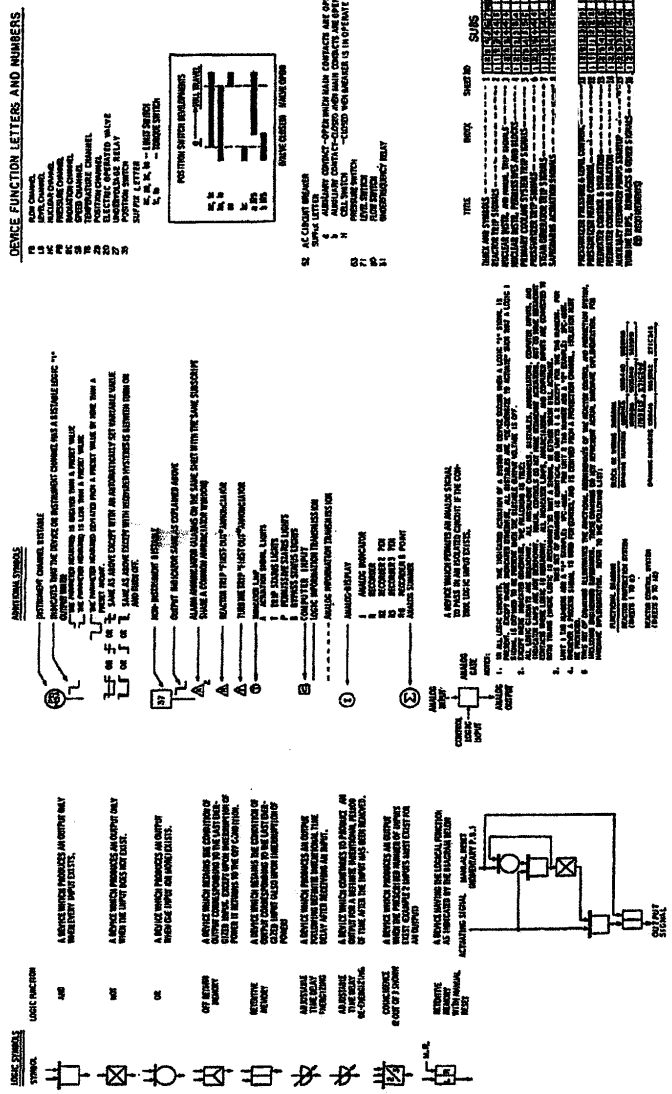
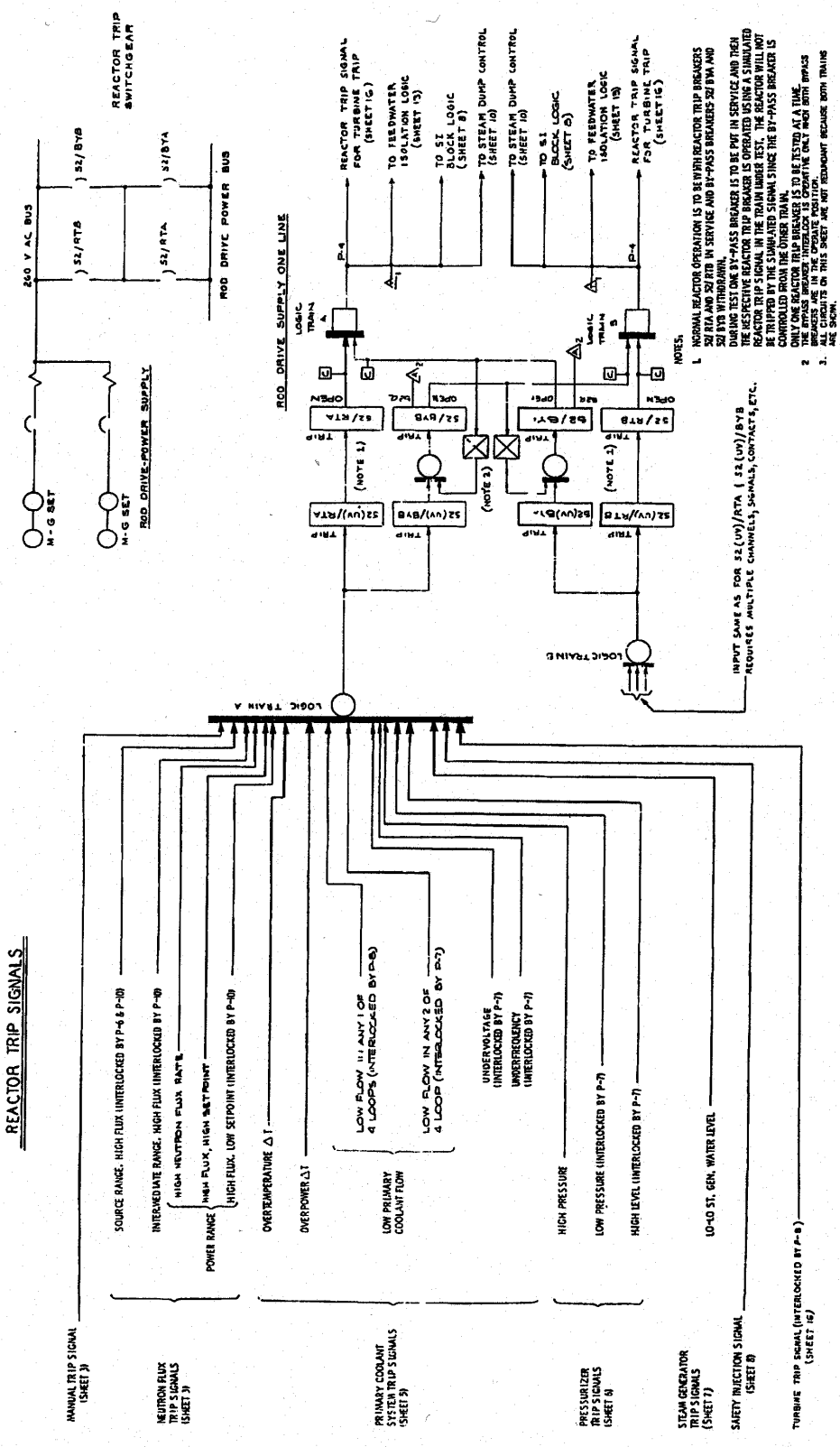
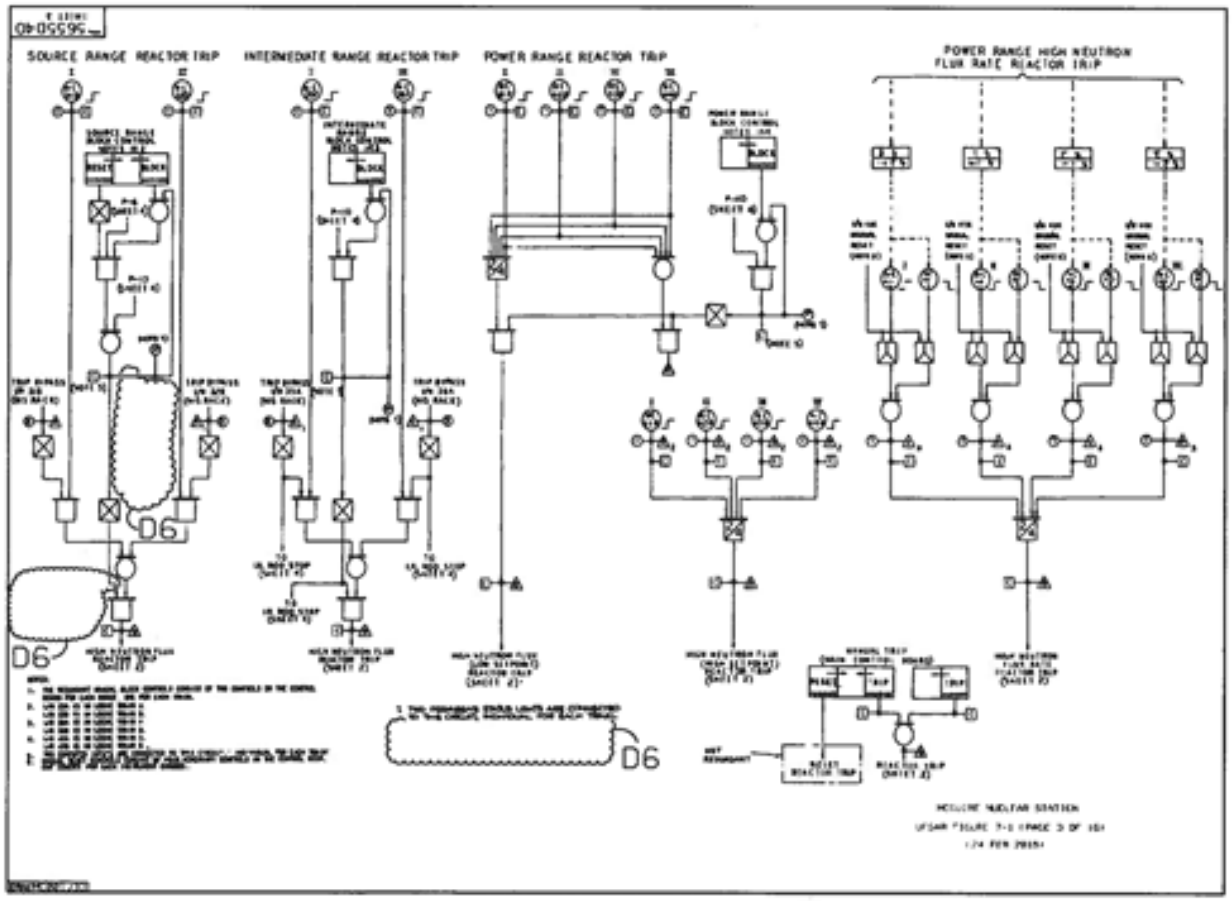
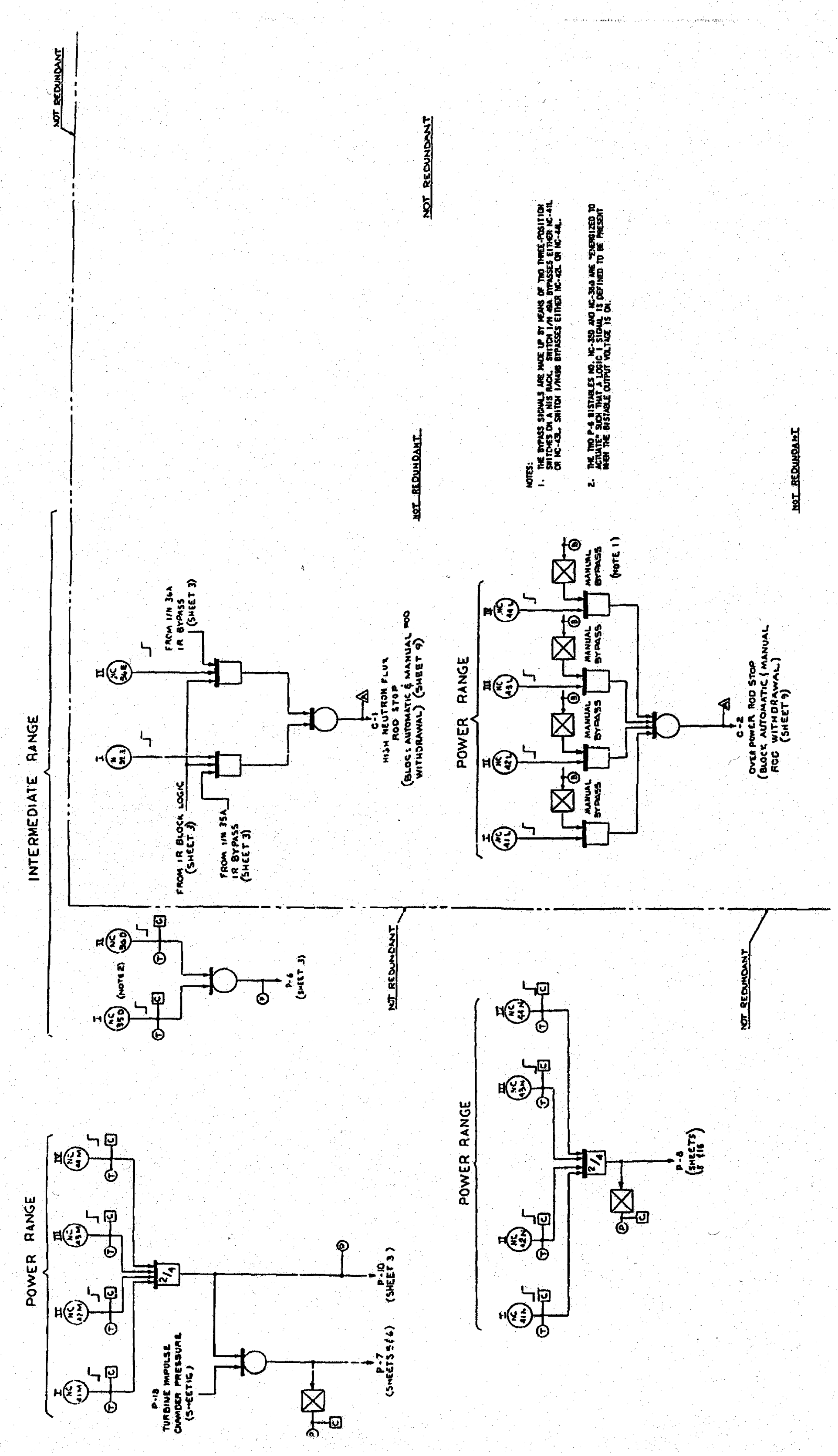
Appendix 7B. Figures

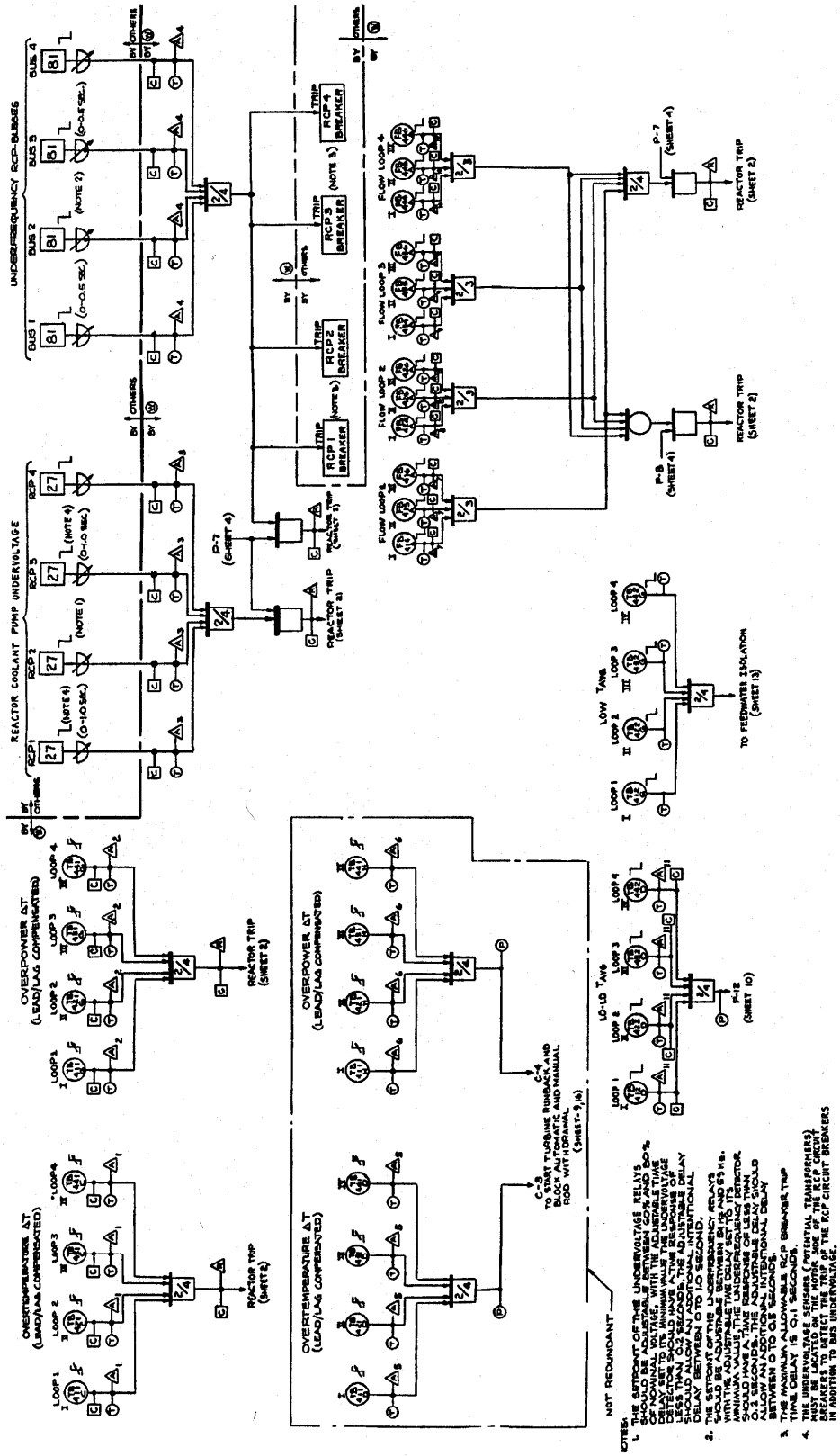
Figure 7-1. Instrumentation and Control System Logic Diagram

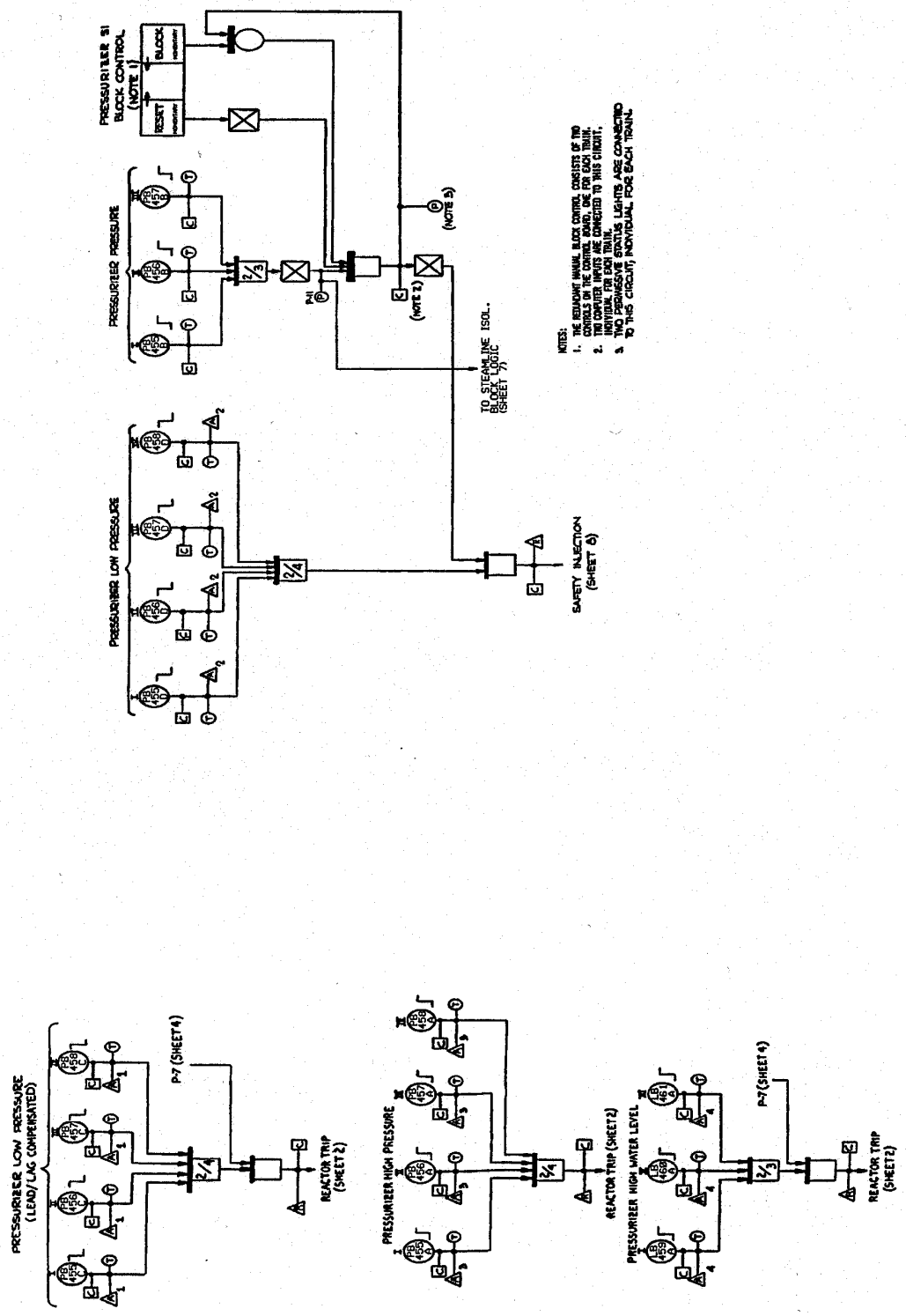


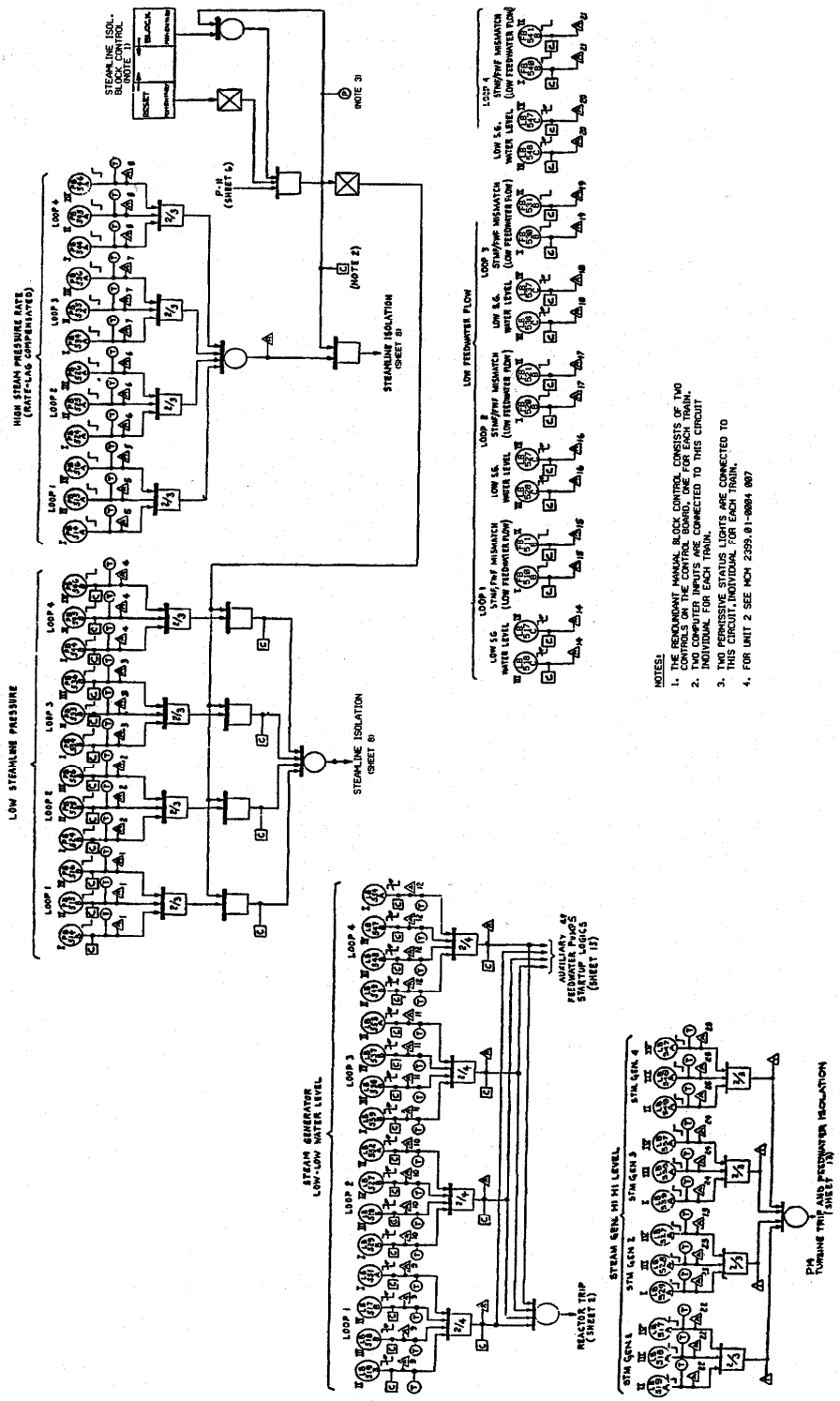

REACTOR TRIP SIGNALS
MANUAL TRIP SIGNAL (SHEET 3)
NEUTRON FLUX TRIP SIGNALS (SHEET 3)
PRIMARY COOLANT SYSTEM TRIP SIGNALS (SHEET 5)
PRESSURIZER TRIP SIGNALS (SHEET 6)
STEAM GENERATOR TRIP SIGNALS (SHEET 7)
SAFETY INJECTION SIGNAL (SHEET 8)
TURBINE TRIP SIGNAL (INTERLOCKED BY P-8) (SHEET 16)
SOURCE RANGE, HIGH FLUX (INTERLOCKED BY P-6 & P-10)
INTERMEDIATE RANGE, HIGH FLUX (INTERLOCKED BY P-10)
POWER RANGE
HIGH NEUTRON FLUX RATE
HIGH FLUX, HIGH SETPOINT
HIGH FLUX, LOW SETPOINT (INTERLOCKED BY P-10)
OVERTEMPERATURE ΔT
OVERPOWER ΔT
LOW FLOW IN ANY 1 OF 4 LOOPS (INTERLOCKED BY P-8)
LOW FLOW IN ANY 2 OF 4 LOOP (INTERLOCKED BY P-7)
LOW PRIMARY COOLANT FLOW
UNDERVOLTAGE (INTERLOCKED BY P-7)
UNDERFREQUENCY (INTERLOCKED BY P-7)
HIGH PRESSURE
LOW PRESSURE (INTERLOCKED BY P-7)
HIGH LEVEL (INTERLOCKED BY P-7)
LO-LO ST. GEN. WATER LEVEL
LOGIC TRAIN A
LOGIC TRAIN B
ROD DRIVE SUPPLY ONE LINE
ROD DRIVE-POWER SUPPLY
M-G SET
M-G SET
480 V AC BUS
52/RTB
52/BYB
52/RTA
52/BYA
REACTOR TRIP SWITCHGEAR
ROD DRIVE POWER BUS
REACTOR TRIP SIGNAL FOR TURBINE TRIP (SHEET 16)
TO FEEDWATER ISOLATION LOGIC (SHEET 13)
TO SI BLOCK LOGIC (SHEET 8)
TO STEAM DUMP CONTROL (SHEET 10)
TO STEAM DUMP CONTROL (SHEET 10)
TO SI BLOCK LOGIC (SHEET 8)
TO FEEDWATER ISOLATION LOGIC (SHEET 13)
REACTOR TRIP SIGNAL FOR TURBINE TRIP (SHEET 16)
52/RTA
52/BYB
BB/BYA
52/RTB
OPEN
TRIP
CLOSE
(NOTE 1)
(NOTE 2)
52(UV)/RTA
52(UV)/BYB
52(UV)/BYA
52(UV)/RTB
INPUT SAME AS FOR 52(UV)/RTA (52(UV)/BYB REQUIRES MULTIPLE CHANNELS, SIGNALS, CONTACTS, ETC.
NOTES:
1. 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.
THE BYPASS BREAKER INTERLOCK IS OPERATIVE ONLY WHEN BOTH BYPASS BREAKERS ARE IN THEIR RESPECTIVE CUBICLES.
ALL CIRCUITS ON THIS SHEET ARE NOT REDUNDANT BECAUSE BOTH TRAINS ARE SHOWN.

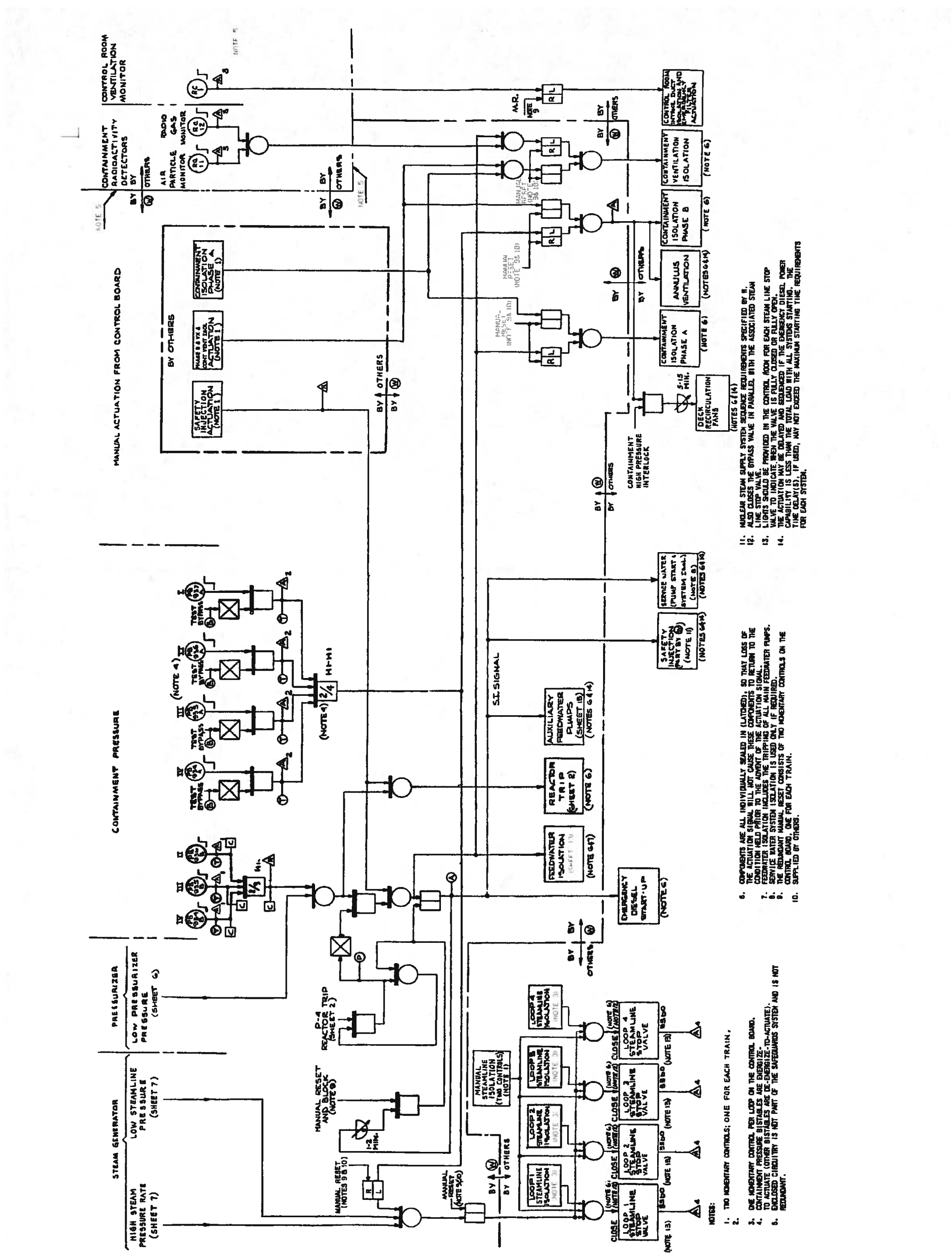

SOURCE RANGE REACTOR TRIP
INTERMEDIATE RANGE REACTOR TRIP
POWER RANGE REACTOR TRIP
POWER RANGE HIGH NEUTRON FLUX RATE REACTOR TRIP
D6
D6
D6


INTERMEDIATE RANGE
POWER RANGE
POWER RANGE
POWER RANGE
NOT REDUNDANT
C-1
HIGH NEUTRON FLUX
ROD STOP
C-2
OVER POWER ROD STOP
MANUAL BYPASS
P-10
P-7
P-8
P-6
P-13
TURBINE IMPULSE CHAMBER PRESSURE


REACTOR COOLANT PUMP UNDERVOLTAGE
UNDERFREQUENCY RCP BUSSES
OVERPOWER ΔT (LEAD/LAG COMPENSATED)
OVERTEMPERATURE ΔT (LEAD/LAG COMPENSATED)
LO-LO T_AVG
LOW T_AVG
FLOW LOOP 1
FLOW LOOP 2
FLOW LOOP 3
FLOW LOOP 4
RCP 1 BREAKER
RCP 2 BREAKER
RCP 3 BREAKER
RCP 4 BREAKER
REACTOR TRIP (SHEET 2)
TO FEEDWATER ISOLATION (SHEET 13)
NOTES:
1. THE SETPOINT OF THE UNDERVOLTAGE RELAYS SHOULD BE SET AT A VALUE WITHIN 60% OF NOMINAL VOLTAGE WITH THE ADJUSTABLE TIME DELAY SET TO ITS MINIMUM VALUE. THE UNDERVOLTAGE RELAYS SHOULD HAVE A TIME RESPONSE OF LESS THAN 2 SECONDS. THE ADJUSTABLE DELAY SHOULD ALLOW AN ADDITIONAL INTENTIONAL DELAY BETWEEN 0 TO 10 SECOND.
2. THE SETPOINT OF THE UNDERFREQUENCY RELAYS SHOULD BE SET AT A VALUE BETWEEN 57 TO 59 Hz. WITH THE ADJUSTABLE TIME DELAY SET TO ITS MINIMUM VALUE, THE UNDERFREQUENCY DETECTOR SHOULD HAVE A TIME RESPONSE OF LESS THAN 0.5 SECONDS. THE ADJUSTABLE DELAY SHOULD ALLOW AN ADDITIONAL INTENTIONAL DELAY BETWEEN 0 TO 0.5 SECONDS.
3. THE MAXIMUM ALLOWABLE RCP BREAKER TRIP TIME DELAY IS 1.5 SECONDS.
4. THE UNDERVOLTAGE SENSORS (POTENTIAL TRANSFORMERS) MUST BE LOCATED ON THE MOTOR SIDE OF THE RCP CIRCUIT BREAKERS IN ADDITION TO BUS UNDERVOLTAGE.
NOT REDUNDANT

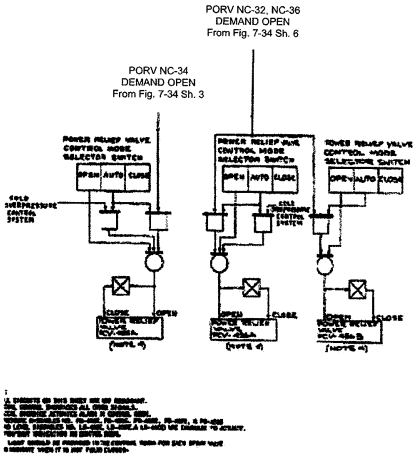

PRESSURIZER SI BLOCK CONTROL (NOTE 1)
BLOCK
RESET
PRESSURIZER PRESSURE
PRESSURIZER LOW PRESSURE
PRESSURIZER LOW PRESSURE (LEAD/LAG COMPENSATED)
PRESSURIZER HIGH PRESSURE
PRESSURIZER HIGH WATER LEVEL
P-7 (SHEET 4)
REACTOR TRIP (SHEET 2)
TO STEAMLINE ISOL. BLOCK LOGIC (SHEET 7)
SAFETY INJECTION (SHEET 6)
(NOTE 2)
(NOTE 5)
NOTES:
1. THE REDUNDANT MANUAL BLOCK CONTROL CONSISTS OF TWO CONTROLS ON THE CONTROL BOARD, ONE FOR EACH TRAIN.
2. TWO COMPUTER INPUTS ARE CONNECTED TO THIS CIRCUIT.
3. INDIVIDUAL FOR EACH TRAIN.
4. TWO PERMISSIVE BISTABLES LIGHTS ARE CONNECTED TO THIS CIRCUIT; INDIVIDUAL FOR EACH TRAIN.

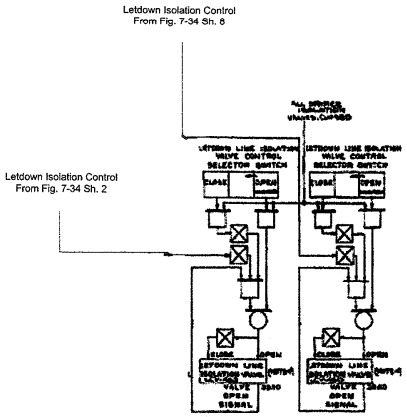

LOW STEAMLINE PRESSURE
HIGH STEAM PRESSURE RATE (RATE-LAG COMPENSATED)
STEAMLINE ISOL. BLOCK CONTROL (NOTE 1)
STEAMLINE ISOLATION (SHEET 8)
LOW FEEDWATER FLOW
STEAM GENERATOR LOW-LOW WATER LEVEL
AUXILIARY FEEDWATER PUMPS START (SHEET 12)
REACTOR TRIP (SHEET 2)
STEAM GEN. HI HI LEVEL
TURBINE TRIP AND FEEDWATER ISOLATION (SHEET 12)
NOTES:
1. THE REDUNDANT MANUAL BLOCK CONTROL CONSISTS OF TWO CONTROLS ON THE CONTROL BOARD, ONE FOR EACH TRAIN.
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.
4. FOR UNIT 2 SEE MCM 2399.01-0004 007

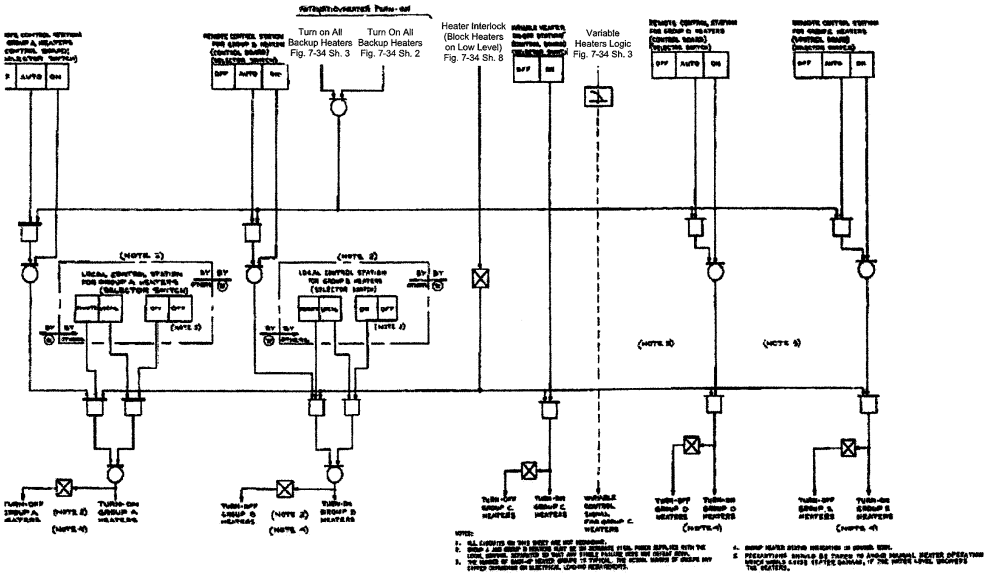

CONTAINMENT PRESSURE
MANUAL ACTUATION FROM CONTROL BOARD
STEAM GENERATOR
PRESSURIZER
S.I. SIGNAL

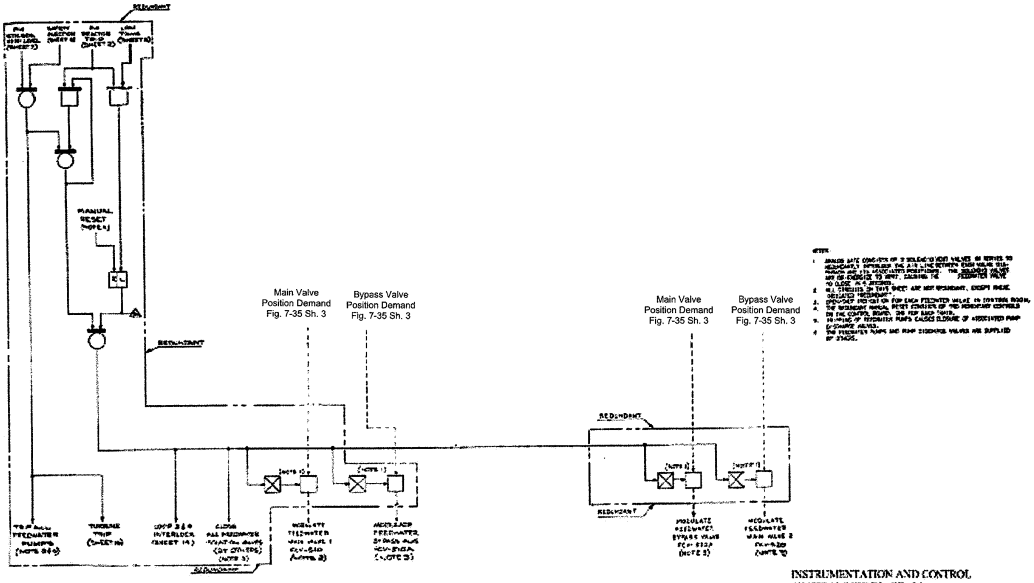
Deleted Per 2011 Update

Deleted Per 2011 Update

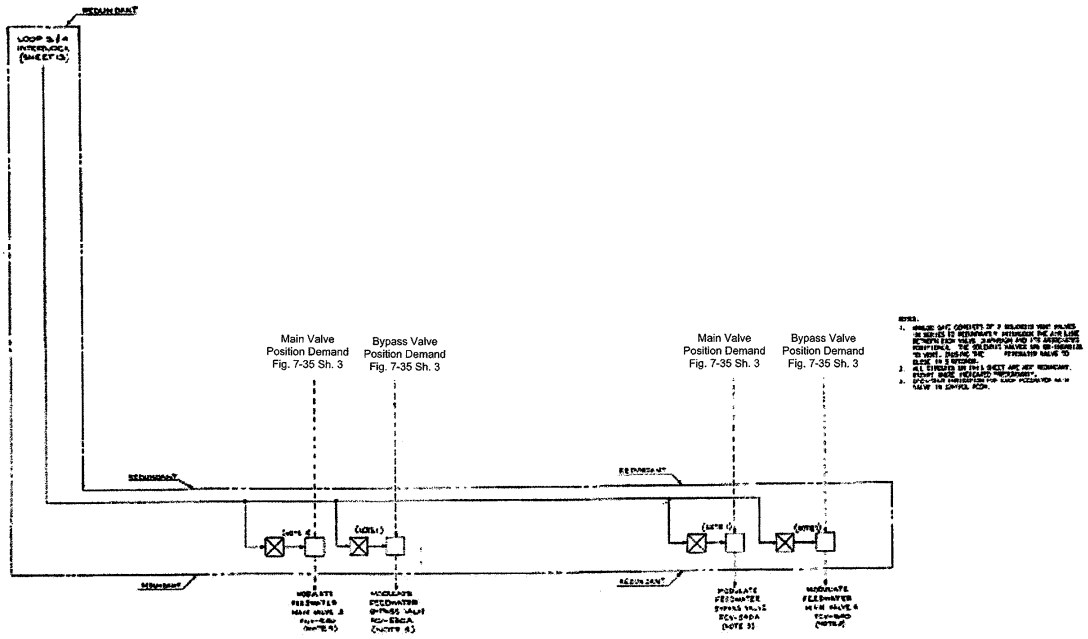

PORV NC-32, NC-36
DEMAND OPEN
From Fig. 7-34 Sh. 6
PORV NC-34
DEMAND OPEN
From Fig. 7-34 Sh. 3
POWER RELIEF VALVE
CONTROL MODE
SELECTOR SWITCH
OPEN
AUTO
CLOSE


Letdown Isolation Control
From Fig. 7-34 Sh. 6
Letdown Isolation Control
From Fig. 7-34 Sh. 2
CLOSE
OPEN

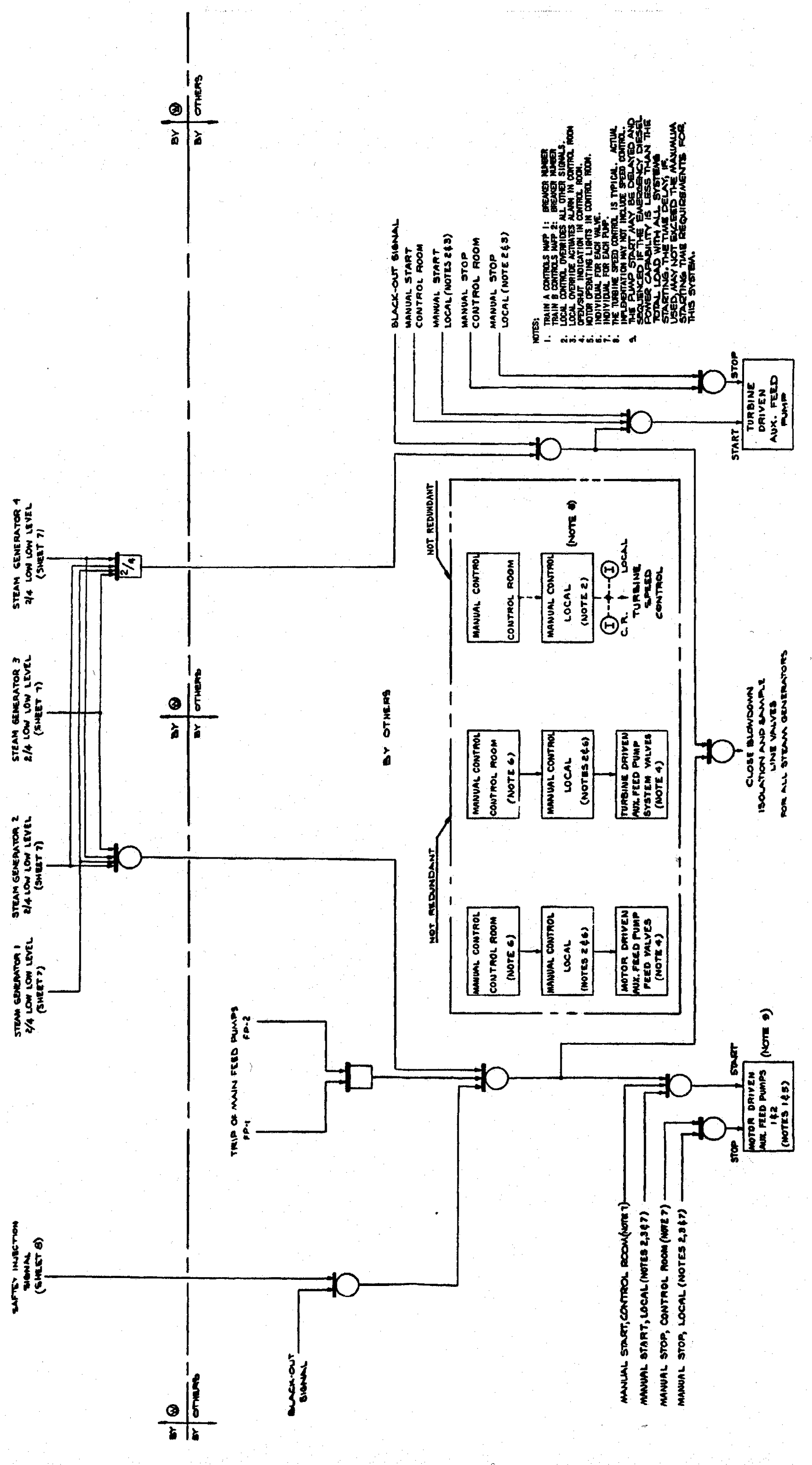

Turn on All Backup Heaters Fig. 7-34 Sh. 3
Turn On All Backup Heaters Fig. 7-34 Sh. 2
Heater Interlock (Block Heaters on Low Level) Fig. 7-34 Sh. 8
Variable Heaters Logic Fig. 7-34 Sh. 3



INSTRUMENTATION AND CONTROL SYSTEM LOGIC DIAGRAM



INSTRUMENTATION AND CONTROL
SYSTEM LOGIC DIAGRAM


SAFETY INJECTION SIGNAL (SHEET 8)
STEAM GENERATOR 1 2/4 LOW LOW LEVEL (SHEET 7)
STEAM GENERATOR 2 2/4 LOW LOW LEVEL (SHEET 7)
STEAM GENERATOR 3 2/4 LOW LOW LEVEL (SHEET 7)
STEAM GENERATOR 4 2/4 LOW LOW LEVEL (SHEET 7)
2/4
BY Ⓦ
BY OTHERS
TRIP OF MAIN FEED PUMPS
FP-1
FP-2
BLACK-OUT SIGNAL
BY OTHERS
NOT REDUNDANT
NOT REDUNDANT
MANUAL CONTROL CONTROL ROOM (NOTE 6)
MANUAL CONTROL LOCAL (NOTES 2&6)
MOTOR DRIVEN AUX. FEED PUMP FEED VALVES (NOTE 4)
MANUAL CONTROL CONTROL ROOM (NOTE 6)
MANUAL CONTROL LOCAL (NOTES 2&6)
TURBINE DRIVEN AUX. FEED PUMP SYSTEM VALVES (NOTE 4)
MANUAL CONTROL CONTROL ROOM
MANUAL CONTROL LOCAL (NOTE 2)
(NOTE 8)
C.R.
LOCAL
TURBINE SPEED CONTROL
BLACK-OUT SIGNAL
MANUAL START CONTROL ROOM
MANUAL START LOCAL (NOTES 2&3)
MANUAL STOP CONTROL ROOM
MANUAL STOP LOCAL (NOTE 2&3)
MANUAL START, CONTROL ROOM (NOTE 7)
MANUAL START, LOCAL (NOTES 2,3&7)
MANUAL STOP, CONTROL ROOM (NOTE 7)
MANUAL STOP, LOCAL (NOTES 2,3&7)
STOP
START
MOTOR DRIVEN AUX. FEED PUMPS 1&2 (NOTES 1&5)
(NOTE 9)
CLOSE BLOWDOWN ISOLATION AND SAMPLE LINE VALVES FOR ALL STEAM GENERATORS
START
STOP
TURBINE DRIVEN AUX. FEED PUMP
NOTES:
1. TRAIN A CONTROLS MAFP 1: BREAKER NUMBER
TRAIN B CONTROLS MAFP 2: BREAKER NUMBER
2. LOCAL CONTROL OVERRIDES ALL OTHER SIGNALS.
3. LOCAL OVERRIDE ACTUATES ALARM IN CONTROL ROOM
4. OPEN/SHUT INDICATION IN CONTROL ROOM.
5. MOTOR OPERATING LIGHTS IN CONTROL ROOM.
6. INDIVIDUAL FOR EACH VALVE.
7. INDIVIDUAL FOR EACH PUMP.
8. THE TURBINE SPEED CONTROL IS TYPICAL. ACTUAL IMPLEMENTATION MAY NOT INCLUDE SPEED CONTROL.
9. 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 STARTING TIME REQUIREMENTS FOR THIS SYSTEM.

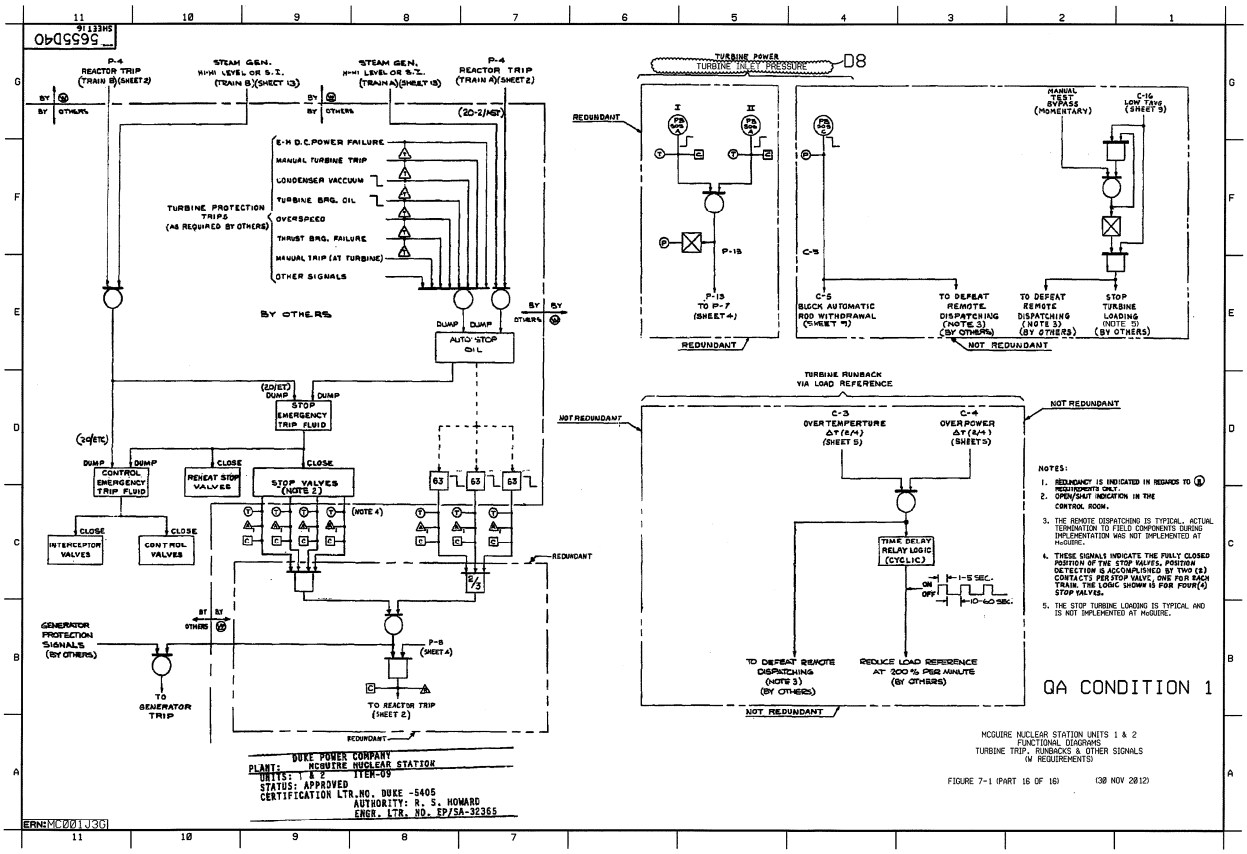
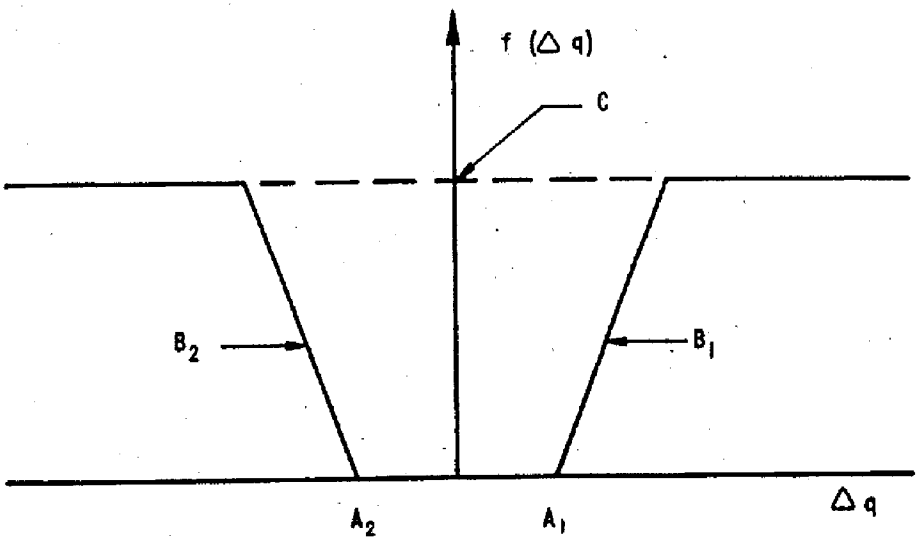

P-4 REACTOR TRIP (TRAIN B)(SHEET 2)
STEAM GEN. HIGH LEVEL OR S.I. (TRAIN B)(SHEET 13)
STEAM GEN. HIGH LEVEL OR S.I. (TRAIN A)(SHEET 13)
P-4 REACTOR TRIP (TRAIN A)(SHEET 2)
(2O-2/MSF)
E-H D.C. POWER FAILURE
MANUAL TURBINE TRIP
LOW CONDENSER VACUUM
TURBINE BRG. OIL
OVERSPEED
THRUST BRG. FAILURE
MANUAL TRIP (AT TURBINE)
OTHER SIGNALS
TURBINE PROTECTION TRIPS (AS REQUIRED BY OTHERS)
BY OTHERS
AUTO STOP OIL
STOP EMERGENCY TRIP FLUID
CONTROL EMERGENCY TRIP FLUID
REHEAT STOP VALVES
STOP VALVES (NOTE 2)
INTERCEPTOR VALVES
CONTROL VALVES
(NOTE 4)
GENERATOR PROTECTION SIGNALS (BY OTHERS)
TO GENERATOR TRIP
P-8 (SHEET 4)
TO REACTOR TRIP (SHEET 2)
REDUNDANT
TURBINE POWER
TURBINE INLET PRESSURE
D8
P-13
TO P-7 (SHEET 4)
C-5 BLOCK AUTOMATIC ROD WITHDRAWAL (SHEET 4)
TO DEFEAT REMOTE DISPATCHING (NOTE 3) (BY OTHERS)
TO DEFEAT REMOTE DISPATCHING (NOTE 3) (BY OTHERS)
STOP TURBINE LOADING (NOTE 5) (BY OTHERS)
MANUAL TEST BYPASS (MOMENTARY)
C-16 LOW TAVG (SHEET 5)
NOT REDUNDANT
TURBINE RUNBACK VIA LOAD REFERENCE
C-3 OVER TEMPERTURE ΔT (4/4) (SHEET 5)
C-4 OVER POWER ΔT (4/4) (SHEET 5)
TIME DELAY RELAY LOGIC (CYCLIC)
ON 1-5 SEC.
OFF 10-60 SEC.
TO DEFEAT REMOTE DISPATCHING (NOTE 3) (BY OTHERS)
REDUCE LOAD REFERENCE AT 200% PER MINUTE (BY OTHERS)
NOTES:
1. REDUNDANCY IS INDICATED IN REGARDS TO (R) MEASUREMENTS ONLY.
2. OPEN/SHUT INDICATION IN THE CONTROL ROOM.
3. THE REMOTE DISPATCHING IS TYPICAL. ACTUAL TERMINATION TO FIELD COMPONENTS DURING IMPLEMENTATION WAS NOT IMPLEMENTED AT McGUIRE.
4. THESE SIGNALS INDICATE THE FULLY CLOSED POSITION OF THE STOP VALVES. POSITION DETECTION IS ACCOMPLISHED BY TWO (2) CONTACTS PER STOP VALVE, ONE FOR EACH TRAIN. THE LOGIC SHOWN IS FOR FOUR(4) STOP VALVES.
5. THE STOP TURBINE LOADING IS TYPICAL AND IS NOT IMPLEMENTED AT McGUIRE.
QA CONDITION 1
DUKE POWER COMPANY
PLANT: McGUIRE NUCLEAR STATION
UNITS: 1 & 2
STATUS: APPROVED
CERTIFICATION LTR.NO. DUKE -5405
AUTHORITY: R. S. HOWARD
ENGR. LTR. NO. EP/SA-32365
McGUIRE NUCLEAR STATION UNITS 1 & 2
FUNCTIONAL DIAGRAMS
TURBINE TRIP, RUNBACKS & OTHER SIGNALS
(W REQUIREMENTS)
FIGURE 7-1 (PART 16 OF 16) (30 NOV 2012)
ERN:MC001J3G

Figure 7-2. Setpoint Reduction Function for Overpower and Overtemperature Δ Trips



Δq -NEUTRON FLUX DIFFERENCE BETWEEN UPPER AND LOWER LONG ION CHAMBERS

A_1, A_2 -LIMIT OF f (Δ q) DEADBAND

B_1, B_2 -SLOPE OF RAMP; DETERMINES RATE AT WHICH FUNCTION REACHES IT'S MAXIMUM VALUE ONCE DEADBAND IS EXCEEDED

C -MAGNITUDE OF MAXIMUM VALUE THE FUNCTION MAY ATTAIN

Figure 7-3. Typical Illustration of High Δ Trip. (ΔT°F Tavg)

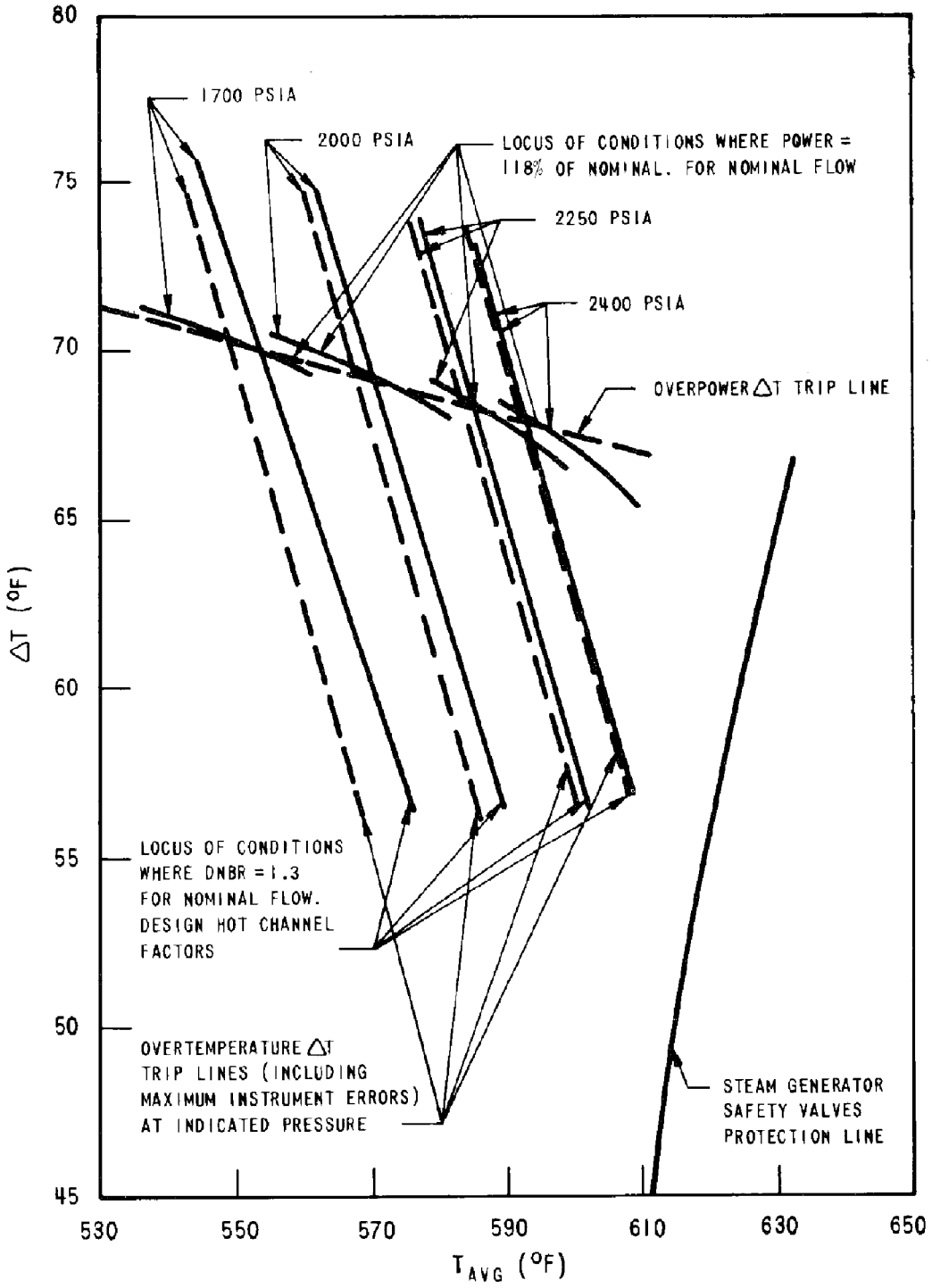


Figure 7-4. Design to Achieve Isolation Between Channels

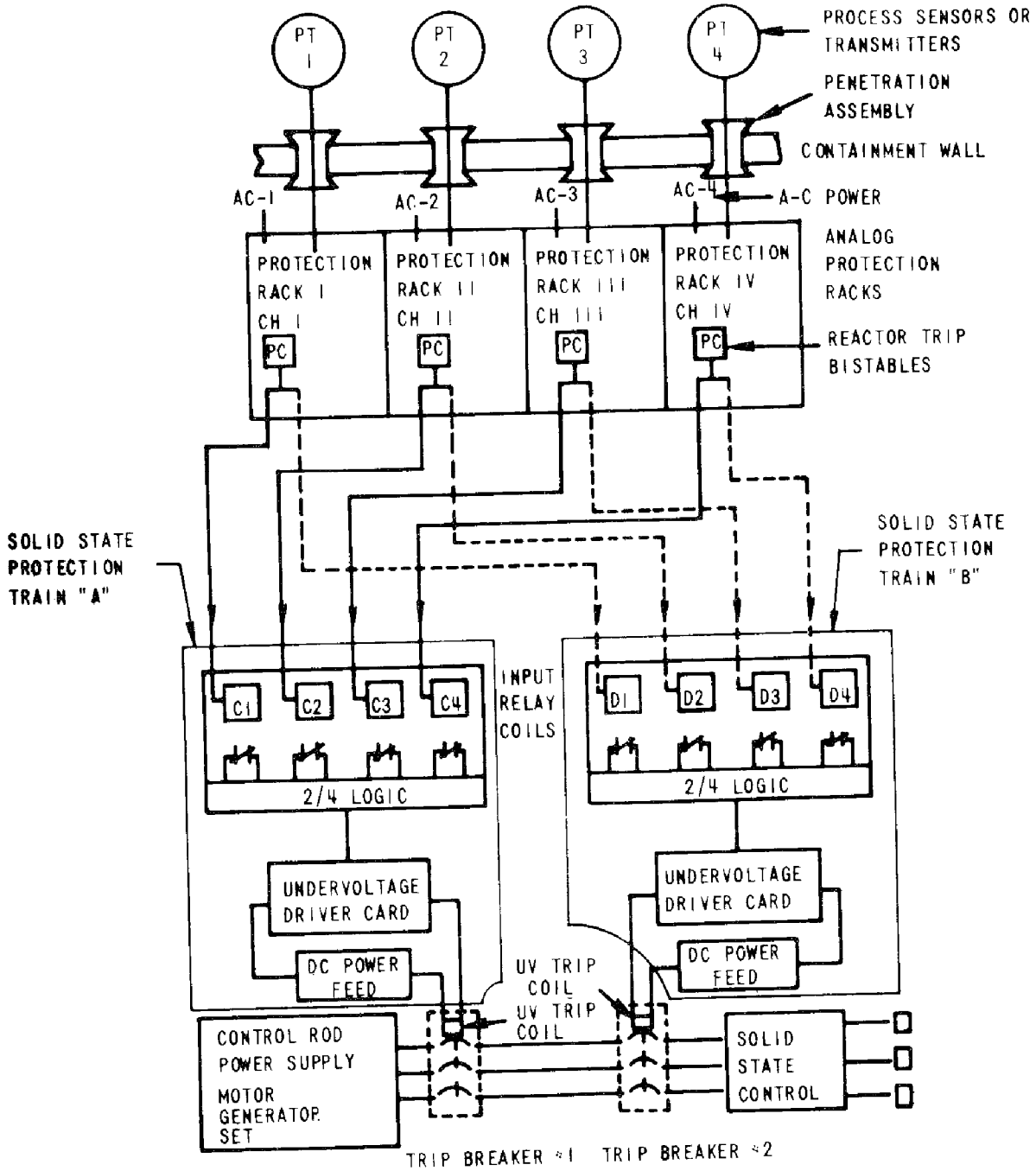
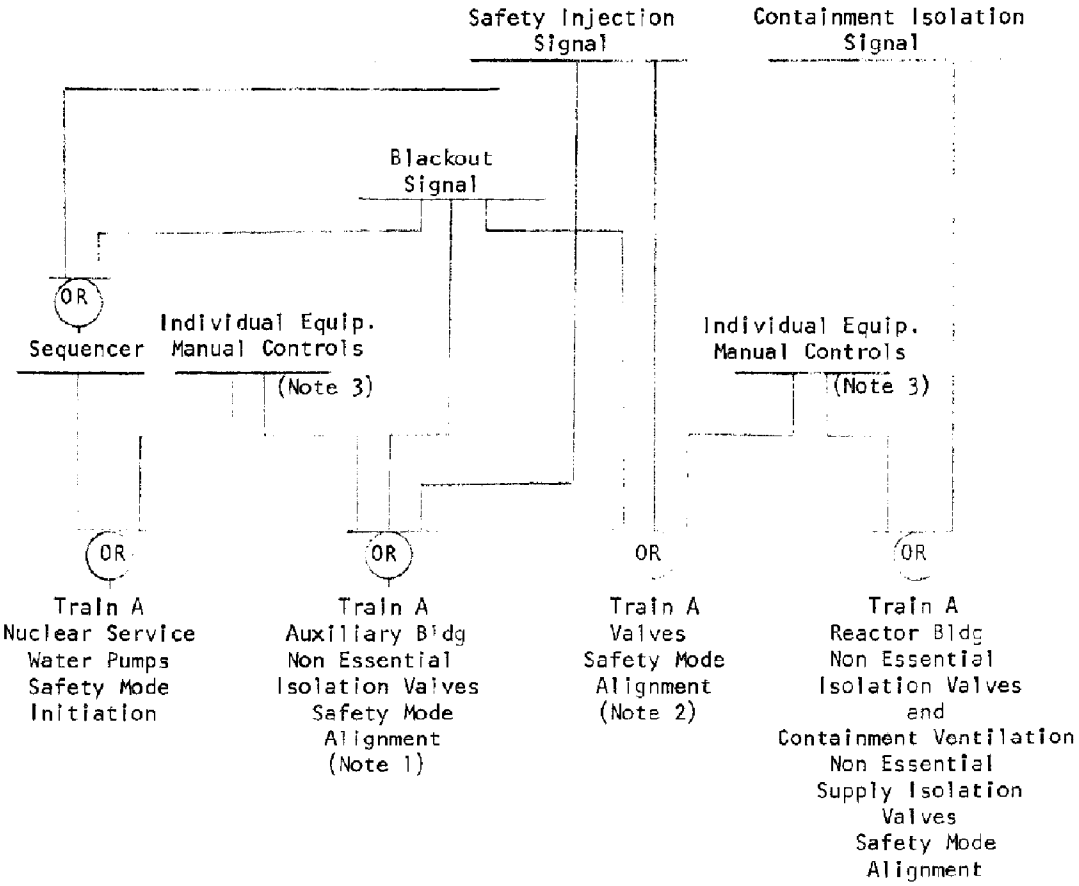


Figure 7-6. Logic Diagram Nuclear Service Water System



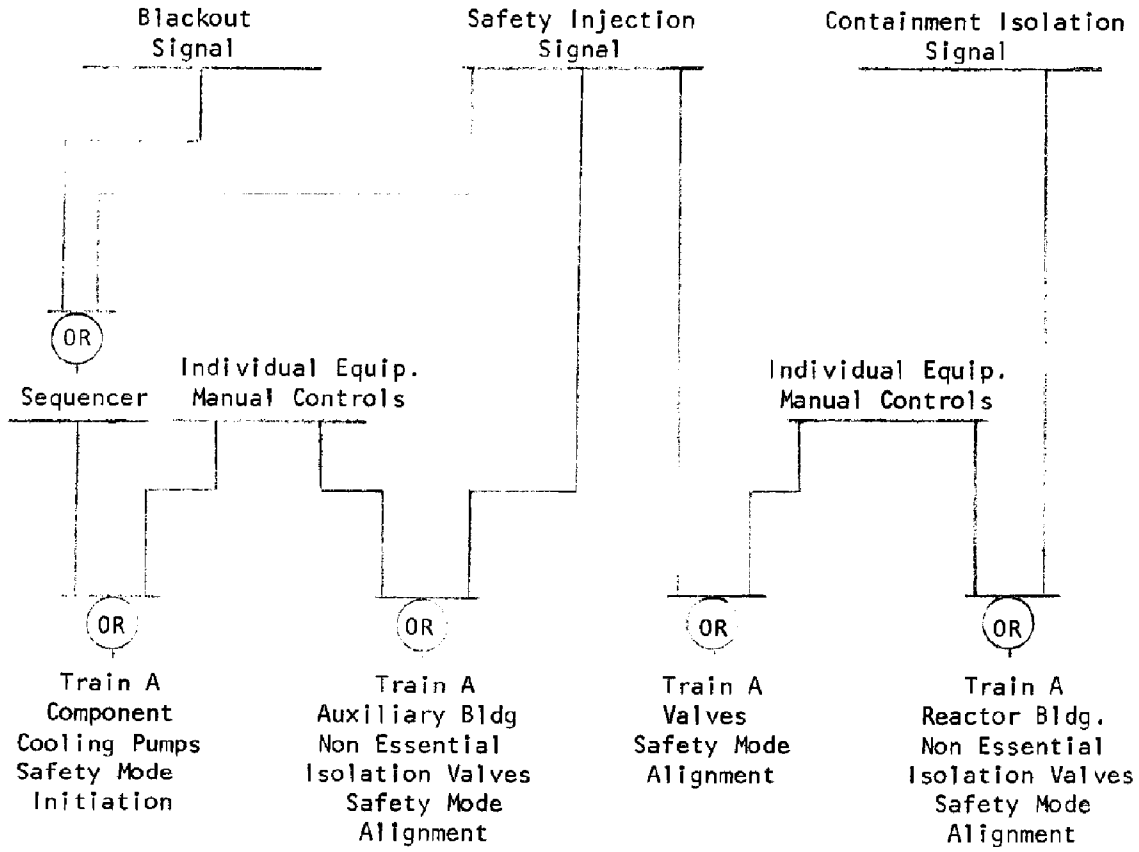
(Train B Similar)

Note 1 - Auxiliary Bldg. Supply isolation valve does not receive blackout signal in order to supply cooling water to containment ventilation system during blackout.

Note 2 - Crossover valves do not receive blackout signal.

Note 3 - A separate manual control switch is provided for each pump and valve which receives a safety injection or containment isolation signal. Each such device is controlled independently of any others in the manual mode. Capability for simultaneous manual actuation of all devices by a single control switch is not provided or implied.

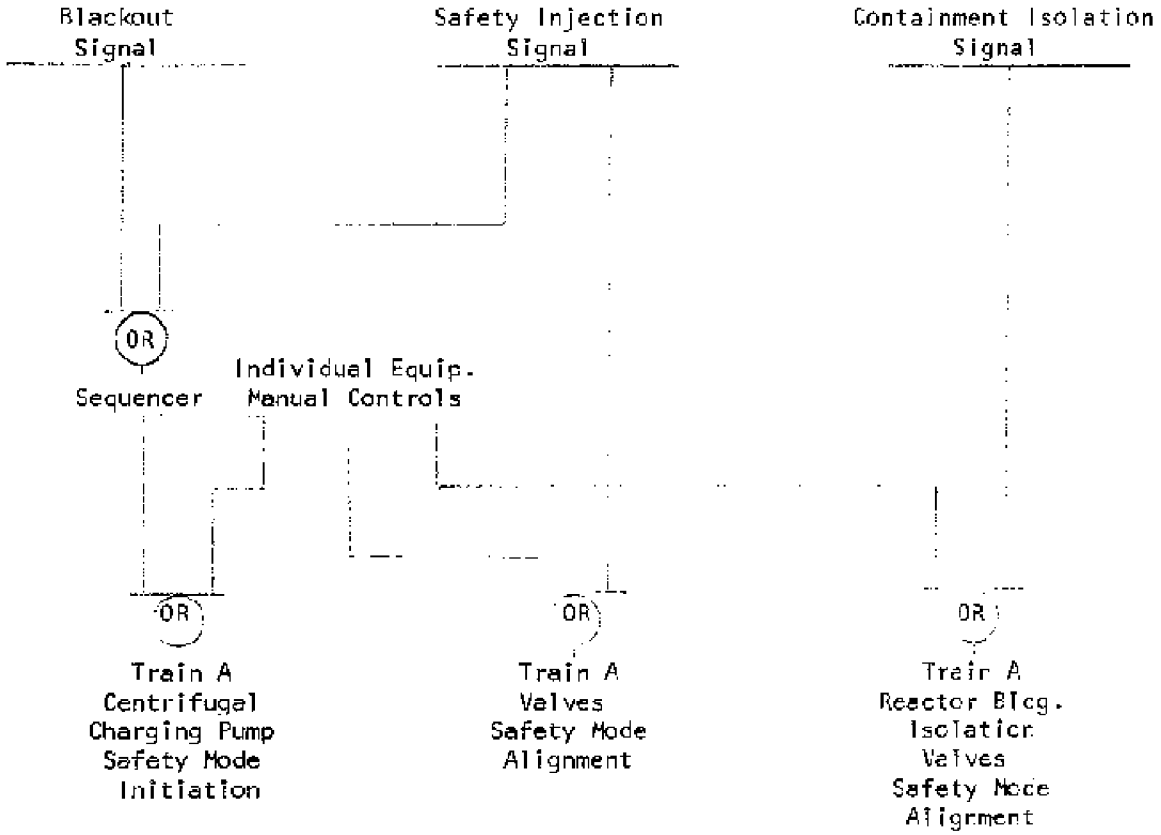
Figure 7-7. Logic Diagram Component Cooling Water System



(Train B Similar)

NOTE: A separate manual control switch is provided for each pump and valve which receives a safety injection or containment isolation signal. Each such device is controlled independently of any others in the manual mode. Capability for simultaneous manual actuation of all devices by a single control switch is not provided or implied.

Figure 7-8. Logic Diagram Chemical and Volume Control System



(Train B Similar)

NOTE: A separate manual control switch is provided for each pump and valve which receives a safety injection or containment isolation signal. Each such device is controlled independently of any others in the manual mode. Capability for simultaneous manual actuation of all devices by a single control switch is not provided or implied.

Figure 7-9. Logic Diagram Residual Heat Removal System

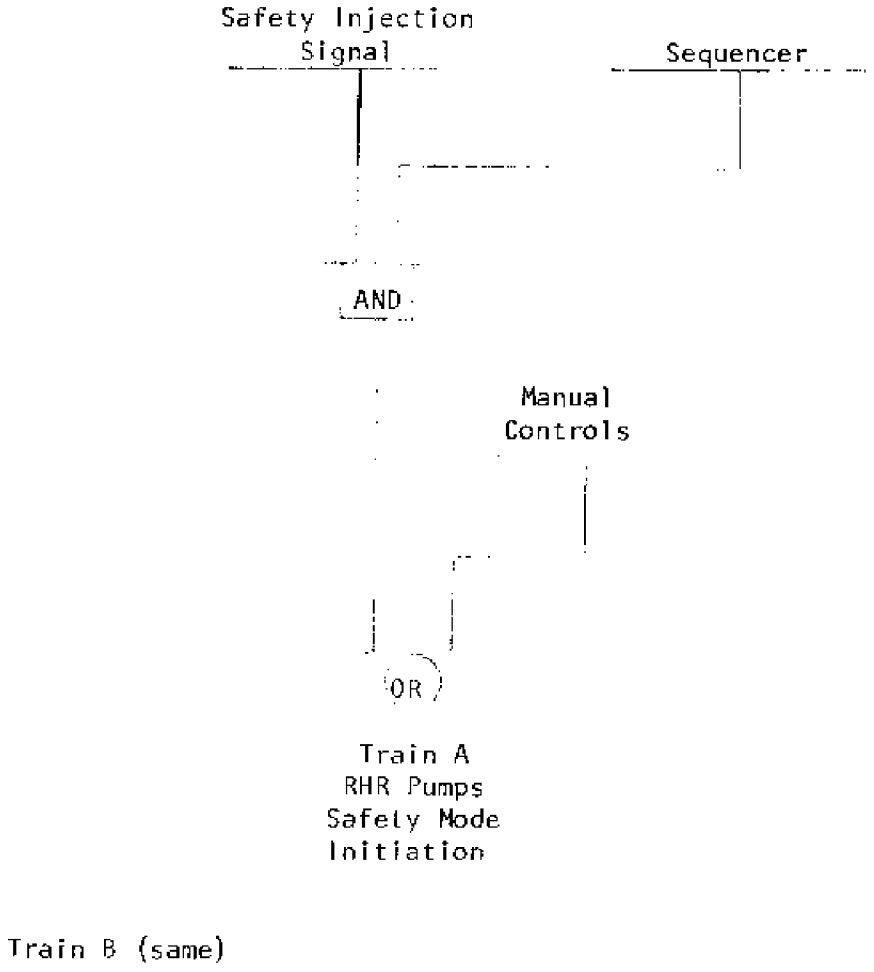


Figure 7-10. Deleted Per 1996 Update

Figure 7-11. Deleted Per 1996 Update

Figure 7-12. Logic Diagram - Annulus Vent System

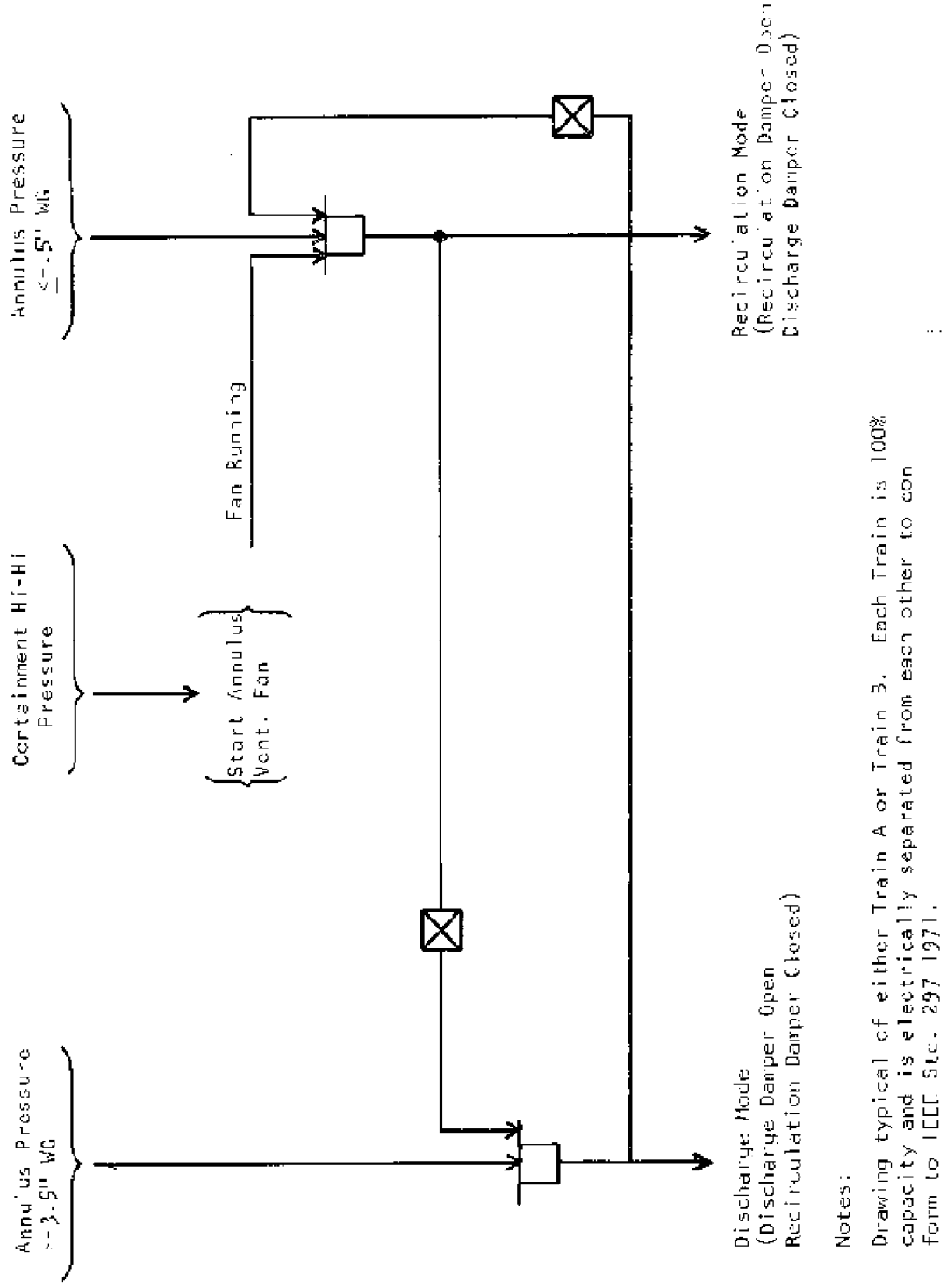


Figure 7-13. Door Monitoring Zones

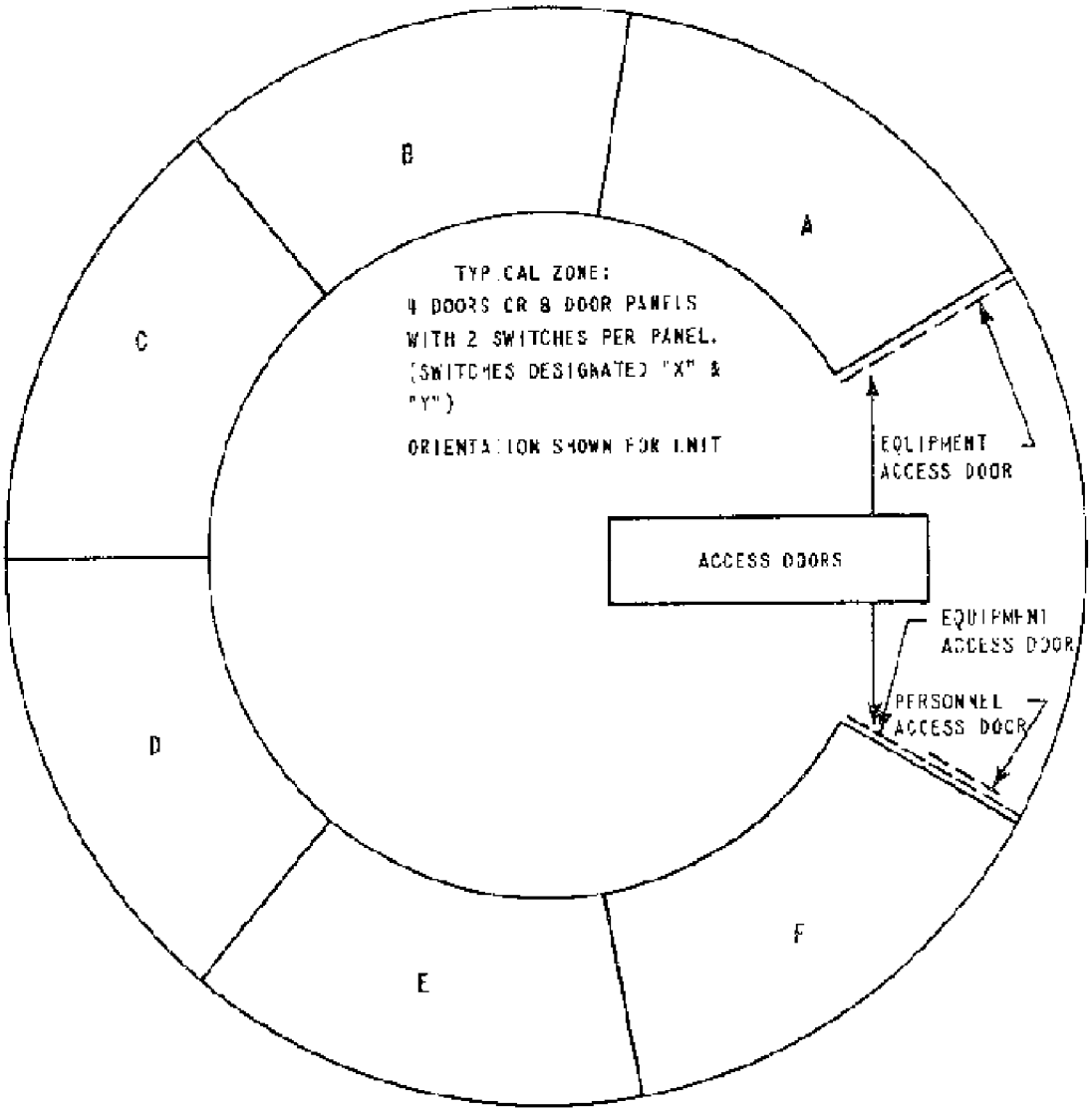


Figure 7-14. Logic Diagram - Lower Inlet Doors

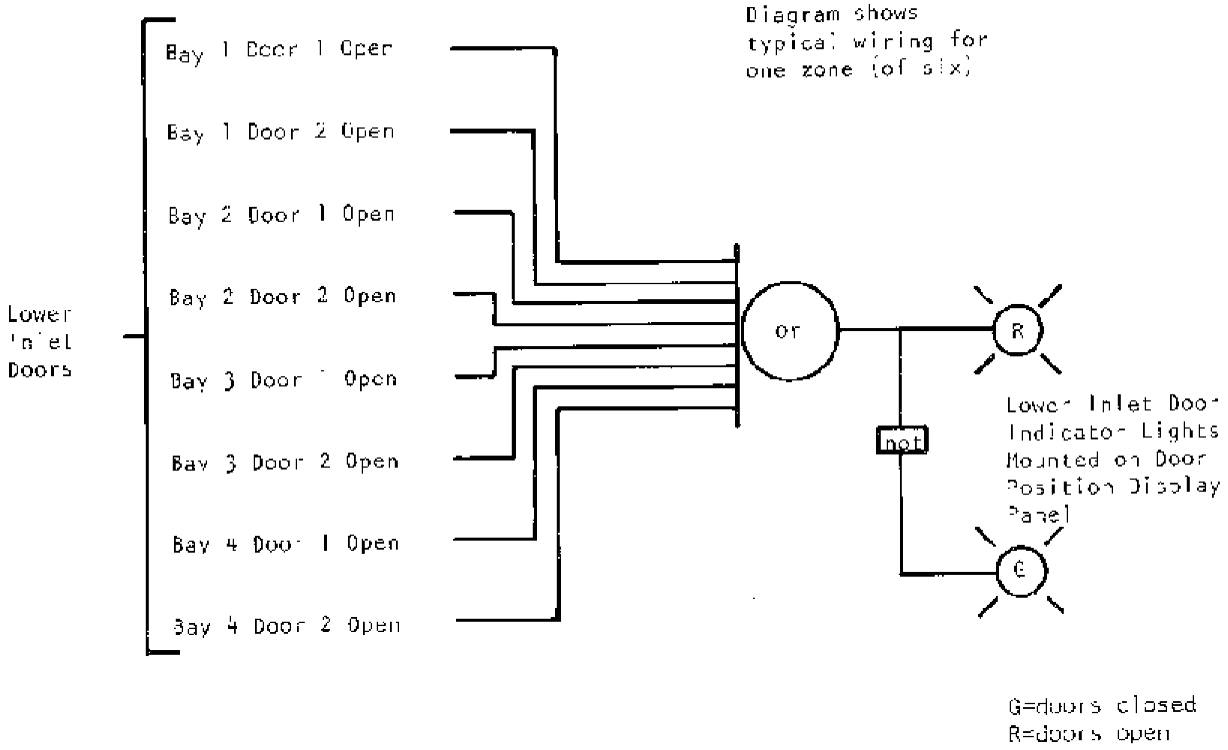
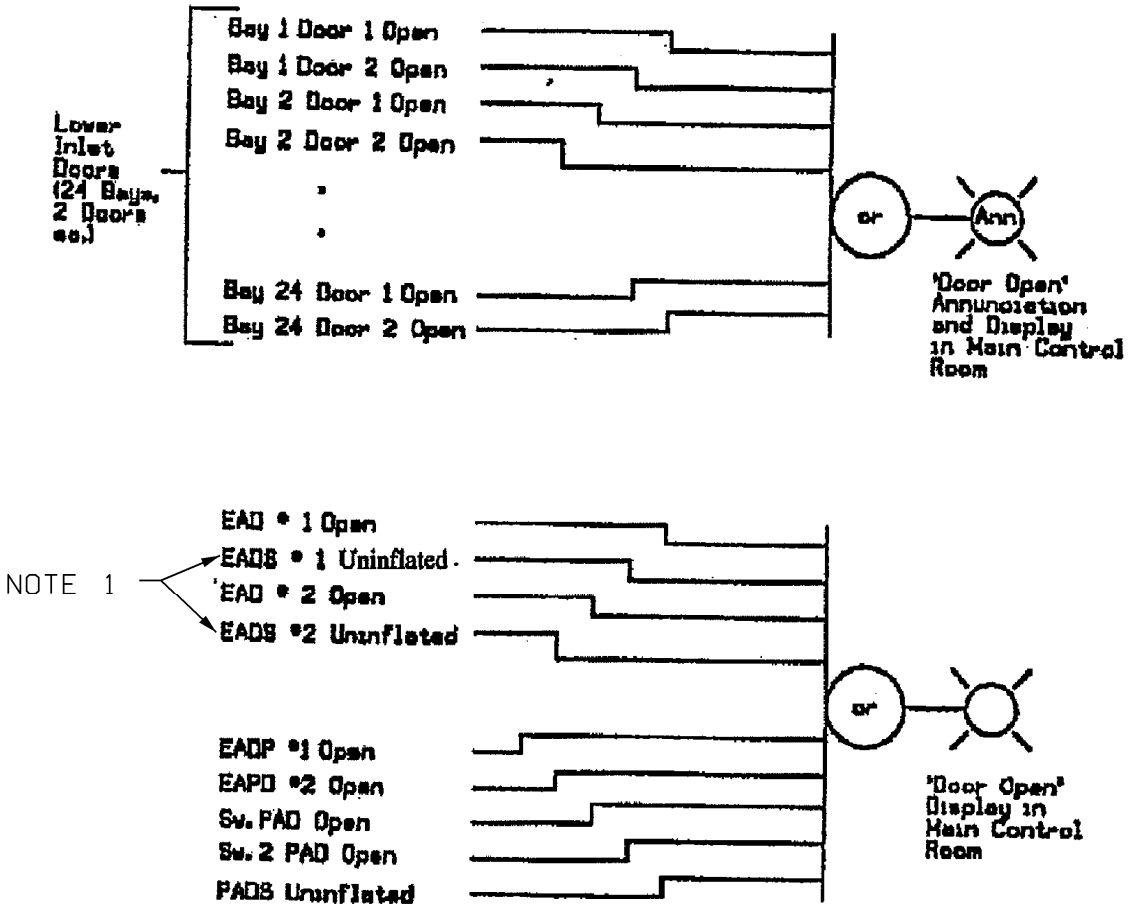


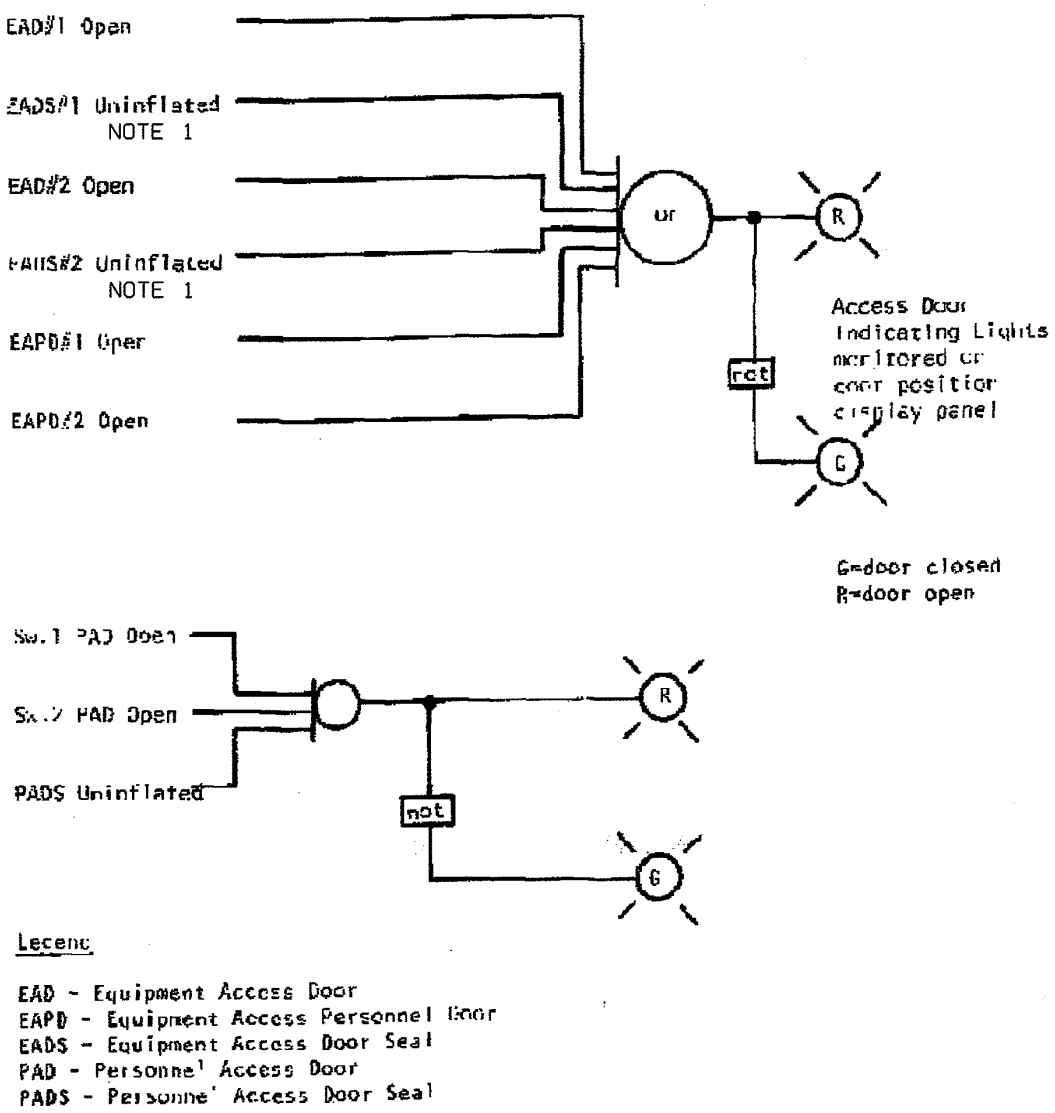
Figure 7-15. Logic Diagram: Lower Inlet Doors, Personnel Access Doors, Equipment Access Doors and Equipment Access Personnel Doors



NOTE 1:

THE EQUIPMENT ACCESS DOOR SEALS (EADS) HAVE BEEN MODIFIED SO T
THE EQUIPMENT ACCESS DOORS ARE PERMANENTLY IN THE CLOSED POS
WITH THE EQUIPMENT ACCESS DOOR SEALS DEFLATED. THEREFORE, T
INDICATION HAS BEEN REWIRED TO REMOVE THE EQUIPMENT ACCESS DO
SEAL (EADS) ALARM PORTION FROM THE REST OF THE CIRCUITRY.

Figure 7-16. Logic Diagram: Equipment Access and Equipment Access Personnel Doors



Note 1: The Equipment Access Door Seals (EADS) have been modified so that the Equipment Access Doors are permanently in the closed position with the Equipment Access Door seals deflated. Therefore, the alarm indication has been rewired to remove the Equipment Access Door Seal (EADS) alarm portion from the rest of the circuitry.

Figure 7-17. Ice Condenser RTD Location

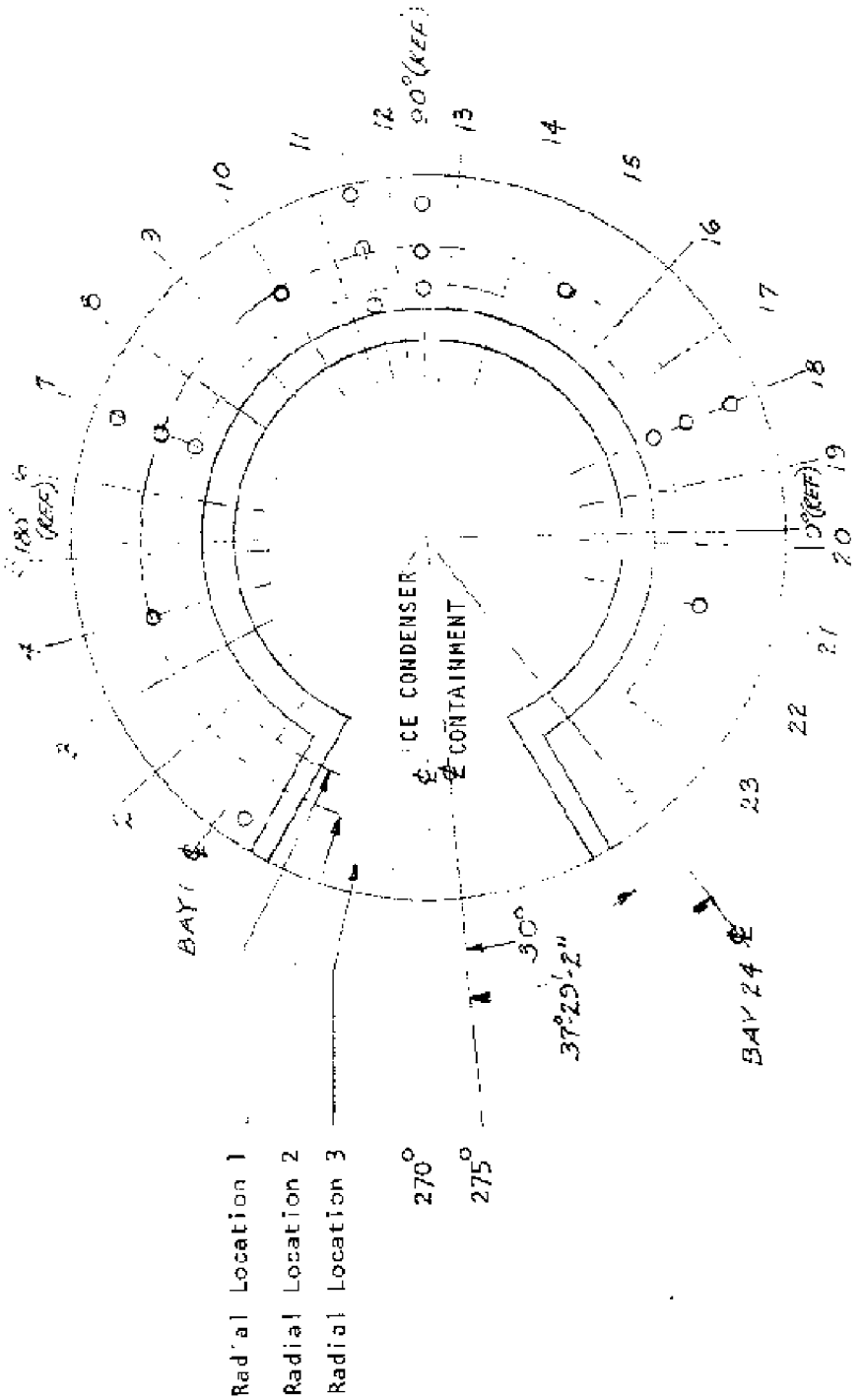


Figure 7-18. Block Diagram: Ice Condenser Temperature Monitoring System

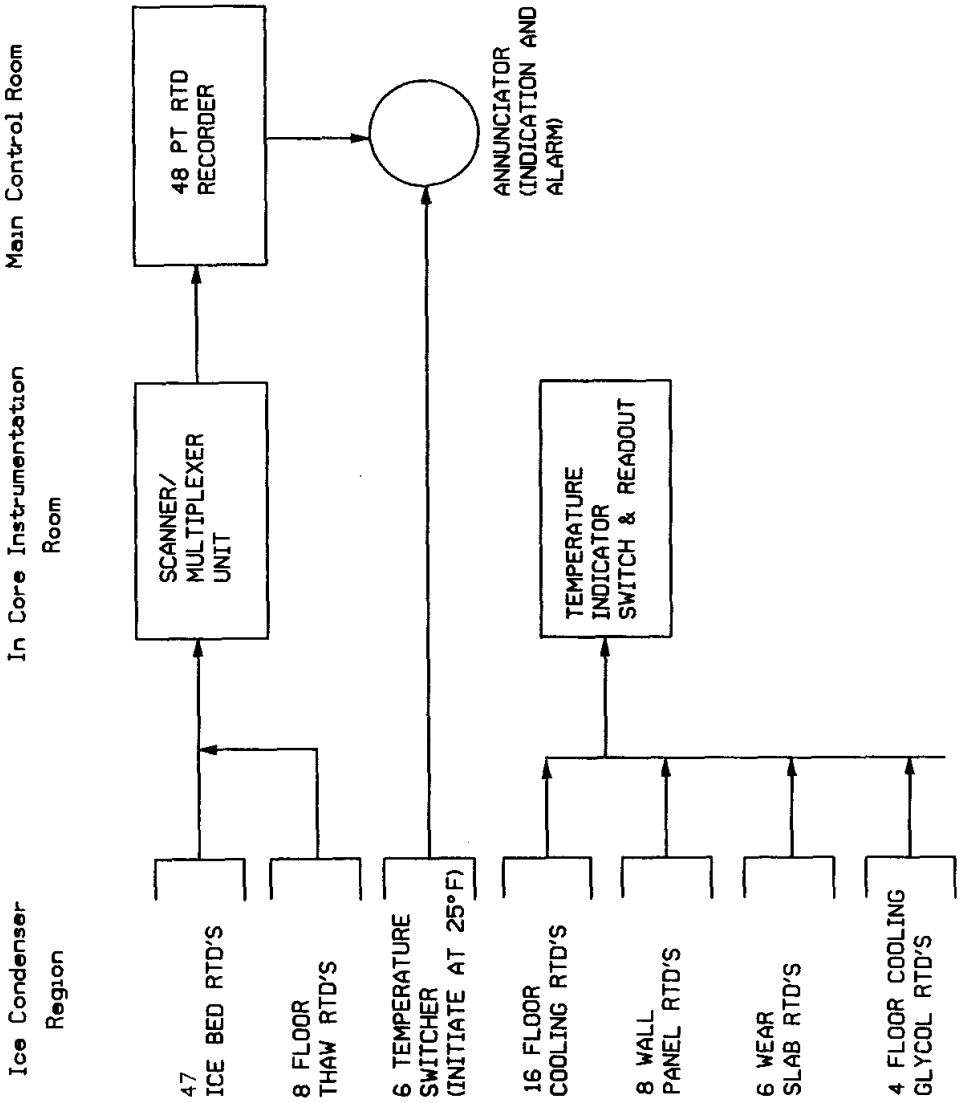


Figure 7-19. Containment Pressure Control System Logic

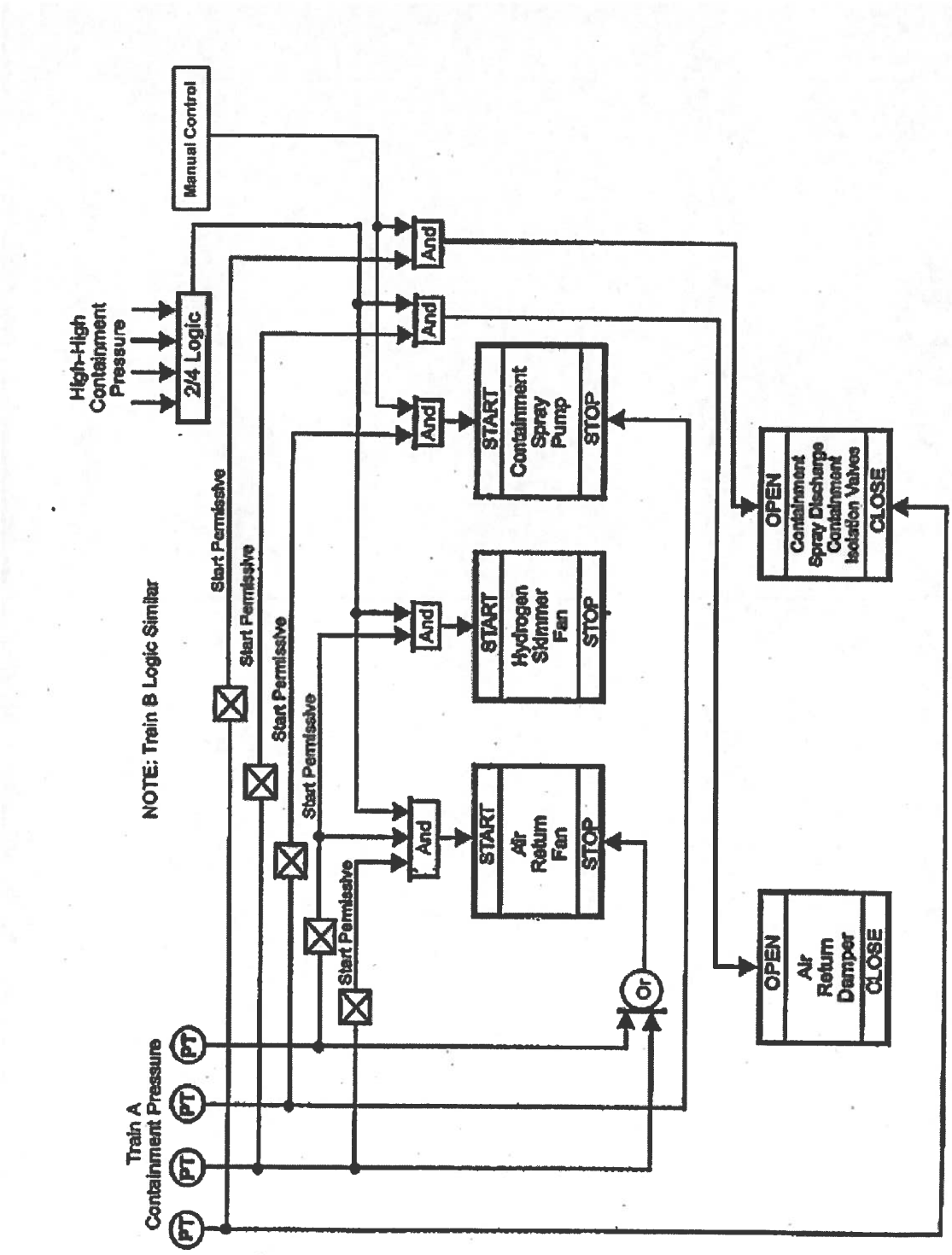


Figure 7-20. Reactor Coolant System Overpressure Protection - Train A

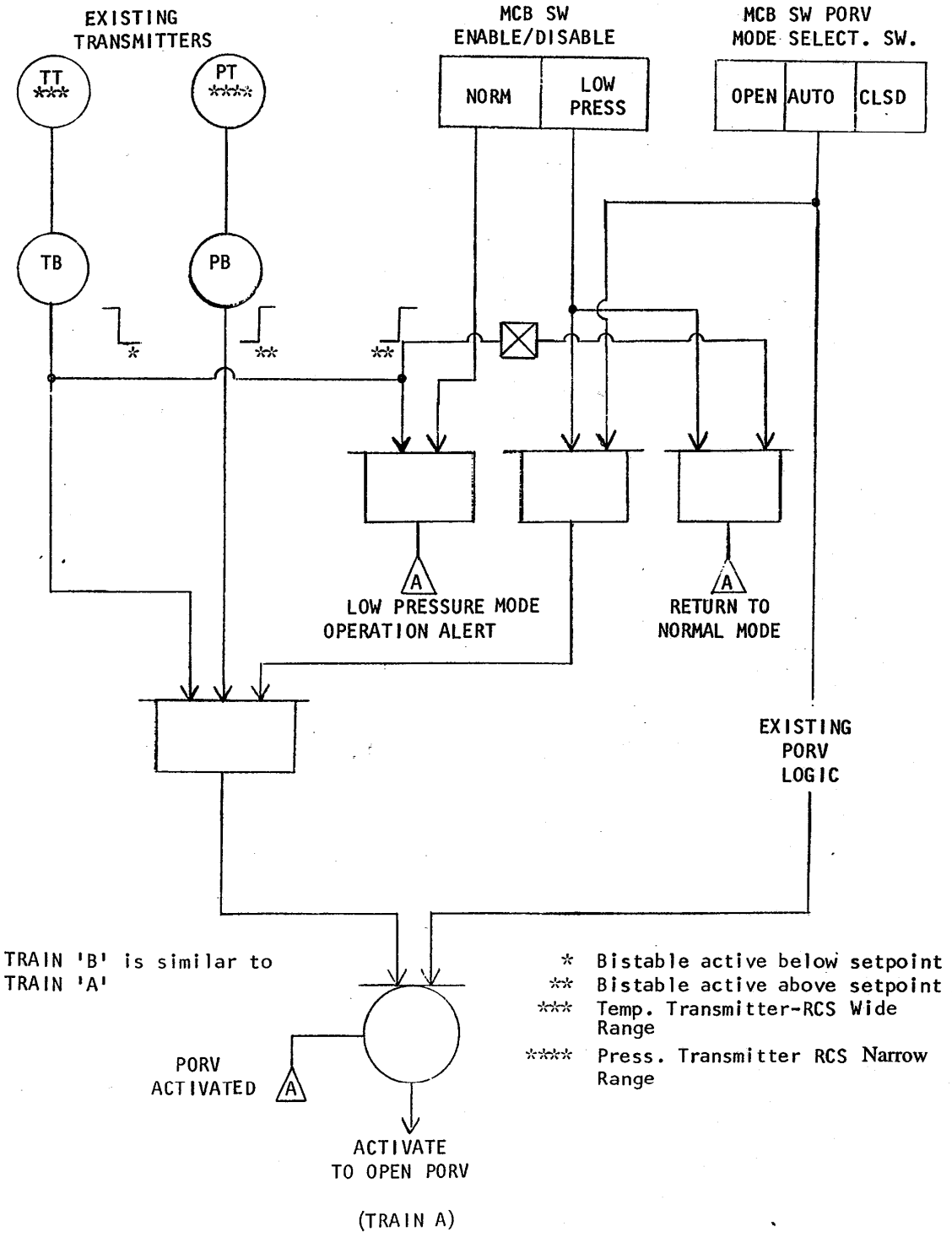


Figure 7-21. Simplified Block Diagram of Reactor Control System

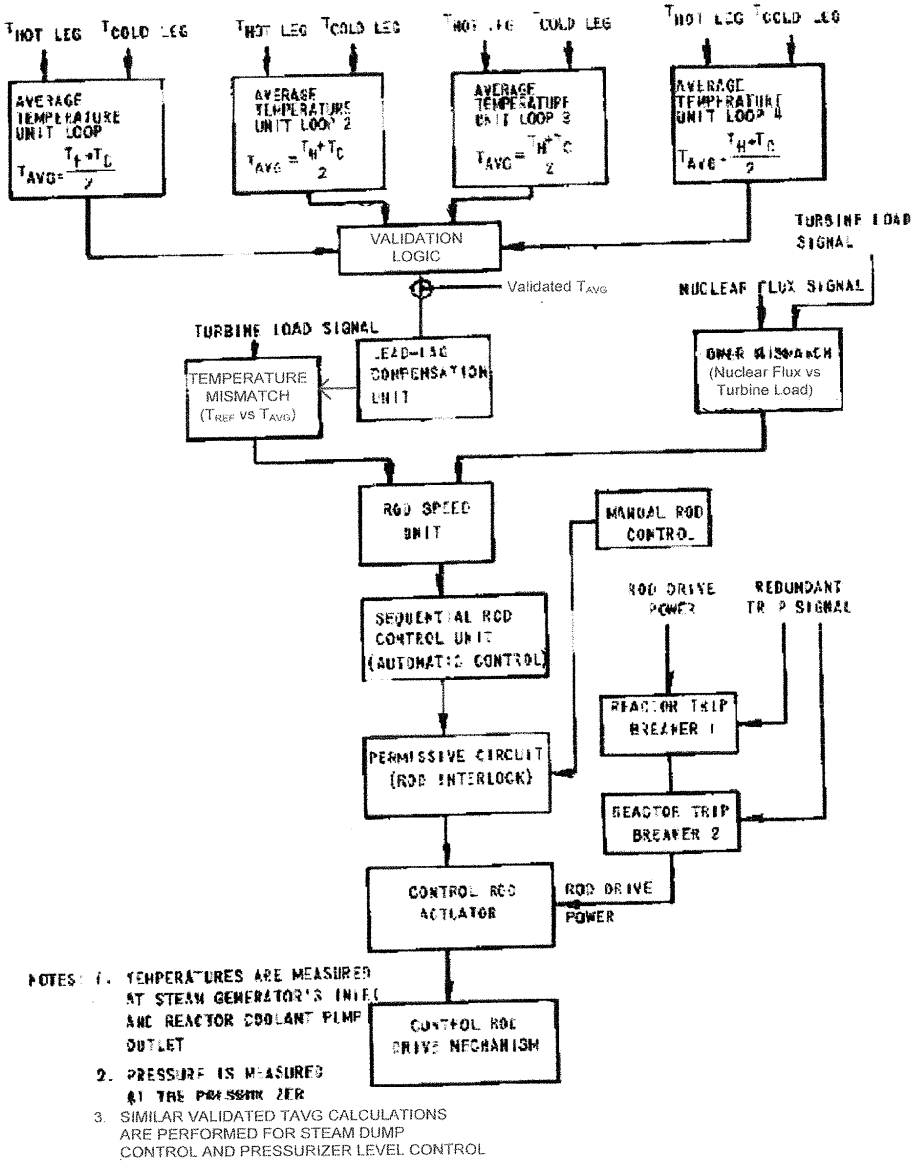


Figure 7-22. Deleted Per 2011 Update

Figure 7-23. Deleted Per 2011 Update

Figure 7-24. Deleted Per 2011 Update

Figure 7-25. Deleted Per 2011 Update

Figure 7-26. Deleted Per 2011 Update

Figure 7-24. Deleted Per 2011 Update

Figure 7-27. Basic Flux-Mapping System

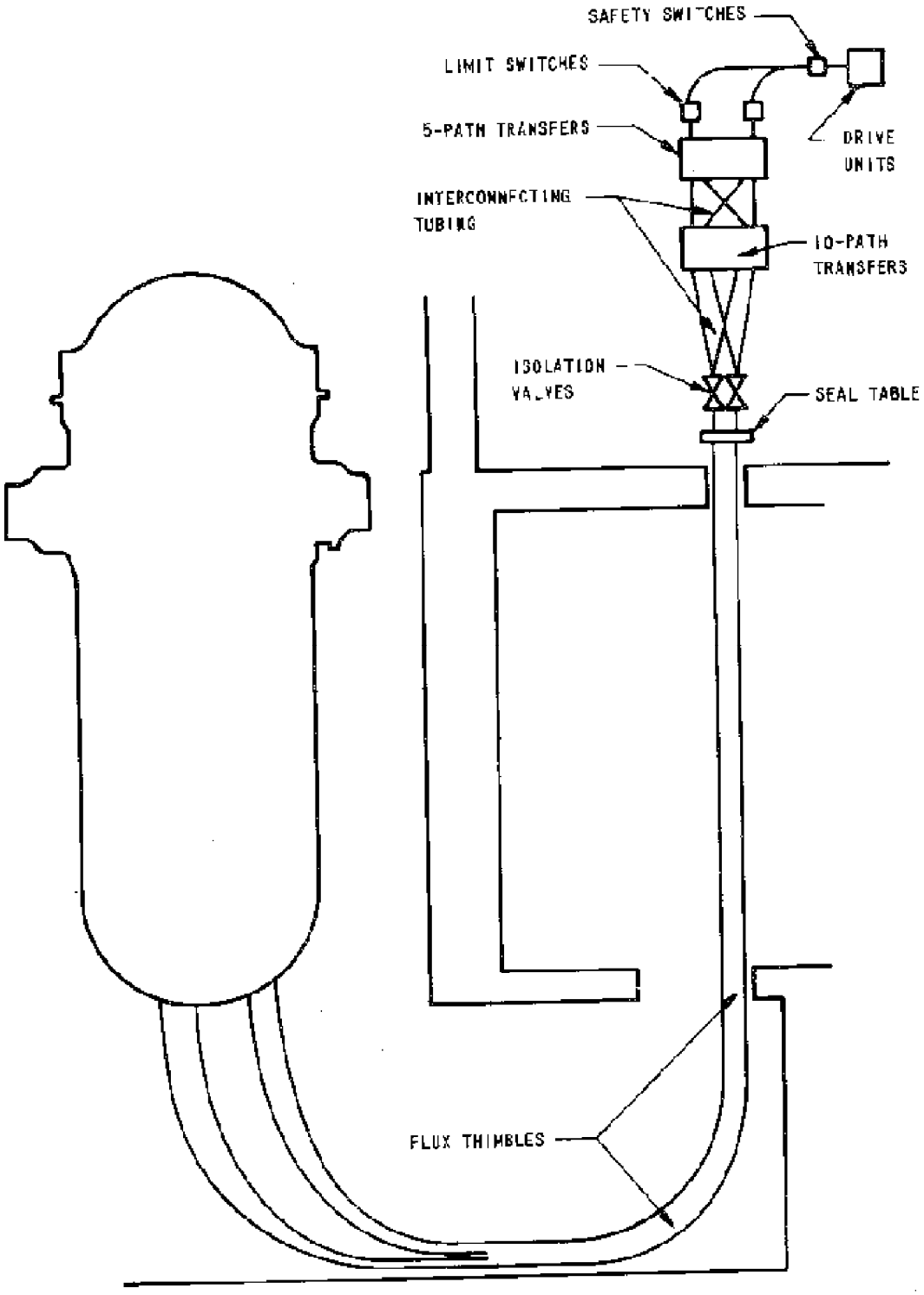


Figure 7-28. Deleted Per 1996 Update.

Figure 7-29. Control Room Layout

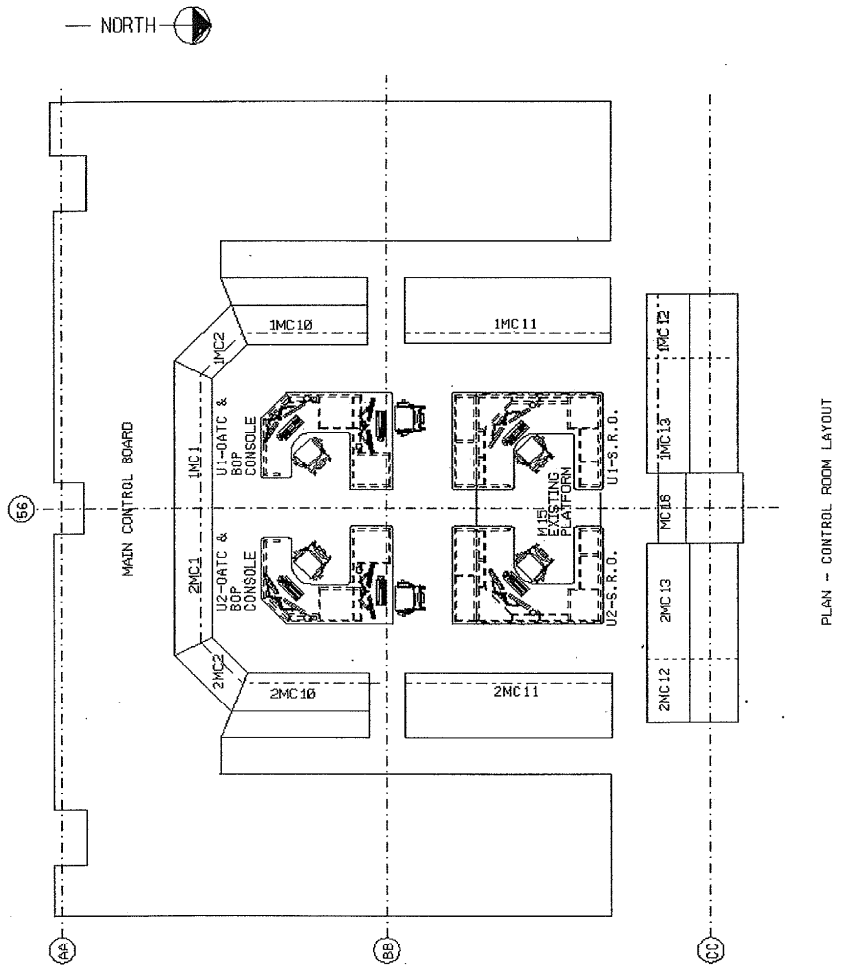


Figure 7-30. Rod Deviation Comparator

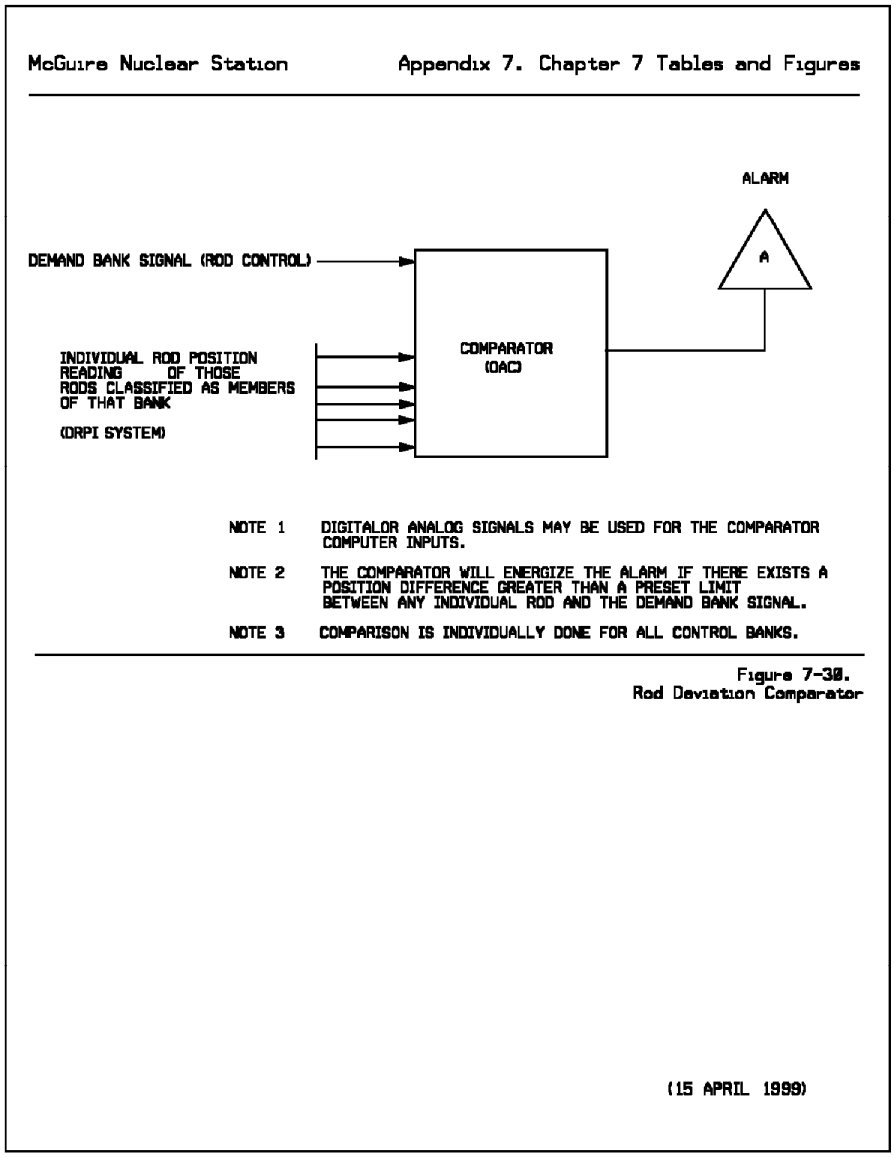
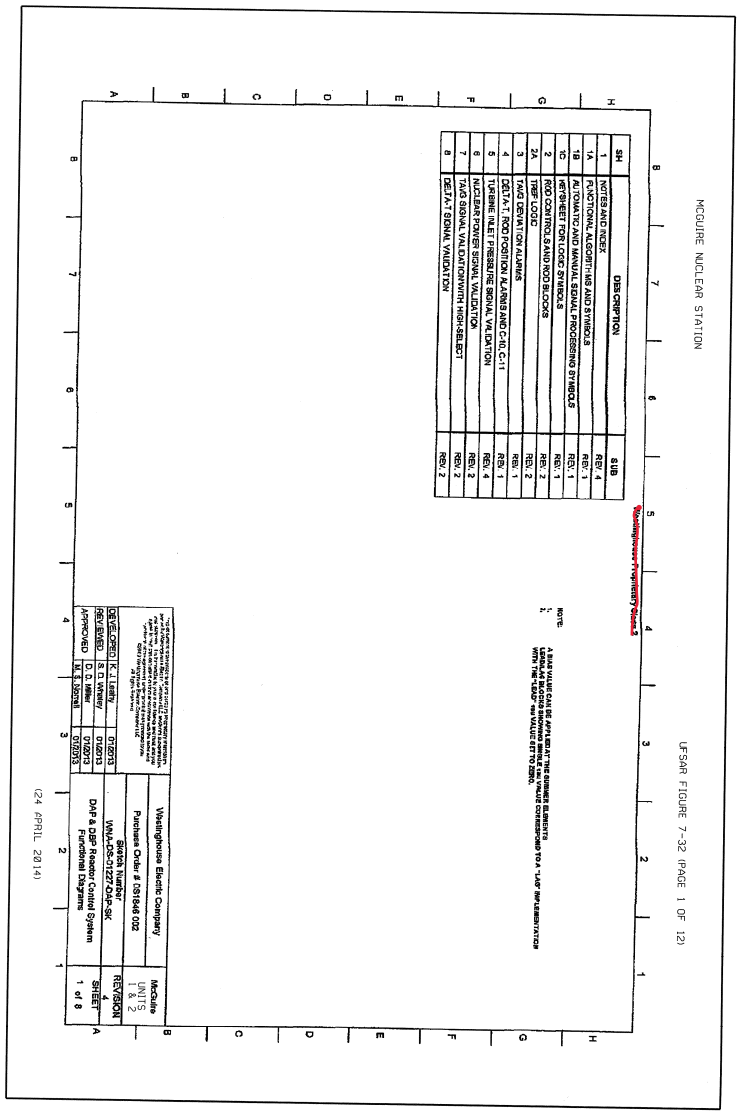
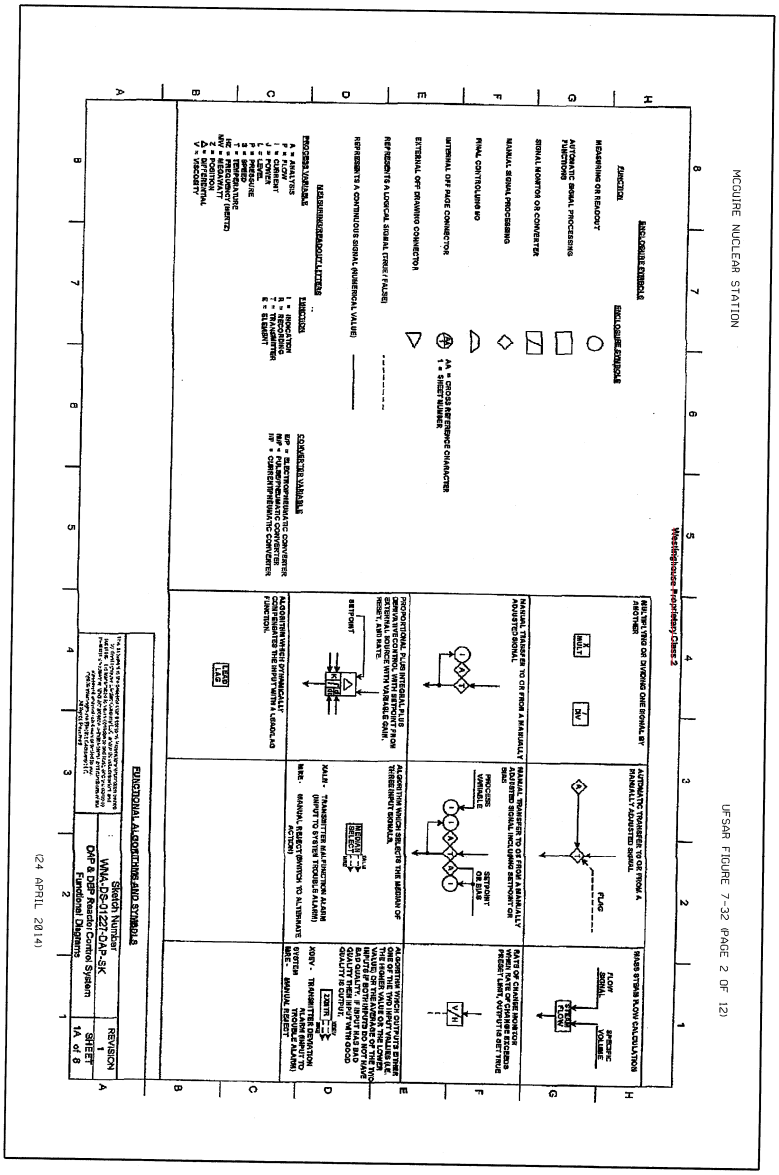
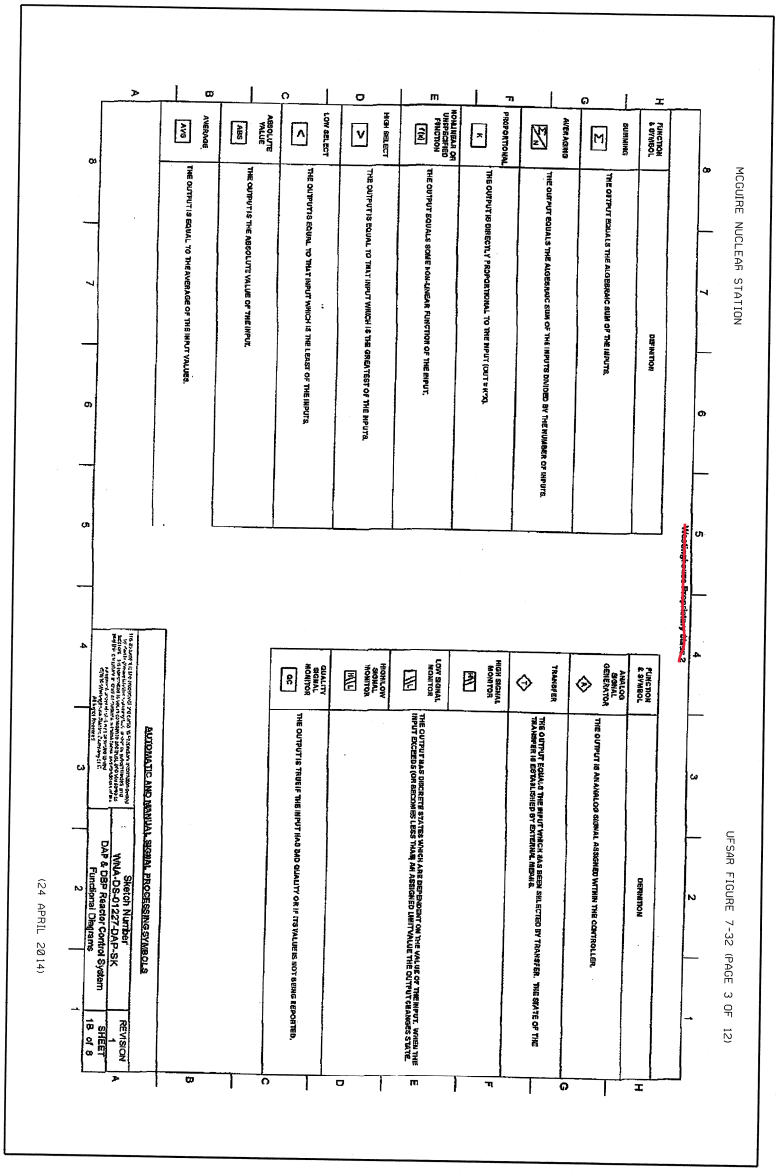


Figure 7-31. Deleted Per 2011 Update

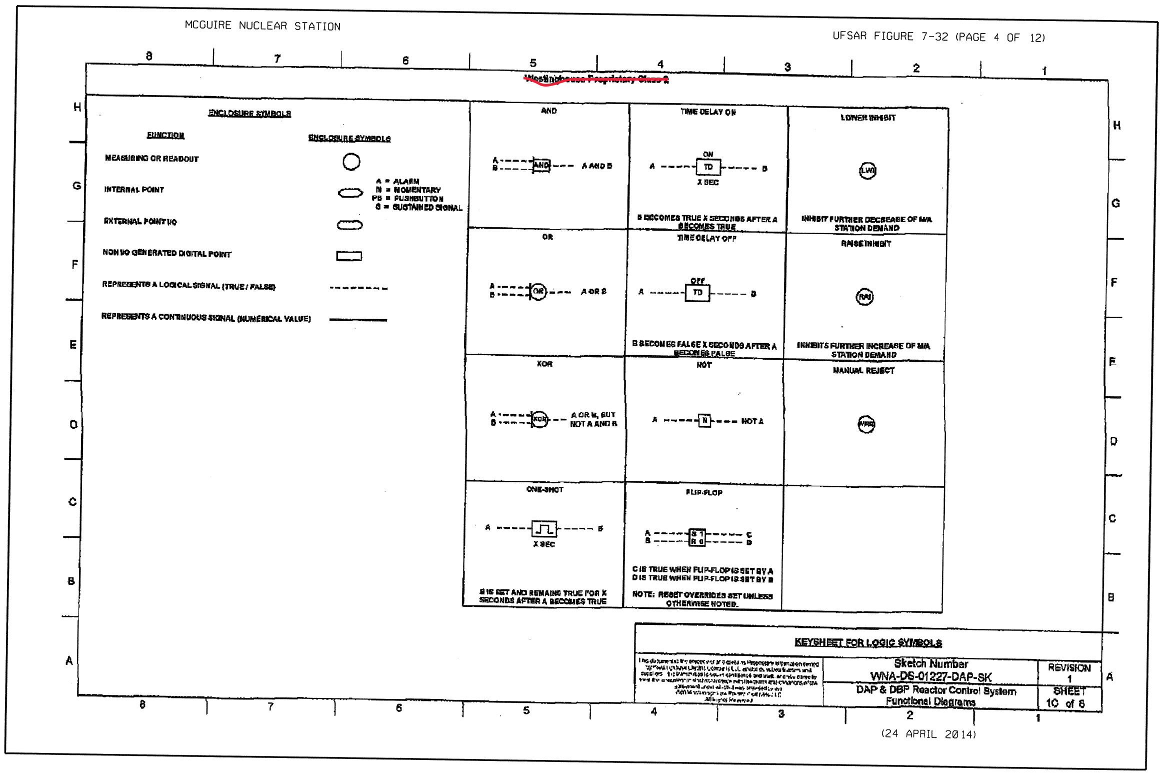
Figure 7-32. DAP & DBP Reactor Control System Functional Diagrams

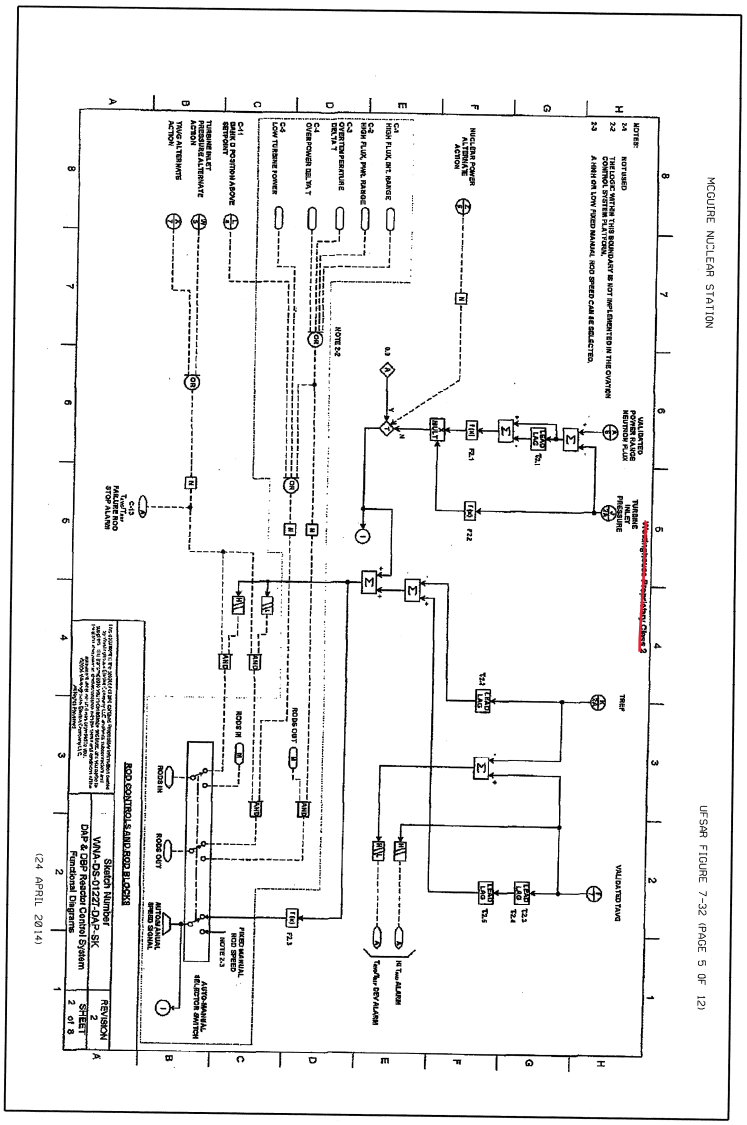


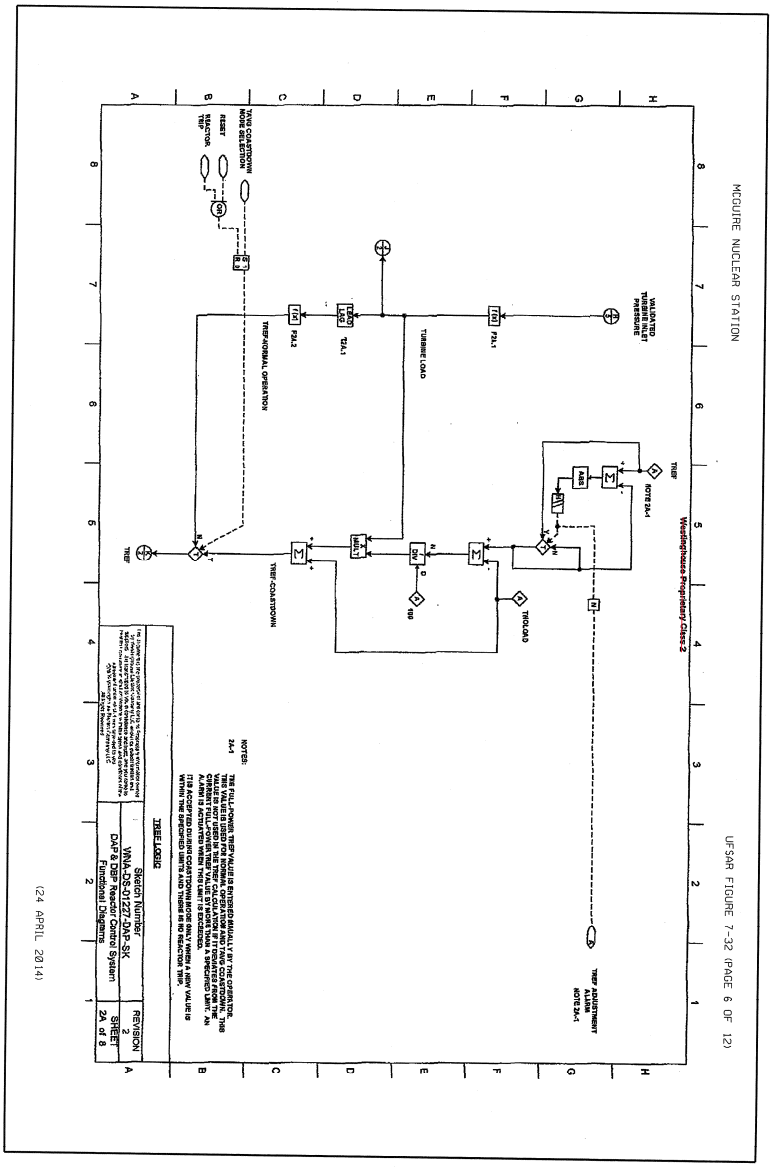

MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 2 OF 12)
Westinghouse Proprietary Class 3
FUNCTIONAL ALGORITHM AND SYMBOLS
Sketch Number
WMA-DS-01227-DAP-SK
REVISION
1
SHEET
1A of 8
DAP & DBP Reactor Control System
Functional Diagrams
(24 APRIL 2014)

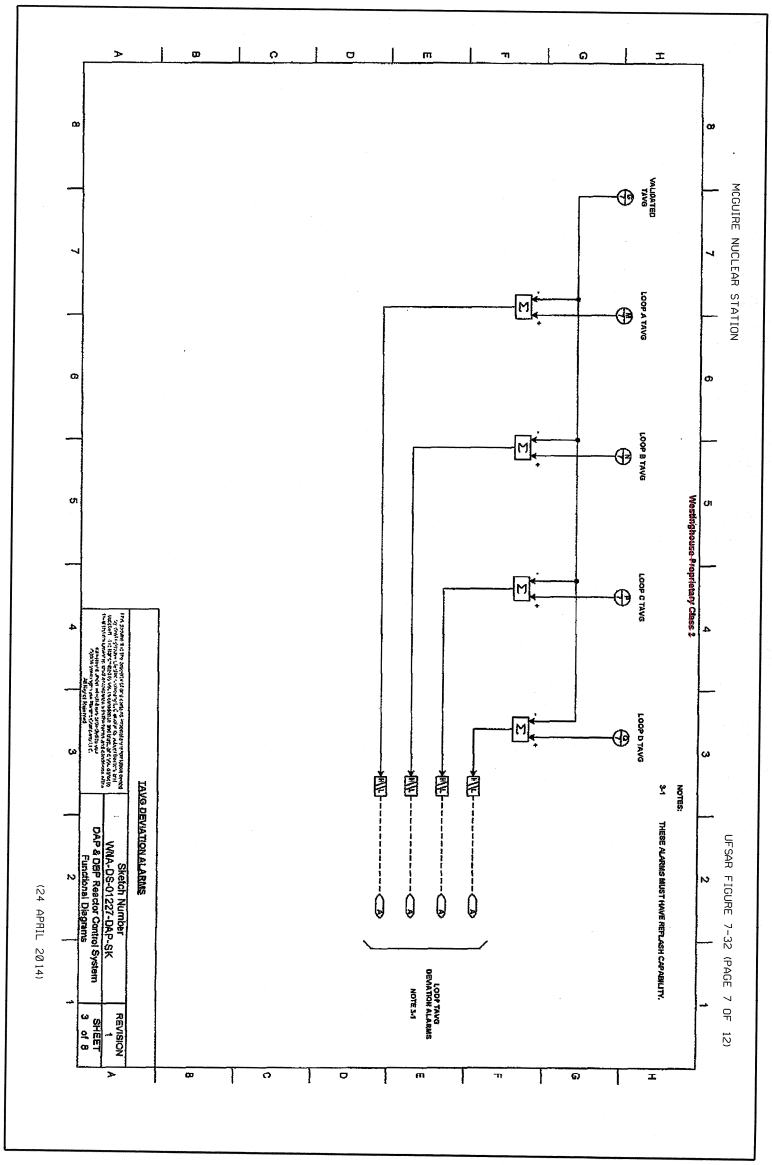

MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 3 OF 12)
AUTOMATIC AND MANUAL SIGNAL PROCESSING SYMBOLS
SHEET 18 of 8
(24 APRIL 2014)

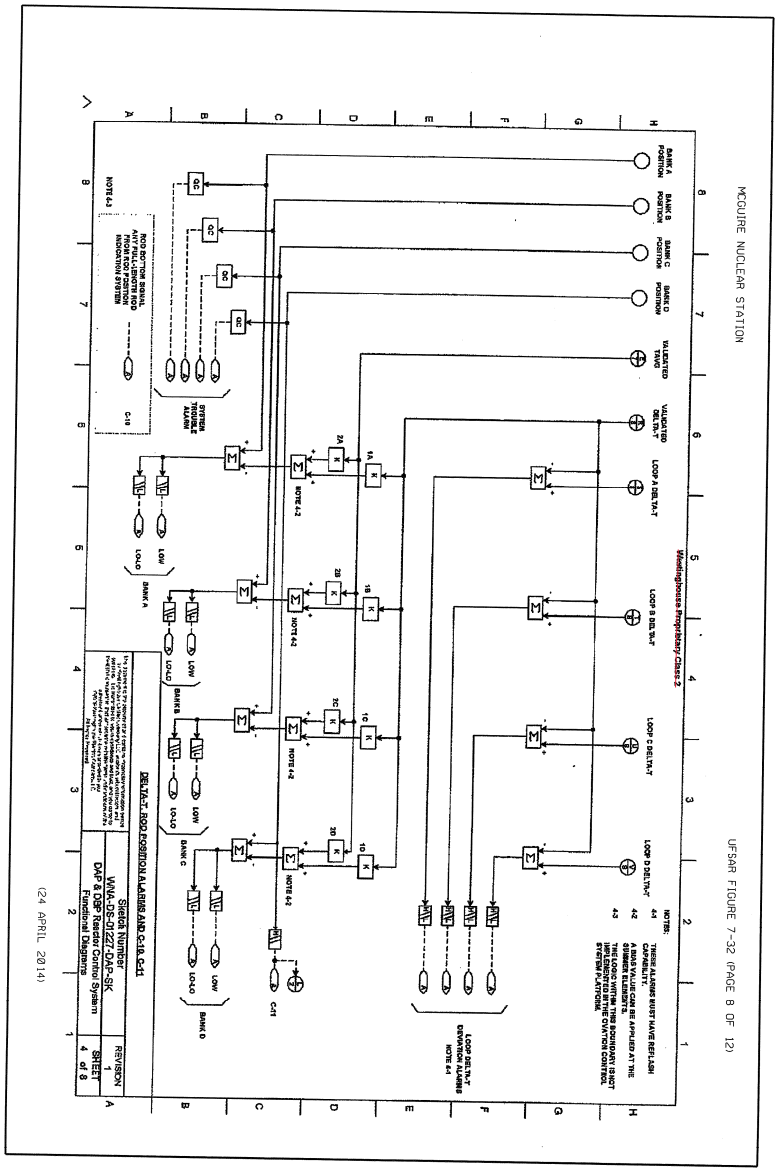
(24 APR 2014)

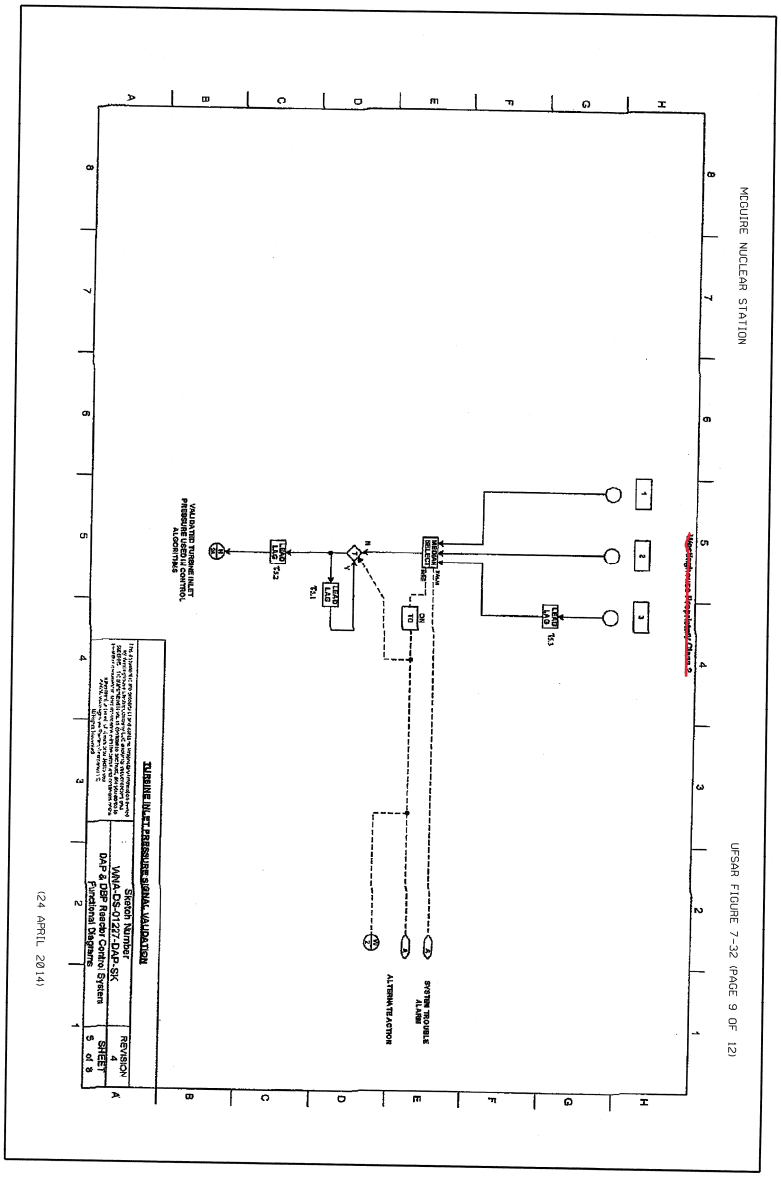

MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 4 OF 12)
ENCLOSURE SYMBOLS
FUNCTION
ENCLOSURE SYMBOLS
MEASURING OR READOUT
INTERNAL POINT
EXTERNAL POINT I/O
NON I/O GENERATED DIGITAL POINT
REPRESENTS A LOGICAL SIGNAL (TRUE / FALSE)
REPRESENTS A CONTINUOUS SIGNAL (NUMERICAL VALUE)
A = ALARM
M = MOMENTARY
PB = PUSHBUTTON
S = SUSTAINED SIGNAL
AND
A AND B
TIME DELAY ON
ON
TD
X SEC
B BECOMES TRUE X SECONDS AFTER A BECOMES TRUE
LOWER INHIBIT
LWI
INHIBIT FURTHER DECREASE OF M/A STATION DEMAND
OR
A OR B
TIME DELAY OFF
OFF
TD
B BECOMES FALSE X SECONDS AFTER A BECOMES FALSE
RAISE INHIBIT
RAI
INHIBITS FURTHER INCREASE OF M/A STATION DEMAND
XOR
A OR B, BUT NOT A AND B
NOT
N
NOT A
MANUAL REJECT
MRE
ONE-SHOT
X SEC
B IS SET AND REMAINS TRUE FOR X SECONDS AFTER A BECOMES TRUE
FLIP-FLOP
S 1
R 0
C IS TRUE WHEN FLIP-FLOP IS SET BY A
D IS TRUE WHEN FLIP-FLOP IS SET BY B
NOTE: RESET OVERRIDES SET UNLESS OTHERWISE NOTED.
KEYSHEET FOR LOGIC SYMBOLS
Sketch Number
WNA-DS-01227-DAP-SK
REVISION
1
DAP & DBP Reactor Control System Functional Diagrams
SHEET
10 of 8
(24 APRIL 2014)

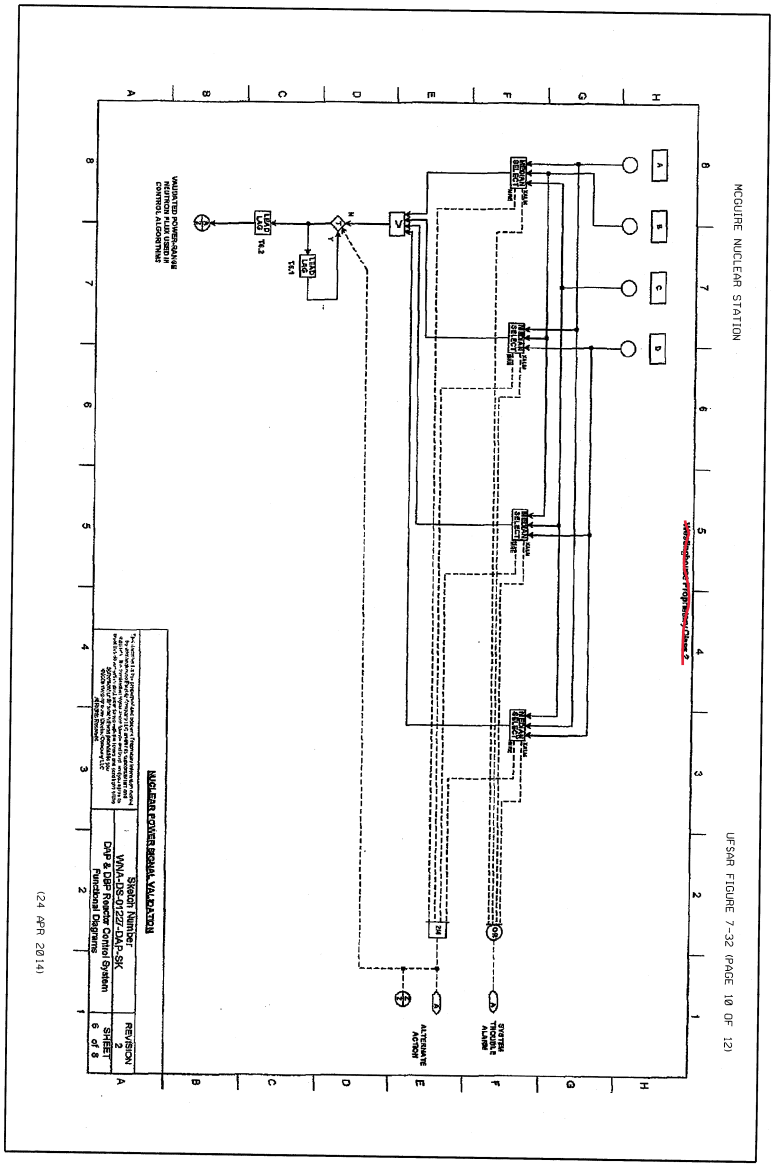

MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 5 OF 12)
ROD CONTROLS AND ROD BLOCKS
Sketch Number
VANA-DS-01227-DAP-SK
DNP & CBP Reactor Control System
Functional Diagrams
REVISION
2
SHEET
2 of 8
(24 APRIL 2014)

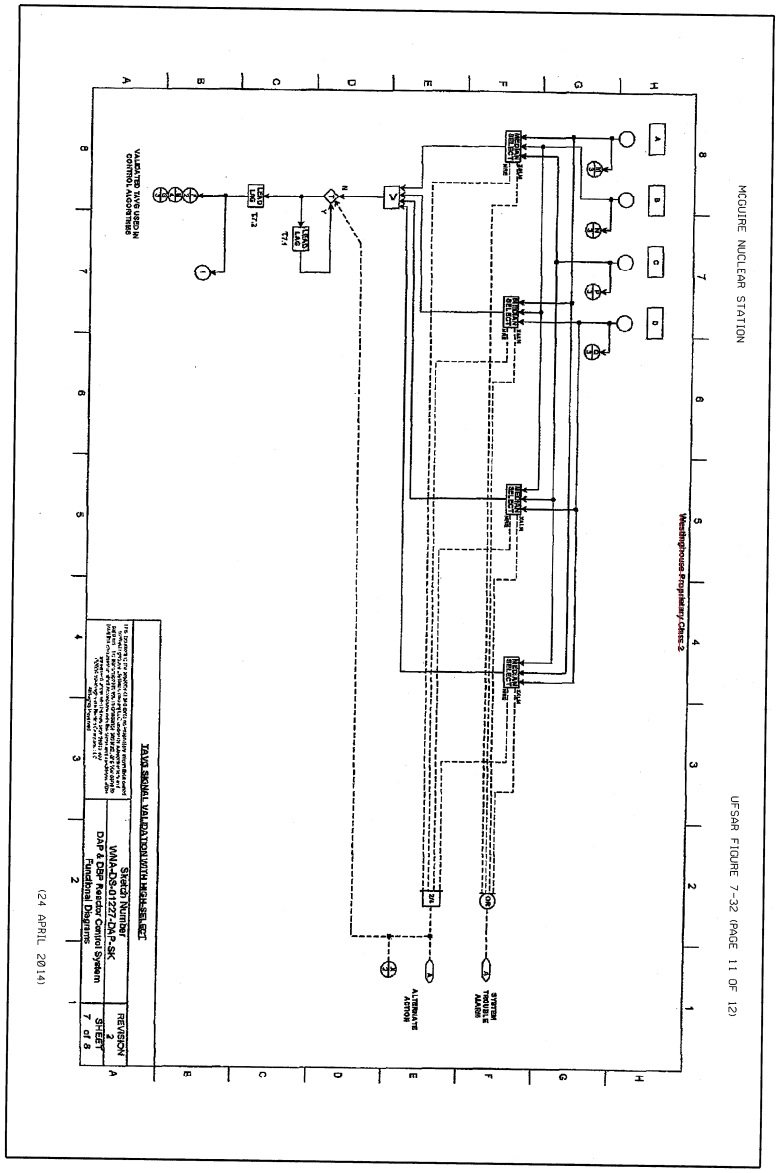

MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 6 OF 12)
Westinghouse Proprietary Class 2
TAVG COASTDOWN MODE SELECTION
RESET
REACTOR TRIP
VALIDATED TURBINE INLET PRESSURE
TURBINE LOAD
TREF/NORMAL OPERATION
TREF/COASTDOWN
TREF
TREF ADJUSTMENT
TRIP/LOAD
NOTES:
2A-1
(24 APRIL 2014)


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 7 OF 12)
Westinghouse Proprietary Class 2
NOTES:
3-1 THESE ALARMS MUST HAVE REFLASH CAPABILITY.
VALIDATED TAVG
LOOP A TAVG
LOOP B TAVG
LOOP C TAVG
LOOP D TAVG
LOOP TAVG DEVIATION ALARMS NOTE 3-1
TAVG DEVIATION ALARMS
Sketch Number
WNA-DS-01227-DAP-SK
DAP & DBF Reactor Control System
Functional Diagrams
REVISION
1
SHEET
3 of 8
(24 APRIL 2014)


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 8 OF 12)
Westinghouse Proprietary Class 2
DELTA-T, ROD POSITION AND RPI SIGNALS
(24 APRIL 2014)


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 9 OF 12)
(24 APRIL 2014)
TURBINE INLET PRESSURE SIGNAL VALIDATION
System Number
WNA-DS-01227-DAP-SK
DAP & DSP Reactr Control System
Functional Diagrams
REVISION
4
SHEET
5 of 9
VOLUMETRIC THERMAL INLET PRESSURE LEAD/LAG CONTROL ALGORITHMS
LEAD LAG
TS2
LEAD LAG
TS1
LEAD LAG
TS3
ON TD
ALTERNATE ACTION
SYSTEM TROUBLE ALARM


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 10 OF 12)
(24 APR 2014)
MCGUIRE POWER RANGE VALIDATION
Sheet/ Number
VAA-12S-01227-DAP-SK
DNP & DBP Power Control System
Power Diagrams
REVISION
2
SHEET
6 of 6
SYSTEM TROUBLE ALARM
ALTERNATE ACTION


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 11 OF 12)
Westinghouse Proprietary Class 2
TAVG SIGNAL VALIDATION WITH MEGASELECT
Sketch Number
VMA-2S01227-2M-P-SK
Functional Diagram
REVISION
2
SHEET
7 of 8
VALIDATED TAVG USED IN CONTROL ROOM SYSTEMS
ALTERNATE ACTION
SYSTEM TROUBLE ALARM
(24 APRIL 2014)

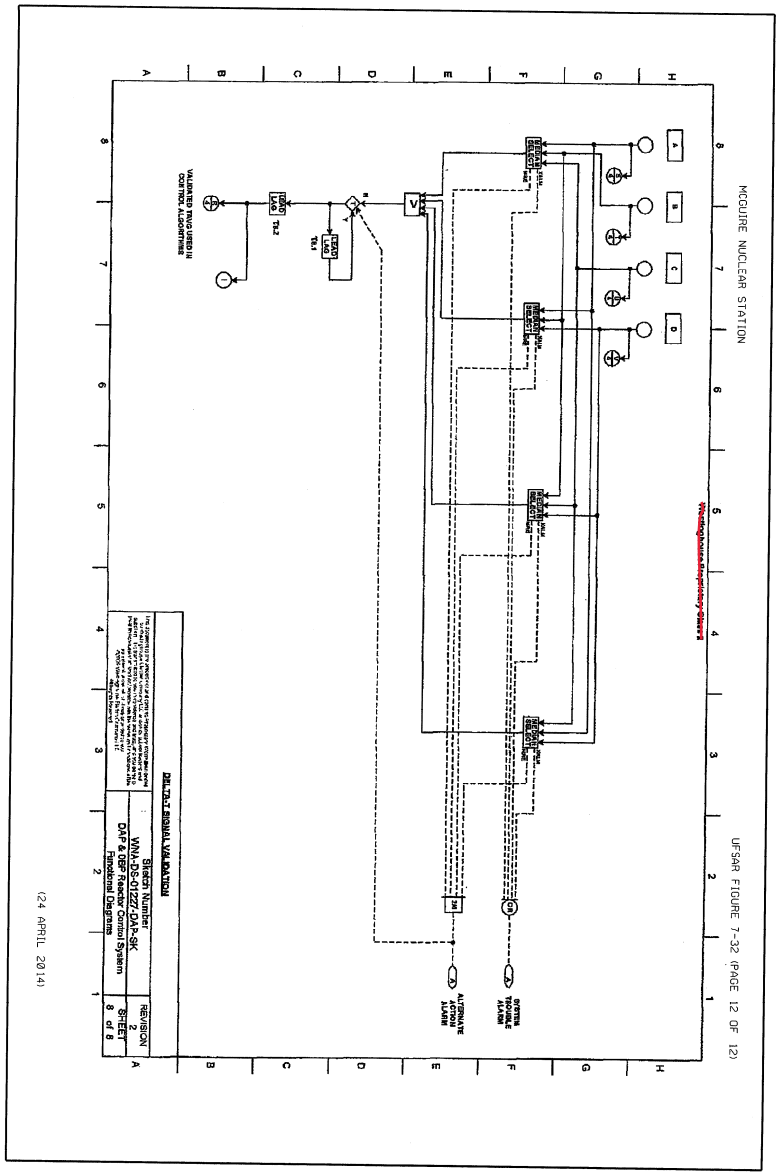
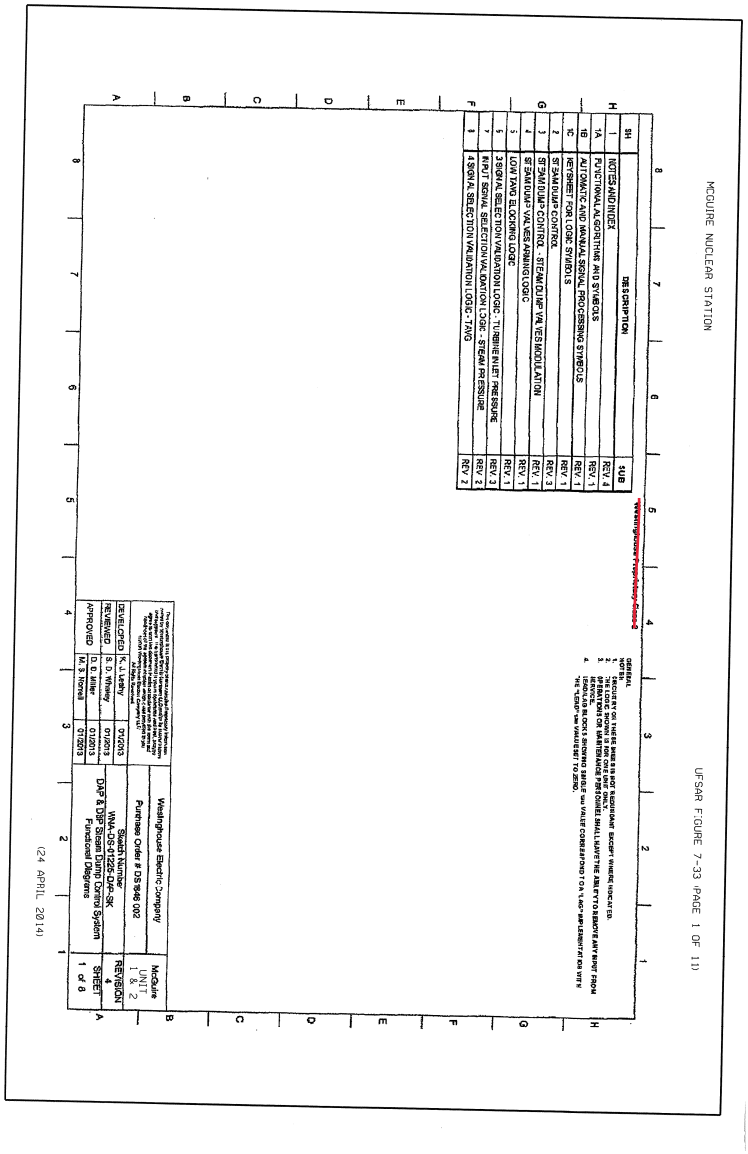
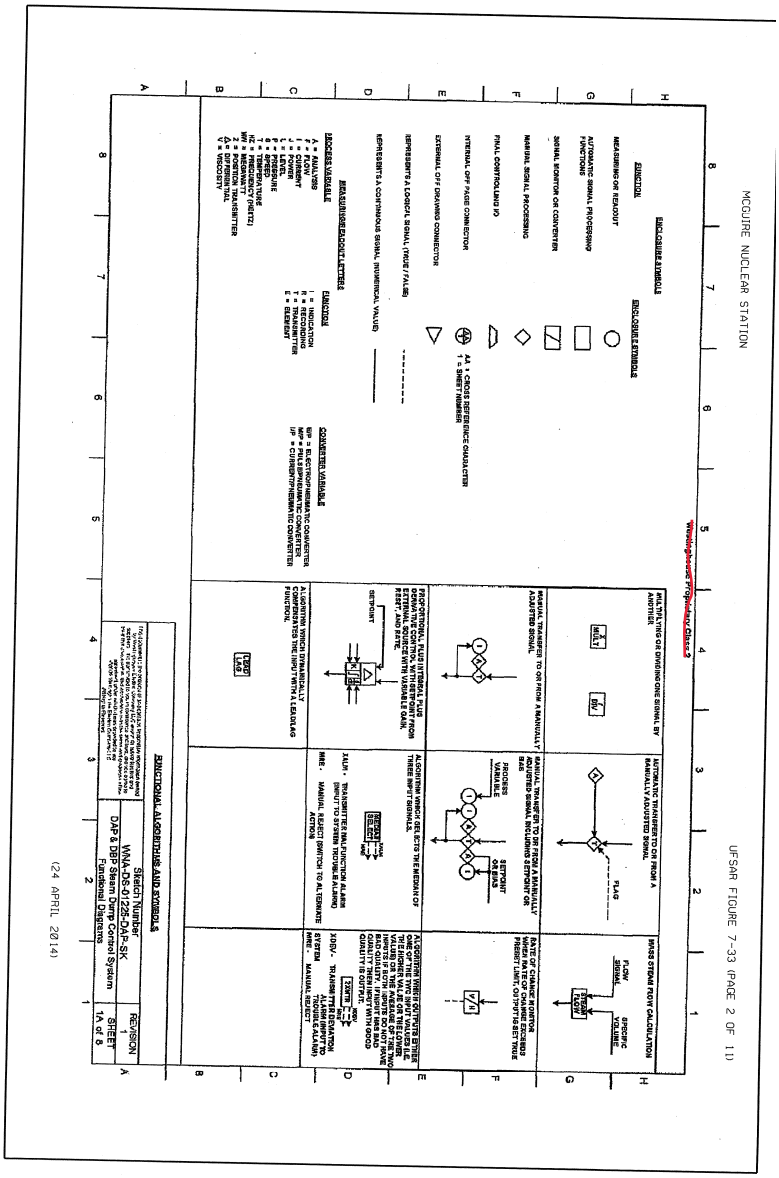

MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-32 (PAGE 12 OF 12)
(24 APRIL 2014)
VALIDATED TRIG DERIVED IN COINCIDENCE ALGORITHMS
ALTERNATE ACTION ALARM
SYSTEM TROUBLE ALARM
Sketch Number
VMA-DS-01227-DAP-SK
DAP & DBP Reactor Control System
Functional Diagrams
REVISION
2
SHEET
8 of 8

Figure 7-33. DAP & DBP Steam Dump Control System Functional Diagrams




MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-33 (PAGE 2 OF 11)
Westinghouse Proprietary Class 2
FUNCTIONAL ALGORITHMS AND SYMBOLS
Sketch Number
WNA-DS-01225-DAP-SK
REVISION
1
DAP & DBP Steam Dump Control System
Functional Diagrams
SHEET
1A of 8
(24 APRIL 2014)

MCGUIRE NUCLEAR STATION

UFSAR FIGURE 7-33 (PAGE 3 OF 11)

~~Westinghouse Proprietary Class 2~~

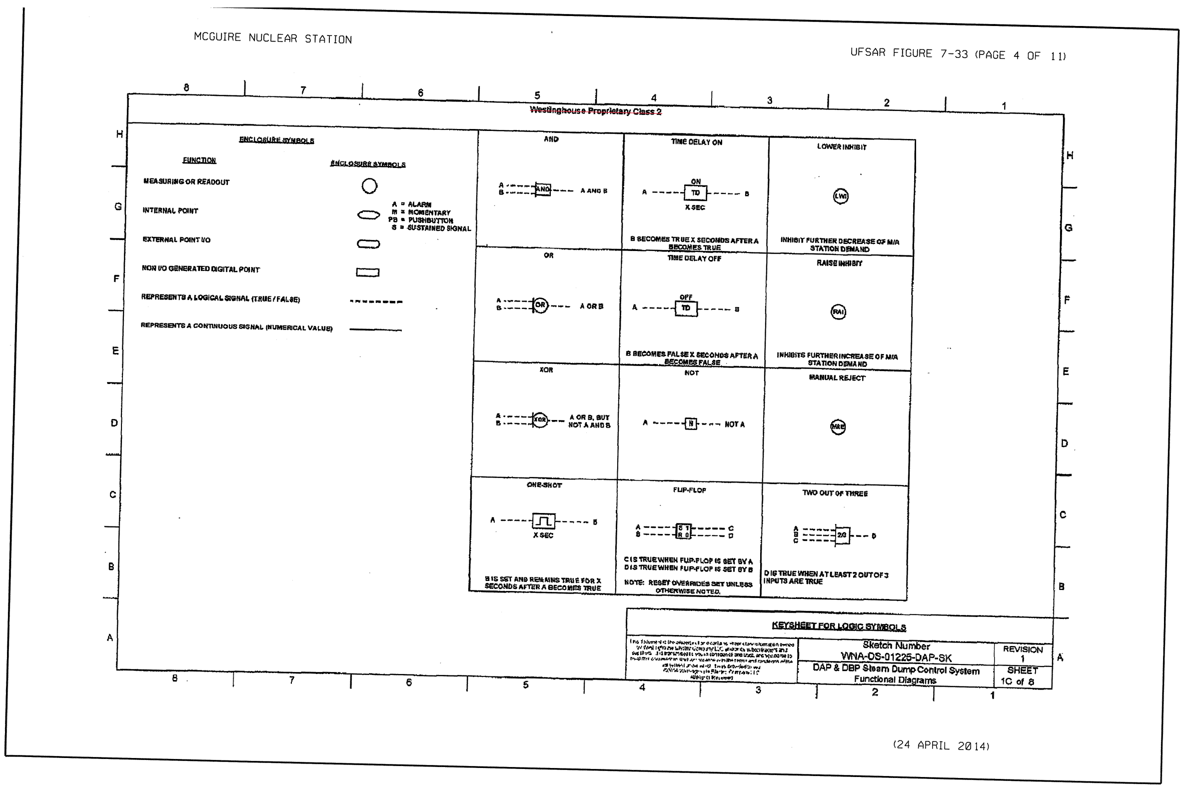
FUNCTION & SYMBOL	DEFINITION
SUMMING Σ	THE OUTPUT EQUALS THE ALGEBRAIC SUM OF THE INPUTS.
AVERAGING Σ/N	THE OUTPUT EQUALS THE ALGEBRAIC SUM OF THE INPUTS DIVIDED BY THE NUMBER OF INPUTS.
PROPORTIONAL K	THE OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT (OUT = K*X).
NON LINEAR OR UNSPECIFIED FUNCTION f(x)	THE OUTPUT EQUALS SOME NON-LINEAR FUNCTION OF THE INPUT.
HIGH SELECT >	THE OUTPUT IS EQUAL TO THAT INPUT WHICH IS THE GREATEST OF THE INPUTS.
LOW SELECT <	THE OUTPUT IS EQUAL TO THAT INPUT WHICH IS THE LEAST OF THE INPUTS.
ABSOLUTE VALUE ABS	THE OUTPUT IS THE ABSOLUTE VALUE OF THE INPUT.

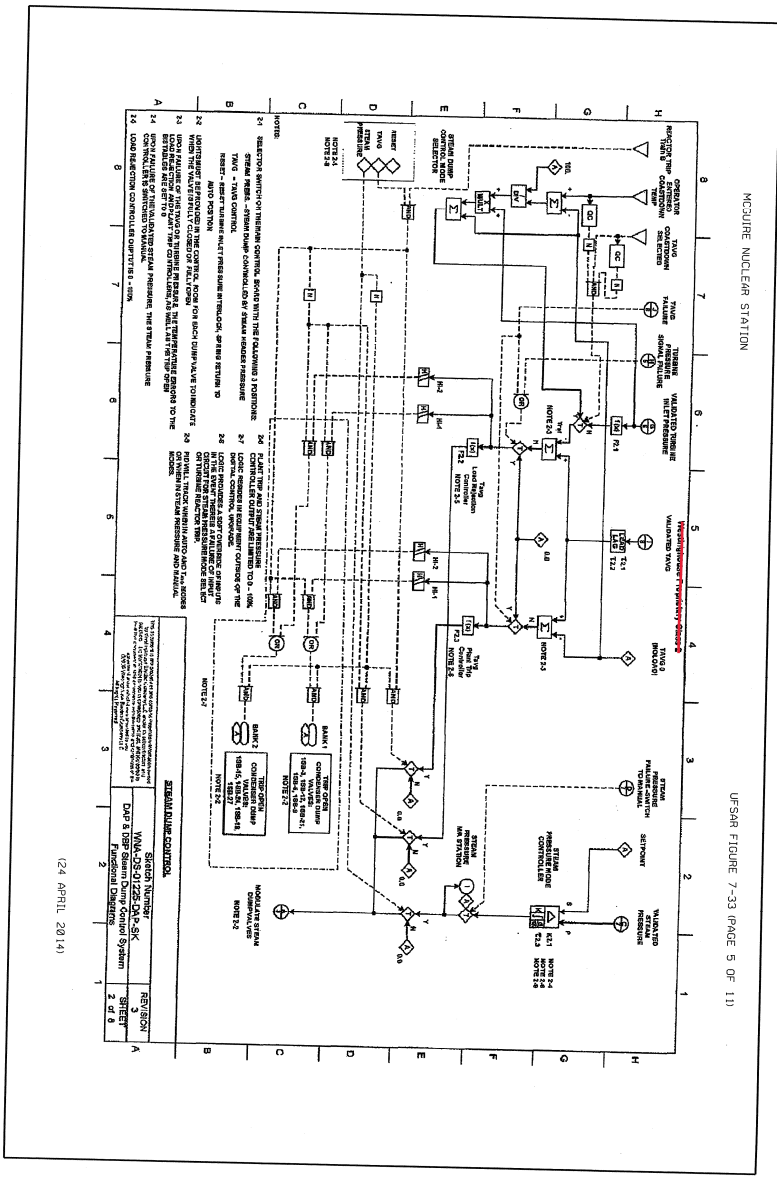
FUNCTION & SYMBOL	DEFINITION
ANALOG SIGNAL GENERATOR A	THE OUTPUT IS AN ANALOG SIGNAL ASSIGNED WITHIN THE CONTROLLER.
TRANSFER T	THE OUTPUT EQUALS THE INPUT WHICH HAS BEEN SELECTED BY TRANSFER. THE STATE OF THE TRANSFER IS ESTABLISHED BY EXTERNAL MEANS.
HIGH SIGNAL MONITOR H	THE OUTPUT HAS DISCRETE STATES WHICH ARE DEPENDENT ON THE VALUE OF THE INPUT. WHEN THE INPUT EXCEEDS (OR BECOMES LESS THAN) AN ASSIGNED LIMIT VALUE THE OUTPUT CHANGES STATE.
LOW SIGNAL MONITOR L	
HIGH/LOW SIGNAL MONITOR H L	
QUALITY SIGNAL MONITOR QC	THE OUTPUT IS TRUE IF THE INPUT HAS BAD QUALITY OR IF ITS VALUE IS NOT BEING REPORTED.

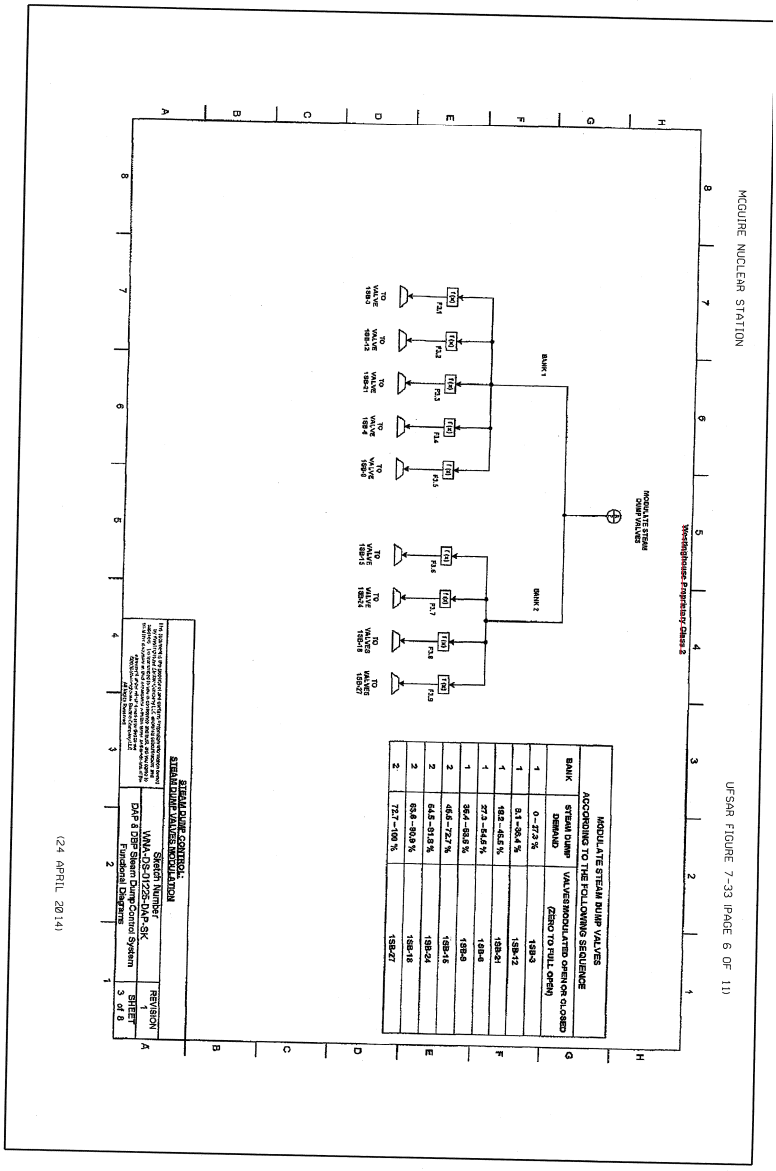
AUTOMATIC AND MANUAL SIGNAL PROCESSING SYMBOLS

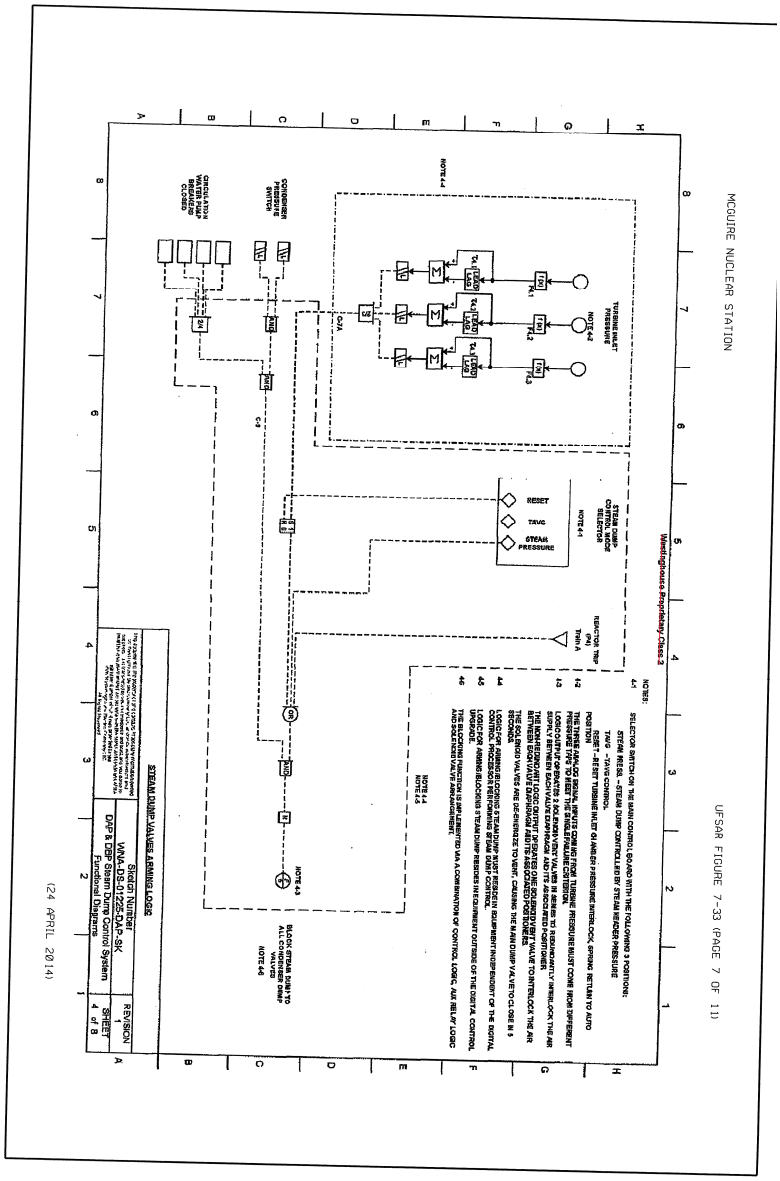
[illegible] All Rights Reserved	Sketch Number WNA-DS-01225-DAP-SK	REVISION 1
	DAP & DBP Steam Dump Control System Functional Diagrams	SHEET 1B of 8

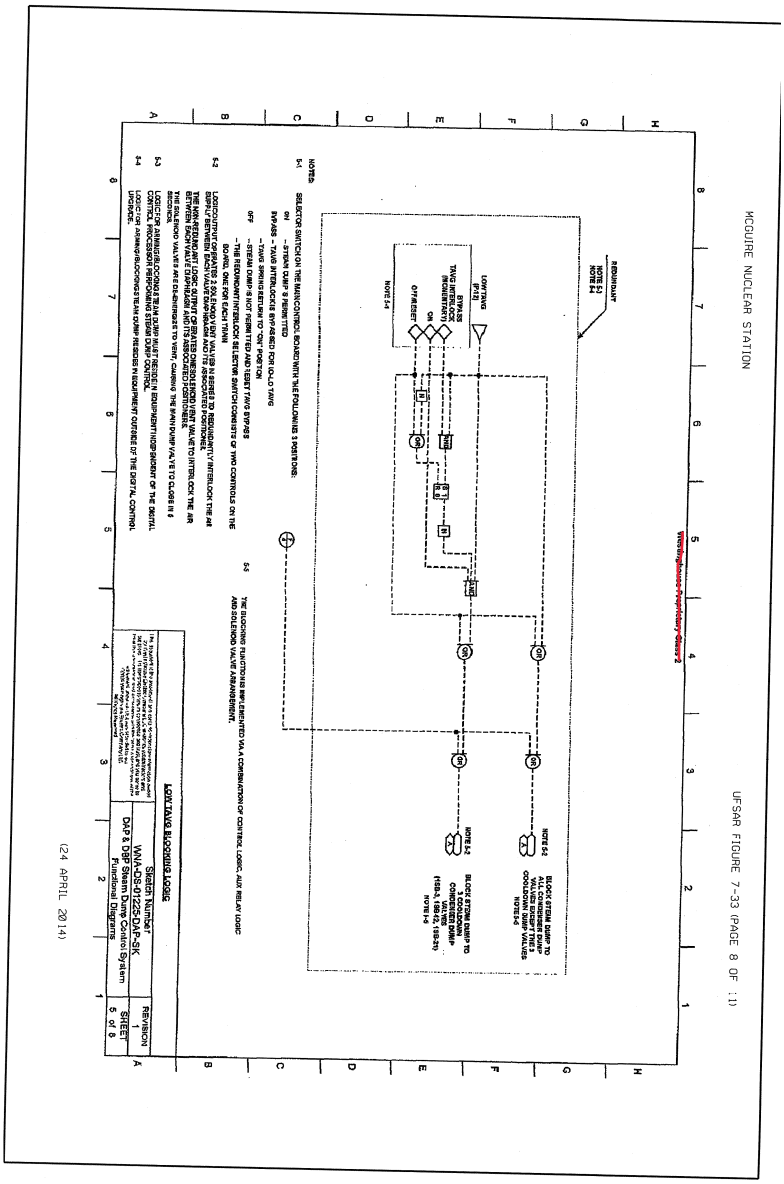
(24 APRIL 2014)

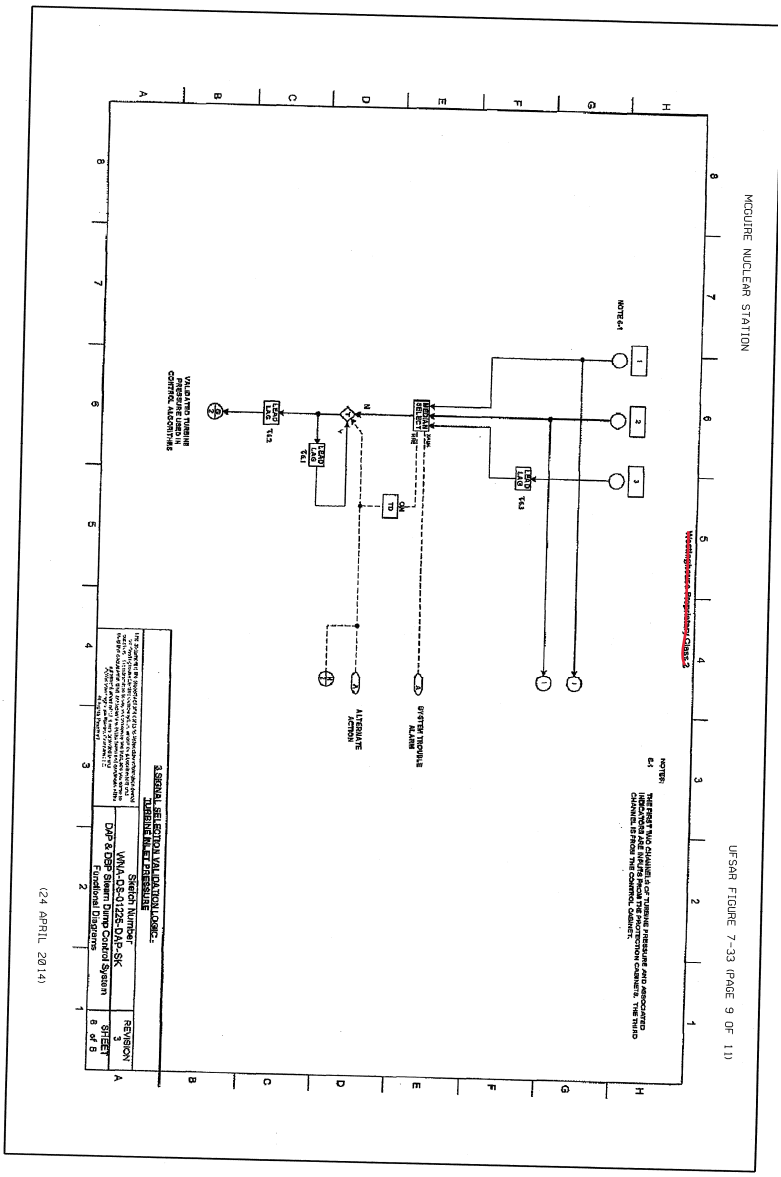

MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-33 (PAGE 4 OF 11)
Westinghouse Proprietary Class 2
ENCLOSURE SYMBOLS
FUNCTION
ENCLOSURE SYMBOLS
MEASURING OR READOUT
INTERNAL POINT
A = ALARM
M = MOMENTARY
PB = PUSHBUTTON
S = SUSTAINED SIGNAL
EXTERNAL POINT I/O
NON I/O GENERATED DIGITAL POINT
REPRESENTS A LOGICAL SIGNAL (TRUE / FALSE)
REPRESENTS A CONTINUOUS SIGNAL (NUMERICAL VALUE)
AND
A AND B
TIME DELAY ON
ON
TD
X SEC
B BECOMES TRUE X SECONDS AFTER A BECOMES TRUE
LOWER INHIBIT
LWI
INHIBIT FURTHER DECREASE OF M/A STATION DEMAND
OR
A OR B
TIME DELAY OFF
OFF
B BECOMES FALSE X SECONDS AFTER A BECOMES FALSE
RAISE INHIBIT
RAI
INHIBITS FURTHER INCREASE OF M/A STATION DEMAND
XOR
A OR B, BUT NOT A AND B
NOT
N
NOT A
MANUAL REJECT
MRE
ONE-SHOT
X SEC
B IS SET AND REMAINS TRUE FOR X SECONDS AFTER A BECOMES TRUE
FLIP-FLOP
C IS TRUE WHEN FLIP-FLOP IS SET BY A
D IS TRUE WHEN FLIP-FLOP IS SET BY B
NOTE: RESET OVERRIDES SET UNLESS OTHERWISE NOTED.
TWO OUT OF THREE
2/3
D IS TRUE WHEN AT LEAST 2 OUT OF 3 INPUTS ARE TRUE
KEYSHEET FOR LOGIC SYMBOLS
Sketch Number
WNA-DS-01225-DAP-SK
REVISION
1
DAP & DBP Steam Dump Control System
Functional Diagrams
SHEET
1C of 8
(24 APRIL 2014)

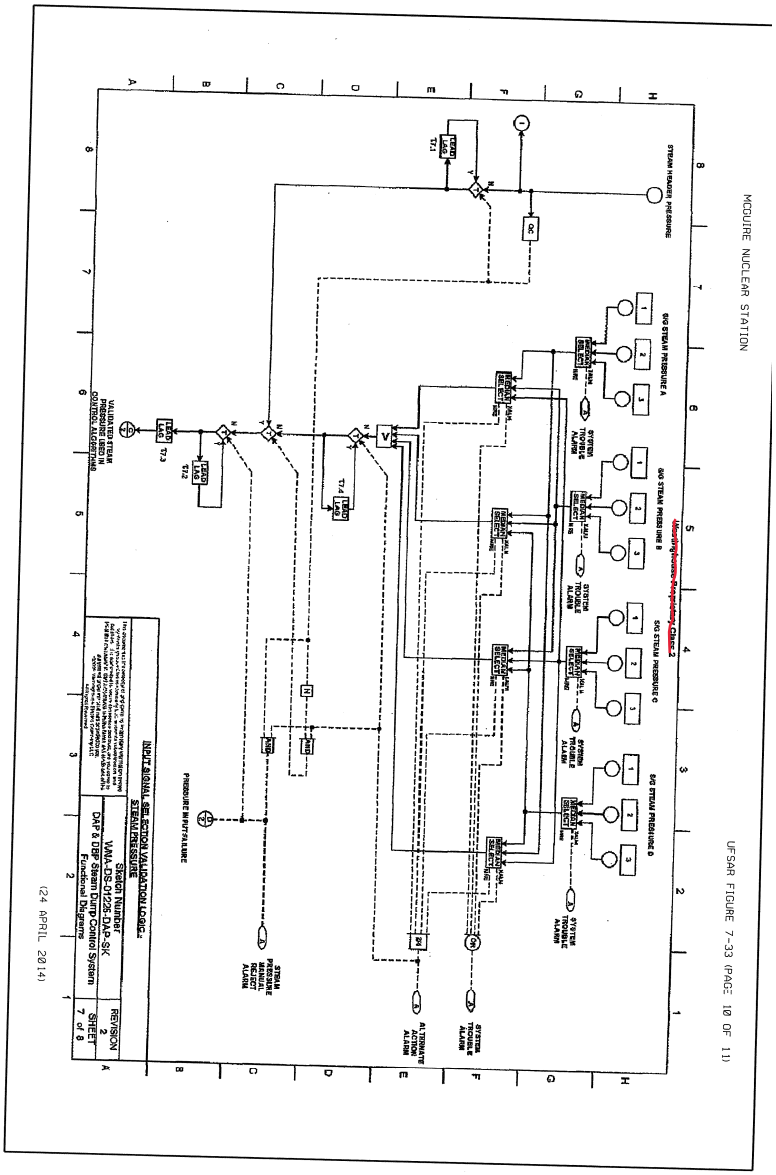

MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-33 (PAGE 5 OF 11)
STEAM DUMP CONTROL
Sketch Number
WMA-DS-01225-DAP-SK
DAP & DBP Steam Dump Control System
Functional Diagrams
REVISION
3
SHEET
2 of 6
(24 APRIL 2014)


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-33 (PAGE 6 OF 11)
Westinghouse Proprietary Class 2
MODULATE STEAM DUMP VALVES
BANK 1
BANK 2
MODULATE STEAM DUMP VALVES ACCORDING TO THE FOLLOWING SEQUENCE
BANK
STEAM DUMP DEMAND
VALVES MODULATED OPEN OR CLOSED (ZERO TO FULL OPEN)
1 0 - 27.3 % 1SB-3
1 51 - 90.4 % 1SB-12
1 182 - 454.5 % 1SB-21
1 273 - 545.5 % 1SB-6
1 364 - 636.5 % 1SB-9
2 455 - 727.7 % 1SB-15
2 546 - 818.2 % 1SB-24
2 636 - 909.8 % 1SB-18
2 727 - 1091 % 1SB-27
STEAM DUMP CONTROL
STEAM DUMP VALVES MODULE
WM-DB-01228-DAP-SK
DAP 6 DBP Steam Dump Control System
Functional Diagrams
REVISION
SHEET
3 of 8
(24 APRIL 2014)


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-33 (PAGE 7 OF 11)
Westinghouse Proprietary Class 2
STEAM DUMP VALVES ARMING LOGIC
WNA-DS-01225-GAI-SK
DAP & DBP Steam Dump Control System
Functional Diagrams
REVISION
SHEET 4 of 8
(24 APRIL 2014)


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-33 (PAGE 8 OF 11)
(24 APRIL 2014)


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-33 (PAGE 9 OF 11)
(24 APRIL 2014)


MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-33 (PAGE 10 OF 11)
(24 APRIL 2014)
STEAM HEADER PRESSURE
SG STEAM PRESSURE A
SG STEAM PRESSURE B
SG STEAM PRESSURE C
SG STEAM PRESSURE D
VALIDATED STEAM PRESSURE USED IN CONTROL ALGORITHMS
PRESSURE MISMATCH FAILURE
STEAM PRESSURE REJECT ALARM
SYSTEM TROUBLE ALARM
ALTERNATE FEEDWATER ALARM
INPUT SIGNAL SELECTION VALIDATION LOGIC
DRP & DRP Steam Dump Control System
Functional Diagrams
REVISION 2
SHEET 7 of 8

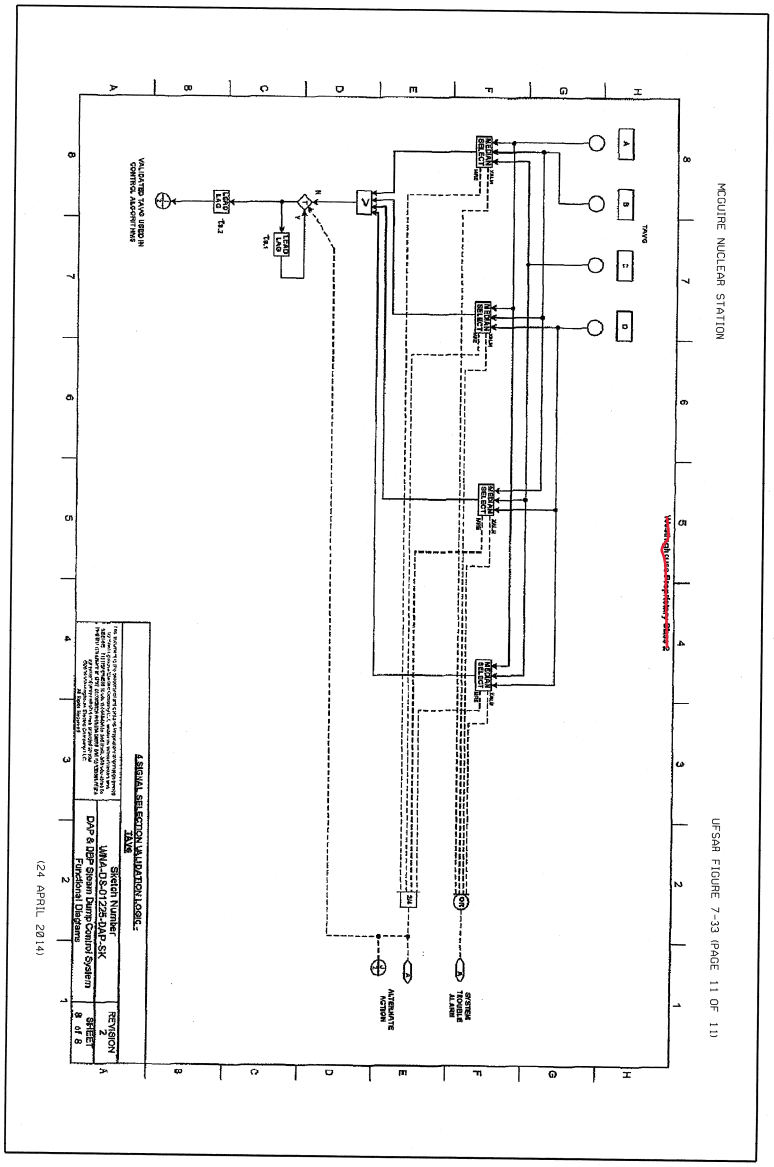
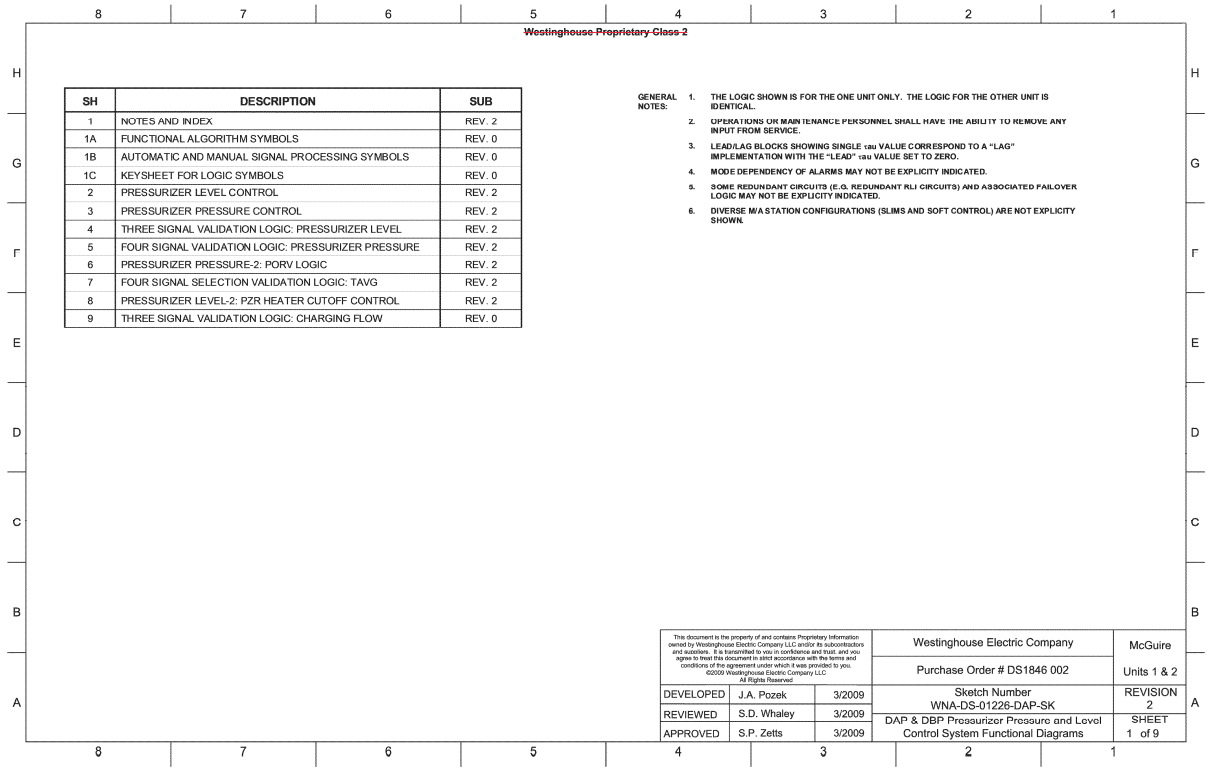

MCGUIRE NUCLEAR STATION
UFSAR FIGURE 7-33 (PAGE 11 OF 11)
(24 APRIL 2014)
4 SIGNAL SELECTION LOGIC
Sketch Number
UMA-DS-01225-DAP-SK
DAP 8 MP Steam Dump Control System
Functional Diagram
REVISION 2
SHEET 8 of 8
ALTERNATE ACTION
SYSTEM TROUBLE ALARM

Figure 7-34. DAP & DBP Pressurizer Pressure and Level Control System Functional Diagrams



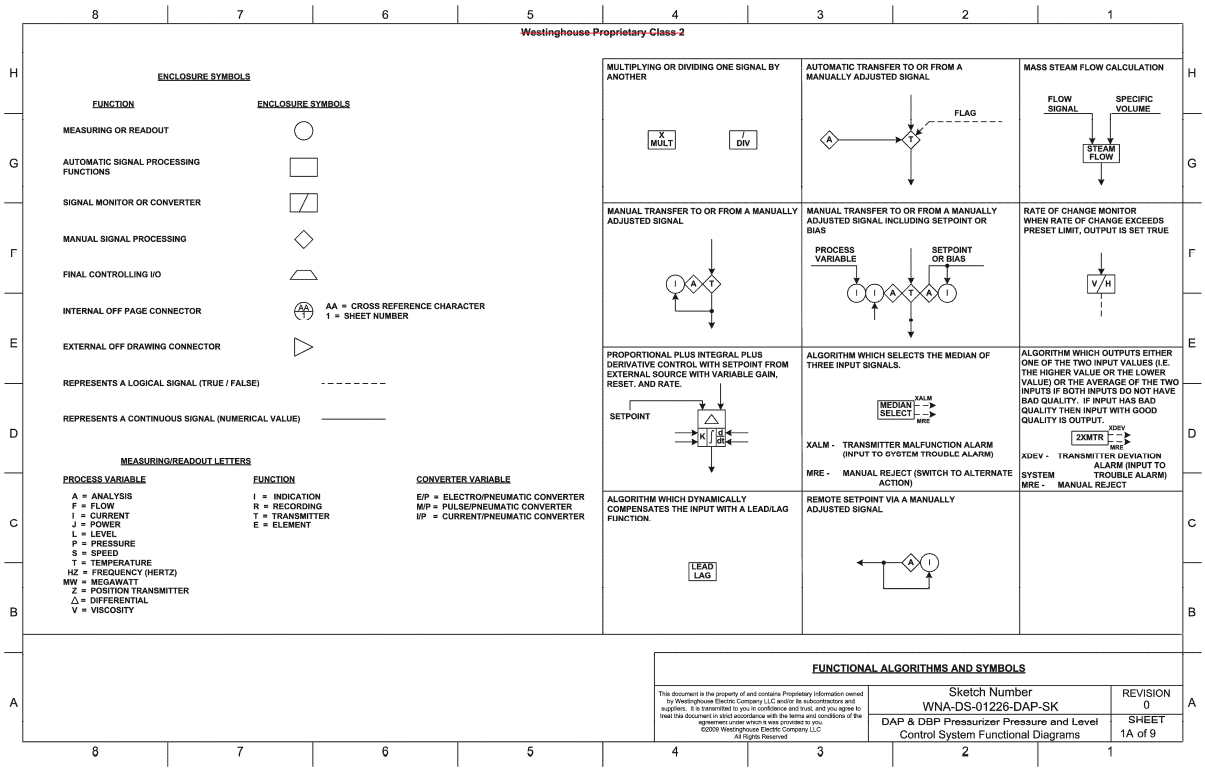
SH	DESCRIPTION	SUB
1	NOTES AND INDEX	REV. 2
1A	FUNCTIONAL ALGORITHM SYMBOLS	REV. 0
1B	AUTOMATIC AND MANUAL SIGNAL PROCESSING SYMBOLS	REV. 0
1C	KEYSHEET FOR LOGIC SYMBOLS	REV. 0
2	PRESSURIZER LEVEL CONTROL	REV. 2
3	PRESSURIZER PRESSURE CONTROL	REV. 2
4	THREE SIGNAL VALIDATION LOGIC: PRESSURIZER LEVEL	REV. 2
5	FOUR SIGNAL VALIDATION LOGIC: PRESSURIZER PRESSURE	REV. 2
6	PRESSURIZER PRESSURE-2: PORV LOGIC	REV. 2
7	FOUR SIGNAL SELECTION VALIDATION LOGIC: TAVG	REV. 2
8	PRESSURIZER LEVEL-2: PZR HEATER CUTOFF CONTROL	REV. 2
9	THREE SIGNAL VALIDATION LOGIC: CHARGING FLOW	REV. 0

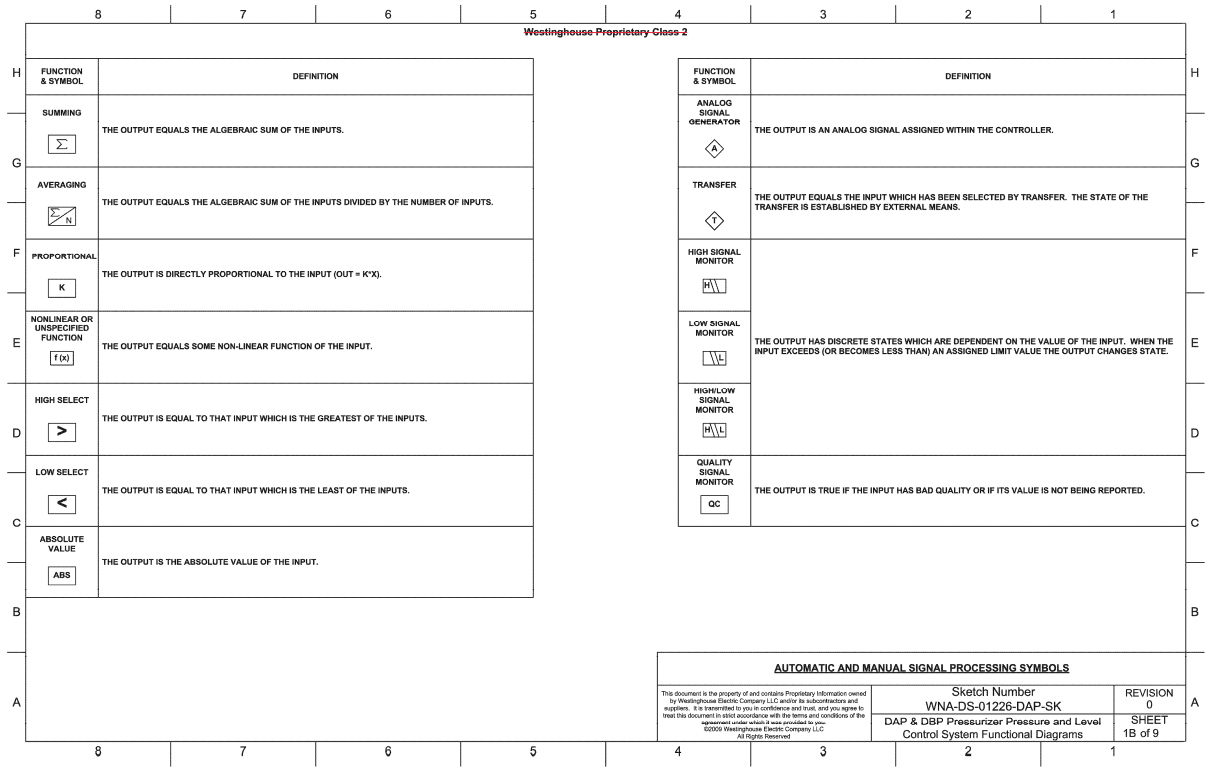
GENERAL NOTES:

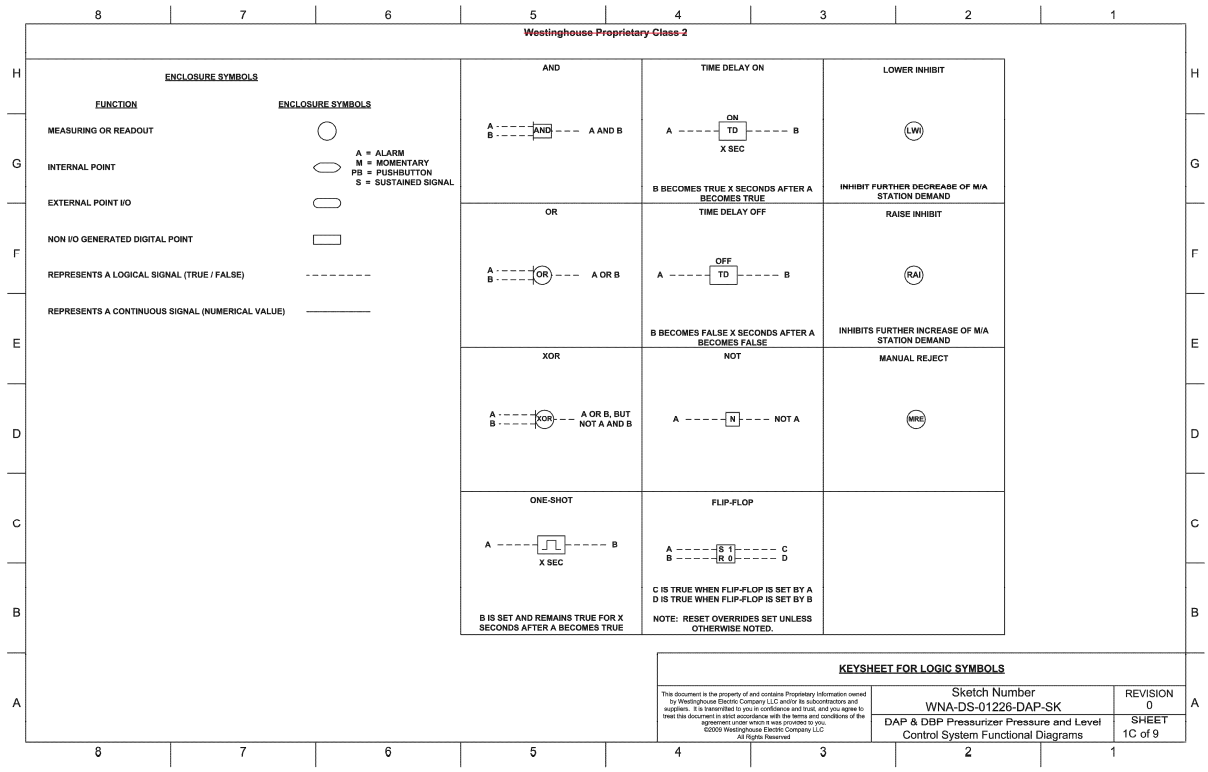
1. THE LOGIC SHOWN IS FOR THE ONE UNIT ONLY. THE LOGIC FOR THE OTHER UNIT IS IDENTICAL.
2. OPERATIONS OR MAINTENANCE PERSONNEL SHALL HAVE THE ABILITY TO REMOVE ANY INPUT FROM SERVICE.
3. LEAD/LAG BLOCKS SHOWING SINGLE τau VALUE CORRESPOND TO A "LAG" IMPLEMENTATION WITH THE "LEAD" τau VALUE SET TO ZERO.
4. MODE DEPENDENCY OF ALARMS MAY NOT BE EXPLICITY INDICATED.
5. SOME REDUNDANT CIRCUITS (E.G. REDUNDANT RLI CIRCUITS) AND ASSOCIATED FAILOVER LOGIC MAY NOT BE EXPLICITY INDICATED.
6. DIVERSE M/A STATION CONFIGURATIONS (SLIMS AND SOFT CONTROL) ARE NOT EXPLICITY SHOWN.

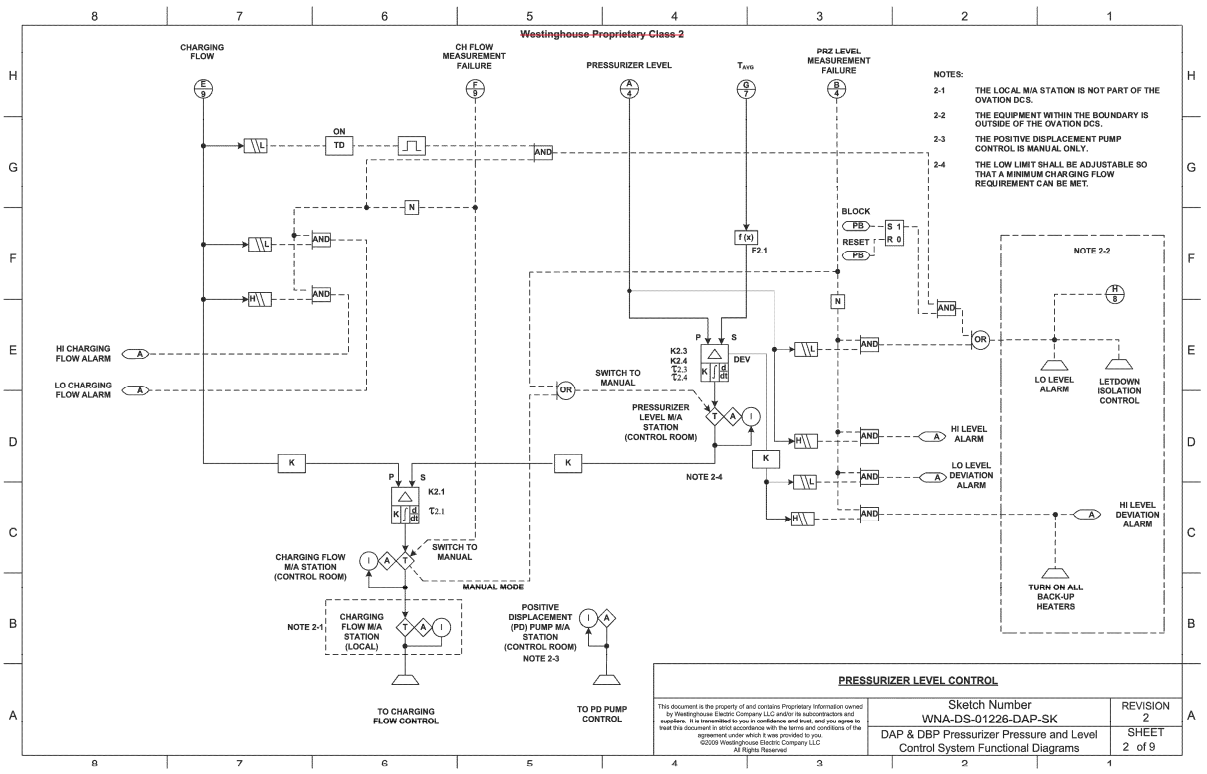
DEVELOPED	J.A. Pozek	3/2009
REVIEWED	S.D. Whaley	3/2009
APPROVED	S.P. Zetts	3/2009

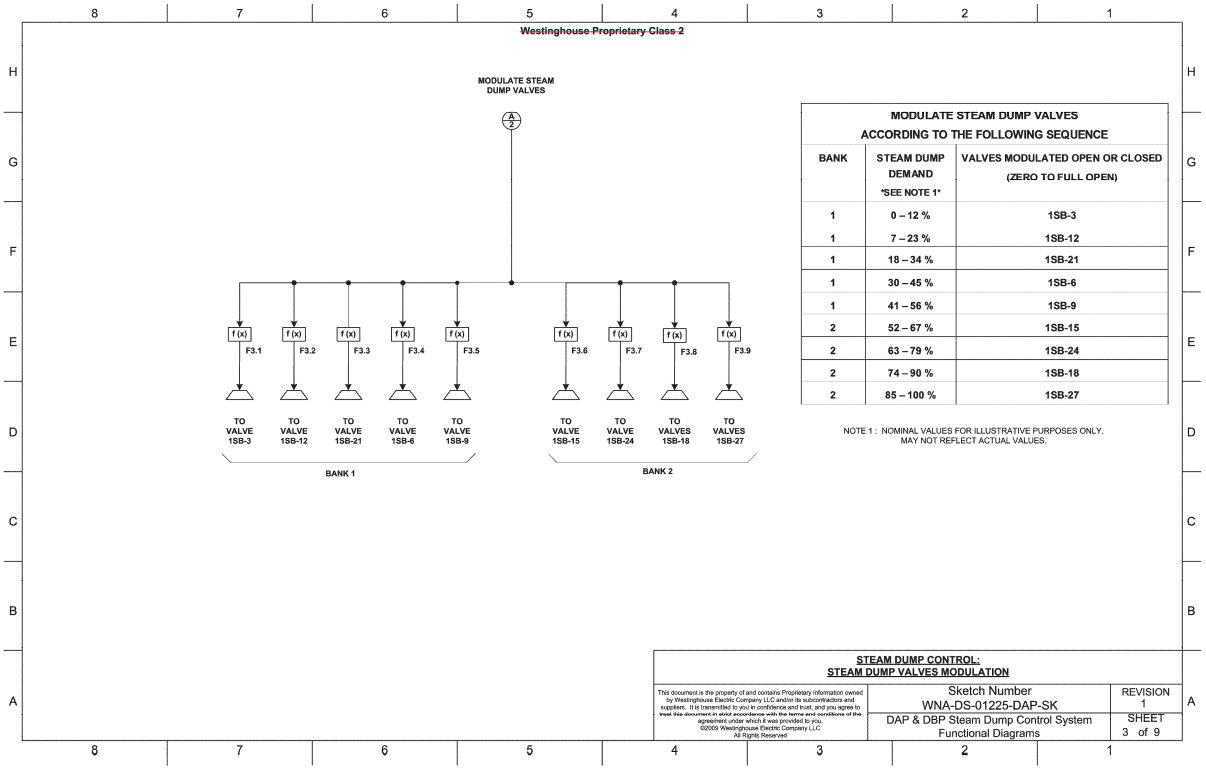
Westinghouse Electric Company	McGuire
Purchase Order # DS1846 002	Units 1 & 2
Sketch Number WNA-DS-01226-DAP-SK	REVISION 2
DAP & DBP Pressurizer Pressure and Level Control System Functional Diagrams	SHEET 1 of 9


Westinghouse Proprietary Class 2
ENCLOSURE SYMBOLS
FUNCTION
ENCLOSURE SYMBOLS
MEASURING OR READOUT
AUTOMATIC SIGNAL PROCESSING FUNCTIONS
SIGNAL MONITOR OR CONVERTER
MANUAL SIGNAL PROCESSING
FINAL CONTROLLING I/O
INTERNAL OFF PAGE CONNECTOR
AA = CROSS REFERENCE CHARACTER
1 = SHEET NUMBER
EXTERNAL OFF DRAWING CONNECTOR
REPRESENTS A LOGICAL SIGNAL (TRUE / FALSE)
REPRESENTS A CONTINUOUS SIGNAL (NUMERICAL VALUE)
MEASURING/READOUT LETTERS
PROCESS VARIABLE
A = ANALYSIS
F = FLOW
I = CURRENT
J = POWER
L = LEVEL
P = PRESSURE
S = SPEED
T = TEMPERATURE
HZ = FREQUENCY (HERTZ)
MW = MEGAWATT
Z = POSITION TRANSMITTER
△ = DIFFERENTIAL
V = VISCOSITY
FUNCTION
I = INDICATION
R = RECORDING
T = TRANSMITTER
E = ELEMENT
CONVERTER VARIABLE
E/P = ELECTRO/PNEUMATIC CONVERTER
M/P = PULSE/PNEUMATIC CONVERTER
I/P = CURRENT/PNEUMATIC CONVERTER
MULTIPLYING OR DIVIDING ONE SIGNAL BY ANOTHER
X MULT
/ DIV
AUTOMATIC TRANSFER TO OR FROM A MANUALLY ADJUSTED SIGNAL
FLAG
MASS STEAM FLOW CALCULATION
FLOW SIGNAL
SPECIFIC VOLUME
STEAM FLOW
MANUAL TRANSFER TO OR FROM A MANUALLY ADJUSTED SIGNAL
MANUAL TRANSFER TO OR FROM A MANUALLY ADJUSTED SIGNAL INCLUDING SETPOINT OR BIAS
PROCESS VARIABLE
SETPOINT OR BIAS
RATE OF CHANGE MONITOR WHEN RATE OF CHANGE EXCEEDS PRESET LIMIT, OUTPUT IS SET TRUE
PROPORTIONAL PLUS INTEGRAL PLUS DERIVATIVE CONTROL WITH SETPOINT FROM EXTERNAL SOURCE WITH VARIABLE GAIN, RESET, AND RATE.
SETPOINT
ALGORITHM WHICH SELECTS THE MEDIAN OF THREE INPUT SIGNALS.
MEDIAN SELECT
XALM
MRE
XALM - TRANSMITTER MALFUNCTION ALARM (INPUT TO SYSTEM TROUBLE ALARM)
MRE - MANUAL REJECT (SWITCH TO ALTERNATE ACTION)
ALGORITHM WHICH OUTPUTS EITHER ONE OF THE TWO INPUT VALUES (I.E. THE HIGHER VALUE OR THE LOWER VALUE) OR THE AVERAGE OF THE TWO INPUTS IF BOTH INPUTS DO NOT HAVE BAD QUALITY. IF INPUT HAS BAD QUALITY THEN INPUT WITH GOOD QUALITY IS OUTPUT.
2XMTR
XDEV
MRE
XDEV - TRANSMITTER DEVIATION ALARM (INPUT TO SYSTEM TROUBLE ALARM)
MRE - MANUAL REJECT
ALGORITHM WHICH DYNAMICALLY COMPENSATES THE INPUT WITH A LEAD/LAG FUNCTION.
LEAD LAG
REMOTE SETPOINT VIA A MANUALLY ADJUSTED SIGNAL
FUNCTIONAL ALGORITHMS AND SYMBOLS
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2009 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number
WNA-DS-01226-DAP-SK
REVISION
0
DAP & DBP Pressurizer Pressure and Level Control System Functional Diagrams
SHEET
1A of 9


Westinghouse Proprietary Class 2
FUNCTION & SYMBOL
DEFINITION
SUMMING
Σ
THE OUTPUT EQUALS THE ALGEBRAIC SUM OF THE INPUTS.
AVERAGING
Σ N
THE OUTPUT EQUALS THE ALGEBRAIC SUM OF THE INPUTS DIVIDED BY THE NUMBER OF INPUTS.
PROPORTIONAL
K
THE OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT (OUT = K*X).
NONLINEAR OR UNSPECIFIED FUNCTION
f (x)
THE OUTPUT EQUALS SOME NON-LINEAR FUNCTION OF THE INPUT.
HIGH SELECT
>
THE OUTPUT IS EQUAL TO THAT INPUT WHICH IS THE GREATEST OF THE INPUTS.
LOW SELECT
<
THE OUTPUT IS EQUAL TO THAT INPUT WHICH IS THE LEAST OF THE INPUTS.
ABSOLUTE VALUE
ABS
THE OUTPUT IS THE ABSOLUTE VALUE OF THE INPUT.
FUNCTION & SYMBOL
DEFINITION
ANALOG SIGNAL GENERATOR
A
THE OUTPUT IS AN ANALOG SIGNAL ASSIGNED WITHIN THE CONTROLLER.
TRANSFER
T
THE OUTPUT EQUALS THE INPUT WHICH HAS BEEN SELECTED BY TRANSFER. THE STATE OF THE TRANSFER IS ESTABLISHED BY EXTERNAL MEANS.
HIGH SIGNAL MONITOR
H
LOW SIGNAL MONITOR
L
HIGH/LOW SIGNAL MONITOR
H\L
THE OUTPUT HAS DISCRETE STATES WHICH ARE DEPENDENT ON THE VALUE OF THE INPUT. WHEN THE INPUT EXCEEDS (OR BECOMES LESS THAN) AN ASSIGNED LIMIT VALUE THE OUTPUT CHANGES STATE.
QUALITY SIGNAL MONITOR
QC
THE OUTPUT IS TRUE IF THE INPUT HAS BAD QUALITY OR IF ITS VALUE IS NOT BEING REPORTED.
AUTOMATIC AND MANUAL SIGNAL PROCESSING SYMBOLS
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2009 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number
WNA-DS-01226-DAP-SK
REVISION
0
DAP & DBP Pressurizer Pressure and Level Control System Functional Diagrams
SHEET
1B of 9




Westinghouse Proprietary Class 2
CHARGING FLOW
CH FLOW MEASUREMENT FAILURE
PRESSURIZER LEVEL
T_{AVG}
PRZ LEVEL MEASUREMENT FAILURE
NOTES:
2-1 THE LOCAL M/A STATION IS NOT PART OF THE OVATION DCS.
2-2 THE EQUIPMENT WITHIN THE BOUNDARY IS OUTSIDE OF THE OVATION DCS.
2-3 THE POSITIVE DISPLACEMENT PUMP CONTROL IS MANUAL ONLY.
2-4 THE LOW LIMIT SHALL BE ADJUSTABLE SO THAT A MINIMUM CHARGING FLOW REQUIREMENT CAN BE MET.
ON TD
AND
N
BLOCK
RESET
PB
S 1
R 0
f (x)
F2.1
NOTE 2-2
HI CHARGING FLOW ALARM
LO CHARGING FLOW ALARM
SWITCH TO MANUAL
OR
K2.3
K2.4
$\tau_{2.3}$
$\tau_{2.4}$
DEV
PRESSURIZER LEVEL M/A STATION (CONTROL ROOM)
NOTE 2-4
HI LEVEL ALARM
LO LEVEL DEVIATION ALARM
HI LEVEL DEVIATION ALARM
LO LEVEL ALARM
LETDOWN ISOLATION CONTROL
TURN ON ALL BACK-UP HEATERS
K2.1
$\tau_{2.1}$
CHARGING FLOW M/A STATION (CONTROL ROOM)
MANUAL MODE
NOTE 2-1
CHARGING FLOW M/A STATION (LOCAL)
POSITIVE DISPLACEMENT (PD) PUMP M/A STATION (CONTROL ROOM)
NOTE 2-3
TO CHARGING FLOW CONTROL
TO PD PUMP CONTROL
PRESSURIZER LEVEL CONTROL
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2009 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number
WNA-DS-01226-DAP-SK
REVISION 2
DAP & DBP Pressurizer Pressure and Level Control System Functional Diagrams
SHEET 2 of 9

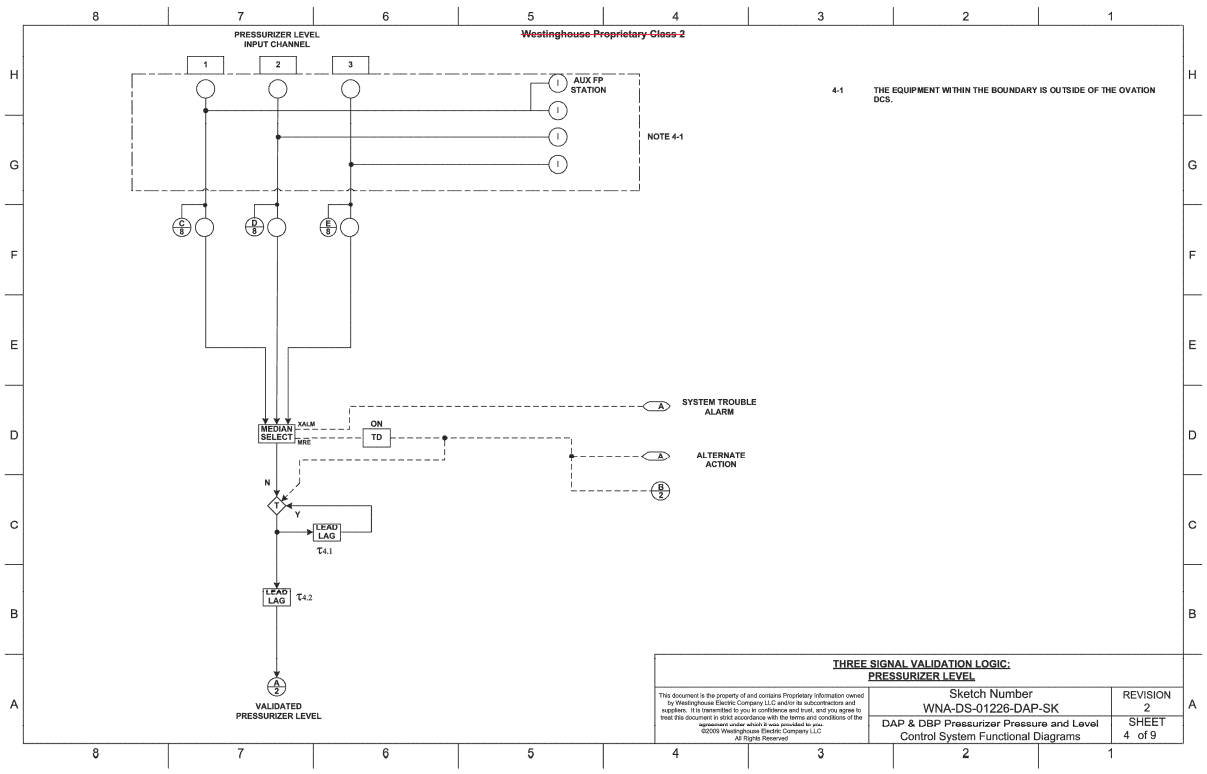


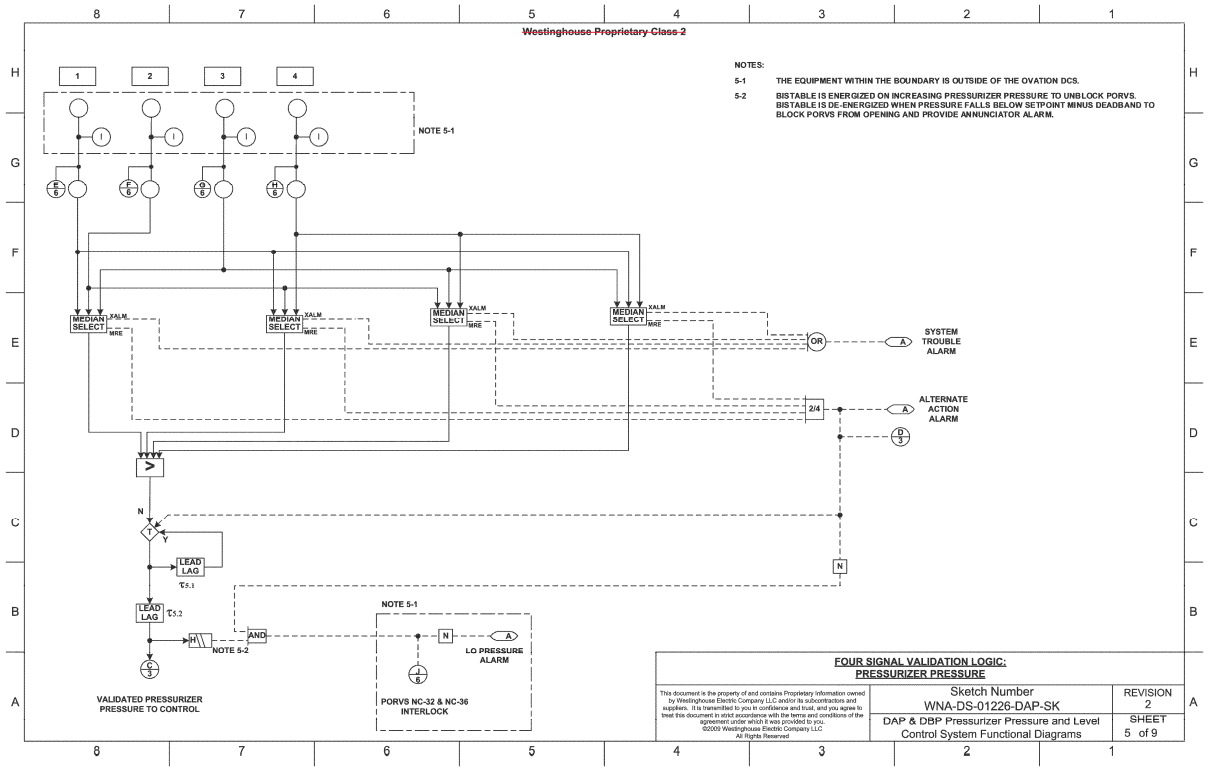
MODULATE STEAM DUMP VALVES ACCORDING TO THE FOLLOWING SEQUENCE		
BANK	STEAM DUMP DEMAND *SEE NOTE 1*	VALVES MODULATED OPEN OR CLOSED (ZERO TO FULL OPEN)
1	0 – 12 %	1SB-3
1	7 – 23 %	1SB-12
1	18 – 34 %	1SB-21
1	30 – 45 %	1SB-6
1	41 – 56 %	1SB-9
2	52 – 67 %	1SB-15
2	63 – 79 %	1SB-24
2	74 – 90 %	1SB-18
2	85 – 100 %	1SB-27

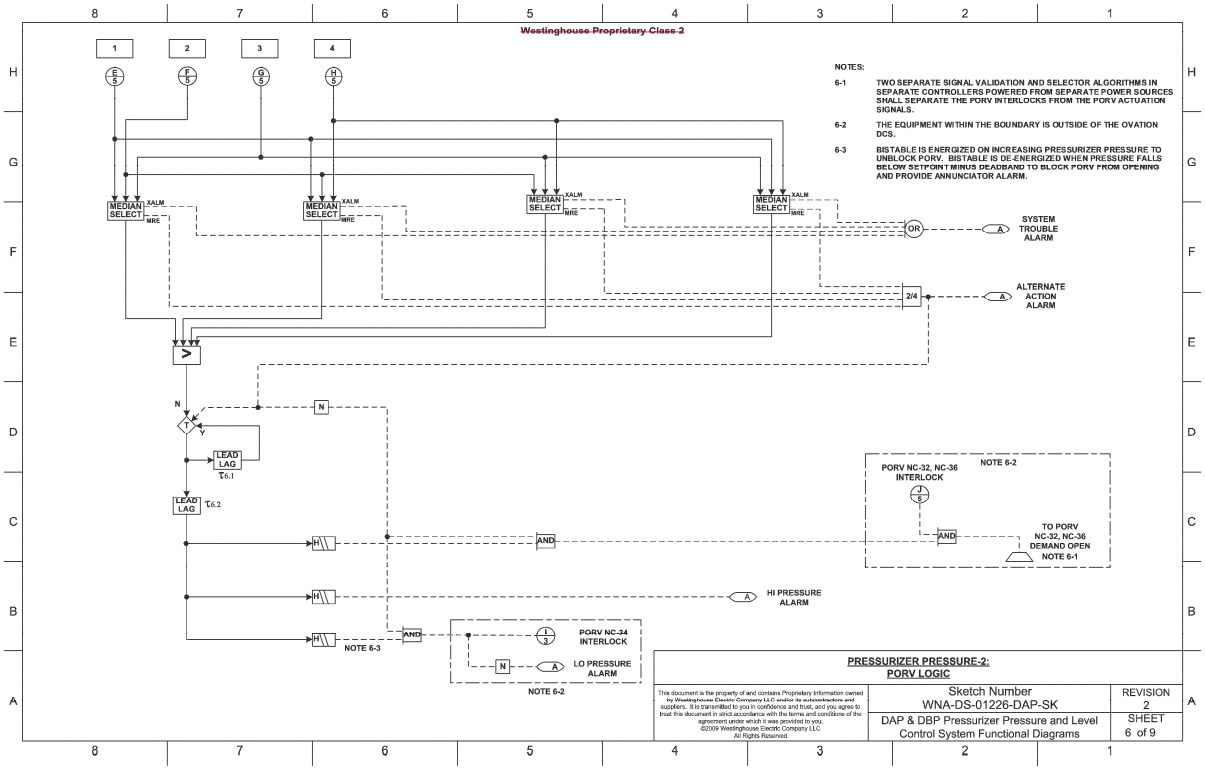
NOTE 1 : NOMINAL VALUES FOR ILLUSTRATIVE PURPOSES ONLY. MAY NOT REFLECT ACTUAL VALUES.

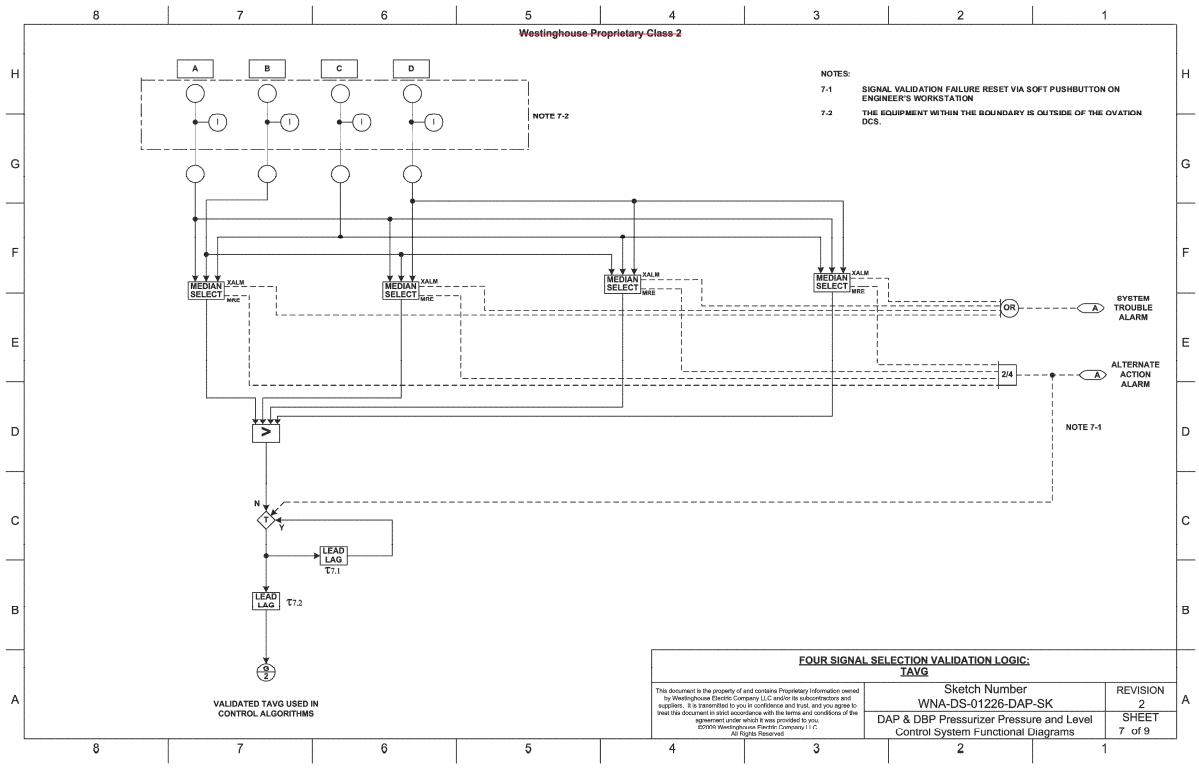
STEAM DUMP CONTROL:
STEAM DUMP VALVES MODULATION

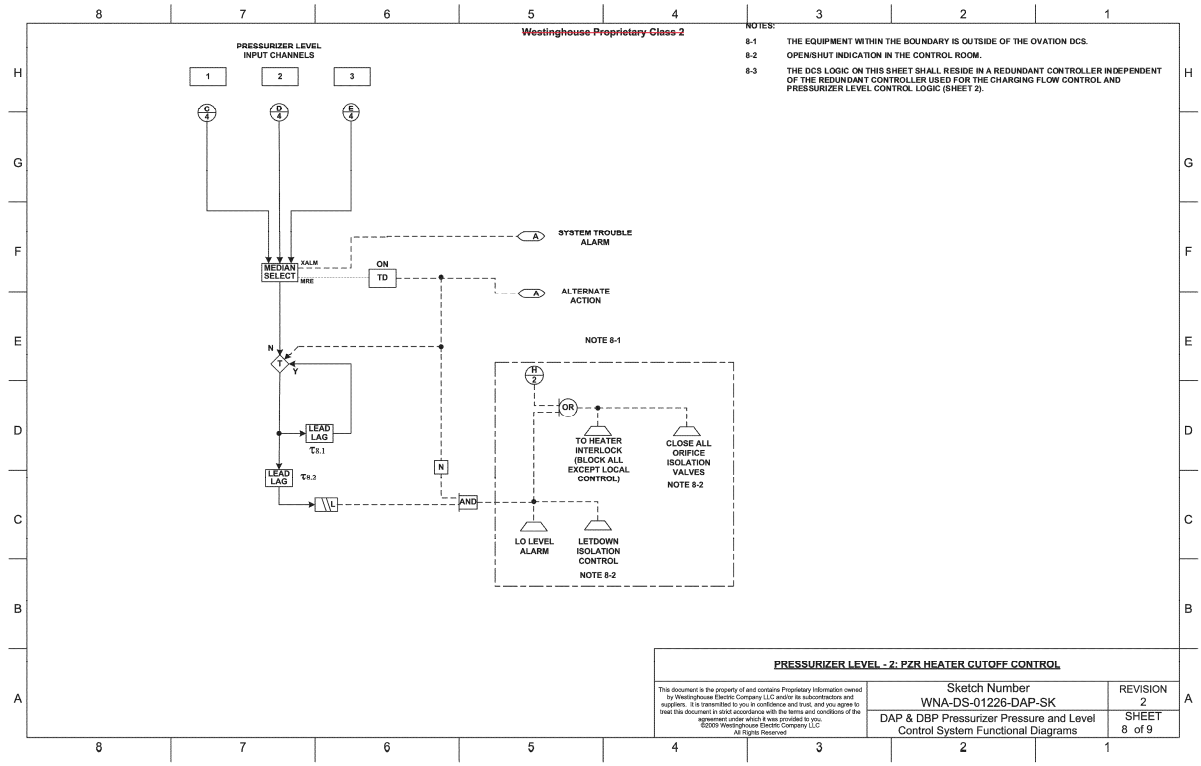
Sketch Number	REVISION
WNA-DS-01225-DAP-SK	1
DAP & DBP Steam Dump Control System Functional Diagrams	SHEET 3 of 9


PRESSURIZER LEVEL INPUT CHANNEL
~~Westinghouse Proprietary Class 2~~
1
2
3
AUX FP STATION
NOTE 4-1
4-1 THE EQUIPMENT WITHIN THE BOUNDARY IS OUTSIDE OF THE OVATION DCS.
C 8
D 8
E 8
SYSTEM TROUBLE ALARM
MEDIAN SELECT
XALM
MRE
ON
TD
ALTERNATE ACTION
N
T
Y
LEAD LAG
τ4.1
LEAD LAG
τ4.2
A 2
VALIDATED PRESSURIZER LEVEL
THREE SIGNAL VALIDATION LOGIC:
PRESSURIZER LEVEL
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2005 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number
WNA-DS-01226-DAP-SK
REVISION 2
DAP & DBP Pressurizer Pressure and Level Control System Functional Diagrams
SHEET 4 of 9




Westinghouse Proprietary Class 2
NOTES:
6-1 TWO SEPARATE SIGNAL VALIDATION AND SELECTOR ALGORITHMS IN SEPARATE CONTROLLERS POWERED FROM SEPARATE POWER SOURCES SHALL SEPARATE THE PORV INTERLOCKS FROM THE PORV ACTUATION SIGNALS.
6-2 THE EQUIPMENT WITHIN THE BOUNDARY IS OUTSIDE OF THE OVATION DCS.
6-3 BISTABLE IS ENERGIZED ON INCREASING PRESSURIZER PRESSURE TO UNBLOCK PORV. BISTABLE IS DE-ENERGIZED WHEN PRESSURE FALLS BELOW SETPOINT MINUS DEADBAND TO BLOCK PORV FROM OPENING AND PROVIDE ANNUNCIATOR ALARM.
MEDIAN SELECT
XALM
NRE
OR
SYSTEM TROUBLE ALARM
2/4
ALTERNATE ACTION ALARM
LEAD LAG
τ6.1
τ6.2
AND
HI PRESSURE ALARM
NOTE 6-3
PORV NC-34 INTERLOCK
LO PRESSURE ALARM
NOTE 6-2
PORV NC-32, NC-36 INTERLOCK
TO PORV NC-32, NC-36 DEMAND OPEN
NOTE 6-1
PRESSURIZER PRESSURE-2: PORV LOGIC
Sketch Number WNA-DS-01226-DAP-SK
REVISION 2
DAP & DBP Pressurizer Pressure and Level Control System Functional Diagrams
SHEET 6 of 9


Westinghouse Proprietary Class 2
A
B
C
D
NOTE 7-2
NOTES:
7-1 SIGNAL VALIDATION FAILURE RESET VIA SOFT PUSHBUTTON ON ENGINEER'S WORKSTATION
7-2 THE EQUIPMENT WITHIN THE BOUNDARY IS OUTSIDE OF THE OVATION DCS.
MEDIAN SELECT
XALM
MRC
MRE
OR
SYSTEM TROUBLE ALARM
2/4
ALTERNATE ACTION ALARM
NOTE 7-1
LEAD LAG
T7.1
T7.2
VALIDATED TAVG USED IN CONTROL ALGORITHMS
FOUR SIGNAL SELECTION VALIDATION LOGIC: TAVG
Sketch Number
WNA-DS-01226-DAP-SK
REVISION
2
DAP & DBP Pressurizer Pressure and Level Control System Functional Diagrams
SHEET
7 of 9


Westinghouse Proprietary Class 2
NOTES:
8-1 THE EQUIPMENT WITHIN THE BOUNDARY IS OUTSIDE OF THE OVATION DCS.
8-2 OPEN/SHUT INDICATION IN THE CONTROL ROOM.
8-3 THE DCS LOGIC ON THIS SHEET SHALL RESIDE IN A REDUNDANT CONTROLLER INDEPENDENT OF THE REDUNDANT CONTROLLER USED FOR THE CHARGING FLOW CONTROL AND PRESSURIZER LEVEL CONTROL LOGIC (SHEET 2).
PRESSURIZER LEVEL INPUT CHANNELS
1
2
3
MEDIAN SELECT
XALM
XRE
ON
TD
SYSTEM TROUBLE ALARM
ALTERNATE ACTION
NOTE 8-1
LEAD LAG
LEAD LAG
AND
OR
TO HEATER INTERLOCK (BLOCK ALL EXCEPT LOCAL CONTROL)
CLOSE ALL ORIFICE ISOLATION VALVES
NOTE 8-2
LO LEVEL ALARM
LETDOWN ISOLATION CONTROL
NOTE 8-2
PRESSURIZER LEVEL - 2: PZR HEATER CUTOFF CONTROL
Sketch Number
WNA-DS-01226-DAP-SK
REVISION
2
DAP & DBP Pressurizer Pressure and Level Control System Functional Diagrams
SHEET
8 of 9

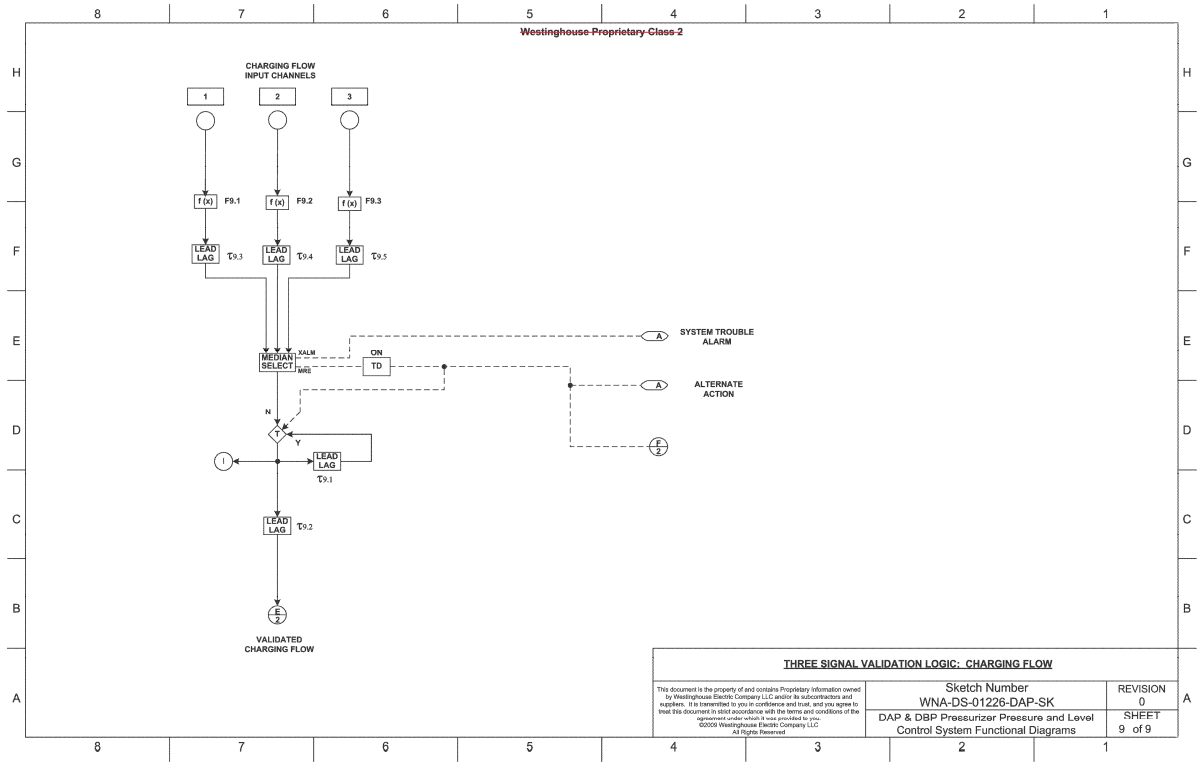
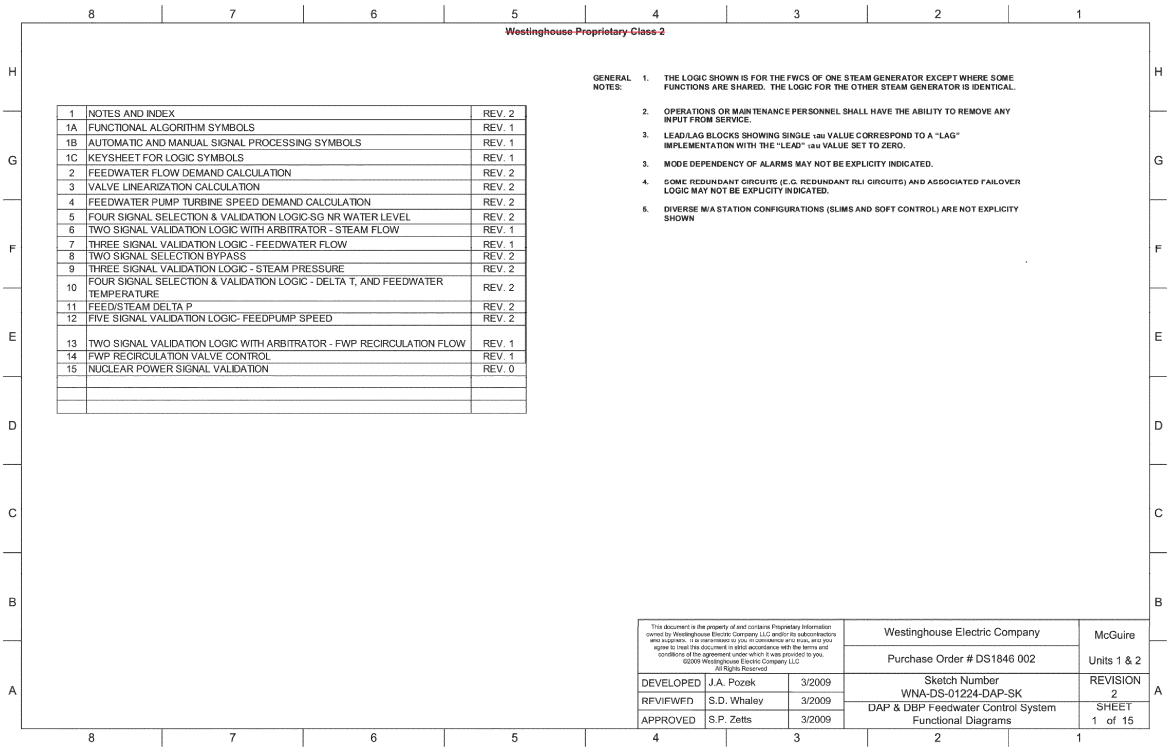
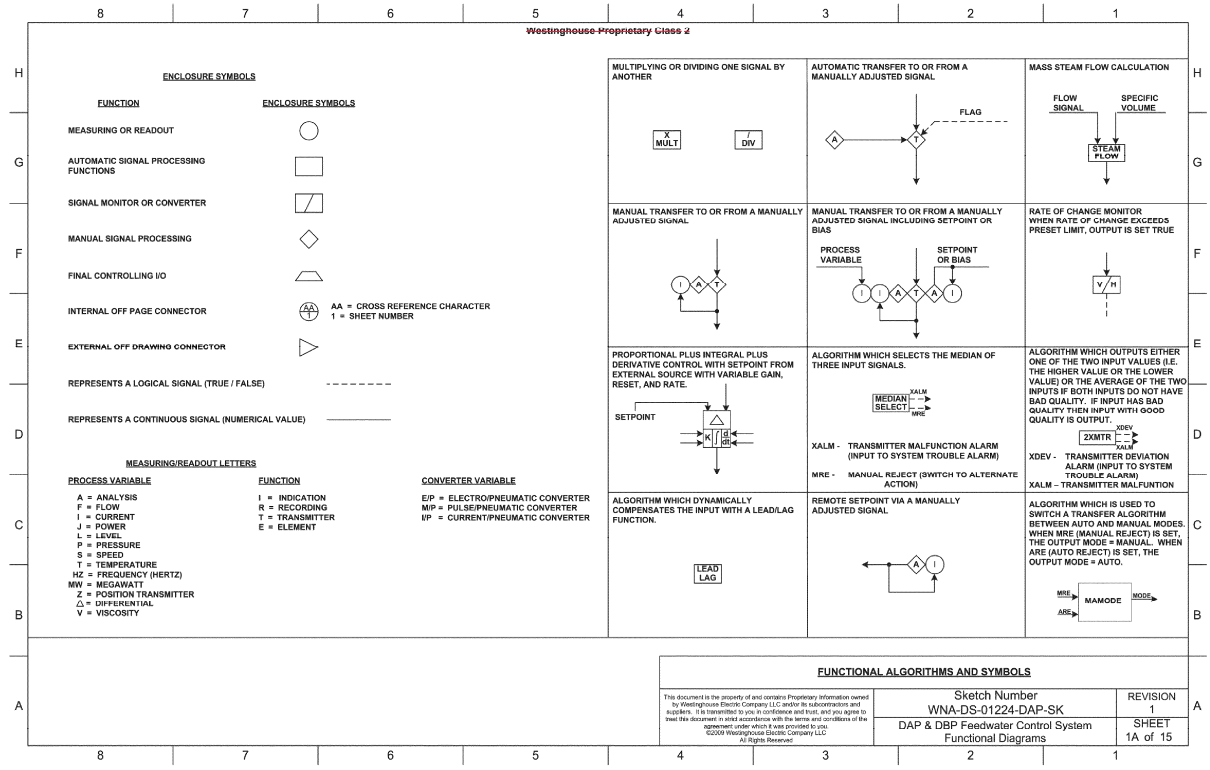
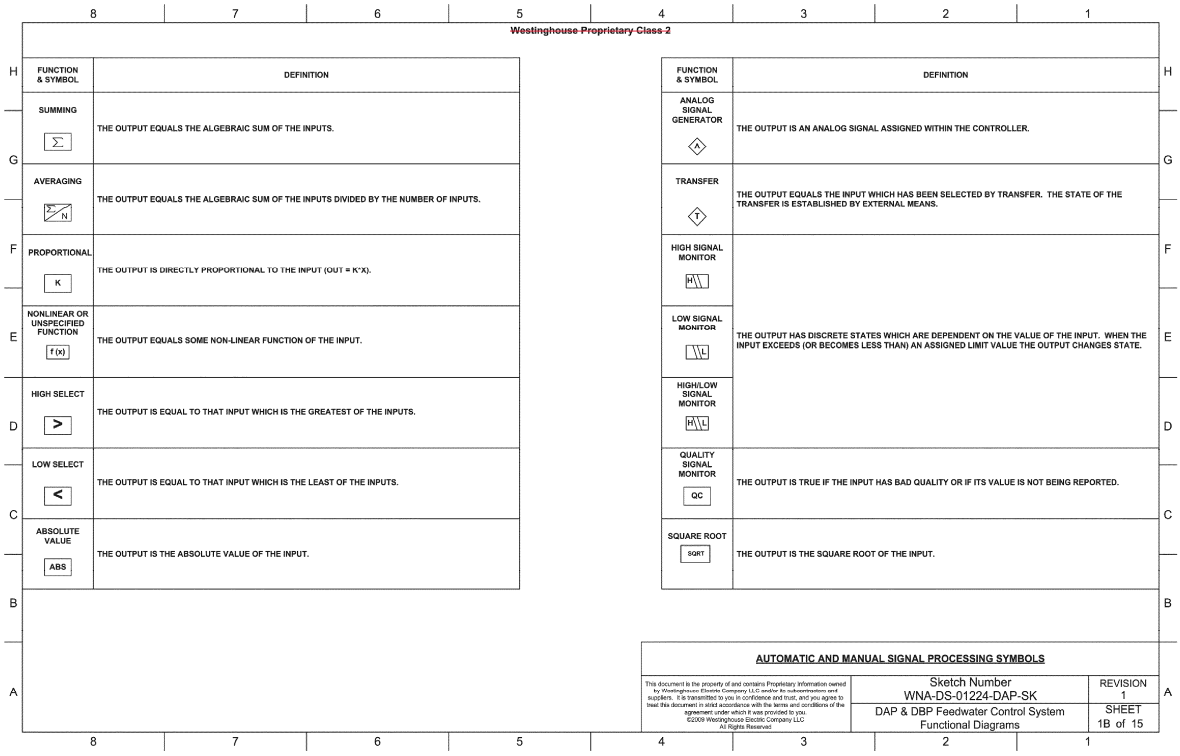
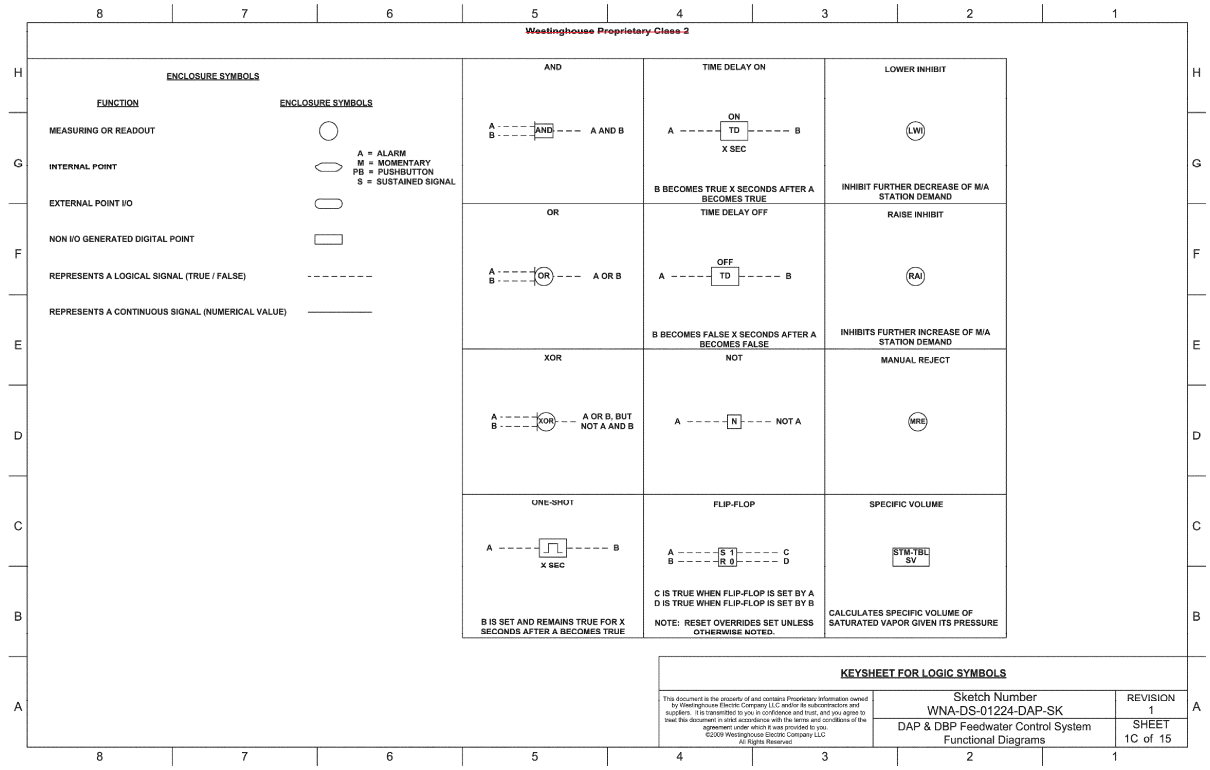


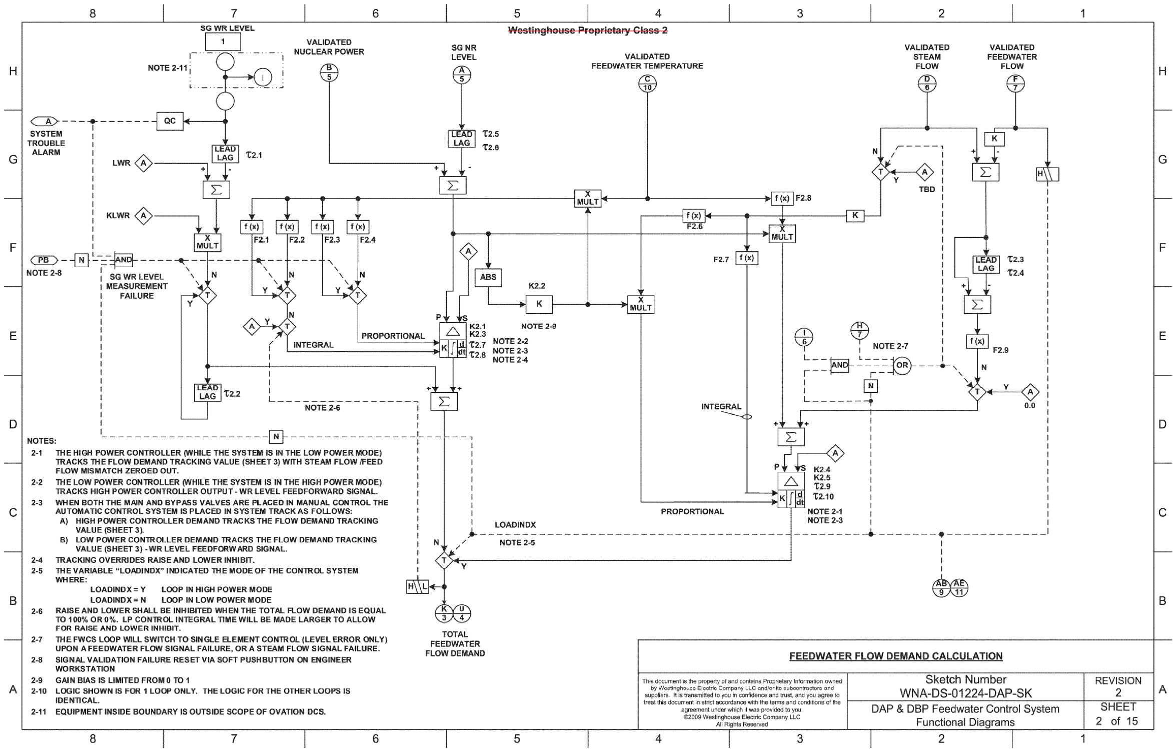
Figure 7-35. DAP & DBP Feedwater Control System Functional Diagrams

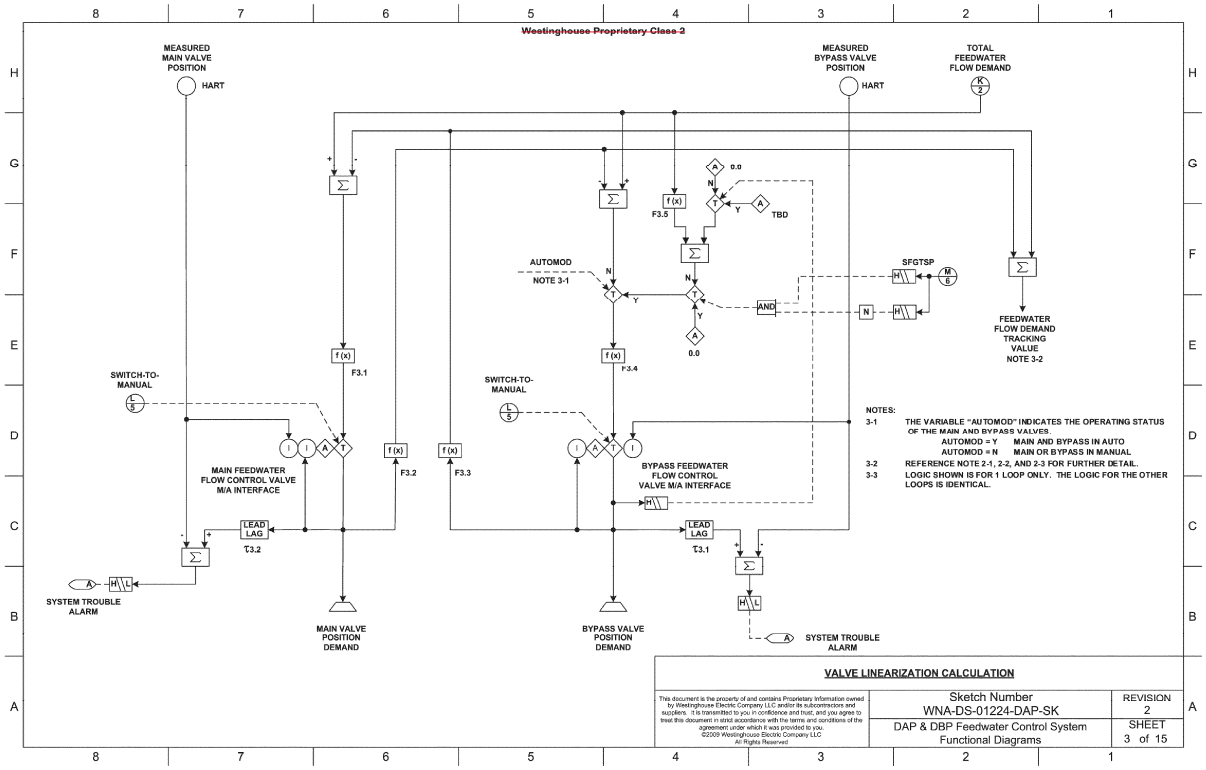


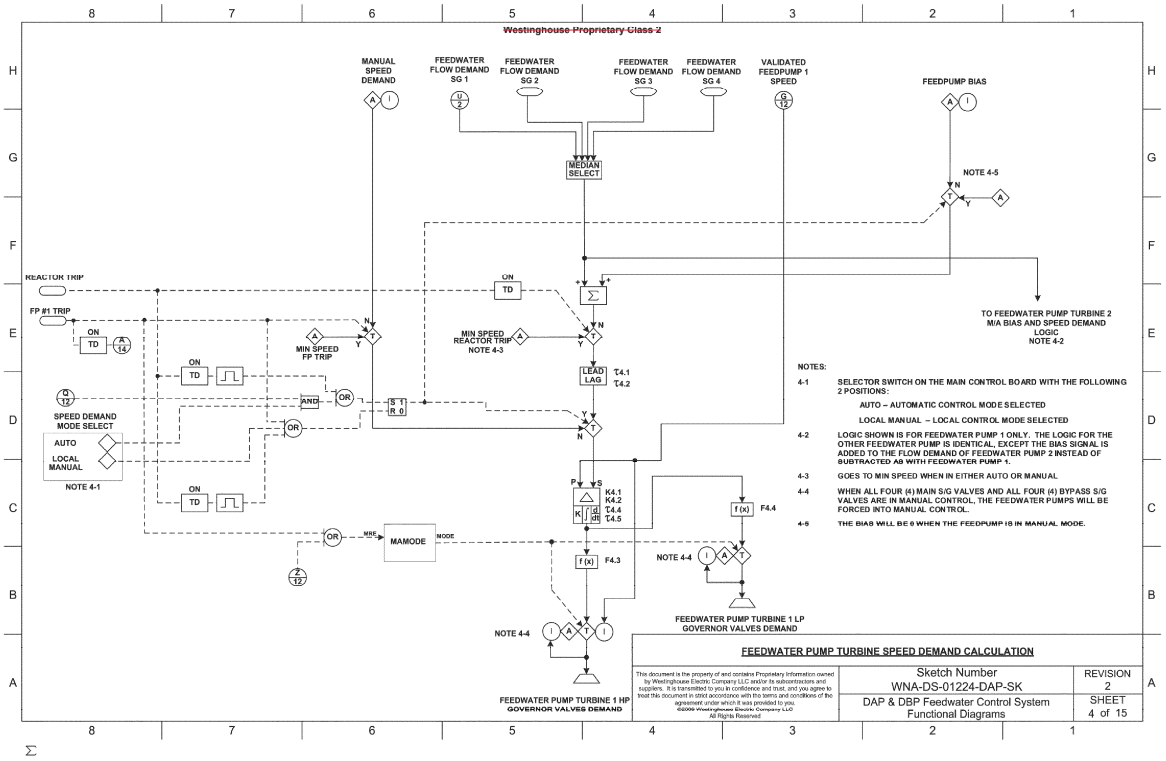


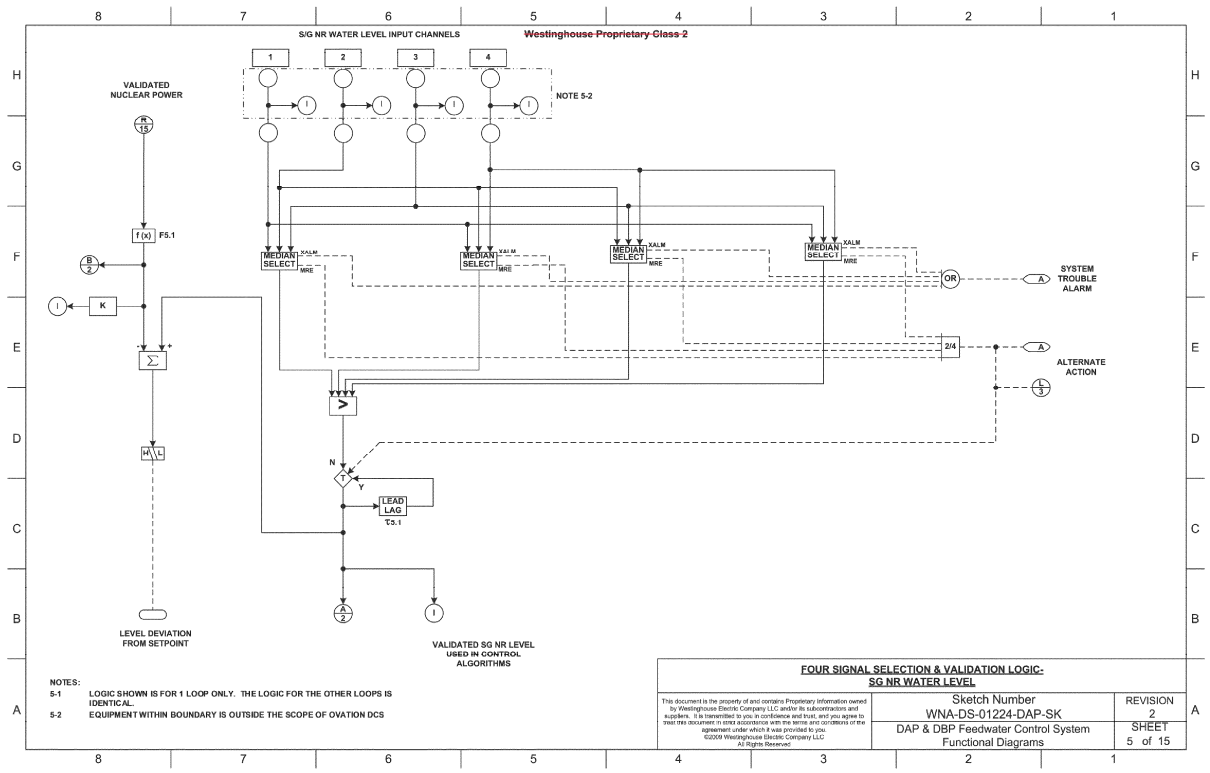

Westinghouse Proprietary Class 2
FUNCTION & SYMBOL
DEFINITION
SUMMING
Σ
THE OUTPUT EQUALS THE ALGEBRAIC SUM OF THE INPUTS.
AVERAGING
Σ N
THE OUTPUT EQUALS THE ALGEBRAIC SUM OF THE INPUTS DIVIDED BY THE NUMBER OF INPUTS.
PROPORTIONAL
K
THE OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT (OUT = K*X).
NONLINEAR OR UNSPECIFIED FUNCTION
f (x)
THE OUTPUT EQUALS SOME NON-LINEAR FUNCTION OF THE INPUT.
HIGH SELECT
>
THE OUTPUT IS EQUAL TO THAT INPUT WHICH IS THE GREATEST OF THE INPUTS.
LOW SELECT
<
THE OUTPUT IS EQUAL TO THAT INPUT WHICH IS THE LEAST OF THE INPUTS.
ABSOLUTE VALUE
ABS
THE OUTPUT IS THE ABSOLUTE VALUE OF THE INPUT.
FUNCTION & SYMBOL
DEFINITION
ANALOG SIGNAL GENERATOR
A
THE OUTPUT IS AN ANALOG SIGNAL ASSIGNED WITHIN THE CONTROLLER.
TRANSFER
T
THE OUTPUT EQUALS THE INPUT WHICH HAS BEEN SELECTED BY TRANSFER. THE STATE OF THE TRANSFER IS ESTABLISHED BY EXTERNAL MEANS.
HIGH SIGNAL MONITOR
H
LOW SIGNAL MONITOR
L
HIGH/LOW SIGNAL MONITOR
H L
THE OUTPUT HAS DISCRETE STATES WHICH ARE DEPENDENT ON THE VALUE OF THE INPUT. WHEN THE INPUT EXCEEDS (OR BECOMES LESS THAN) AN ASSIGNED LIMIT VALUE THE OUTPUT CHANGES STATE.
QUALITY SIGNAL MONITOR
QC
THE OUTPUT IS TRUE IF THE INPUT HAS BAD QUALITY OR IF ITS VALUE IS NOT BEING REPORTED.
SQUARE ROOT
SQRT
THE OUTPUT IS THE SQUARE ROOT OF THE INPUT.
AUTOMATIC AND MANUAL SIGNAL PROCESSING SYMBOLS
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2009 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number
WNA-DS-01224-DAP-SK
REVISION
1
DAP & DBP Feedwater Control System
Functional Diagrams
SHEET
1B of 15

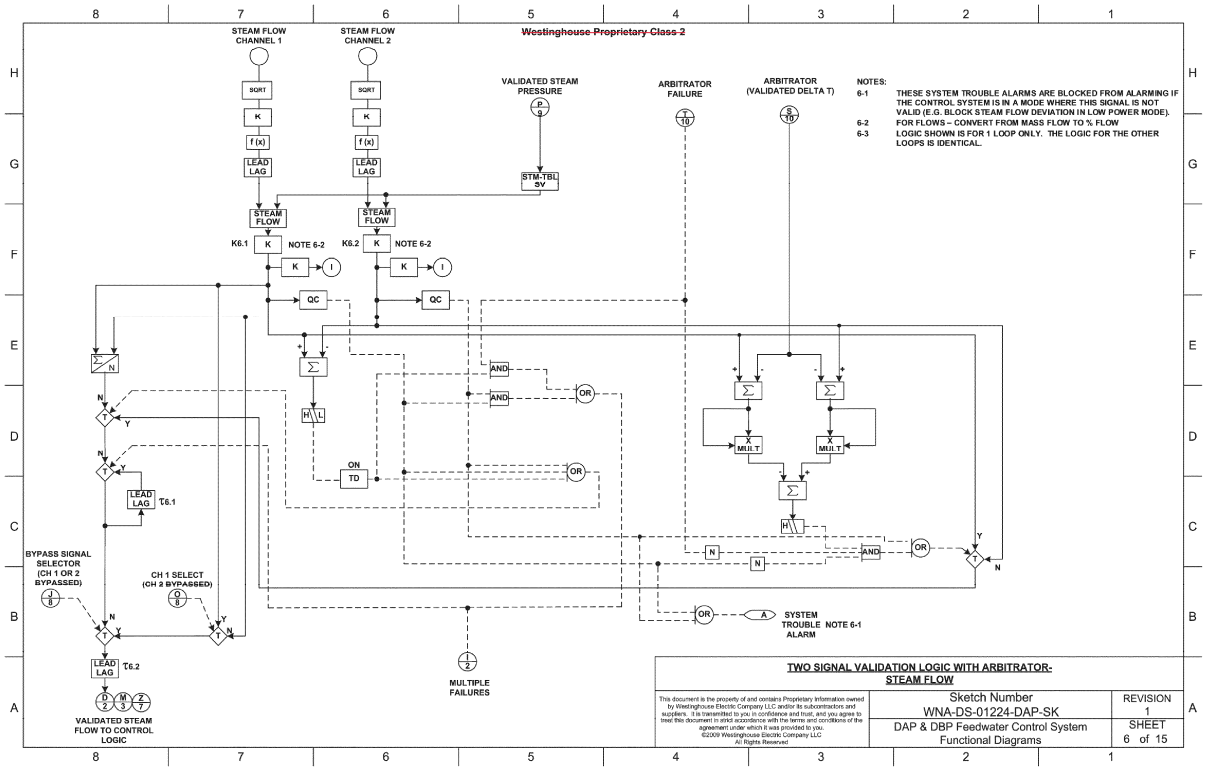


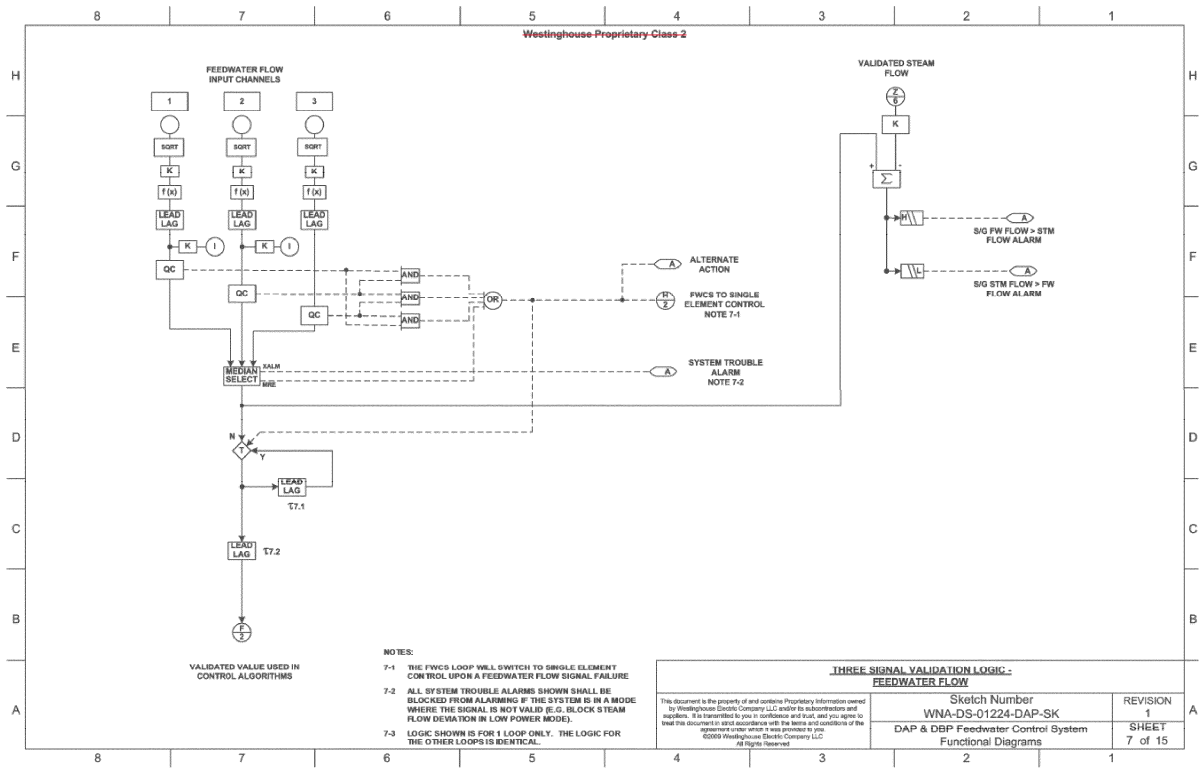

Westinghouse Proprietary Class 2
SG WR LEVEL
NOTE 2-11
VALIDATED NUCLEAR POWER
SG NR LEVEL
VALIDATED FEEDWATER TEMPERATURE
VALIDATED STEAM FLOW
VALIDATED FEEDWATER FLOW
SYSTEM TROUBLE ALARM
QC
LEAD LAG
LWR
KLWR
X MULT
f (x)
F2.1
F2.2
F2.3
F2.4
F2.6
F2.7
F2.8
F2.9
PB
NOTE 2-8
AND
SG WR LEVEL MEASUREMENT FAILURE
ABS
K2.2
NOTE 2-9
K2.1
K2.3
NOTE 2-2
NOTE 2-3
NOTE 2-4
INTEGRAL
PROPORTIONAL
NOTE 2-6
TBD
NOTE 2-7
OR
K2.4
K2.5
NOTE 2-1
NOTE 2-3
LOADINDX
NOTE 2-5
TOTAL FEEDWATER FLOW DEMAND
NOTES:
2-1 THE HIGH POWER CONTROLLER (WHILE THE SYSTEM IS IN THE LOW POWER MODE) TRACKS THE FLOW DEMAND TRACKING VALUE (SHEET 3) WITH STEAM FLOW /FEED FLOW MISMATCH ZEROED OUT.
2-2 THE LOW POWER CONTROLLER (WHILE THE SYSTEM IS IN THE HIGH POWER MODE) TRACKS HIGH POWER CONTROLLER OUTPUT - WR LEVEL FEEDFORWARD SIGNAL.
2-3 WHEN BOTH THE MAIN AND BYPASS VALVES ARE PLACED IN MANUAL CONTROL THE AUTOMATIC CONTROL SYSTEM IS PLACED IN SYSTEM TRACK AS FOLLOWS:
A) HIGH POWER CONTROLLER DEMAND TRACKS THE FLOW DEMAND TRACKING VALUE (SHEET 3).
B) LOW POWER CONTROLLER DEMAND TRACKS THE FLOW DEMAND TRACKING VALUE (SHEET 3) - WR LEVEL FEEDFORWARD SIGNAL.
2-4 TRACKING OVERRIDES RAISE AND LOWER INHIBIT.
2-5 THE VARIABLE "LOADINDX" INDICATED THE MODE OF THE CONTROL SYSTEM WHERE:
LOADINDX = Y LOOP IN HIGH POWER MODE
LOADINDX = N LOOP IN LOW POWER MODE
2-6 RAISE AND LOWER SHALL BE INHIBITED WHEN THE TOTAL FLOW DEMAND IS EQUAL TO 100% OR 0%. LP CONTROL INTEGRAL TIME WILL BE MADE LARGER TO ALLOW FOR RAISE AND LOWER INHIBIT.
2-7 THE FWCS LOOP WILL SWITCH TO SINGLE ELEMENT CONTROL (LEVEL ERROR ONLY) UPON A FEEDWATER FLOW SIGNAL FAILURE, OR A STEAM FLOW SIGNAL FAILURE.
2-8 SIGNAL VALIDATION FAILURE RESET VIA SOFT PUSHBUTTON ON ENGINEER WORKSTATION
2-9 GAIN BIAS IS LIMITED FROM 0 TO 1
2-10 LOGIC SHOWN IS FOR 1 LOOP ONLY. THE LOGIC FOR THE OTHER LOOPS IS IDENTICAL.
2-11 EQUIPMENT INSIDE BOUNDARY IS OUTSIDE SCOPE OF OVATION DCS.
FEEDWATER FLOW DEMAND CALCULATION
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2009 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number
WNA-DS-01224-DAP-SK
REVISION
2
DAP & DBP Feedwater Control System
Functional Diagrams
SHEET
2 of 15

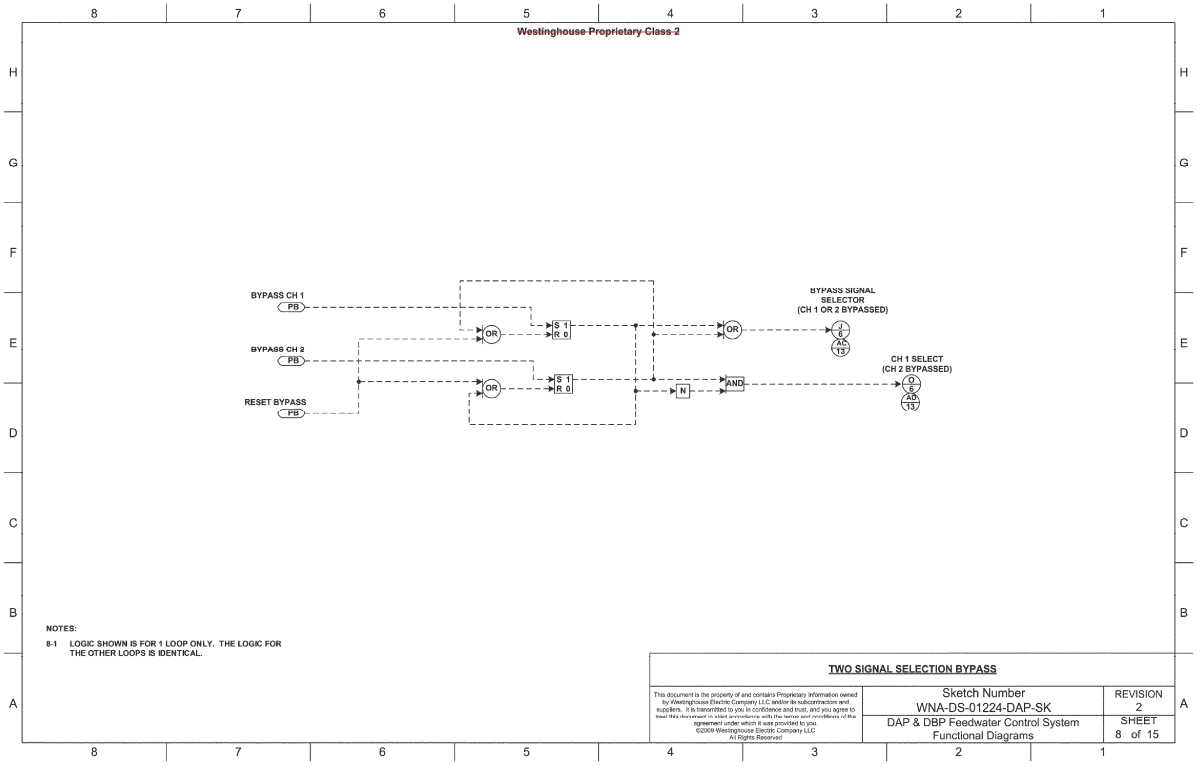

Westinghouse Proprietary Class 2
MEASURED MAIN VALVE POSITION
HART
MEASURED BYPASS VALVE POSITION
HART
TOTAL FEEDWATER FLOW DEMAND
K 2
f (x) F3.5
TBD
AUTOMOD NOTE 3-1
SFGTSP
M 6
AND
FEEDWATER FLOW DEMAND TRACKING VALUE NOTE 3-2
f (x) F3.1
f (x) F3.4
SWITCH-TO-MANUAL
L 5
MAIN FEEDWATER FLOW CONTROL VALVE M/A INTERFACE
f (x) F3.2
f (x) F3.3
BYPASS FEEDWATER FLOW CONTROL VALVE M/A INTERFACE
LEAD LAG T3.2
LEAD LAG T3.1
SYSTEM TROUBLE ALARM
MAIN VALVE POSITION DEMAND
BYPASS VALVE POSITION DEMAND
SYSTEM TROUBLE ALARM
NOTES:
3-1 THE VARIABLE "AUTOMOD" INDICATES THE OPERATING STATUS OF THE MAIN AND BYPASS VALVES.
AUTOMOD = Y MAIN AND BYPASS IN AUTO
AUTOMOD = N MAIN OR BYPASS IN MANUAL
3-2 REFERENCE NOTE 2-1, 2-2, AND 2-3 FOR FURTHER DETAIL.
3-3 LOGIC SHOWN IS FOR 1 LOOP ONLY. THE LOGIC FOR THE OTHER LOOPS IS IDENTICAL.
VALVE LINEARIZATION CALCULATION
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2009 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number WNA-DS-01224-DAP-SK
REVISION 2
DAP & DBP Feedwater Control System Functional Diagrams
SHEET 3 of 15

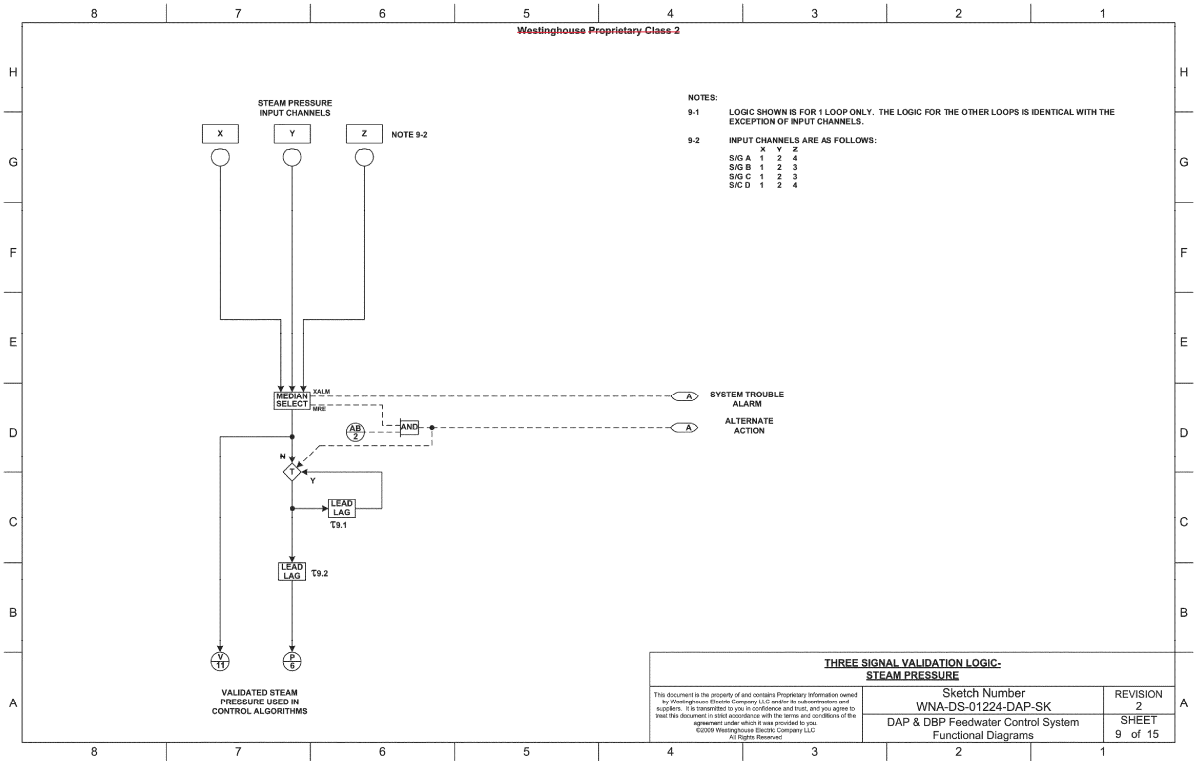

Westinghouse Proprietary Class 2
MANUAL SPEED DEMAND
FEEDWATER FLOW DEMAND SG 1
FEEDWATER FLOW DEMAND SG 2
FEEDWATER FLOW DEMAND SG 3
FEEDWATER FLOW DEMAND SG 4
VALIDATED FEEDPUMP 1 SPEED
FEEDPUMP BIAS
MEDIAN SELECT
NOTE 4-5
REACTOR TRIP
FP #1 TRIP
ON TD
MIN SPEED FP TRIP
MIN SPEED REACTOR TRIP NOTE 4-3
LEAD LAG
τ4.1
τ4.2
TO FEEDWATER PUMP TURBINE 2 M/A BIAS AND SPEED DEMAND LOGIC NOTE 4-2
SPEED DEMAND MODE SELECT
AUTO
LOCAL MANUAL
NOTE 4-1
AND
OR
S 1
R 0
MAMODE
MODE
K4.1
K4.2
τ4.4
τ4.5
f(x) F4.3
f(x) F4.4
NOTE 4-4
FEEDWATER PUMP TURBINE 1 LP GOVERNOR VALVES DEMAND
FEEDWATER PUMP TURBINE 1 HP GOVERNOR VALVES DEMAND
NOTES:
4-1 SELECTOR SWITCH ON THE MAIN CONTROL BOARD WITH THE FOLLOWING 2 POSITIONS:
AUTO – AUTOMATIC CONTROL MODE SELECTED
LOCAL MANUAL – LOCAL CONTROL MODE SELECTED
4-2 LOGIC SHOWN IS FOR FEEDWATER PUMP 1 ONLY. THE LOGIC FOR THE OTHER FEEDWATER PUMP IS IDENTICAL, EXCEPT THE BIAS SIGNAL IS ADDED TO THE FLOW DEMAND OF FEEDWATER PUMP 2 INSTEAD OF SUBTRACTED AS WITH FEEDWATER PUMP 1.
4-3 GOES TO MIN SPEED WHEN IN EITHER AUTO OR MANUAL
4-4 WHEN ALL FOUR (4) MAIN S/G VALVES AND ALL FOUR (4) BYPASS S/G VALVES ARE IN MANUAL CONTROL, THE FEEDWATER PUMPS WILL BE FORCED INTO MANUAL CONTROL.
4-5 THE BIAS WILL BE 0 WHEN THE FEEDPUMP IS IN MANUAL MODE.
FEEDWATER PUMP TURBINE SPEED DEMAND CALCULATION
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2008 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number
WNA-DS-01224-DAP-SK
REVISION 2
DAP & DBP Feedwater Control System Functional Diagrams
SHEET 4 of 15

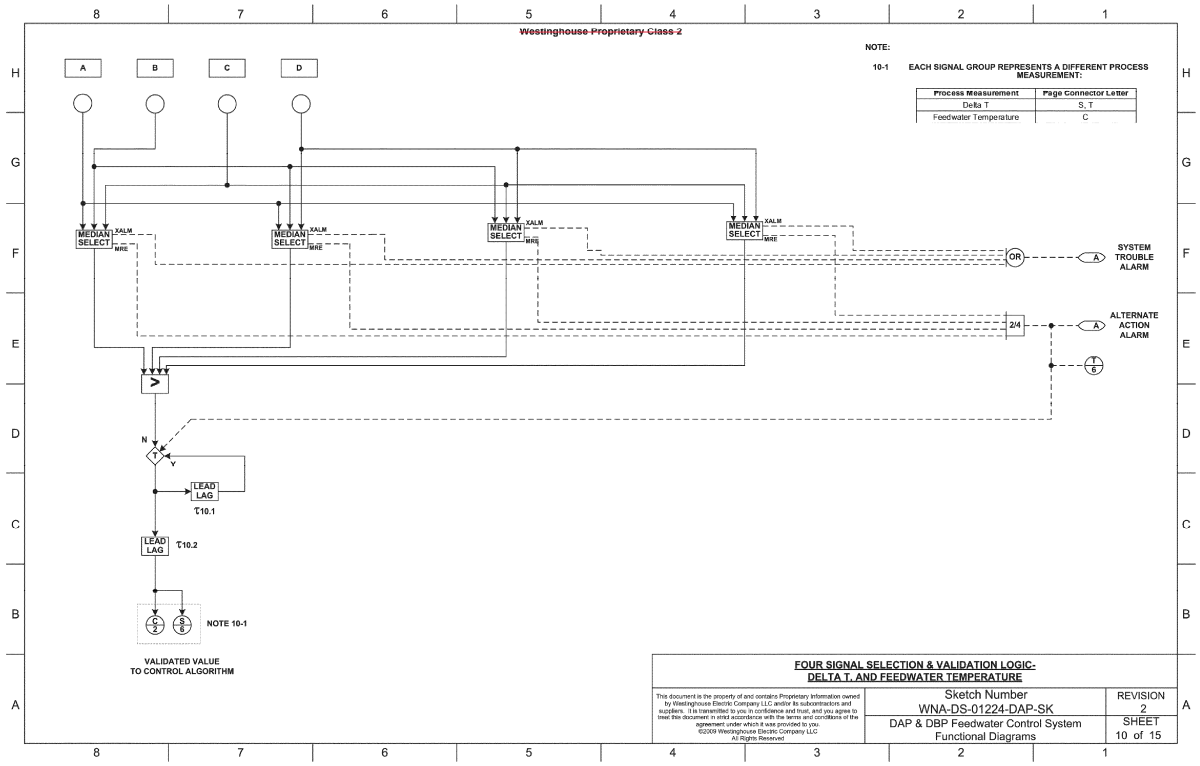

S/G NR WATER LEVEL INPUT CHANNELS
Westinghouse Proprietary Class 2
VALIDATED NUCLEAR POWER
NOTE 5-2
MEDIAN SELECT
XALM
MRE
SYSTEM TROUBLE ALARM
OR
2/4
ALTERNATE ACTION
LEAD LAG
LEVEL DEVIATION FROM SETPOINT
VALIDATED SG NR LEVEL USED IN CONTROL ALGORITHMS
NOTES:
5-1 LOGIC SHOWN IS FOR 1 LOOP ONLY. THE LOGIC FOR THE OTHER LOOPS IS IDENTICAL.
5-2 EQUIPMENT WITHIN BOUNDARY IS OUTSIDE THE SCOPE OF OVATION DCS
FOUR SIGNAL SELECTION & VALIDATION LOGIC-
SG NR WATER LEVEL
Sketch Number
WNA-DS-01224-DAP-SK
REVISION
2
DAP & DBP Feedwater Control System
Functional Diagrams
SHEET
5 of 15

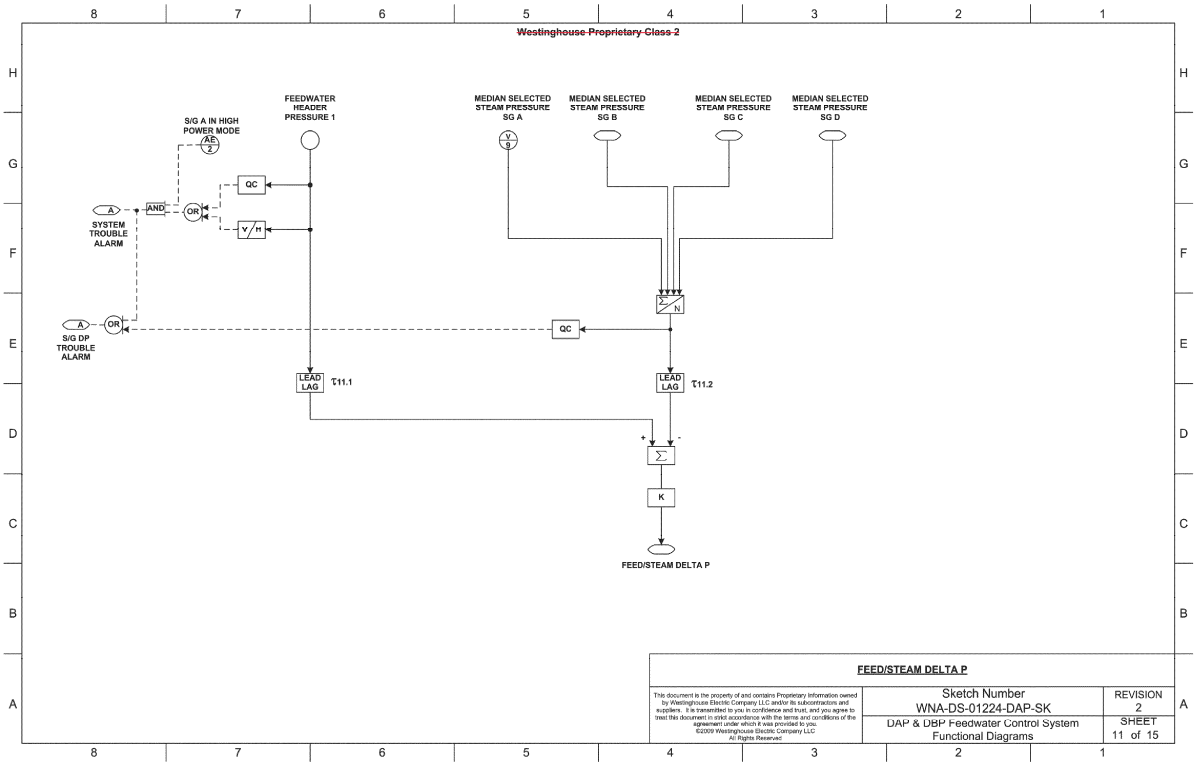


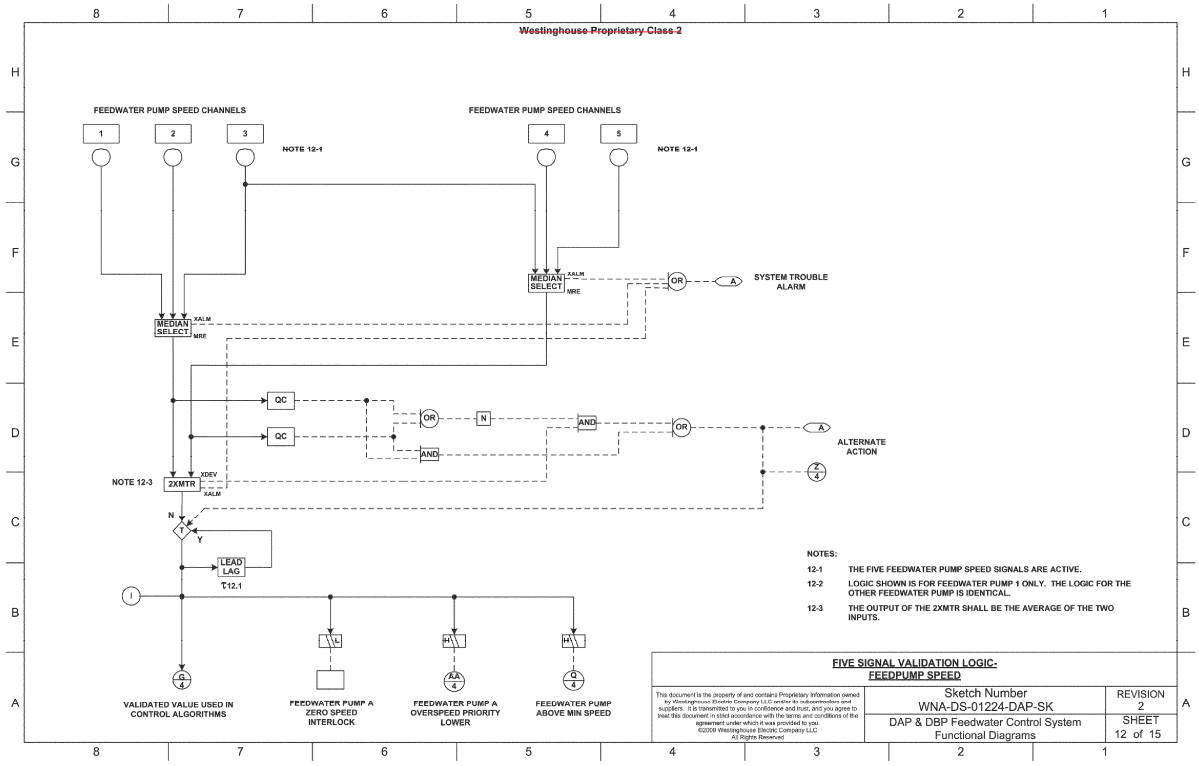

Westinghouse Proprietary Class 2
FEEDWATER FLOW INPUT CHANNELS
VALIDATED STEAM FLOW
SQRT
K
f (x)
LEAD LAG
QC
AND
OR
ALTERNATE ACTION
FWCS TO SINGLE ELEMENT CONTROL NOTE 7-1
SYSTEM TROUBLE ALARM NOTE 7-2
S/G FW FLOW > STM FLOW ALARM
S/G STM FLOW > FW FLOW ALARM
MEDIAN SELECT
XALM
T7.1
T7.2
VALIDATED VALUE USED IN CONTROL ALGORITHMS
NOTES:
7-1 THE FWCS LOOP WILL SWITCH TO SINGLE ELEMENT CONTROL UPON A FEEDWATER FLOW SIGNAL FAILURE
7-2 ALL SYSTEM TROUBLE ALARMS SHOWN SHALL BE BLOCKED FROM ALARMING IF THE SYSTEM IS IN A MODE WHERE THE SIGNAL IS NOT VALID (E.G. BLOCK STEAM FLOW DEVIATION IN LOW POWER MODE).
7-3 LOGIC SHOWN IS FOR 1 LOOP ONLY. THE LOGIC FOR THE OTHER LOOPS IS IDENTICAL.
THREE SIGNAL VALIDATION LOGIC - FEEDWATER FLOW
Sketch Number WNA-DS-01224-DAP-SK
REVISION 1
DAP & DBP Feedwater Control System Functional Diagrams
SHEET 7 of 15

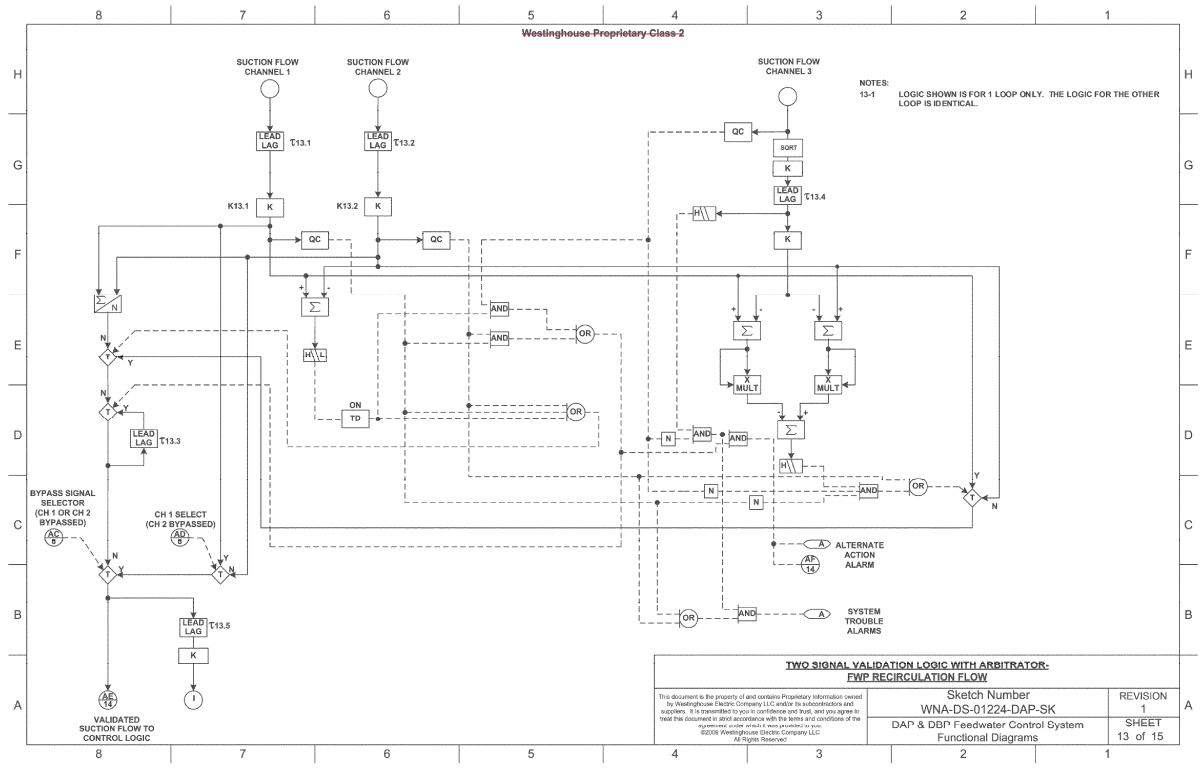

Westinghouse Proprietary Class 2
BYPASS CH 1
PB
BYPASS CH 2
PB
RESET BYPASS
PB
OR
OR
S 1
R 0
S 1
R 0
OR
AND
N
BYPASS SIGNAL SELECTOR (CH 1 OR 2 BYPASSED)
J 6
AC 13
CH 1 SELECT (CH 2 BYPASSED)
O 5
AD 13
NOTES:
8-1 LOGIC SHOWN IS FOR 1 LOOP ONLY. THE LOGIC FOR THE OTHER LOOPS IS IDENTICAL.
TWO SIGNAL SELECTION BYPASS
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2009 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number
WNA-DS-01224-DAP-SK
REVISION
2
DAP & DBP Feedwater Control System
Functional Diagrams
SHEET
8 of 15

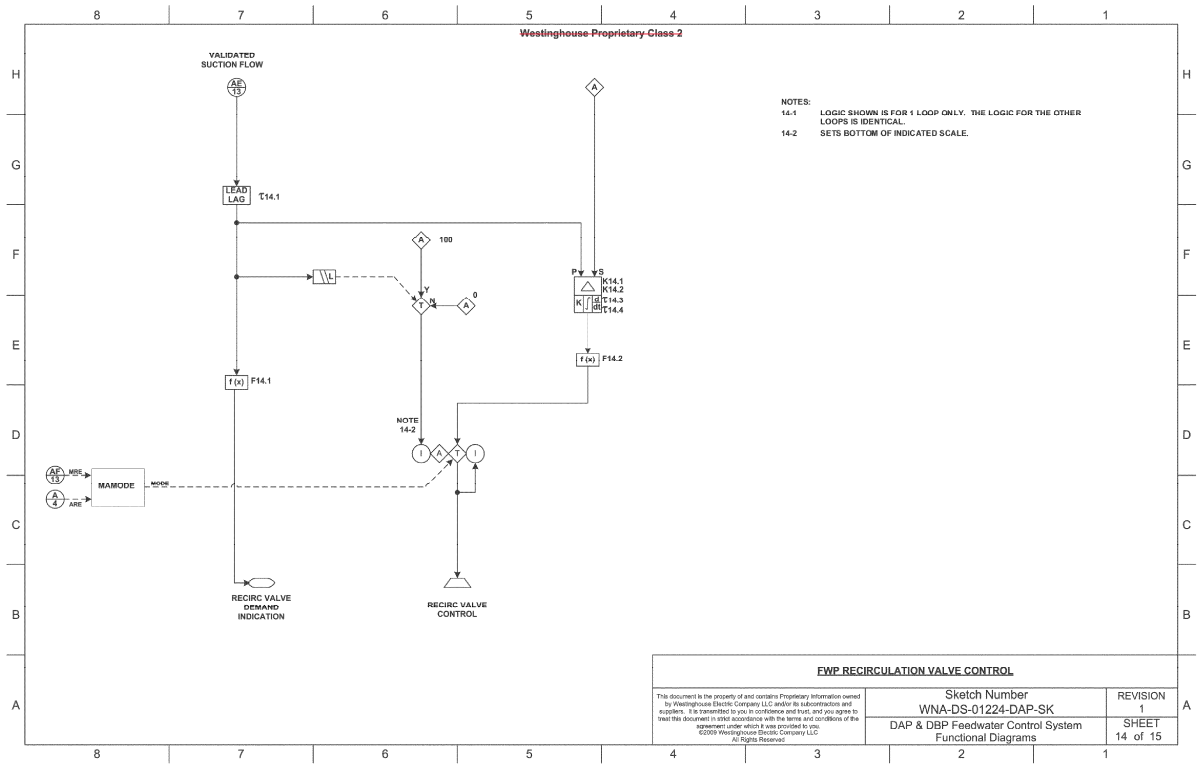


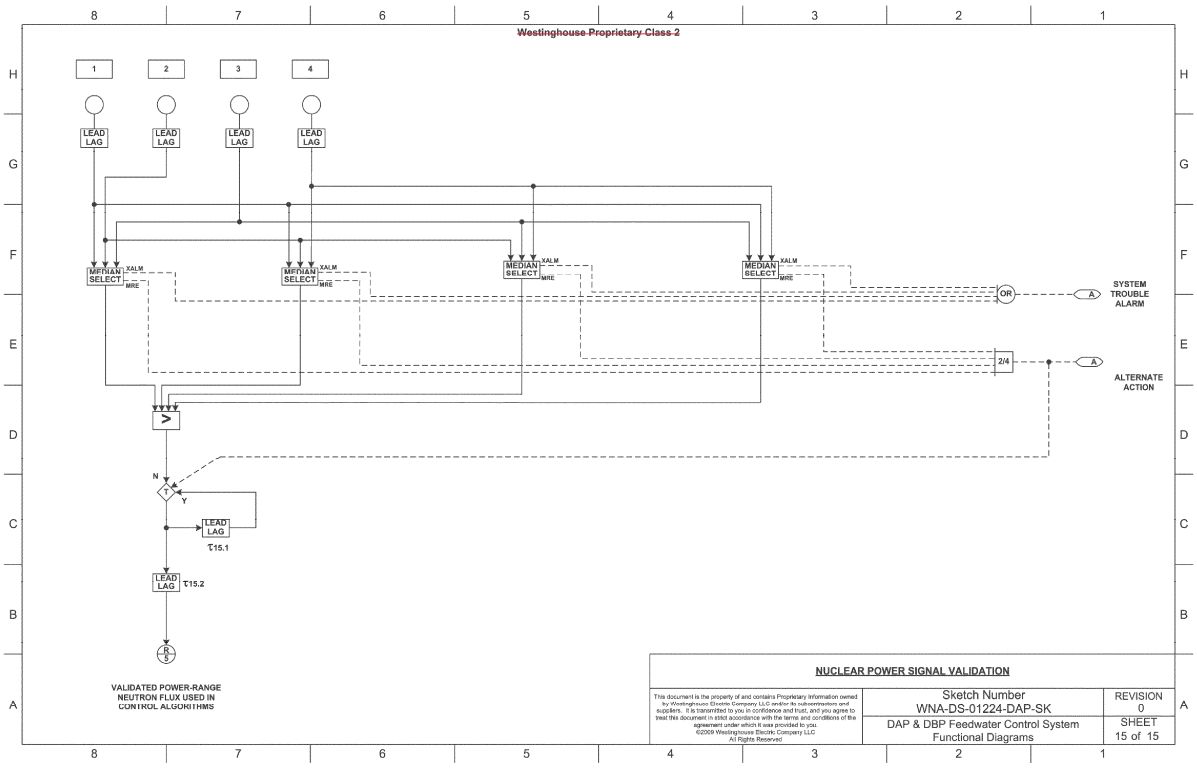





Westinghouse Proprietary Class 2
FEEDWATER PUMP SPEED CHANNELS
1
2
3
NOTE 12-1
FEEDWATER PUMP SPEED CHANNELS
4
5
NOTE 12-1
MEDIAN SELECT
XALM
MRE
OR
A
SYSTEM TROUBLE ALARM
QC
N
AND
ALTERNATE ACTION
NOTE 12-3
2XMTR
XDEV
XALM
LEAD LAG
τ12.1
VALIDATED VALUE USED IN CONTROL ALGORITHMS
FEEDWATER PUMP A ZERO SPEED INTERLOCK
FEEDWATER PUMP A OVERSPEED PRIORITY LOWER
FEEDWATER PUMP ABOVE MIN SPEED
NOTES:
12-1 THE FIVE FEEDWATER PUMP SPEED SIGNALS ARE ACTIVE.
12-2 LOGIC SHOWN IS FOR FEEDWATER PUMP 1 ONLY. THE LOGIC FOR THE OTHER FEEDWATER PUMP IS IDENTICAL.
12-3 THE OUTPUT OF THE 2XMTR SHALL BE THE AVERAGE OF THE TWO INPUTS.
FIVE SIGNAL VALIDATION LOGIC-
FEEDPUMP SPEED
Sketch Number
WNA-DS-01224-DAP-SK
REVISION
2
DAP & DBP Feedwater Control System
Functional Diagrams
SHEET
12 of 15


Westinghouse Proprietary Class 2
SUCTION FLOW CHANNEL 1
SUCTION FLOW CHANNEL 2
SUCTION FLOW CHANNEL 3
NOTES:
13-1 LOGIC SHOWN IS FOR 1 LOOP ONLY. THE LOGIC FOR THE OTHER LOOP IS IDENTICAL.
LEAD LAG τ13.1
LEAD LAG τ13.2
LEAD LAG τ13.3
LEAD LAG τ13.4
LEAD LAG τ13.5
K13.1
K13.2
QC
SQRT
K
AND
OR
MULT
ON TD
BYPASS SIGNAL SELECTOR (CH 1 OR CH 2 BYPASSED)
CH 1 SELECT (CH 2 BYPASSED)
ALTERNATE ACTION ALARM
SYSTEM TROUBLE ALARMS
VALIDATED SUCTION FLOW TO CONTROL LOGIC
TWO SIGNAL VALIDATION LOGIC WITH ARBITRATOR-
FWP RECIRCULATION FLOW
Sketch Number
WNA-DS-01224-DAP-SK
REVISION
1
DAP & DBP Feedwater Control System
Functional Diagrams
SHEET
13 of 15
©2009 Westinghouse Electric Company LLC
All Rights Reserved


Westinghouse Proprietary Class 2
VALIDATED SUCTION FLOW
AF 13
LEAD LAG
T14.1
A
100
P
S
K14.1
K14.2
K
d/dt
T14.3
T14.4
f(x)
F14.1
f(x)
F14.2
NOTE 14-2
AF 13
MBE
A 4
ARE
MAMODE
MODE
RECIRC VALVE DEMAND INDICATION
RECIRC VALVE CONTROL
NOTES:
14-1 LOGIC SHOWN IS FOR 1 LOOP ONLY. THE LOGIC FOR THE OTHER LOOPS IS IDENTICAL.
14-2 SETS BOTTOM OF INDICATED SCALE.
FWP RECIRCULATION VALVE CONTROL
This document is the property of and contains Proprietary Information owned by Westinghouse Electric Company LLC and/or its subcontractors and suppliers. It is transmitted to you in confidence and trust, and you agree to treat this document in strict accordance with the terms and conditions of the agreement under which it was provided to you.
©2009 Westinghouse Electric Company LLC
All Rights Reserved
Sketch Number
WNA-DS-01224-DAP-SK
REVISION
1
DAP & DBP Feedwater Control System
Functional Diagrams
SHEET
14 of 15


Westinghouse Proprietary Class 2
1
2
3
4
LEAD LAG
MEDIAN SELECT
XALM
MRE
OR
A
SYSTEM TROUBLE ALARM
2/4
ALTERNATE ACTION
N
Y
τ15.1
τ15.2
VALIDATED POWER-RANGE NEUTRON FLUX USED IN CONTROL ALGORITHMS
NUCLEAR POWER SIGNAL VALIDATION
Sketch Number WNA-DS-01224-DAP-SK
REVISION 0
DAP & DBP Feedwater Control System Functional Diagrams
SHEET 15 of 15
©2009 Westinghouse Electric Company LLC All Rights Reserved