUIT. ALTHOUGH THIS INTERLOCK IS SHOWN FUNCTIONALLY ON W DWG 7245D02, SH.12 SIMILAR TO THE BKR CLOSING CKTS FOR THE BACKUP GROUPS. PRZR LOW LEVEL WILL TRIP OPEN THE CONTROL BKR AS SHOWN AND ONCE TRIPPED THE BKR CAN BE RECLOSED ONLY BY SWITCHING CS-7320 TO "OFF" AND THEN TO "ON".

REFERENCE DRAWINGS:

M-503749
M-503750
M-503751

REDRAW OF F.P. 70324
W 7245D02 SH.12

REV	DATE	DRWN	CHKD	CE	LDE	DESCRIPTION
5	10/25/80	SJB	JM	RPC	NA	9763-C-509052 SUPERCEDES UE&C DWG.

REV. NO.	DATE	DESCRIPTION	PE	DWN. BY	CKD. BY	RES. ENG.	SDE	QAE	PEM
4	1-28-86	ECA99 109947A						—	
3	7/13/84	EDITORIAL CHANGE						—	
2	5/20/83	REV. PER ENG. ASSURANCE AUDIT REPORT NHE-5		GWR					
1	8/21/81	FIRST ISSUE						—	

DWG. TRANSFERRED TO CUSTODY OF NHY AT REV. 4
LTR. SBU #A0722 DTD. 10/14/86

ISSUED-FOR-CONSTRUCTION

RC PRZR HTR CONTROL
W FUNCTIONAL DIAGRAMS

New Hampshire Yankee — Seabrook Station

1-NHY-509052

12

bdr files N:\FUNC\WORK

1-NHY- 509053

REDUNDANT

P-14 STM. GEN HI-HI LEVEL (. 509047)
SAFETY INJECTION (. 509046)
P-4 REACTOR TRIP (. 509042)
LOW T AVG (. 509045)

CS 4345 MCB-EF
CS 4344 MCB-EF
MANUAL RESET (NOTE 4 & 7)
R L
C D4886 1

REDUNDANT

MM UA 53-12 MCB-EF (NOTE 5)

TURBINE TRIP (. 509056)
LOOP 3 & 4 INTERLOCK (. 509054)
CLOSE ALL FEEDWATER ISOLATION VALVES (BY UE&C) (NOTE 3).
FW-V-30
FW-V-39
FW-V-48
FW-V-57
M-506493
M-506494
M-506495
M-506496

BLOCK START OF START-UP FEED-PUMP P-13 (.509055) M-506480

TRIP MAIN FEEDWATER PUMPS (P-32A, B) (NOTE 6) 506481 506482

STEAM GENERATOR "1"

FROM FY-512B (. 509013) STEAM FLOW
FROM FY-513B (. 509013) STEAM FLOW
FROM FY-510B (. 509013) FEEDWATER FLOW
FROM FY-511B (. 509015) FEEDWATER FLOW
FROM LY-519 & LQY-519 (. 509033) LEVEL

FI 512A MCB-EF
FI 513A MCB-EF (NOTE 7)
FI 510A MCB-EF
FI 511A MCB-EF
SS 512C MCB-EF
SS 510C MCB-EF
SS 519C MCB-EF
LB 519 C
LB 519 DIE
C D4876
C D4770 1
FR 510 MCB-EF
BLUE PEN
RED PEN
FB 510 A/B
C D4706 1
(NOTE 10)
FK 510 MCB-EF
AUTO-MANUAL CONTROL STATION

STEAM FLOW (. 509054) ST.GEN.3 ST.GEN.4

FROM MS-PQY-507 (. 509025) STEAM HEADER PRESSURE
FROM MS-PQY-508 (. 509025) FEED PUMP DISCHARGE PRESS.
FROM LY-4210-C (506485)
BIAS
SC 509A

(NOTE 1)
5 sec.
(NOTE 1)

MODULATE FEEDWATER MAIN VALVE 1 FCV-510 (NOTE 3)
MODULATE FEEDWATER BYPASS VALVE (NOTES 3 & 8) LCV-4210

REDUNDANT

A/M STATION SK 509A MCB-EF
SC 509B
SC 509C
CONTROLLER
BIAS
CONTROLLER
SK 509B MCB-EF
SK 509C MCB-EF
A/M STATION
A/M STATION
TO FW-PUMP FW-P-32A
TO FW-PUMP FW-P-32B

STEAM GENERATOR "2"

FROM FY-522B (. 509035) STEAM FLOW
FROM FY-523B (. 509035) STEAM FLOW
FROM FY-520B (. 509035) FEEDWATER FLOW
FROM FY-521B (. 509035) FEEDWATER FLOW
FROM LQY-529 & LQY-552 (. 509035) LEVEL

FI 522A MCB-EF
FI 523A MCB-EF (NOTE 7)
FI 520A MCB-EF
FI 521A MCB-EF
SS 522C MCB-EF
SS 520C MCB-EF
SS 529C MCB-EF
LB 529 C
LB 529 DIE
C D4877
C D4771 2
FR 520 MCB-EF
BLUE PEN
RED PEN
FB 520 A/B
C D4708
(NOTE 10)

FROM LY-4220-C (506486)

FK 520 MCB-EF
AUTO-MANUAL CONTROL STATION

(NOTE 1)
5 sec.

MODULATE FEEDWATER BYPASS VALVE (NOTES 3 & 8) LCV-4220

MODULATE FEEDWATER MAIN VALVE 2 FCV-520 (NOTE 3)

NOTES:

1. ANALOG GATE CONSISTS OF TWO SOLENOID VENT VALVES IN SERIES TO REDUNDANTLY INTERLOCK THE AIR LINE BETWEEN EACH VALVE DIAPHRAGM AND ITS ASSOCIATED POSITIONER. THE SOLENOID VALVES ARE DE-ENERGIZE TO VENT, CAUSING THE FEEDWATER VALVE TO CLOSE IN FIVE SECONDS. EITHER OF THE TWO REDUNDANT BLOCK SIGNALS WILL CLOSE THE ASSOCIATED VALVES INDEPENDENT OF THE OTHER SIGNAL.
2. ALL CIRCUITS ON THIS SHEET ARE NOT REDUNDANT, EXCEPT WHERE INDICATED "REDUNDANT".
3. OPEN/SHUT INDICATION FOR EACH FEEDWATER VALVE IN CONTROL ROOM.
4. THE REDUNDANT MANUAL RESET CONSISTS OF TWO MOMENTARY CONTROLS ON THE CONTROL BOARD, ONE FOR EACH TRAIN.
5. TRAIN "A" ONLY
6. TRAIN "A" TRIPS PUMP A. TRAIN "B" TRIPS PUMP B.
7. THESE CONTROLS ON THE CONTROL BOARD ARE SUPPLIED BY UE&C
8. SUPPLIED BY UE&C
9. SYSTEM PREFIX IS "FW" UNLESS OTHERWISE NOTED
10. SUMMING JUNCTION SHOWN FOR FUNCTIONAL PURPOSES ONLY (NOT AN ACTUAL DEVICE)

REFERENCE DRAWINGS:

M-503581
M-504151
M-503598
M-506485
M-506486
M-506487
M-506488
M-506482
M-506481
F.P. 70001 SH 33,25
-509025
-509033

REDRAW OF F.P. 70325
W7245D02 SHT. 13

ISSUED-FOR-CONSTRUCTION

DWG. TRANSFERRED TO CUSTODY OF NHY AT REV. 3 LTR. SBU #20722 DTD. 10/14/86

REV	DATE	DRWN	CHKD	CE	LDE	DESCRIPTION
13	4/21/08	MRB	TLM		QCO	INCORP 07MM0D527, DCN 01

FPL Energy Seabrook Station

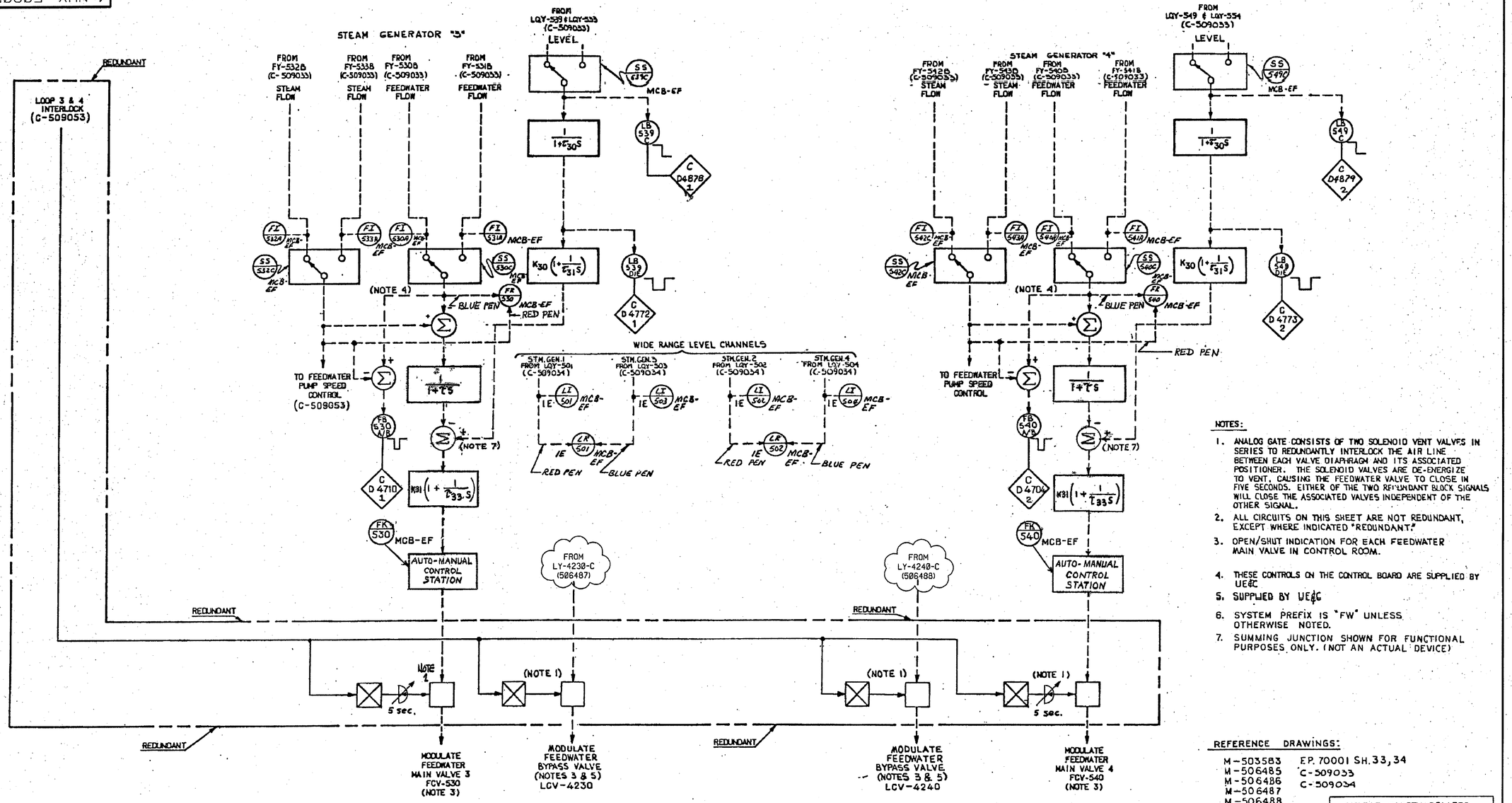
FW CONTROL & ISOLATION W FUNCTIONAL DIAGRAM

1-NHY 509053 REV 13

509053.dgn 4/10/2008 2:16:17 AM

bdr file: N:\FUNC\WORK

1-NHY- 509054



NOTES:

1. ANALOG GATE CONSISTS OF TWO SOLENOID VENT VALVES IN SERIES TO REDUNDANTLY INTERLOCK THE AIR LINE BETWEEN EACH VALVE DIAPHRAGM AND ITS ASSOCIATED POSITIONER. THE SOLENOID VALVES ARE DE-ENERGIZE TO VENT, CAUSING THE FEEDWATER VALVE TO CLOSE IN FIVE SECONDS. EITHER OF THE TWO REDUNDANT BLOCK SIGNALS WILL CLOSE THE ASSOCIATED VALVES INDEPENDENT OF THE OTHER SIGNAL.
2. ALL CIRCUITS ON THIS SHEET ARE NOT REDUNDANT, EXCEPT WHERE INDICATED "REDUNDANT."
3. OPEN/SHUT INDICATION FOR EACH FEEDWATER MAIN VALVE IN CONTROL ROOM.
4. THESE CONTROLS ON THE CONTROL BOARD ARE SUPPLIED BY UE&C
5. SUPPLIED BY UE&C
6. SYSTEM PREFIX IS "FW" UNLESS OTHERWISE NOTED.
7. SUMMING JUNCTION SHOWN FOR FUNCTIONAL PURPOSES ONLY. (NOT AN ACTUAL DEVICE)

REFERENCE DRAWINGS:

M-503583 E.P. 70001 SH.33,34
M-506485 C-509033
M-506486 C-509034
M-506487
M-506488

NUCLEAR SAFETY RELATED

REDRAW OF F.P.70326
W7275D04 SHT.14

ISSUED-FOR-CONSTRUCTION

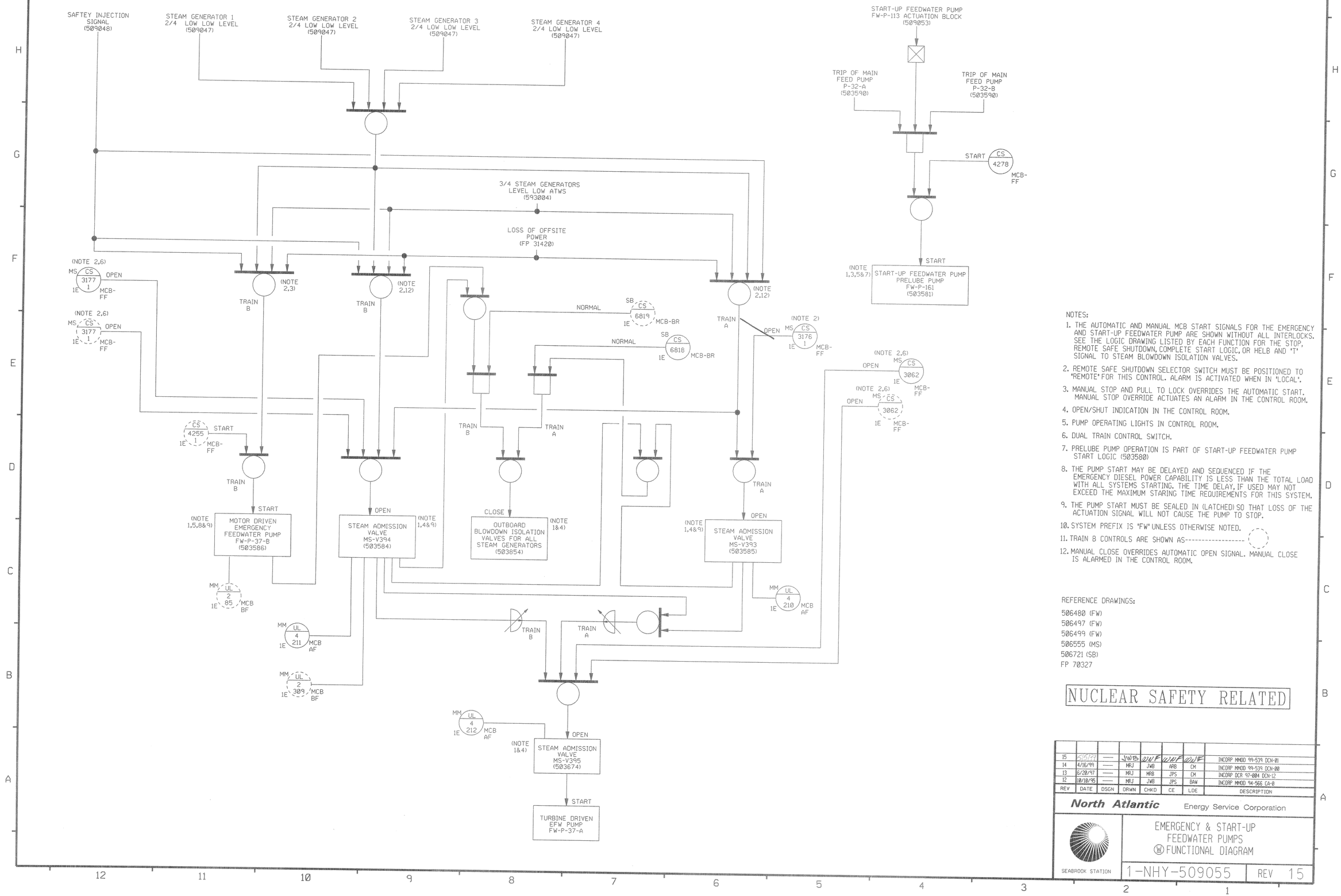
REV	DATE	DRWN	CHKD	CE	LDE	DESCRIPTION
8	4/21/08	MRB	TLM	BWF	RCO	INCORP 07MM0D527, DCN-01
7	12/6/95	MRB	JWB	BAW	CM	INCORP 94DCR039, DCN-03

FPL Energy Seabrook Station

FW CONTROL & ISOLATION W FUNCTIONAL DIAGRAM

1-NHY 509054 REV 8

509054.dgn 4/10/2008 2:49:29 AM



NOTES:

1. THE AUTOMATIC AND MANUAL MCB START SIGNALS FOR THE EMERGENCY AND START-UP FEEDWATER PUMP ARE SHOWN WITHOUT ALL INTERLOCKS. SEE THE LOGIC DRAWING LISTED BY EACH FUNCTION FOR THE STOP, REMOTE SAFE SHUTDOWN, COMPLETE START LOGIC, OR HELB AND 'T' SIGNAL TO STEAM BLOWDOWN ISOLATION VALVES.
2. REMOTE SAFE SHUTDOWN SELECTOR SWITCH MUST BE POSITIONED TO 'REMOTE' FOR THIS CONTROL. ALARM IS ACTIVATED WHEN IN 'LOCAL'.
3. MANUAL STOP AND PULL TO LOCK OVERRIDES THE AUTOMATIC START. MANUAL STOP OVERRIDE ACTUATES AN ALARM IN THE CONTROL ROOM.
4. OPEN/SHUT INDICATION IN THE CONTROL ROOM.
5. PUMP OPERATING LIGHTS IN CONTROL ROOM.
6. DUAL TRAIN CONTROL SWITCH.
7. PRELUBE PUMP OPERATION IS PART OF START-UP FEEDWATER PUMP START LOGIC (503580)
8. THE PUMP START MAY BE DELAYED AND SEQUENCED IF THE EMERGENCY DIESEL POWER CAPABILITY IS LESS THAN THE TOTAL LOAD WITH ALL SYSTEMS STARTING. THE TIME DELAY, IF USED MAY NOT EXCEED THE MAXIMUM STARING TIME REQUIREMENTS FOR THIS SYSTEM.
9. THE PUMP START MUST BE SEALED IN (LATCHED) SO THAT LOSS OF THE ACTUATION SIGNAL WILL NOT CAUSE THE PUMP TO STOP.
10. SYSTEM PREFIX IS 'FW' UNLESS OTHERWISE NOTED.
11. TRAIN B CONTROLS ARE SHOWN AS----------
12. MANUAL CLOSE OVERRIDES AUTOMATIC OPEN SIGNAL. MANUAL CLOSE IS ALARMED IN THE CONTROL ROOM.

REFERENCE DRAWINGS:

506480 (FW)
506497 (FW)
506499 (FW)
506555 (MS)
506721 (SB)
FP 70327

NUCLEAR SAFETY RELATED

REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
15	[illegible]	—	JWB	JWB	JWB	JWB	INCORP MMOD 99-539 DCN-01
14	4/16/99	—	MRJ	JWB	ARB	CM	INCORP MMOD 99-539 DCN-00
13	6/20/97	—	MRJ	MRB	JPS	CM	INCORP DCR 97-004 DCN-12
12	10/10/95	—	MRJ	JWB	JPS	BAW	INCORP MMOD 94-566 CA-0

North Atlantic Energy Service Corporation

SEABROOK STATION

EMERGENCY & START-UP FEEDWATER PUMPS
Ⓦ FUNCTIONAL DIAGRAM

1-NHY-509055 REV 15

1-NHY-509056 REV 14

bdr file: N:\FUNC\PROD FILE: 509056.DGN

BY Ⓦ N.E.S.
BY U.E. & C.

EMERGENCY OVERSPEED
MANUAL TRIP
3/4 STEAM GENERATOR LOW LEVELS ATWS DWG. 593004
STEAM GENERATOR HI HI LEVEL OR SI (TRAIN B) (509053)
STEAM GENERATOR HI HI LEVEL OR SI (TRAIN A) (509053)
TURBINE GENERATOR PROT SIGNALS (310961)
P4 REACTOR TRIP (TRAIN B) (509042)
MANUAL TRIPS
P4 REACTOR TRIP (TRAIN B) (509042)
DIGITAL EHC NOTE 9,10
SPRO/PPRO
TREG
TRPG
TREG
TRPG
SPRO/PPRO
D1600N TRIP MANIFOLD ASSEMBLY
3 SOLENOID VALVES 2/3 VOTING
3 SOLENOID VALVES 2/3 VOTING
DE-ENERGIZED SEE NOTE 11

(SEE NOTE 6)
DEPRESSURIZE
DEPRESSURIZE
(SEE NOTE 6)
MS ZS 3090 I 1E
MS ZS 3190 I 1E
MS ZS 3091 II 1E
MS ZS 3191 II 1E
EMERGENCY TRIP FLUID SYSTEM
MS ZS 3092 III 1E
MS ZS 3192 III 1E
MS ZS 3093 IV 1E
MS ZS 3193 IV 1E

CLOSE INTERCEPTOR VALVES
CLOSE CONTROL VALVES
CLOSE INTERMEDIATE STOP VALVES
CLOSE TURBINE MAIN STOP VALVES (NOTE 3)
MS PSL 3075 I 1E
MS PSL 3076 II 1E
MS PSL 3077 III 1E
I II (NOTE 1) III IV

C D5204 1 — MM UL 6 127 MCB-DF
C D5205 2 — MM UL 6 128 MCB-DF
C D5206 1 — MM UL 6 129 MCB-DF
C D5207 2 — MM UL 6 130 MCB-DF
C D5209 1 — MM UL 6 132 MCB-DF
C D5212 2 — MM UL 6 133 MCB-DF
C D5213 1 — MM UL 6 134 MCB-DF
2/3
REDUNDANT

GENERATOR PROTECTION SIGNALS (BY UE & C)
TO GENERATOR TRIP
P-9 (509044)
C D5211 2 — MM UA 52 20 MCB-DF
TO REACTOR TRIP (509042)

BY U.E. & C. BY Ⓦ N.E.S.

BY U.E. & C. BY Ⓦ N.E.S.

TURBINE POWER
(TURBINE IMPULSE CHAMBER PRESSURE)

REDUNDANT
I PB 505A 1E — BTI
II PB 506A 1E — BTI
C D4838 1
C D4839 2
MM UL 6 122 MCB-DF
MM UL 6 123 MCB-DF
MM UL 6 124 MCB-DF
P-13
P-13 TO P-7 (509044)
REDUNDANT

NOT REDUNDANT
PB 505C 1E
MM UL 8 250 MCB-DF
C5
C-5 BLOCK AUTOMATIC ROD WITHDRAWAL (509049)
TO DEFEAT REMOTE DISPATCHING (NOTE 4)(BY UE & C) (310961)
NOT REDUNDANT

TURBINE RUNBACK
VIA LOAD REFERENCE

STOP TURBINE LOADING
NOT REDUNDANT
MANUAL TEST BYPASS (MOMENTARY) (SEE NOTE 7)
C-16 LOW TAVG (509049) (SEE NOTE 7)
OVERTEMPERATURE ΔT (2/4) (509045)
OVERPOWER ΔT (2/4) (509045)
TIME DELAY RELAY LOGIC (CYCLIC)
ON 1-5 SECONDS
OFF 10-60 SECONDS
NOTE 8
NOTE 8
TO DEFEAT REMOTE DISPATCHING (NOTE 4) (BY UE & C)
REDUCE LOAD REFERENCE AT 133% PER MINUTE (BY UE & C)
TO DEFEAT REMOTE DISPATCHING (NOTE 4) (BY UE & C) (310961)
STOP TURBINE LOADING (BY UE & C) (310961)
NOT REDUNDANT

NOTES:
1. THESE SIGNALS INDICATE THE CLOSING (LESS THAN FULL OPEN) OF THE STOP VALVES. POSITION DETECTION IS ACCOMPLISHED BY TWO CONTACTS PER STOP VALVE, ONE FOR EACH TRAIN. THE LOGIC SHOWN IS FOR FOUR STOP VALVES.
2. REDUNDANCY IS INDICATED IN REGARDS TO WESTINGHOUSE NUCLEAR ENERGY SYSTEMS REQUIREMENTS ONLY.
3. OPEN/SHUT INDICATION IN CONTROL ROOM FOR EACH STOP VALVE.
4. THE REMOTE DISPATCHING IS TYPICAL. ACTUAL IMPLEMENTATION MAY NOT INCLUDE REMOTE DISPATCHING.
5. SYSTEM PREFIX IS "FW" UNLESS OTHERWISE NOTED.
6. →
7. MANUAL TEST BY-PASS SWITCH IS NOT INSTALLED.
8. DEFEAT DISPATCHING AND LOAD REDUCTION NOT USED. (REF: DCR 92-0033)
9. LOGIC PERFORMED BY MK VIe DIGITAL EHC IMR PROCESSORS.
10. FOR A COMPLETE LIST OF TURBINE TRIPS REFER TO 1-NHY-503229.
11. SUCESSFUL OPERATION (DE-ENERGIZATION) OF ANY 2 OUT OF 3 SOLENOIDS IN EITHER HYDRAULIC CIRCUIT WILL INITIATE A TURBINE TRIP.

REFERENCE DRAWINGS:
506556 (MS)

REDRAW OF F.P. 70328
W 7245D02 SHT. 16

NUCLEAR-SAFETY-RELATED

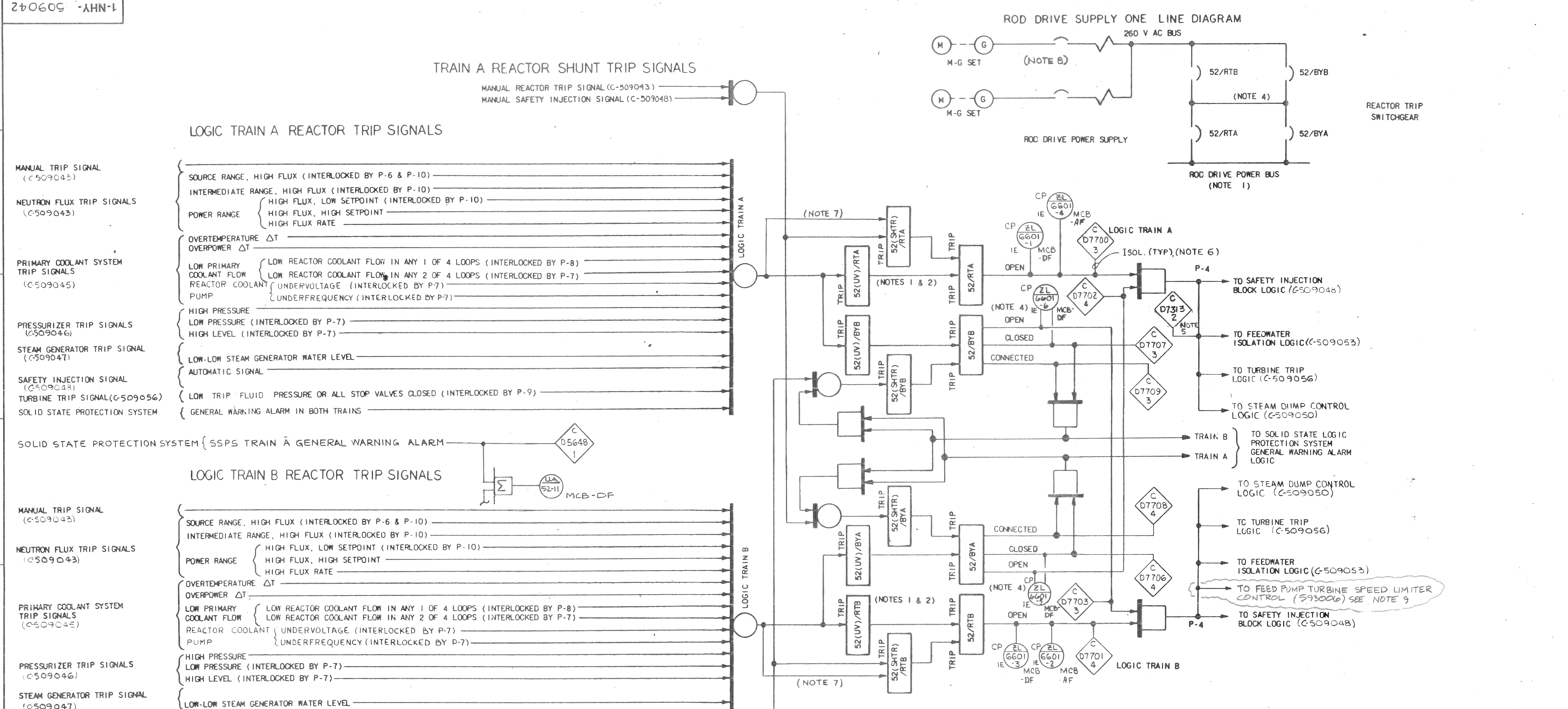
REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
14	11-04-08	MRB	MRB	TLM	CM		INCORP EC12635
13	4/18/08	JWB	JWB	TLM	JPS	RCD	INCORP 07MMOD500 DCN00
12	12/1/95	RJS	RJS	MRJ/JWB	WNF	CM	REDRAWN; INCORP. DCR 94-0002, CA-8 EDITORAL CHANGES

Seabrook Station

NEXTera ENERGY SEABROOK

FW- TURBINE TRIP/RUN BACK W FUNCTIONAL DIAGRAMS

1-NHY-509056 REV 14



1-NHY- 509042 REV. 10
ROD DRIVE SUPPLY ONE LINE DIAGRAM
260 V AC BUS
M-G SET
(NOTE 8)
52/RTB
52/BYB
(NOTE 4)
52/RTA
52/BYA
REACTOR TRIP SWITCHGEAR
ROD DRIVE POWER SUPPLY
ROD DRIVE POWER BUS (NOTE 1)
TRAIN A REACTOR SHUNT TRIP SIGNALS
MANUAL REACTOR TRIP SIGNAL (C-509043)
MANUAL SAFETY INJECTION SIGNAL (C-509048)
LOGIC TRAIN A REACTOR TRIP SIGNALS
MANUAL TRIP SIGNAL (C-509043)
NEUTRON FLUX TRIP SIGNALS (C-509043)
SOURCE RANGE, HIGH FLUX (INTERLOCKED BY P-6 & P-10)
INTERMEDIATE RANGE, HIGH FLUX (INTERLOCKED BY P-10)
POWER RANGE
HIGH FLUX, LOW SETPOINT (INTERLOCKED BY P-10)
HIGH FLUX, HIGH SETPOINT
HIGH FLUX RATE
PRIMARY COOLANT SYSTEM TRIP SIGNALS (C-509045)
OVERTEMPERATURE ΔT
OVERPOWER ΔT
LOW PRIMARY COOLANT FLOW
LOW REACTOR COOLANT FLOW IN ANY 1 OF 4 LOOPS (INTERLOCKED BY P-8)
LOW REACTOR COOLANT FLOW IN ANY 2 OF 4 LOOPS (INTERLOCKED BY P-7)
REACTOR COOLANT PUMP
UNDERVOLTAGE (INTERLOCKED BY P-7)
UNDERFREQUENCY (INTERLOCKED BY P-7)
PRESSURIZER TRIP SIGNALS (C-509046)
HIGH PRESSURE
LOW PRESSURE (INTERLOCKED BY P-7)
HIGH LEVEL (INTERLOCKED BY P-7)
STEAM GENERATOR TRIP SIGNAL (C-509047)
LOW-LOW STEAM GENERATOR WATER LEVEL
SAFETY INJECTION SIGNAL (C-509048)
AUTOMATIC SIGNAL
TURBINE TRIP SIGNAL (C-509056)
LOW TRIP FLUID PRESSURE OR ALL STOP VALVES CLOSED (INTERLOCKED BY P-9)
SOLID STATE PROTECTION SYSTEM
GENERAL WARNING ALARM IN BOTH TRAINS
LOGIC TRAIN A
SOLID STATE PROTECTION SYSTEM {SSPS TRAIN A GENERAL WARNING ALARM
C D5648 1
UA 52-11 MCB-DF
LOGIC TRAIN B REACTOR TRIP SIGNALS
LOGIC TRAIN B
TRAIN B REACTOR SHUNT TRIP SIGNALS
SOLID STATE PROTECTION SYSTEM {SSPS TRAIN B GENERAL WARNING ALARM
C D5649 1
(NOTE 7)
52(SHTR)/RTA
52(UV)/RTA
52(UV)/BYB
52(SHTR)/BYB
52/RTA
52/BYB
52(SHTR)/BYA
52(UV)/BYA
52(UV)/RTB
52(SHTR)/RTB
52/BYA
52/RTB
TRIP
(NOTES 1 & 2)
(NOTE 4)
OPEN
CLOSED
CONNECTED
CP ZL 6601-4 IE MCB-AF
CP ZL 6601-1 IE MCB-DF
CP ZL 6601-6 IE MCB-DF
C D7700 3
C D7702 4
C D7313 2
NOTE 5
C D7707 3
C D7709 3
LOGIC TRAIN A
ISOL. (TYP) (NOTE 6)
P-4
TO SAFETY INJECTION BLOCK LOGIC (C-509048)
TO FEEDWATER ISOLATION LOGIC (C-509053)
TO TURBINE TRIP LOGIC (C-509056)
TO STEAM DUMP CONTROL LOGIC (C-509050)
TRAIN B
TRAIN A
TO SOLID STATE LOGIC PROTECTION SYSTEM GENERAL WARNING ALARM LOGIC
C D7708 4
C D7706 4
TO STEAM DUMP CONTROL LOGIC (C-509050)
TO TURBINE TRIP LOGIC (C-509056)
TO FEEDWATER ISOLATION LOGIC (C-509053)
TO FEED PUMP TURBINE SPEED LIMITER CONTROL (593006) SEE NOTE 9
TO SAFETY INJECTION BLOCK LOGIC (C-509048)
CP ZL 6601-5 IE MCB-DF
C D7703 3
C D7701 4
CP ZL 6601-3 IE MCB-DF
CP ZL 6601-2 IE MCB-AF
LOGIC TRAIN B

NOTES:

1. TRIPPING THE REACTOR TRIP BREAKERS 52/RTA AND 52/RTB REDUNDANTLY DE-ENERGIZES THE ROD DRIVES. ALL FULL LENGTH CONTROL RODS AND SHUTDOWN RODS ARE THEREBY RELEASED FOR GRAVITY INSERTION INTO THE REACTOR CORE.
2. NORMAL REACTOR OPERATION IS TO BE WITH REACTOR TRIP BREAKERS 52/RTA AND 52/RTB IN SERVICE AND BY-PASS BREAKERS 52/BYA AND 52/BYB WITHDRAWN.
   DURING TEST, ONE BY-PASS BREAKER IS TO BE PUT IN SERVICE AND THEN THE RESPECTIVE REACTOR TRIP BREAKER IS OPERATED USING A SIMULATED REACTOR TRIP SIGNAL IN THE TRAIN UNDER TEST. THE REACTOR WILL NOT BE TRIPPED BY THE SIMULATED SIGNAL SINCE THE BY-PASS BREAKER IS CONTROLLED FROM THE OTHER TRAIN. ONLY ONE REACTOR TRIP BREAKER IS TO BE TESTED AT A TIME.
3. ALL CIRCUITS ON THIS SHEET ARE NOT REDUNDANT BECAUSE BOTH TRAINS ARE SHOWN.
4. OPEN/CLOSED INDICATION FOR EACH TRIP BREAKER AND EACH BYPASS BREAKER IN CONTROL ROOM.
5. COMPUTER INPUT D7313 COMMON FOR LOGIC TRAIN A & B.
6. ISOLATION IS PROVIDED FOR ALL COMPUTER INPUTS.
7. AUTOMATIC SHUNT TRIP UPGRADE APPLIES TO UNIT 1 ONLY
8. OPEN INDICATION FOR EACH BREAKER IS PROVIDED BY COMPUTER INPUTS D7978 AND D7979.
9. B-TRAIN SIGNAL ONLY.

DWG. TRANSFERRED TO CUSTODY OF NHY AT REV. 7
LTR SBU 40722 DTD. 10/14/86

NUCLEAR SAFETY RELATED

ISSUED-FOR-CONSTRUCTION

REDRAW OF F.P. 70314
W 7245D02 SHT. 2

REV	DATE	DRWN	CHKD	CE	LDE	DESCRIPTION
10	12/6/95	MRJ	JWB			INCORP. DCR 94-039, CA-3
9	1/23/89	HP	CCM	APL		INCORP. DCR 88-6, CA-1
8	1-16-87		MNA			INCORP. ECA 05/118192 B, 9763-C-509042
						SUPERCEDES UE&C DWG.

REV. NO.	DATE	DESCRIPTION	PE	DWN. BY	CKD. BY	RES. ENG.	SDE	QAE	PEM
7	6-11-86	ECA 99/113274C ECA 05/113761C		GT				—	
6	3-7-86	ECA 99/113082A						—	
5	5/8/85	REVISED PER W F.P. 70314		HK				—	
4	7/12/85	DCN 630253A			TM			—	
3	7/27/84	REV'D INCOR. WITH M-310944 (R-3)						—	
2	5/3/83	REV. PER ENG. ASSURANCE AUDIT REPORT NHE-3		A.M.				—	
1	8-21-81	FIRST ISSUE						—	

REACTOR TRIP SIGNALS
W FUNCTIONAL DIAGRAMS

New Hampshire Yankee — Seabrook Station

1-NHY-509042 REV. 10

1-NHY-509043 REV 10

SOURCE RANGE REACTOR TRIP

TRIP BYPASS I/N 31B (NIS RACK)
TRIP BYPASS I/N 32B (NIS RACK)
NC 31 D
NC 32 D
ISOL. (TYP) (NOTE 10)
UL 6 232 MCB-DF
UL 6 224 MCB-DF
UL 6 225 MCB-DF
UL 6 233 MCB-DF
C D5018 1
C D5019 2
SOURCE RANGE BLOCK CONTROL (NOTES 1 & 2)
UNBLOCK MOMENTARY
BLOCK MOMENTARY
NI CS 6668 1E MCB-DF
NI CS 6658 1E MCB-DF
NI CS 6618 1E MCB-DF
NI CS 6608 1E MCB-DF
P-6 (509044)
P-10 (509044)
C D5025 1 (NOTE 5)
C D5026 2
OTHER LOGIC TRAIN
(NOTE 7)
UL 6 226 MCB-DF
UL 6 227 MCB-DF
DE-ENERGIZE SOURCE RANGE H.V. (BOTH A & B LOGIC TRAIN REQUIRED)
ENERGIZE SOURCE RANGE H.V. (EITHER LOGIC TRAIN)
C D5027 2
HIGH NEUTRON FLUX REACTOR TRIP (509042)

INTERMEDIATE RANGE REACTOR TRIP

TRIP BYPASS I/N 35A (NIS RACK)
TRIP BYPASS I/N 36A (NIS RACK)
NC 35 F
NC 36 F
UL 6 236 MCB-DF
UL 6 228 MCB-DF
UL 6 229 MCB-DF
UL 6 237 MCB-DF
C D5012 1
C D5013 2
TO BYPASS I.R. ROD STOP (509044)
INTERMEDIATE RANGE BLOCK CONTROL (NOTES 1 & 3)
BLOCK MOMENTARY
NI CS 6607 1E MCB-DF
NI CS 6617 1E MCB-DF
P-10 (509044)
C D5028 1 (NOTE 5)
C D5029 2
(NOTE 7)
UL 6 230 MCB-DF
UL 6 231 MCB-DF
TO BLOCK I.R. ROD STOP
C D5030 2
HIGH NEUTRON FLUX REACTOR TRIP (509042)
C D5023 2
HIGH NEUTRON FLUX (LOW SETPOINT) REACTOR TRIP (509042)

POWER RANGE REACTOR TRIP

NC 41 P
NC 42 P
NC 43 P
NC 44 P
C D5004 1
C D5005 2
C D5006 1
C D5007 2
UL 6 104 MCB-DF
UL 6 105 MCB-DF
UL 6 106 MCB-DF
UL 6 107 MCB-DF
2/4
NI CS 6606 1E MCB-DF
NI CS 6616 1E MCB-DF
POWER RANGE BLOCK CONTROL (NOTES 1 & 4)
BLOCK MOMENTARY
UL 6 108 MCB-DF (NOTE 7)
UL 6 109 MCB-DF
C D5031 1 (NOTE 5)
C D5032 2
P-10 (509044)
NC 41 R
NC 42 R
NC 43 R
NC 44 R
C D5000 1
C D5001 2
C D5002 1
C D5003 2
UL 6 215 MCB-DF
UL 6 216 MCB-DF
UL 6 217 MCB-DF
UL 6 218 MCB-DF
C D5022 1
MANUAL RESET
CLOSE
CP CS 6611 1 1E MCB-DF
CLOSE (RESET) REACTOR TRIP BREAKER
NOT REDUNDANT
MANUAL TRIP (MAIN CONTROL BOARD)
ACTUATE MOMENTARY (NOTE 8)
CP CS 6601 2 1E MCB-AF
CP CS 6601 1 1E MCB-DF
C D7704 1
C D7705 2
REACTOR TRIP (509042) (NOTE 5)

POWER RANGE HIGH NEUTRON FLUX RATE REACTOR TRIP

S.J. 1+1
NC 41 U
NC 42 U
NC 43 U
NC 44 U
I/N 41K MANUAL RESET (NOTE 6)
I/N 42K MANUAL RESET (NOTE 6)
I/N 43K MANUAL RESET (NOTE 6)
I/N 44K MANUAL RESET (NOTE 6)
UL 6 210 MCB-DF
UL 6 211 MCB-DF
UL 6 212 MCB-DF
UL 6 213 MCB-DF
C D5014 1
C D5015 2
C D5016 1
C D5017 2
2/4
C D5024 2
UA 52 1 MCB-DF
HIGH NEUTRON FLUX RATE REACTOR TRIP (509042)

NOTES:
1. THE REDUNDANT MANUAL BLOCK CONTROLS CONSIST OF TWO CONTROLS ON THE CONTROL BOARD FOR EACH RANGE, ONE FOR EACH TRAIN. TRAIN 'B' SWITCH SHOWN THUS.
2. I/N 33A IS IN LOGIC TRAIN A. I/N 33B IS IN LOGIC TRAIN B.
3. I/N 38A IS IN LOGIC TRAIN A. I/N 38B IS IN LOGIC TRAIN B.
4. I/N 47A IS IN LOGIC TRAIN A. I/N 47B IS IN LOGIC TRAIN B.
5. TWO COMPUTER INPUTS ARE CONNECTED TO THIS CIRCUIT, INDIVIDUAL FOR EACH TRAIN. TRAIN 'B' COMPUTER INPUT IS SHOWN AS.
6. MANUAL RESET CONTROLS CONSIST OF FOUR MOMENTARY CONTROLS IN THE CONTROL ROOM, ONE CONTROL FOR EACH INSTRUMENT CHANNEL.
7. TWO PERMISSIVE STATUS LIGHTS ARE CONNECTED TO THIS CIRCUIT, INDIVIDUAL FOR EACH TRAIN.
8. REDUNDANT CONTROL SWITCHES ON SEPARATE MCB SECTIONS.
9. SYSTEM PREFIX IS 'NI' UNLESS OTHERWISE SPECIFIED.
10. ISOLATION IS PROVIDED FOR ALL COMPUTER INPUTS AND MONITORING LIGHTS.

REDRAW OF F.P. 70315
W 7245D02 SHT. 3

NUCLEAR-SAFETY-RELATED

REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
10	8/14/03	TLM	TLM	[illegible]	JC	ROD	INCORP. DCR 02-003, DCN-01
9	4/1/03	JWB	JWB	RB	RCD	CM	CORRECTIVE UPDATE, REF CR 03-02830
8	12/1/95	RJS	RJS	MRJ JWB	WNF	CM	REDRAWN: INCORP. DCR 94-0002, CA-8

FPL Energy
Seabrook Station

NI & MANUAL TRIP SIGNALS W FUNCTIONAL DIAGRAMS

1-NHY-509043 REV 10

INTERMEDIATE RANGE

POWER RANGE

(NOTE 2)

I NC 35 D — BTI — C D5020 1

II NC 36 D — BTI — C D5021 2

MM UL 6 234 MCB-DF

P-6 (509043)

FROM I/N 35A IR BYPASS (509043)

FROM IR BLOCK LOGIC (509043)

FROM I/N 36A IR BYPASS (509043)

I NC 35 E

II NC 36 E

NOT REDUNDANT

C D5042 1

MM UL 8 253 MCB-DF

C-1
HIGH NEUTRON FLUX ROD STOP
(BLOCK AUTOMATIC & MANUAL ROD WITHDRAWAL)
(509049)

NOT REDUNDANT

I NC 41 L — 1E — MANUAL BYPASS I/N 49A — MM UL 8 251 MCB-DF — (NOTE 1)

II NC 42 L — 1E — MANUAL BYPASS I/N 49A — MM UL 8 252 MCB-DF

III NC 43 L — 1E — MANUAL BYPASS I/N 49B — MM UL 8 256 MCB-DF

IV NC 44 L — 1E — MANUAL BYPASS I/N 49B — MM UL 8 257 MCB-DF — (NOTE 1)

C D5043 1

MM UL 8 255 MCB-DF

C-2
OVERPOWER ROD STOP
(BLOCK AUTOMATIC & MANUAL ROD WITHDRAWAL)
(509049)

I NC 41 M — 1E — BTI — C D5011 2 — C D5010 1

II NC 42 M — 1E — BTI — C D5009 2 — C D5008 1

III NC 43 M — 1E — BTI

IV NC 44 M — 1E — BTI

ISOL. (TYP.) NOTE 4

MM UL 6 99 MCB-DF

MM UL 6 100 MCB-DF

MM UL 6 101 MCB-DF

MM UL 6 102 MCB-DF

P-13
TURBINE IMPULSE CHAMBER PRESSURE
(509056)

2/4

MM UL 6 126 MCB-DF

C D5044 2

P-7 (509045) (509046)

MM UL 6 110 MCB-DF

P-10 (509043)

POWER RANGE

I NC 41 S — 1E — BTI — C D5985 1

II NC 42 S — 1E — BTI — C D5986 2

III NC 43 S — 1E — BTI — C D5987 1

IV NC 44 S — 1E — BTI — C D5988 2

MM UL 6 136 MCB-DF

MM UL 6 137 MCB-DF

MM UL 6 138 MCB-DF

MM UL 6 139 MCB-DF

2/4

MM UL 6 140 MCB-DF

P-9 (509056)

I NC 41 N — 1E — BTI — C D5033 1

II NC 42 N — 1E — BTI — C D5034 2

III NC 43 N — 1E — BTI — C D5035 1

IV NC 44 N — 1E — BTI — C D5036 2

MM UL 6 71 MCB-DF

MM UL 6 72 MCB-DF

MM UL 6 73 MCB-DF

MM UL 6 74 MCB-DF

2/4

MM UL 6 81 MCB-DF

P-8 (509045)

NOTES:

1. THE BYPASS SIGNALS ARE MADE UP BY MEANS OF TWO THREE-POSITION SWITCHES ON A NIS RACK. SWITCH I/N 49A BYPASSES EITHER NC-41-L OR NC-43-L. SWITCH I/N 49B BYPASSES EITHER NC-42-L OR NC-44-L. (REF. RACK CP-16)
2. THE TWO P-6 BISTABLES NO. NC-35D AND NC-36D ARE "ENERGIZED TO ACTUATE" SUCH THAT A LOGIC 1 SIGNAL IS DEFINED TO BE PRESENT WHEN THE BISTABLE OUTPUT VOLTAGE IS ON.
3. SYSTEM PREFIX IS 'NI' UNLESS OTHERWISE NOTED.
4. ISOLATION IS PROVIDED FOR COMPUTER INPUT AND MONITORING LIGHTS.

REDRAW OF F.P. 70316
W 7245D02 SHT. 4

NUCLEAR-SAFETY-RELATED

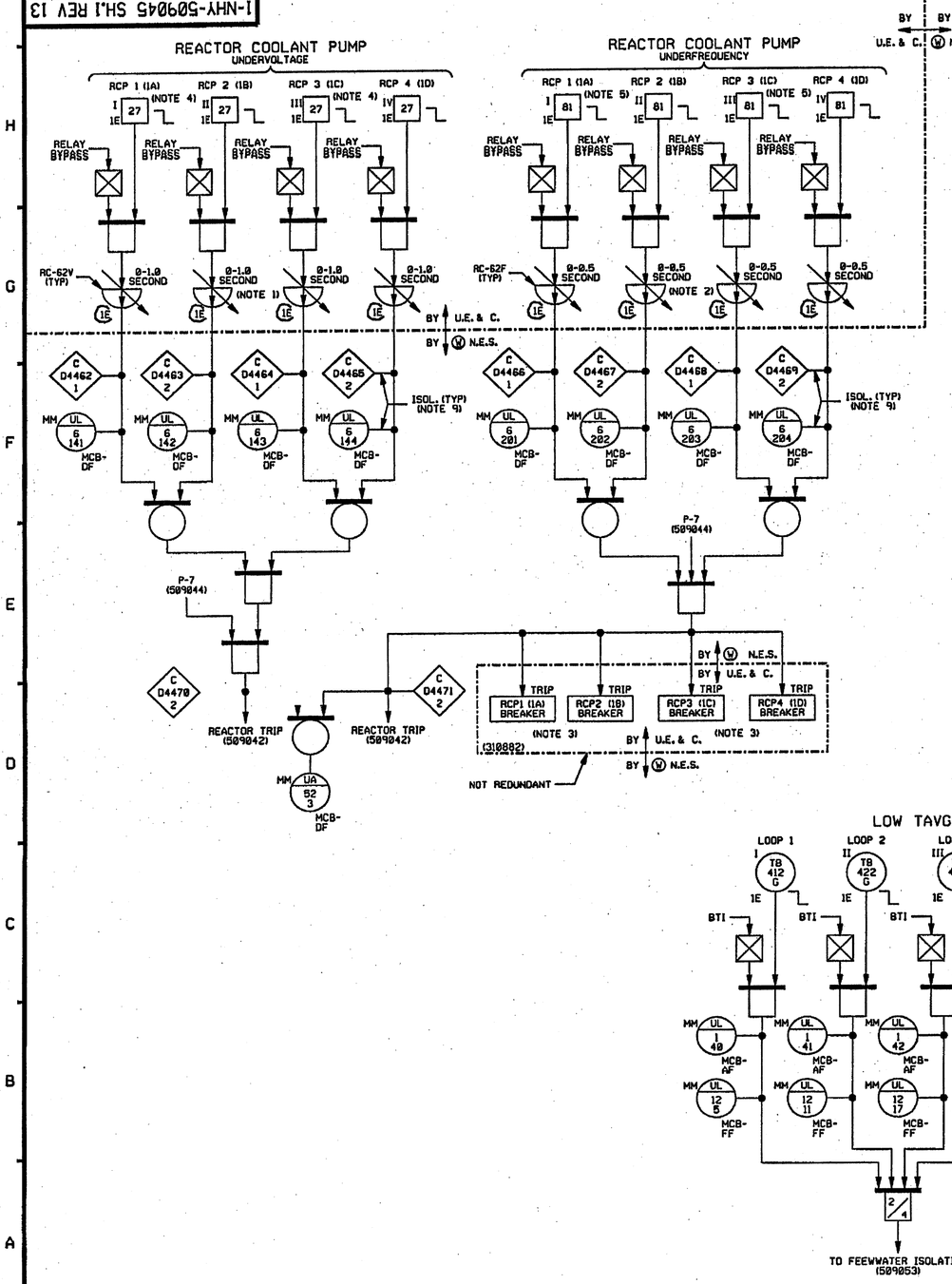
REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
6	12/3/95	MRB	MRB				REDRAWN: INCORP. DCR 94-0002, CA-8

North Atlantic Energy Service Corporation

SEABROOK STATION

NI PERM & BLOCKS
W FUNCTIONAL DIAGRAMS

1-NHY-509044 REV 6



NOTES:

1. THE SETPOINT OF THE UNDERVOLTAGE RELAYS SHOULD BE ADJUSTABLE BETWEEN 60% AND 80% OF NOMINAL VOLTAGE. WITH THE ADJUSTABLE TIME DELAY SET TO ITS MINIMUM VALUE, THE UNDERVOLTAGE DETECTOR SHOULD HAVE A TIME RESPONSE OF LESS THAN 0.2 SECONDS. THE ADJUSTABLE DELAY SHOULD ALLOW AN ADDITIONAL INTENTIONAL DELAY BETWEEN 0 TO 1.0 SECOND. REF. 1-NHY-310231, MOTOR LOAD LIST.
2. THE SETPOINT OF THE UNDERFREQUENCY RELAYS SHOULD BE ADJUSTABLE BETWEEN 54Hz AND 59Hz WITH THE ADJUSTABLE TIME DELAY SET TO ITS MINIMUM VALUE, THE UNDERFREQUENCY DETECTOR SHOULD HAVE A TIME RESPONSE OF LESS THAN 0.1 SECONDS. THE ADJUSTABLE DELAY SHOULD ALLOW AN ADDITIONAL INTENTIONAL DELAY BETWEEN 0 TO 0.5 SECONDS. REF. 1-NHY-310231, MOTOR LOAD LIST.
3. THE MAXIMUM ALLOWABLE RCP BREAKER TRIP TIME DELAY IS 0.1 SECONDS.
4. THE UNDERVOLTAGE SENSORS (POTENTIAL TRANSFORMERS) MUST BE LOCATED ON THE MOTOR SIDE OF THE RCP CIRCUIT BREAKERS TO DETECT THE TRIP OF THE RCP CIRCUIT BREAKERS IN ADDITION TO BUS UNDERVOLTAGE.
5. THE UNDERFREQUENCY SENSORS MAY BE LOCATED ON THE MOTOR SIDE OF THE RCP CIRCUIT BREAKERS.
6. REACTOR COOLANT PUMPS NUMBER 1A AND 1B ARE ON BUS 1. REACTOR COOLANT PUMPS NUMBER 1C AND 1D ARE ON BUS 2.
7. SYSTEM PREFIX IS "RC" UNLESS OTHERWISE NOTED.
8. DEFEAT DISPATCHING AND LOAD REDUCTION ARE NOT USED (REF 92DCR033)
9. ISOLATION IS PROVIDED FOR COMPUTER INPUTS AND MONITORING LIGHTS.
10. RELAY BYPASS IS A BYPASS FUNCTION IMPLEMENTED DURING RELAY TESTING BY THE USE OF INTERNAL SHORTING BARS AND TEST JACKS ON THE 27 AND 81 RELAYS.

REDRAW OF F.P. 70317
W 7245D02 SHT. 5

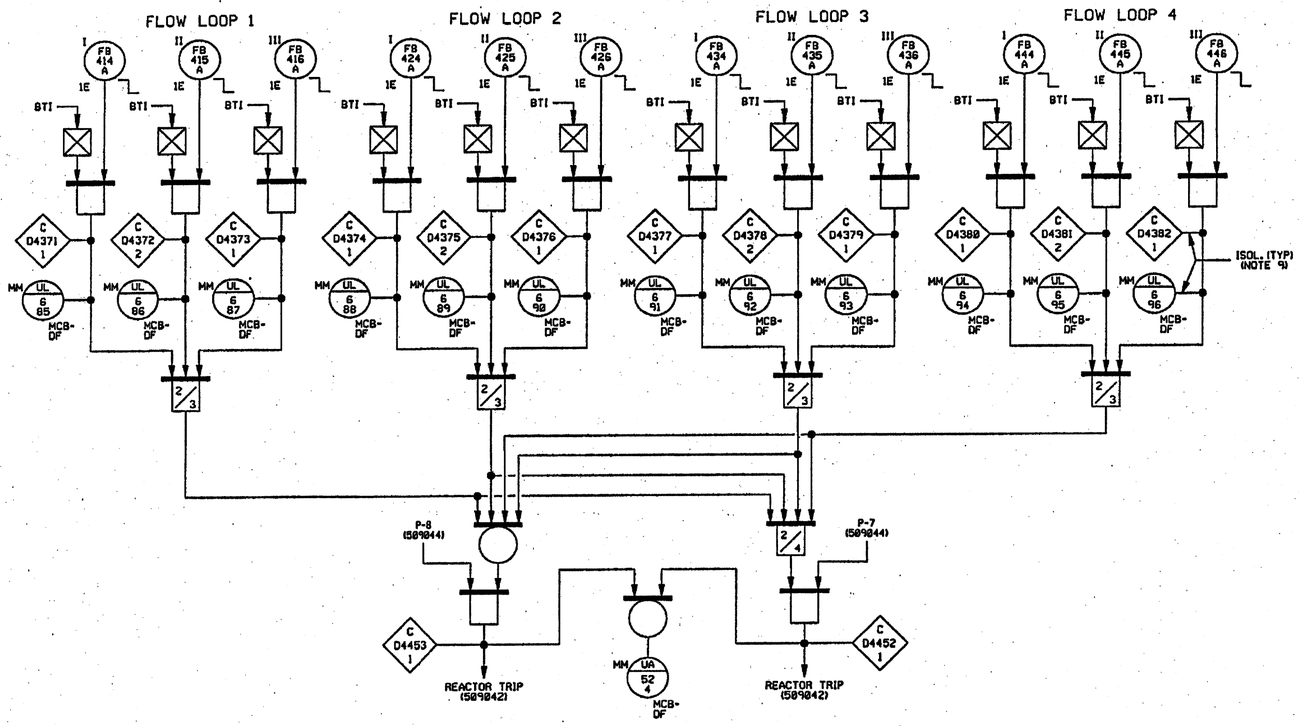
NUCLEAR-SAFETY-RELATED

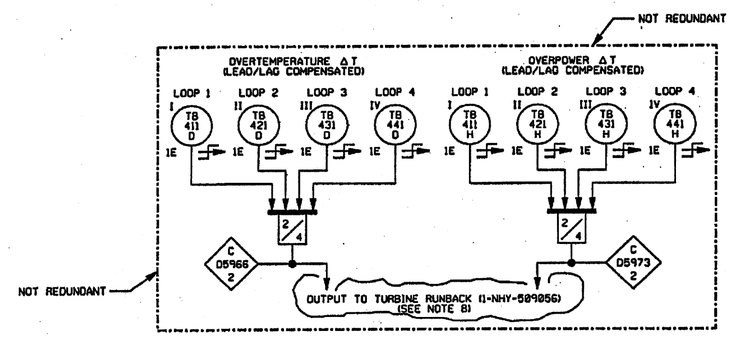
REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
13	10/18/02	JWB	JWB	TJM	[illegible]	PCD	INCORP 97MMOD500 DCN-00
12	12/1/95	RJS	RJS	MRJ/JWB	WNF	CM	REDRAWN: INCORP. DCR 94-0002, CA-8

FPL Energy Seabrook Station

RC TRIP SIGNALS
W FUNCTIONAL DIAGRAMS
SHEET 1 OF 2

1-NHY-509045 SH.1 REV 13





NOTES:
1. FOR NOTES AND REFEREFERENCES SEE 1-NHY-509045 SHEET 1 OF 2.

REDRAW OF F.P. 70317
W 7245D02 SHT. 5

NUCLEAR-SAFETY-RELATED

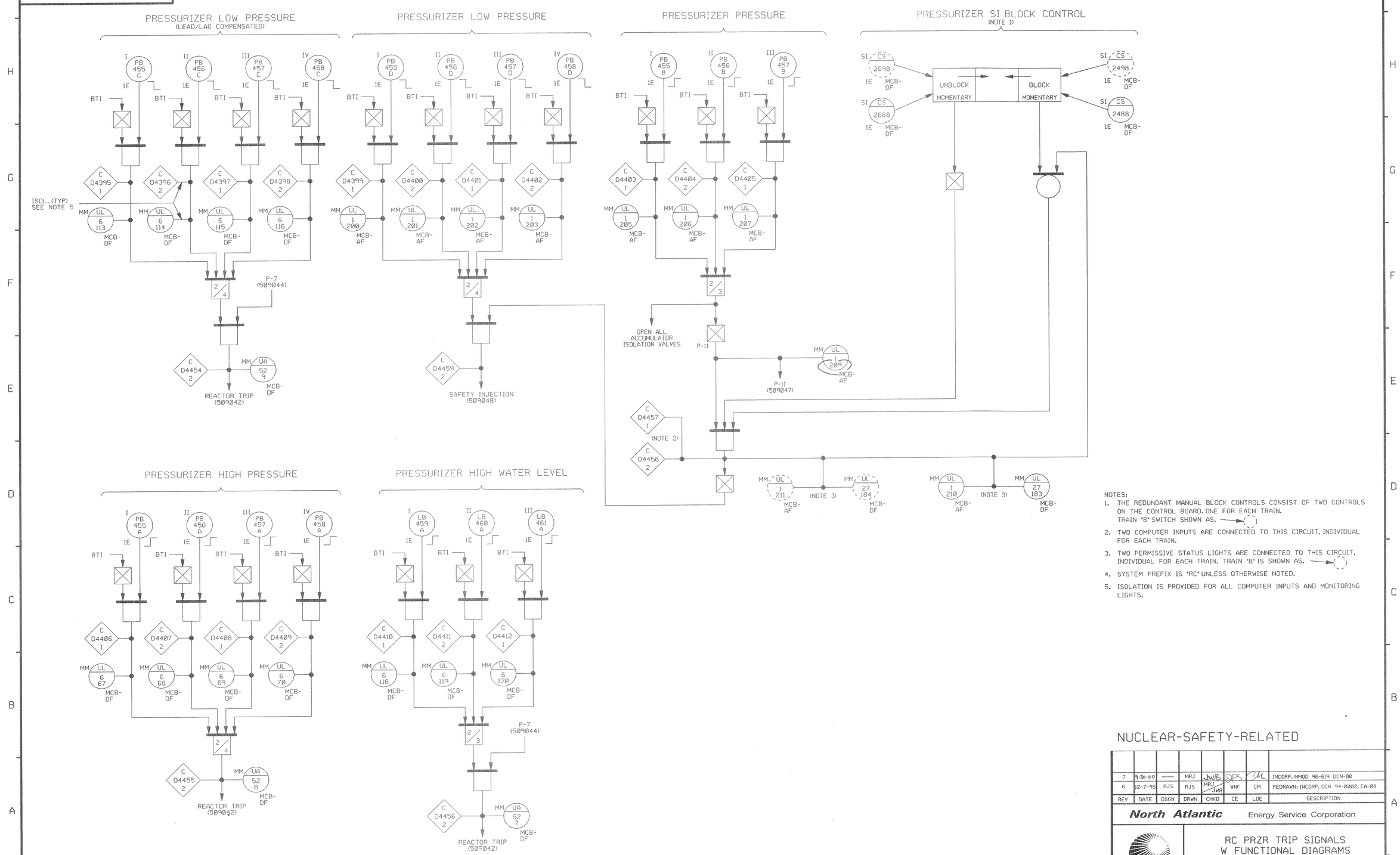
REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
1	4/18/08	JWB	JWB	MRB	WNF	CM	INCORP 07MMOD500 DCN 00
0	12/1/95	RJS	RJS	MRJ JWB	WNF	CM	REDRAWN: INCORP. DCR 94-0002, CA-8

FPL Energy Seabrook Station

RC TRIP SIGNALS
W FUNCTIONAL DIAGRAMS
SHEET 2 OF 2

1-NHY-509045 SH.2 REV 1

FILE: 509046.DGN
bdr file: N:\FUNC\PROD



NOTES:

1. THE REDUNDANT MANUAL BLOCK CONTROLS CONSIST OF TWO CONTROLS ON THE CONTROL BOARD. ONE FOR EACH TRAIN. TRAIN "B" SWITCH SHOWN AS. ⟶( )
2. TWO COMPUTER INPUTS ARE CONNECTED TO THIS CIRCUIT, INDIVIDUAL FOR EACH TRAIN.
3. TWO PERMISSIVE STATUS LIGHTS ARE CONNECTED TO THIS CIRCUIT, INDIVIDUAL FOR EACH TRAIN. TRAIN "B" IS SHOWN AS. ⟶( )
4. SYSTEM PREFIX IS "RC" UNLESS OTHERWISE NOTED.
5. ISOLATION IS PROVIDED FOR ALL COMPUTER INPUTS AND MONITORING LIGHTS.

NUCLEAR-SAFETY-RELATED

REDRAW OF F.P. 70318
W 7245D02 SHT. 6

REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
7	9-20-00	—	MRJ	JWB	SPS	CM	INCORP. MMOD 96-619 DCN-00
6	12-7-95	RJS	RJS	MRJ JWB	WNF	CM	REDRAWN: INCORP. DCR 94-0002, CA-08

North Atlantic Energy Service Corporation

SEABROOK STATION

RC PRZR TRIP SIGNALS
W FUNCTIONAL DIAGRAMS

1-NHY-509046 REV 7

1-NHY-509047 SH.1 REV 11

FILE: 5090474.DGN

STEAM GENERATOR HI-HI LEVEL

(LOOP ONE, CHANNELS I &II LAG COMPENSATED) — STEAM GENERATOR ONE

(LOOP TWO, CHANNELS I &II LAG COMPENSATED) — STEAM GENERATOR TWO

(LOOP THREE, CHANNELS I &III LAG COMPENSATED) — STEAM GENERATOR THREE

(LOOP FOUR, CHANNELS II &IV LAG COMPENSATED) — STEAM GENERATOR FOUR

I LB 551 B — II LB 519 A — III LB 518 A — IV LB 517 A

I LB 529 A — II LB 552 B — III LB 528 A — IV LB 527 A

I LB 539 A — II LB 553 B — III LB 538 A — IV LB 537 A

I LB 554 B — II LB 549 A — III LB 548 A — IV LB 547 A

IE — BTI

MM UL 1 221 MCB-AF — MM UL 12 19 MCB-FF

MM UL 1 53 MCB-AF — MM UL 12 1 MCB-FF

MM UL 1 54 MCB-AF — MM UL 12 7 MCB-FF

MM UL 1 55 MCB-AF — MM UL 12 13 MCB-FF

MM UL 1 189 MCB-AF — MM UL 12 2 MCB-FF

MM UL 1 223 MCB-AF — MM UL 12 20 MCB-FF

MM UL 1 190 MCB-AF — MM UL 12 8 MCB-FF

MM UL 1 191 MCB-AF — MM UL 12 14 MCB-FF

MM UL 1 192 MCB-AF — MM UL 12 3 MCB-FF

MM UL 1 224 MCB-AF — MM UL 12 21 MCB-FF

MM UL 1 193 MCB-AF — MM UL 12 9 MCB-FF

MM UL 1 194 MCB-AF — MM UL 12 15 MCB-FF

MM UL 1 222 MCB-AF — MM UL 12 22 MCB-FF

MM UL 1 195 MCB-AF — MM UL 12 4 MCB-FF

MM UL 1 196 MCB-AF — MM UL 12 10 MCB-FF

MM UL 1 197 MCB-AF — MM UL 12 16 MCB-FF

ISOL. (TYP) (NOTE 6)

C D4774 1 (NOTE 7) — C D4777 1 (NOTE 7) — C D4780 1 (NOTE 7) — C D4783 1 (NOTE 7)

C D4882 2 — C D4883 2 — C D4884 2 — C D4885 2

2/4

P-14
TURBINE TRIP AND FEEDWATER ISOLATION
(509053)

STEAM GENERATOR LOW-LOW WATER LEVEL

(LOOP ONE, CHANNELS I &II LAG COMPENSATED) — LOOP ONE

(LOOP TWO, CHANNELS I &II LAG COMPENSATED) — LOOP TWO

(LOOP THREE, CHANNELS I & III LAG COMPENSATED) — LOOP THREE

(LOOP FOUR, CHANNELS II & IV LAG COMPENSATED) — LOOP FOUR

II LB 519 B — III LB 518 B — IV LB 517 B — I LB 551 A

I LB 529 B — III LB 528 B — IV LB 527 B — II LB 552 A

I LB 539 B — III LB 538 B — IV LB 537 B — II LB 553 A

II LB 549 B — III LB 548 B — IV LB 547 B — I LB 554 A

IE — BTI

C D4798 2 — C D4799 1 — C D4800 2 — C D4824 1

C D4801 1 — C D4802 1 — C D4803 2 — C D4825 2

C D4804 1 — C D4805 1 — C D4806 2 — C D4826 2

C D4807 2 — C D4808 1 — C D4809 2 — C D4827 1

MM UL 6 30 MCB-DF — MM UL 6 43 MCB-DF — MM UL 6 44 MCB-DF — MM UL 6 29 MCB-DF

MM UL 6 31 MCB-DF — MM UL 6 45 MCB-DF — MM UL 6 46 MCB-DF — MM UL 6 32 MCB-DF

MM UL 6 33 MCB-DF — MM UL 6 47 MCB-DF — MM UL 6 48 MCB-DF — MM UL 6 34 MCB-DF

MM UL 6 36 MCB-DF — MM UL 6 49 MCB-DF — MM UL 6 50 MCB-DF — MM UL 6 35 MCB-DF

C D4865 1 — C D4866 2 — C D4867 1 — C D4868 2

2/4

REACTOR TRIP (509042)

MM UA 52 10 MCB-DF

EMERGENCY FEEDWATER PUMPS STARTUP LOGICS (509055)

NOTES:
1. THE REDUNDANT MANUAL BLOCK CONTROLS CONSIST OF TWO CONTROLS ON THE CONTROL BOARD, ONE FOR EACH TRAIN. TRAIN "B" IS SHOWN AS. ⬡
2. TWO COMPUTER INPUTS ARE CONNECTED TO THIS CIRCUIT, INDIVIDUAL FOR EACH TRAIN. TRAIN "B" COMPUTER INPUT IS SHOWN AS. ◇
3. TWO PERMISSIVE STATUS LIGHTS ARE CONNECTED TO THIS CIRCUIT, INDIVIDUAL FOR EACH TRAIN. TRAIN "B" IS SHOWN AS. ⬭
4. SYSTEM PREFIX IS "FW" UNLESS OTHERWISE NOTED.
5. STEAM GEN. LO-LO WATER LEVEL ALARMS NUMBER WERE ADDED PER DCN-650054A.
6. ISOLATION IS PROVIDED FOR ALL COMPUTER INPUTS AND MONITORING LIGHTS.
7. COMPUTER INPUTS D4774, D4777, D4780, D4783, D4811, D4821, D4822 & D4823 ARE ACTUATED WHEN ANY OF THE REDUNDANT BISTABLES TRIP.

REDRAW OF F.P. 70319
W 7245D02 SHT. 7

NUCLEAR-SAFETY-RELATED

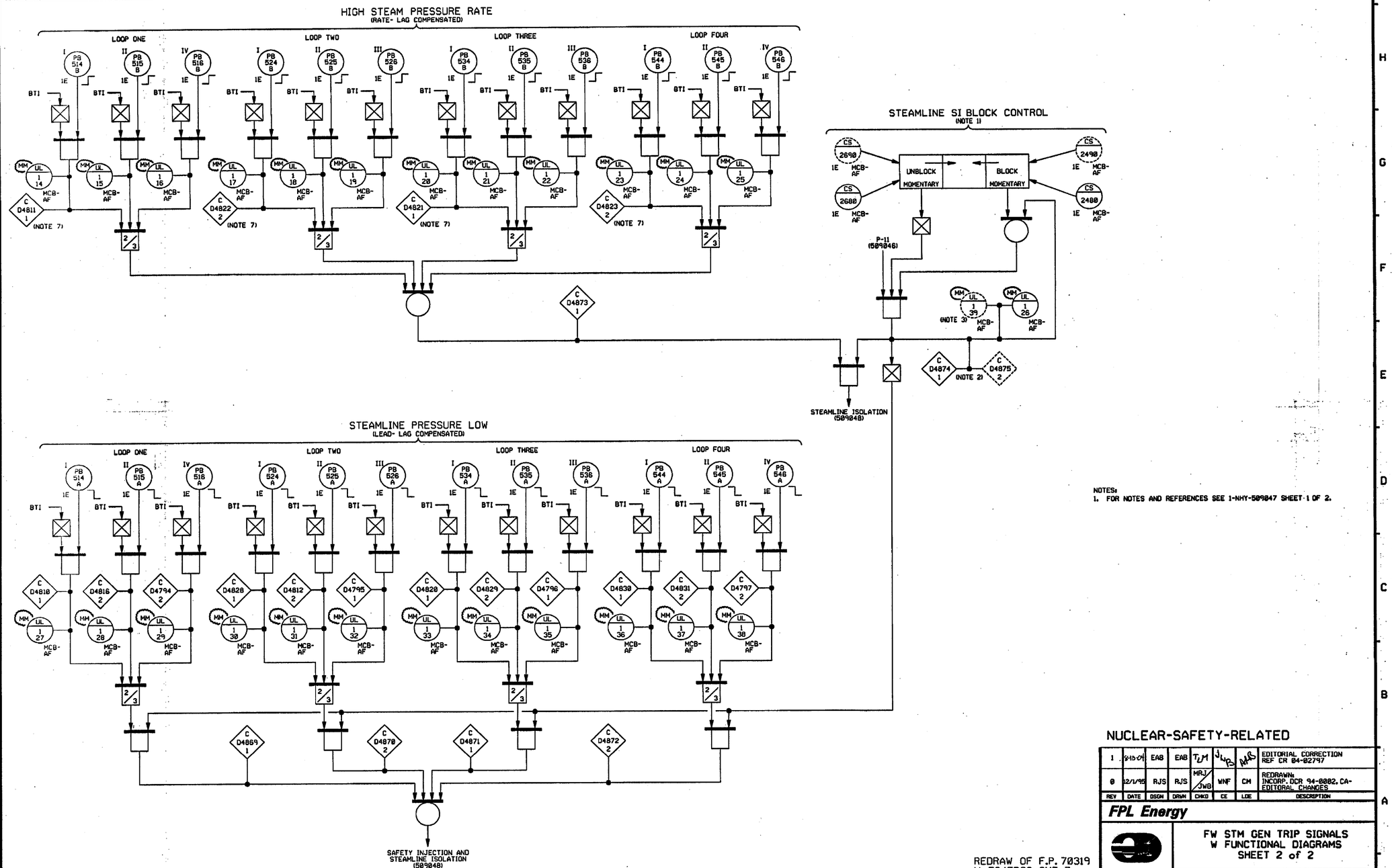
REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
11	12/11/95	RJS	RJS	MRJ/JWB	WVF	CM	REDRAWN: INCORP. DCR 94-0002, CA-8 EDITORIAL COMMENTS

North Atlantic Energy Service Corporation

SEABROOK STATION

FW STM GEN TRIP SIGNALS
W FUNCTIONAL DIAGRAMS
SHEET 1 of 2

1-NHY-509047 SH.1 REV 11



NOTES:
1. FOR NOTES AND REFERENCES SEE 1-NHY-509047 SHEET 1 OF 2.

REDRAW OF F.P. 70319
W 7245D02 SHT. 7

NUCLEAR-SAFETY-RELATED

REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
1	8-13-04	EAB	EAB	TJM / JWB	WNF	CM	EDITORIAL CORRECTION REF CR 04-02797
0	12/1/95	RJS	RJS	MRJ / JWB	WNF	CM	REDRAWN INCORP. DCR 94-0002. CA-EDITORAL CHANGES

FPL Energy

Seabrook Station

FW STM GEN TRIP SIGNALS
W FUNCTIONAL DIAGRAMS
SHEET 2 of 2

1-NHY-509047 SH.2 REV 1

1-NHY-509048 REV 17

STEAM GENERATOR

HIGH STEAM PRESSURE RATE (509047)

LOW STEAMLINE PRESSURE (509047)

PRESSURIZER

LOW PRESSURIZER PRESSURE (509046)

CONTAINMENT PRESSURE

MANUAL ACTUATION FROM CONTROL BOARD

DUAL TRAIN

SAFETY INJECTION ACTUATION (TWO CONTROLS) (NOTE 1)

CONTAINMENT SPRAY ACTUATION (TWO CONTROLS) (NOTE 2)

CONTAINMENT SPRAY ACTUATION (TWO CONTROLS) (NOTE 2)

CONTAINMENT ISOLATION PHASE A (TWO CONTROLS) (NOTE 1)

MANUAL RESET AND BLOCK (NOTE 7 & 8)

HI-1

HI-2

HI-3 (NOTES 4, 14 & 15)

ISOL. (TYP) (NOTE 19)

P-4 REACTOR TRIP (509042)

30-120 SEC.

MANUAL RESET (NOTE 7 & 8)

EMERGENCY FFEDWATER PUMPS (509055)

FEEDWATER ISOLATION (509053)

REACTOR TRIP (509042)

BY (W) N.E.S.

BY U.E. & C.

MANUAL STEAMLINE ISOLATION (TWO CONTROLS) (NOTE 13)

NOTE 23 & 25

(NOTE 25)

LOOP 1 MANUAL STEAMLINE ISOLATION (NOTE 3)

LOOP 2 MANUAL STEAMLINE ISOLATION (NOTE 3)

LOOP 3 MANUAL STEAMLINE ISOLATION (NOTE 3)

LOOP 4 MANUAL STEAMLINE ISOLATION (NOTE 3)

(NOTE 24)

CLOSE (NOTE 6)

LOOP 1 STEAMLINE ISOL V86

LOOP 2 STEAMLINE ISOL V88

LOOP 3 STEAMLINE ISOL V90

LOOP 4 STEAMLINE ISOL V92

EMERGENCY DIESEL START-UP (NOTE 6)

"S" SIGNAL SAFETY INJECTION (PART BY (W)) (NOTE 9) (NOTE 6)

(NOTE 18)

(NOTE 10)

(NOTE 12)

CONTAINMENT VENTILATION ISOLATION (NOTE 6)

"P" SIGNAL CONTAINMENT ISOLATION PHASE B (NOTE 6)

CONTAINMENT SPRAY ACTUATION (NOTE 15 & 16) (NOTE 6)

"T" SIGNAL CONTAINMENT ISOLATION PHASE A (NOTE 6)

(NOTE 22)

(NOTE 14)

(NOTE 11)

NOTES:

1. TWO MOMENTARY CONTROLS ON THE CONTROL BOARD, OPERATING EITHER CONTROL WILL ACTUATE. TRAIN 'B' SHOWN AS. ⟶◯
2. THE MANUAL SPRAY ACTUATION CONSISTS OF FOUR MOMENTARY CONTROLS, ACTUATION WILL OCCUR ONLY IF TWO ASSOCIATED CONTROLS ARE OPERATED SIMULTANEOUSLY. TRAIN 'B' SHOWN AS. ⟶◯
3. ONE MOMENTARY CONTROL PER LOOP ON THE CONTROL BOARD.
4. CONTAINMENT PRESSURE BISTABLES FOR SPRAY ACTUATION ARE ENERGIZE-TO-ACTUATE (OTHER BISTABLES ARE DE-ENERGIZE-TO-ACTUATE).
5. RM-RM-6535A/6527A IS THE TRAIN 'A' CONTAINMENT RAD. MONITOR. RM-RM-6535B/6527B IS FOR TRAIN 'B'.
6. COMPONENTS ARE ALL INDIVIDUALLY SEALED IN (LATCHED), SO THAT LOSS OF THE ACTUATION SIGNAL WILL NOT CAUSE THESE COMPONENTS TO RETURN TO THE CONDITION HELD PRIOR TO THE ADVENT OF THE ACTUATION SIGNAL.
7. THE REDUNDANT MANUAL RESET CONSISTS OF TWO MOMENTARY CONTROLS ON THE CONTROL BOARD, ONE FOR EACH TRAIN. TRAIN 'B' SHOWN AS. ⟶◯
8. SUPPLIED BY UE&C.
9. SAFETY INJECTION SEQUENCE REQUIREMENTS (IF SEQUENCING IS NECESSARY) ARE SPECIFIED BY WESTINGHOUSE N.E.S.
10. COMPUTER INPUT D4596 ORIGINATES FROM WESTINGHOUSE RELAY K615A.
11. COMPUTER INPUT D7906 ORIGINATES FROM WESTINGHOUSE RELAY K629A.
12. THE ACTUATION MAY BE DELAYED AND SEQUENCED IF THE EMERGENCY DIESEL POWER CAPABILITY IS LESS THAN THE TOTAL LOAD WITH ALL SYSTEMS STARTING. THE TIME DELAY(S), IF USED MAY NOT EXCEED THE MAXIMUM STARTING TIME REQUIREMENTS FOR EACH SYSTEM.
13. TWO CONTROLS ON THE CONTROL BOARD. OPERATING EITHER CONTROL WILL ACTUATE.
14. SOME ENGINEERED SAFEGUARDS FUNCTIONS ARE NOT WITHIN THE FUNCTIONAL DESIGN SCOPE OF WESTINGHOUSE NUCLEAR ENERGY SYSTEMS BUT ONLY SHOWN ON THIS SHEET AS THE FUNCTIONS ARE BUILT IN THE WESTINGHOUSE SUPPLIED EQUIPMENT.
15. THE 2 OUT OF 4 COINCIDENCE, MEMORY AND "OR" LOGIC ARE DUPLICATED WITHIN EACH TRAIN. SEPARATE OUTPUT RELAYS ARE ALSO PROVIDED IN EACH TRAIN. TO MINIMIZE FALSE CONTAINMENT SPRAY, ONE OUTPUT RELAY SHOULD START THE PUMPS WHILE ANOTHER SHOULD OPEN THE SYSTEM VALVES.
16. THE CONTAINMENT SPRAY SYSTEM SHOULD BE INDEPENDENT OF THE SAFETY INJECTION SYSTEM. IF THE CONDITIONS OF NOTE 12 APPLY, THE SEQUENCE INTERLOCK SHOULD BE SUCH THAT SPRAY WILL START WITHIN THE REQUIRED TIME INDEPENDENT OF THE SAFETY INJECTION SIGNAL STATUS.
17. SYSTEM PREFIX IS "SI" UNLESS OTHERWISE NOTED.
18. TRAIN B ANNUNCIATORS ARE SHOWN AS. ⟶◯
19. ISOLATION IS PROVIDED FOR COMPUTER INPUTS AND MONITORING LIGHTS.
20. SEE C-509041 FOR GENERAL NOTES & SYMBOL LEGEND.
21. COMPUTER INPUTS D4547 AND D4553 ARE ACTUATED WHEN ANY OF THE REDUNDANT BISTABLES TRIP.
22. THIS ANNUNCIATOR IS WIRED TO PROVIDE BOTH TRAIN A & B ALARM.
23. BY-PASS VALVES V204, V205, V206 AND V207 AND DRAIN VALVES V44, V45, V46 AND V47 (NOT SHOWN) ARE ACTUATED FROM TRAIN "A" MAIN STEAM ISOLATION. SEE LOGIC DIAGRAM 1-NHY-503669 & 503695 FOR OPERATION OF THESE VALVES.
24. SLOW MSIV CLOSURE.
25. FAST MSIV CLOSURE.

REFERENCE DRAWINGS:
509022
503667 (MS)
503668 (MS)
503915 (SI)
503256 (CBS)
503392 (CS)
503221 (CAP)
503298 (COP)
503341 (CS)

REDRAW OF F.P. 70320
W 7245D02 SHT. 8

NUCLEAR-SAFETY-RELATED

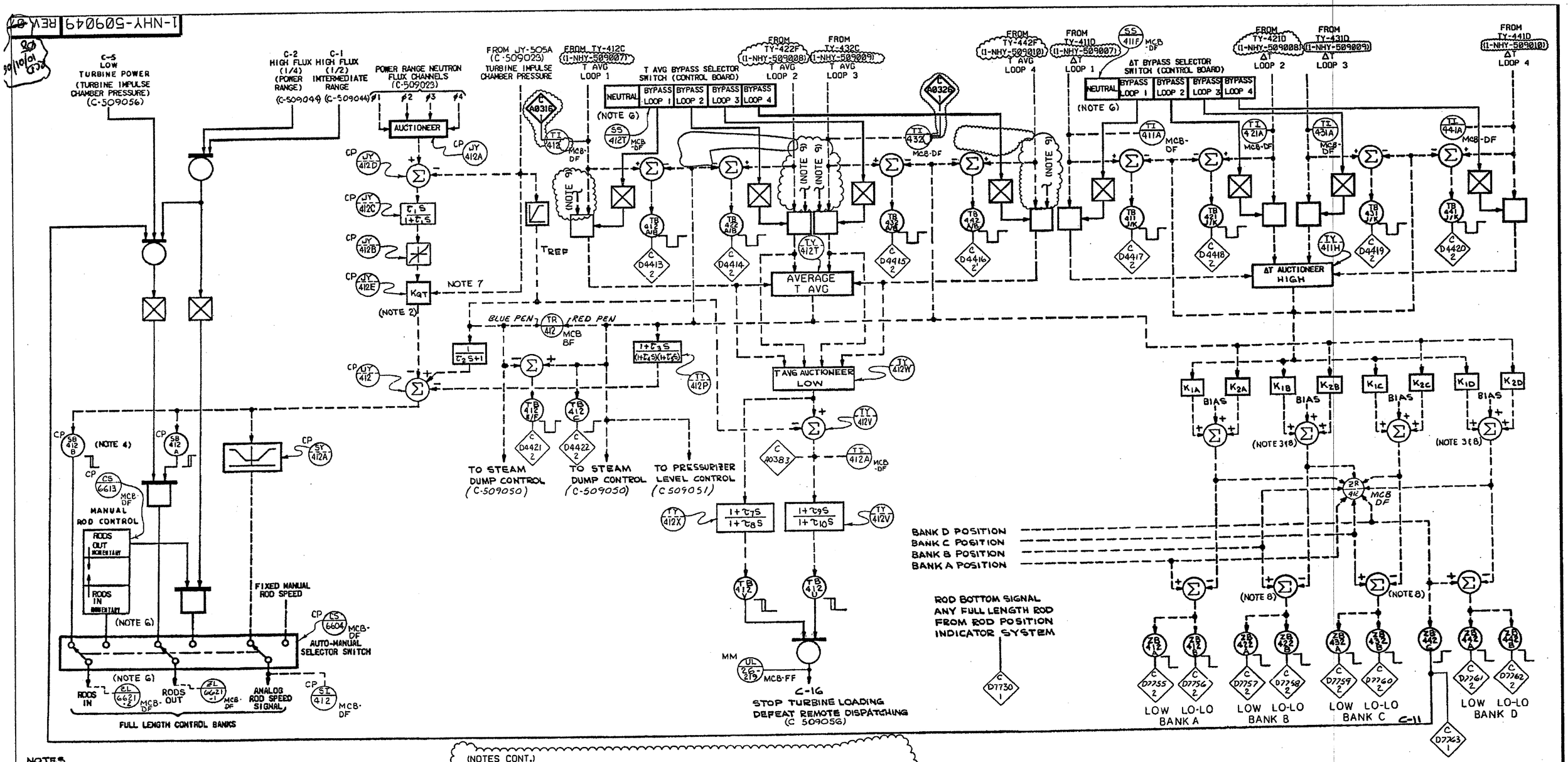
REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION
17	9-20-00	—	MRJ	JWB	SRS	MA	INCORP. MMOD 96-619 DCN-00
16	12/1/95	RJS	RJS	MRJ/JWB	WNF	CH	REDRAWN; INCORP. DCR 94-0002, CA-8

North Atlantic Energy Service Corporation

SEABROOK STATION

SAFEGUARD ACTUATION SIGNALS W FUNCTIONAL DIAGRAMS

1-NHY-509048 REV 17



NOTES

1. ALL CIRCUITS ON THIS SHEET ARE NOT REDUNDANT.
2. KQT MAY VARY INVERSELY PROPORTIONAL TO LOAD WITH A FIXED LIMIT OR MAY VARY IN TWO DISCRETE STEPS WITH BREAK POINTS AT 30 TO 50 % AND 60 TO 80% TURBINE LOAD.
3. THE SUMMER OUTPUTS HAVE FIXED MANUALLY ADJUSTABLE UPPER LIMITS.
4. THE ROD DIRECTION BISTABLES NO. SB-412A AND SB-412B ARE "ENERGIZED TO ACTUATE".
5. SYSTEM PREFIX IS "RC" UNLESS OTHERWISE NOTED.
6. THESE CONTROLS ON THE CONTROL BOARD ARE SUPPLIED BY U.E.&C.
7. REFER TO C-509023 FOR ACTUAL HARDWARE IMPLEMENTATION
8. REFER TO C-509030 FOR ACTUAL HARDWARE IMPLEMENTATION

(NOTES CONT.)

9. BYPASS OPERATIONS AS FOLLOWS:

	T AVG INPUT TO TY-412T			
LOOP →	1	2	3	4
BYPASS NOT SELECTED →	LOOP 1	LOOP 2	LOOP 3	LOOP 4
BYPASS SELECTED →	LOOP 4	LOOP 1	LOOP 2	LOOP 3

REFERENCE DWGS
M-506628 F.P. 70001 SH 23, 32, 30, 31
C-509023
C-509032
C-509030
C-509031

ISSUED-FOR-CONSTRUCTION

REV	DATE	DRWN	CHKD	CE	LDE	DESCRIPTION
8	10/26/05	TPG	MRB	RCD	CM	CR 05-01761-01 EDITORIAL CHANGES
7	4/22/05	MRB	TLM	RCD	CM	INCORP DCR 04-001, DCN-00
6	11/6/92	JWB	WDS	RWM	BEB	INCORP DCR 92-033, CA-01

FPL Energy Seabrook Station

ROD CONTROL & BLOCKS W FUNCTIONAL DIAGRAMS

1-NHY-509049 REV 07