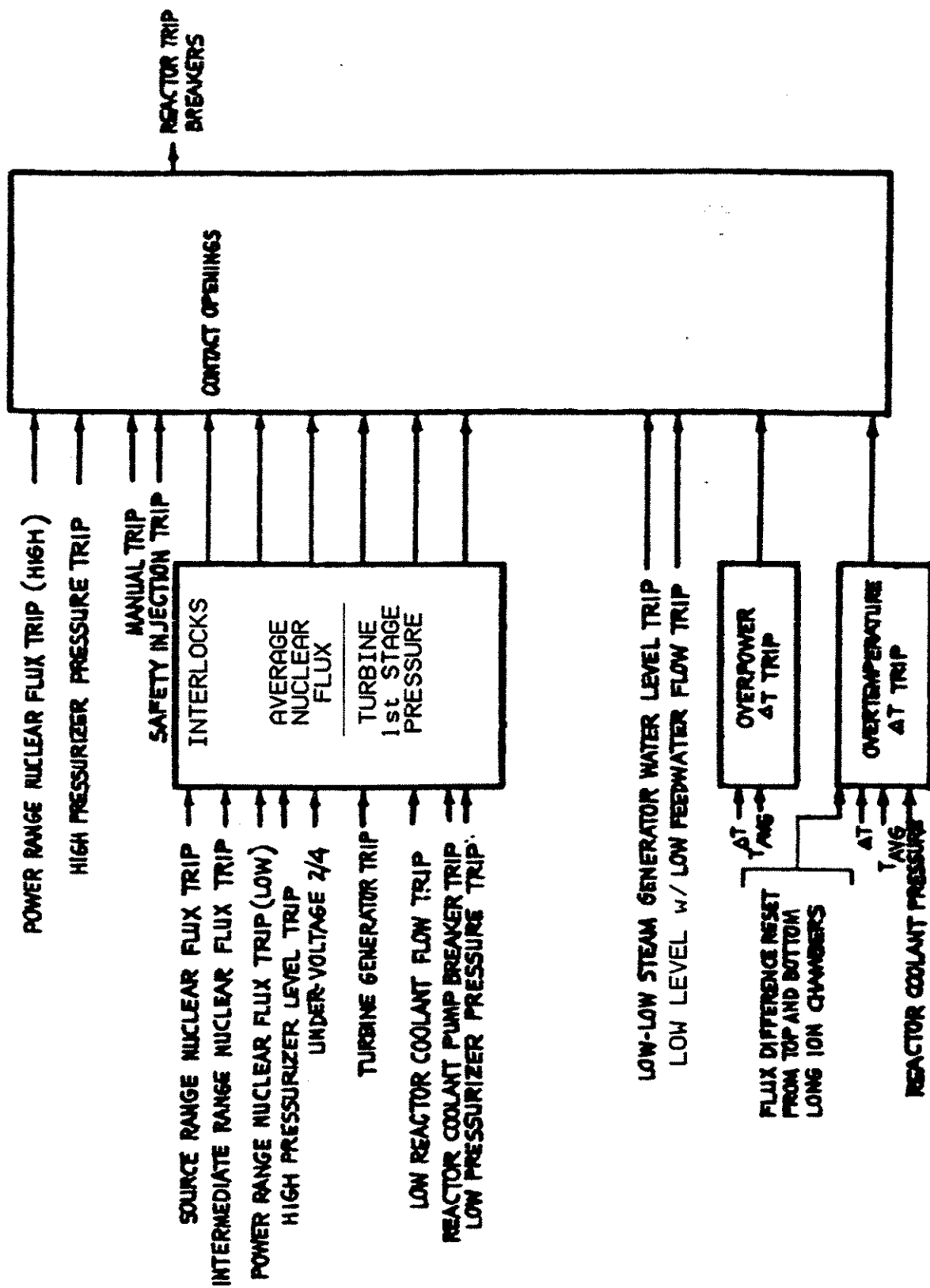


# INDIAN POINT 3 FSAR UPDATE

DESIGN PHILOSOPHY TO ACHIEVE  
ISOLATION BETWEEN CHANNELS

REV. 2 JUN 2000

FIGURE 7.2-1

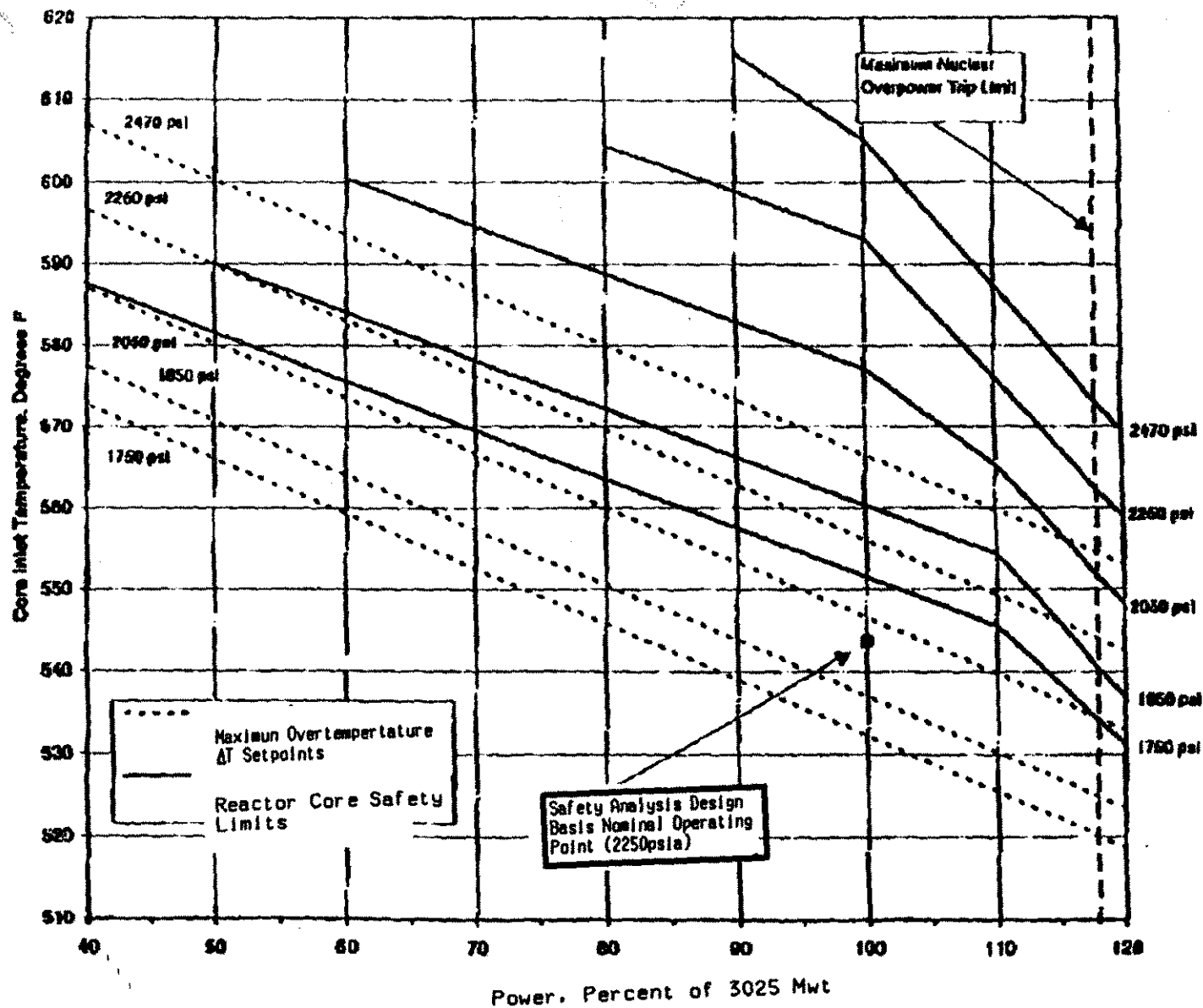


INDIAN POINT 3 FSAR UPDATE

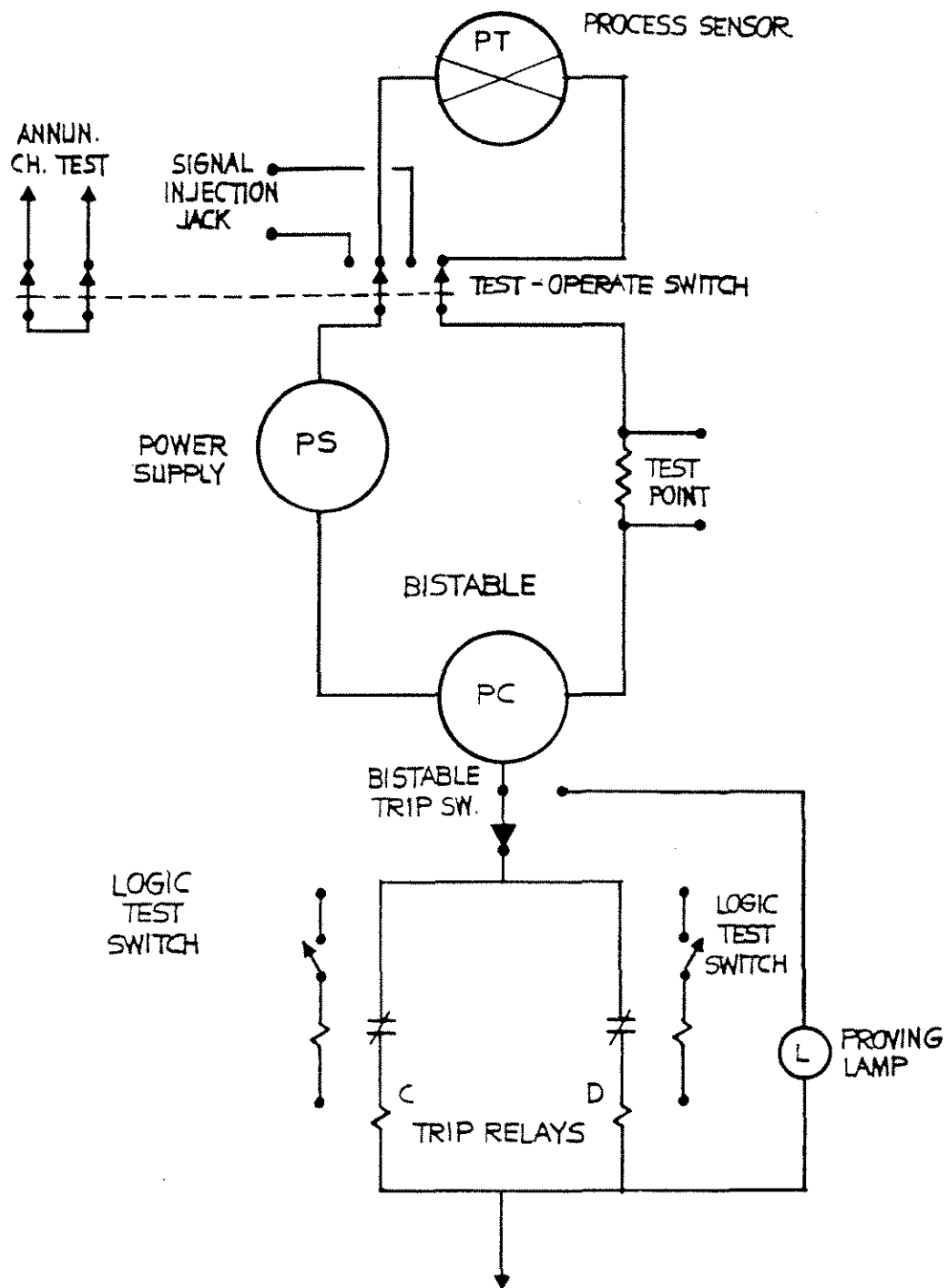
REACTOR PROTECTION SYSTEM

REV. 2 JUN 2000

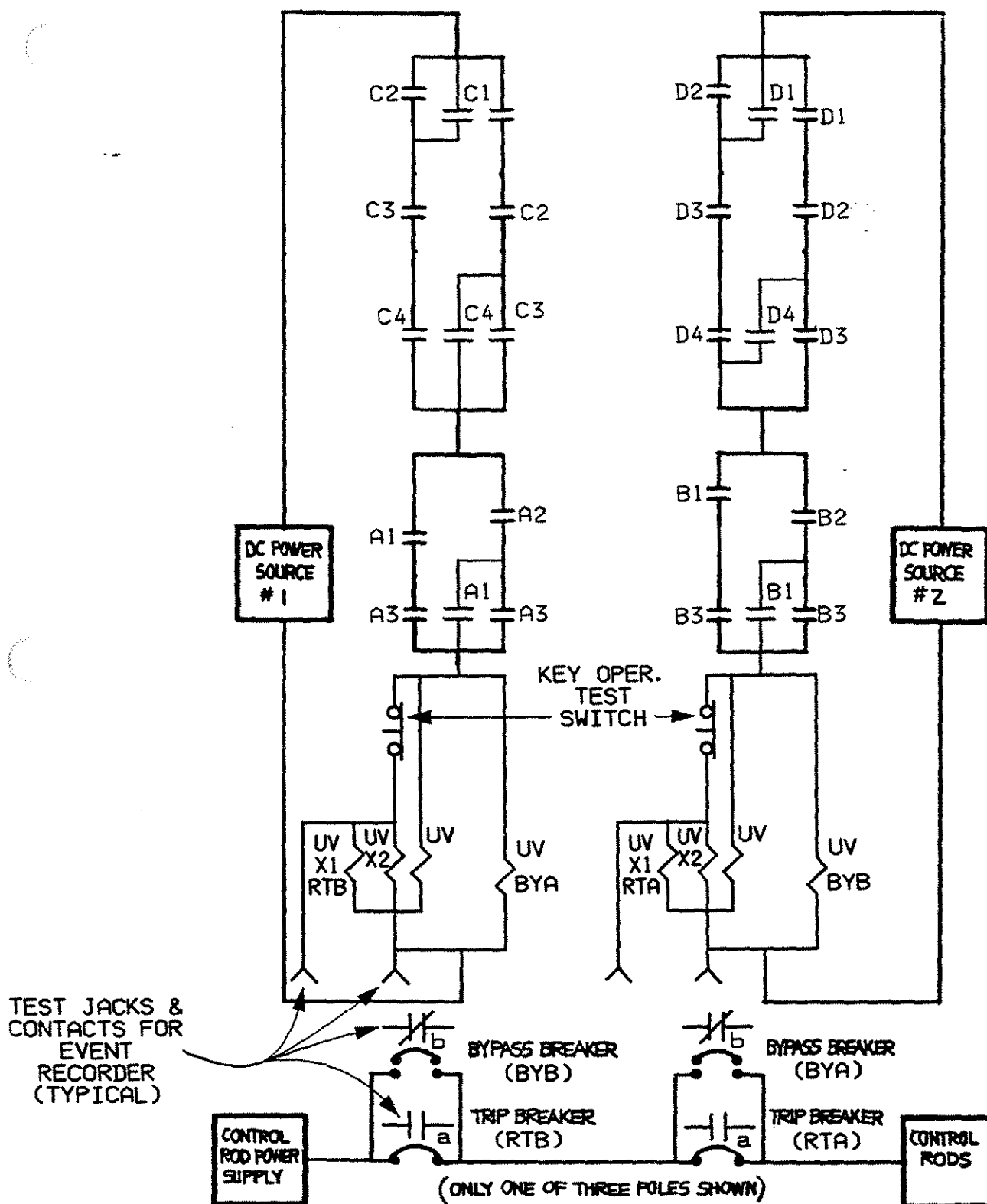
FIGURE 7.2-2

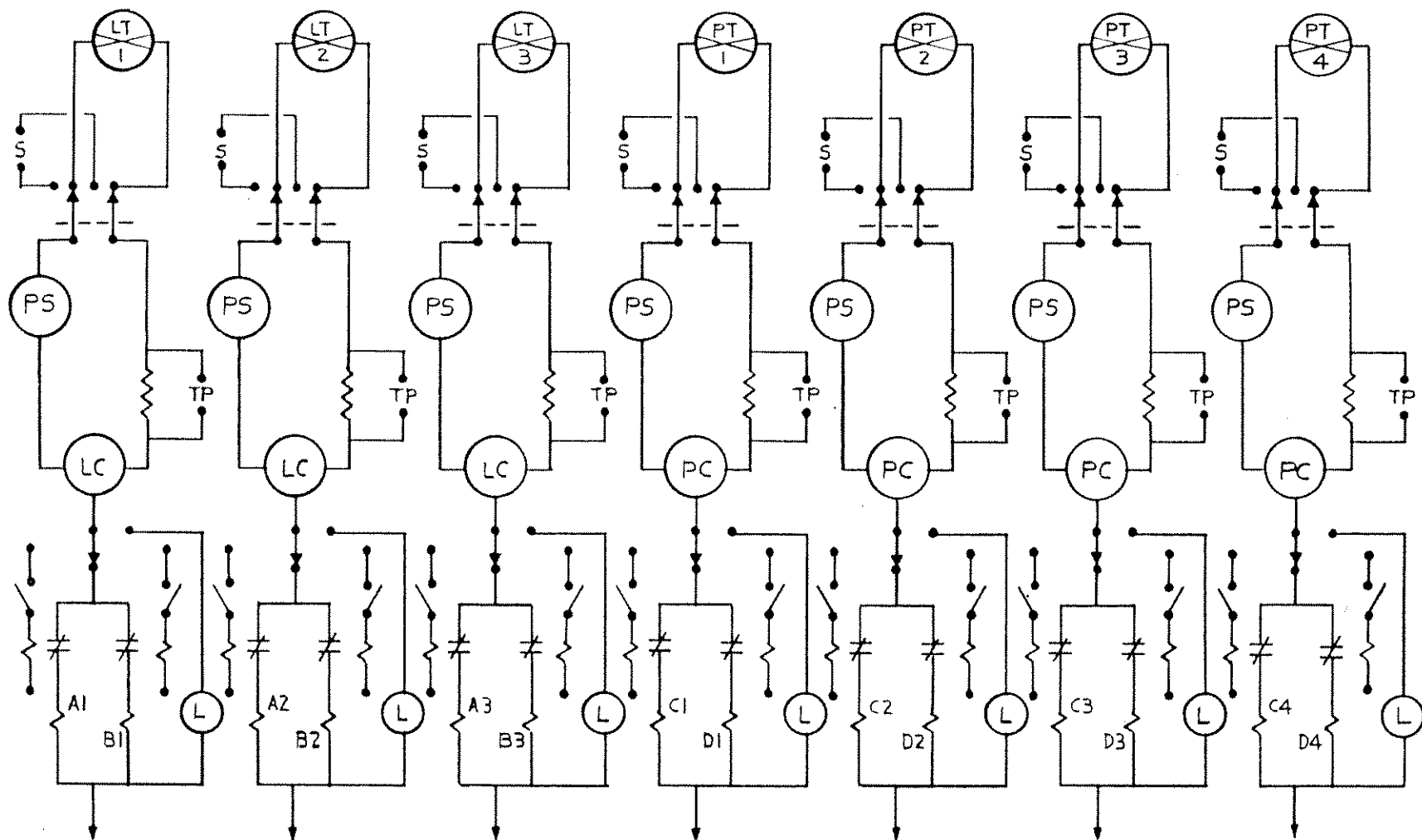


INDIAN POINT 3 FSAR UPDATE	
CORE INLET TEMPERATURE ONB LIMITS VS. PERCENT OF NOMINAL POWER	
REV. 1	JUN 2000   FIG. NO. 7.2-3



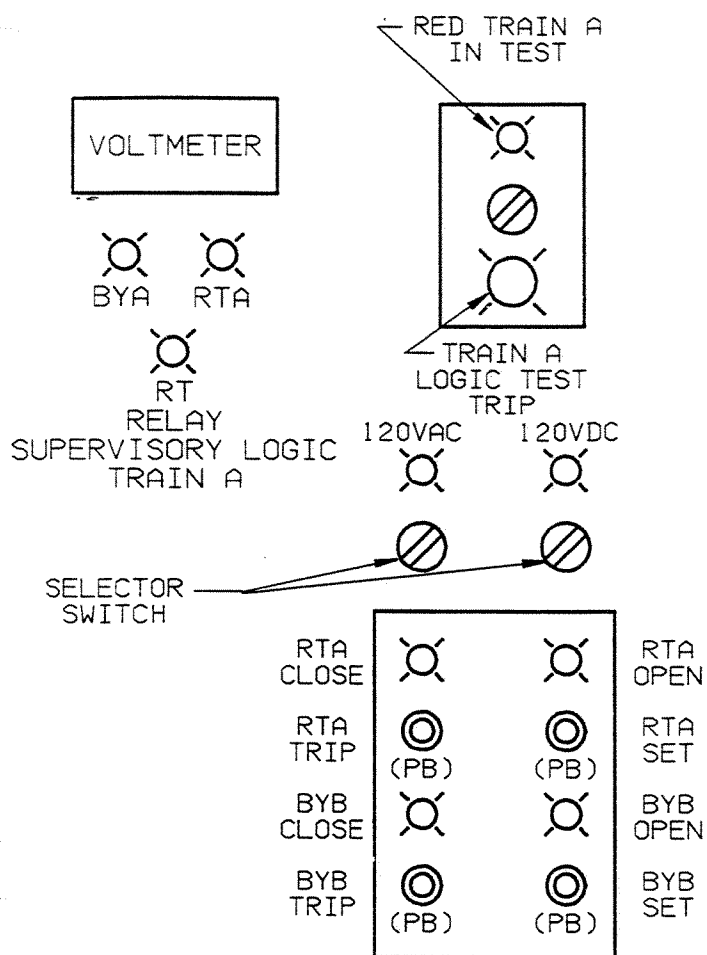
INDIAN POINT 3		FSAR UPDATE	
TYPICAL ANALOG CHANNEL TESTING ARRANGEMENT			
REV. 0	JULY, 1982	FIGURE NO.	7.2-7





REV. 0	JULY, 1982	INDIAN POINT 3	FSAR UPDATE
ANALOG CHANNELS	FIGURE NO. 7.2-9		

# TRAIN A REACTOR TRIP BREAKER TEST PANEL

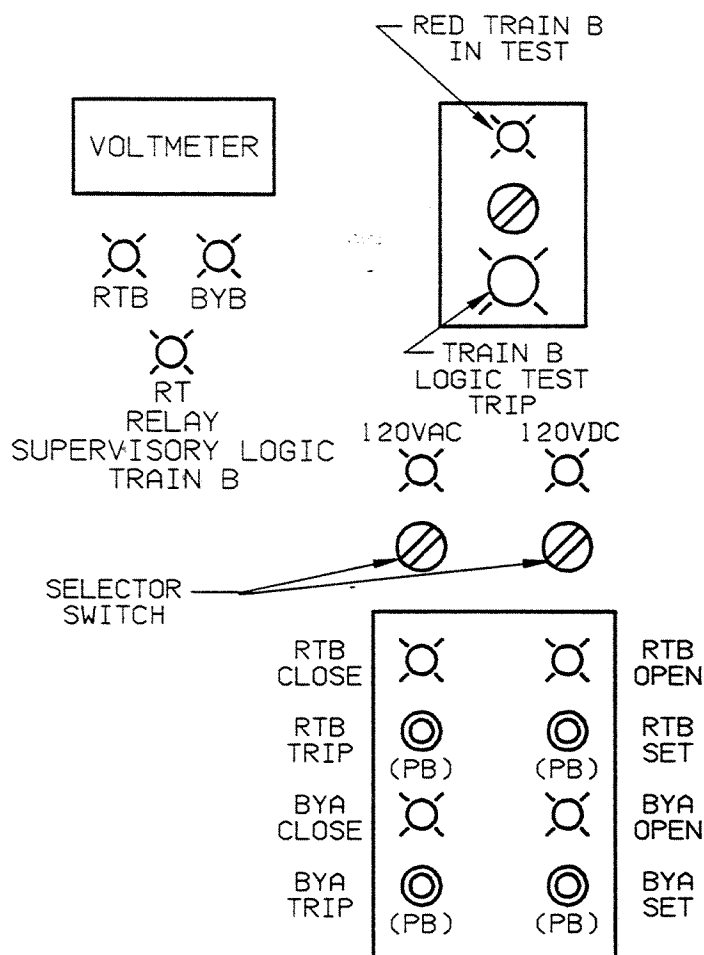


\* LOGIC TEST SW. - PRESSURE



\* LOGIC TEST SW. - LEVEL

# TRAIN B REACTOR TRIP BREAKER TEST PANEL



\* LOGIC TEST SW. - PRESSURE



\* LOGIC TEST SW. - LEVEL

## \* NOTE

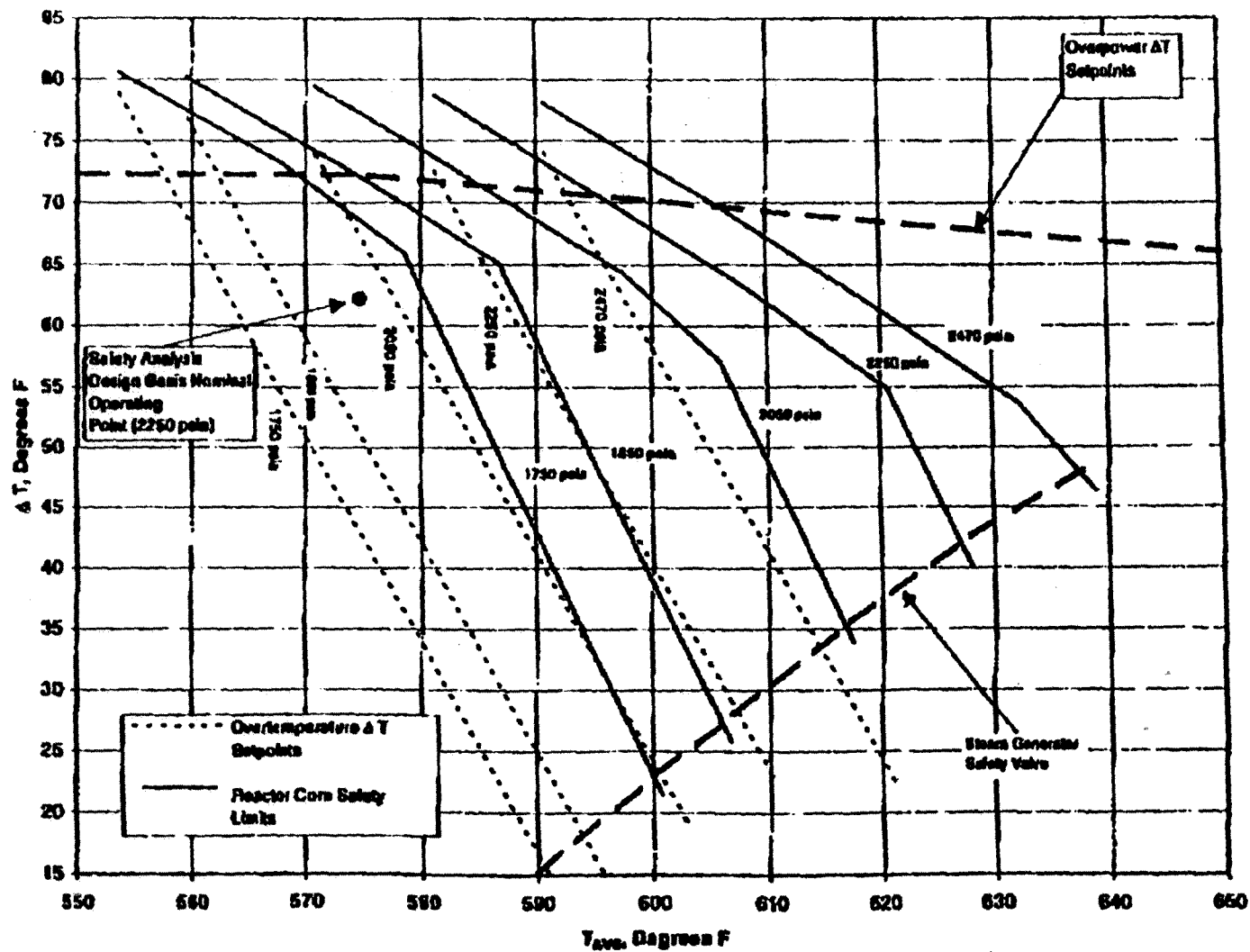
LOGIC TEST SWITCHES ARE SHOWN  
DIAGRAMMATICALLY AND ARE NOT  
INTENDED TO SHOW ACTUAL  
LOCATION, FUNCTION OR CHANNEL.

INDIAN POINT 3 FSAR UPDATE

LOGIC CHANNEL TEST PANELS

REV. 3 JUN 2000

FIGURE 7.2-10



INDIAN POINT 3 FSAR UPDATE

ILLUSTRATION OF OVERPOWER  
AND OVERTEMPERATURE  $\Delta T$  TRIPS

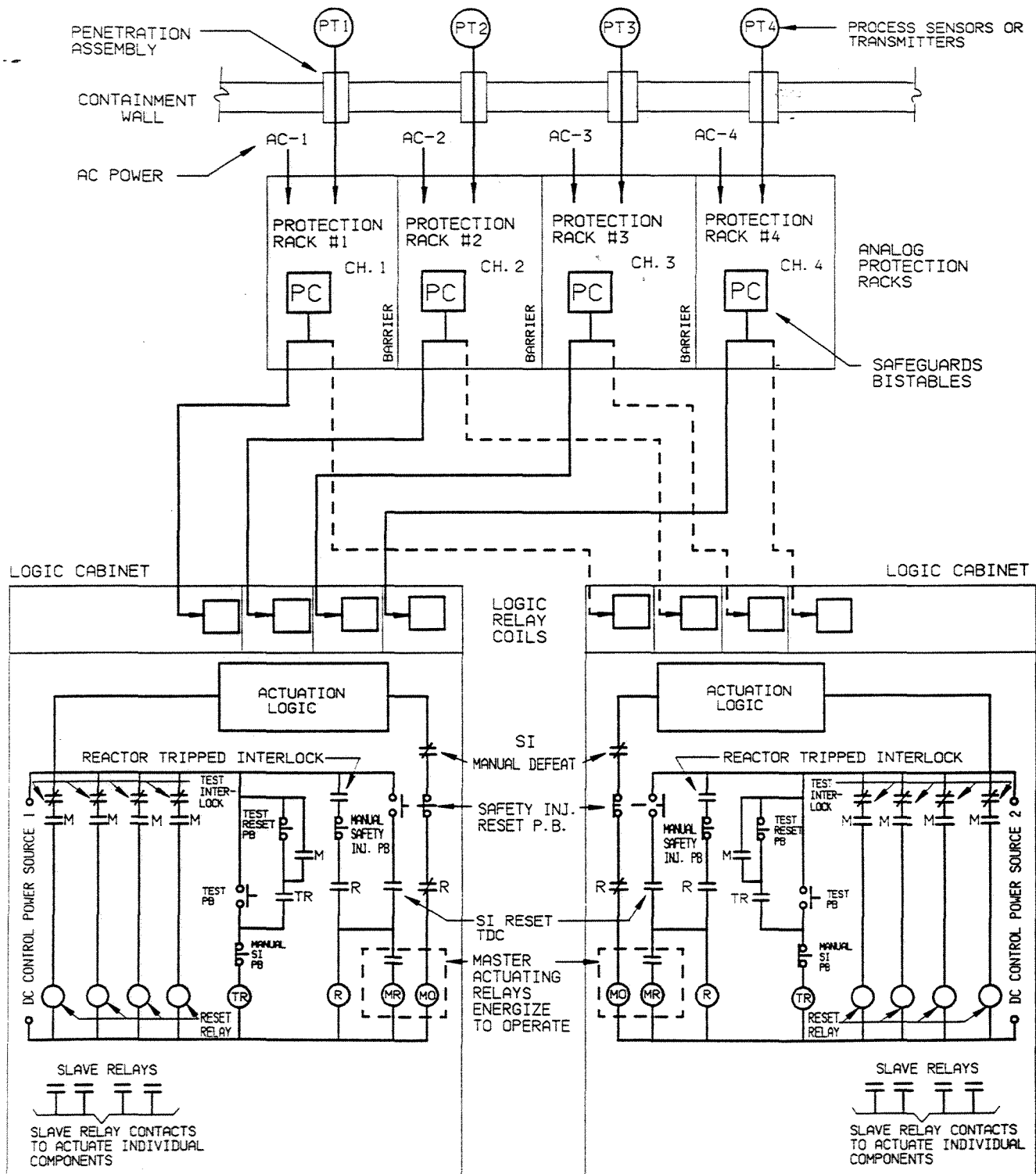
REV. 1 JUN 2000

FIG. NO. 7.2-11



AL.A	- ALARM
BUF	- BUFFER
E/I	- VOLTAGE TO CURRENT CONVERTER
f	- SPECIAL FUNCTION (SUCH AS A PRESSURE COMPENSATION UNIT OR LEAD/LAG COMPENSATION)
FC	- FLOW CONTROLLER BISTABLE (OFF-ON UNLESS OUTPUT SIGNAL IS SHOWN)
FI	- FLOW INDICATOR
FS	- STEAM FLOW
FT	- FLOW TRANSMITTER
Fwf	- FEEDWATER FLOW
Hi LRT	- HIGH LEVEL REACTOR ALARM
Hi PRT	- HIGH PRESSURE REACTOR TRIP
I/I	- ISOLATION CURRENT REPEATER
ISOL	- ISOLATION (OTHER THAN I/I)
LC	- LEVEL CONTROLLER BISTABLE (OFF-ON UNLESS OUTPUT SIGNAL IS SHOWN)
LI	- LEVEL INDICATOR
L/L	- LEAD LAG
L-LOW	- LOW LEVEL
LO L	- LOW LEVEL
LO LRT	- LOW LEVEL REACTOR TRIP
LO PRT	- LOW PRESSURE REACTOR TRIP
Lref	- PROGRAMMED REFERENCE LEVEL
LT	- LEVEL TRANSMITTER
MRT	- MISMATCH REACTOR TRIP
NC	- NUCLEAR FLUX CONTROLLER (BISTABLE)
NE	- NUCLEAR DETECTOR
NI	- NUCLEAR FLUX INDICATOR
NO	- NUCLEAR POWER SUPPLY
PC	- PRESSURE CONTROLLER BISTABLE (OFF-ON UNLESS OUTPUT SIGNAL IS SHOWN)
PI	- PRESSURE INDICATOR
Pref	- PROGRAMMED REFERENCE PRESSURE
PS	- POWER SUPPLY
Ps	- STEAM PRESSURE
PT	- PRESSURE TRANSMITTER
R/I	- RESISTANCE TO CURRENT CONVERTER
S	- CONTROL CHANNEL TRANSFER SWITCH (USED TO MAINTAIN AUTO CHANNEL DURING TEST OF THE PROTECTION CHANNEL)
T	- BUILT-IN TEST POINT
TE	- TEMPERATURE ELEMENT
THC	- MICROPROCESSOR
TJ	- TEST SIGNAL INSERTION JACK
TP	- TEST POINT
TS	- RELAY CONTACT OUTPUT ISOLATOR
TT	- RESISTANCE TO VOLTAGE CONVERTER
TY	- VOLTAGE TO CURRENT CONVERTER
øU.L	- OUT OF CORE UPPER OR LOWER ION CHAMBER FLUX SIGNALS

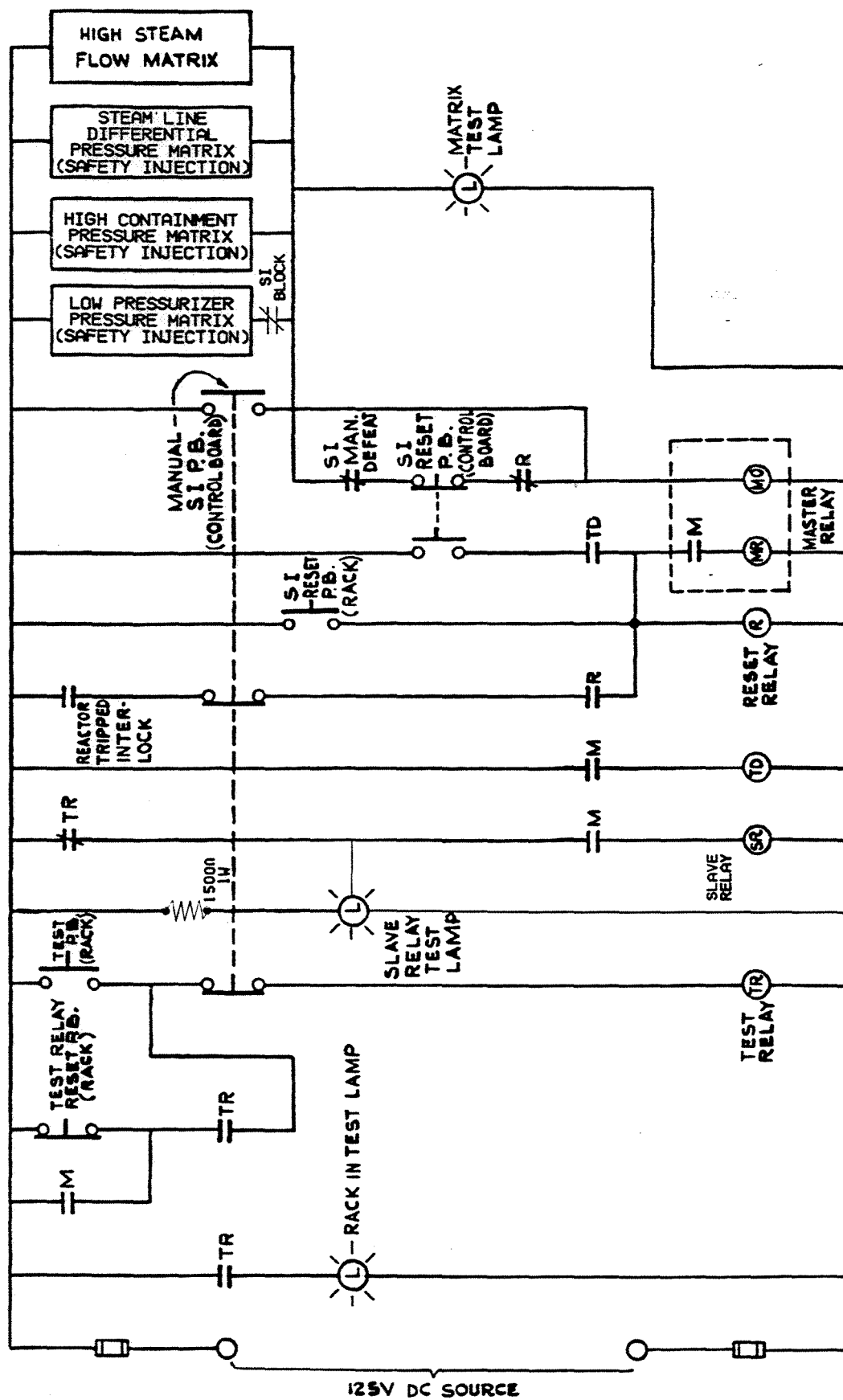
INDIAN POINT 3 FSAR UPDATE
ANALOG SYSTEM SYMBOLS
REV. 2 JUN 2000    FIG. NO. 7.2-14



INDIAN POINT 3 FSAR UPDATE

SAFEGUARDS ACTUATING CIRCUITRY

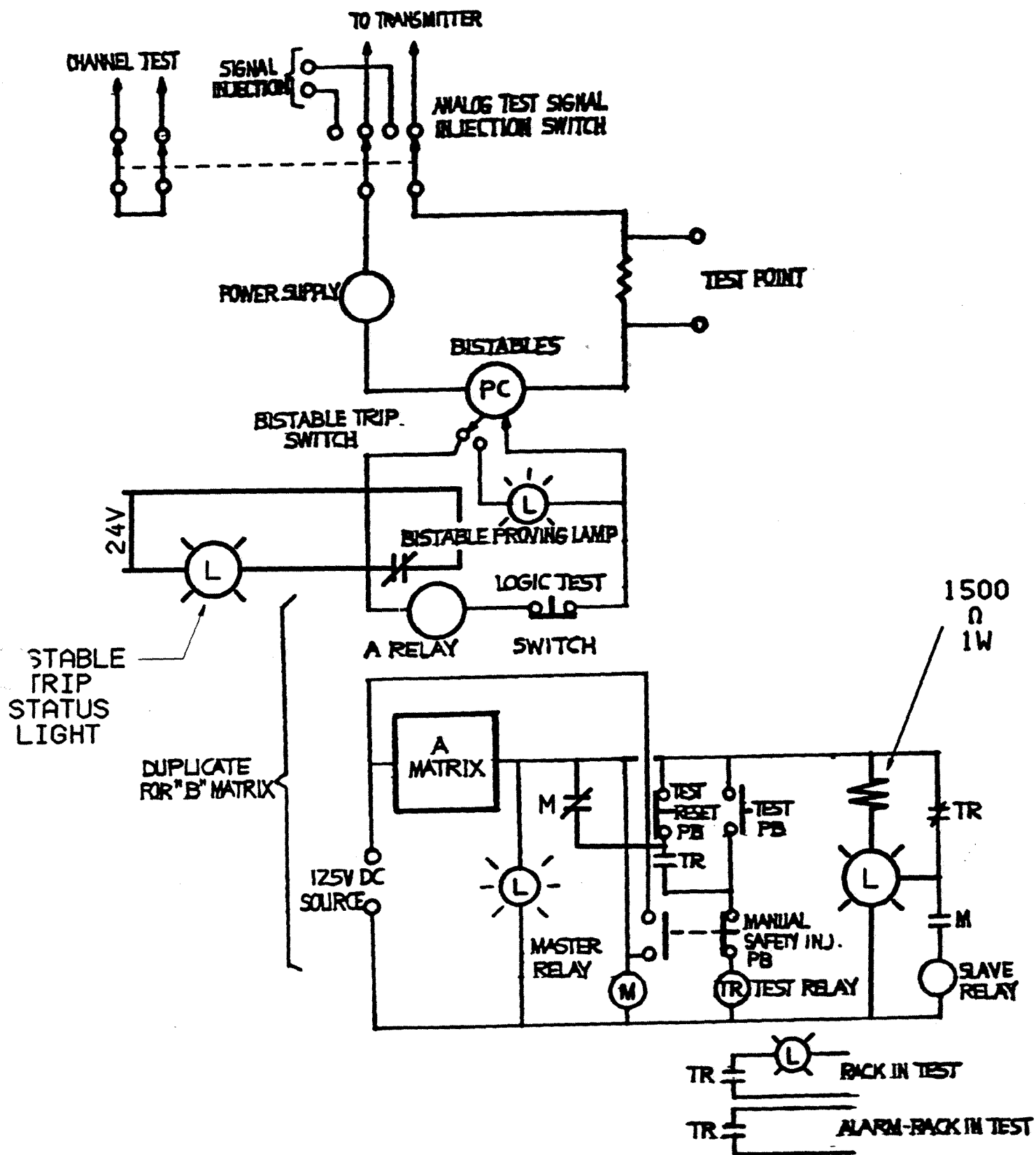
REV. 2 JUN 2000 | FIGURE 7.2-15



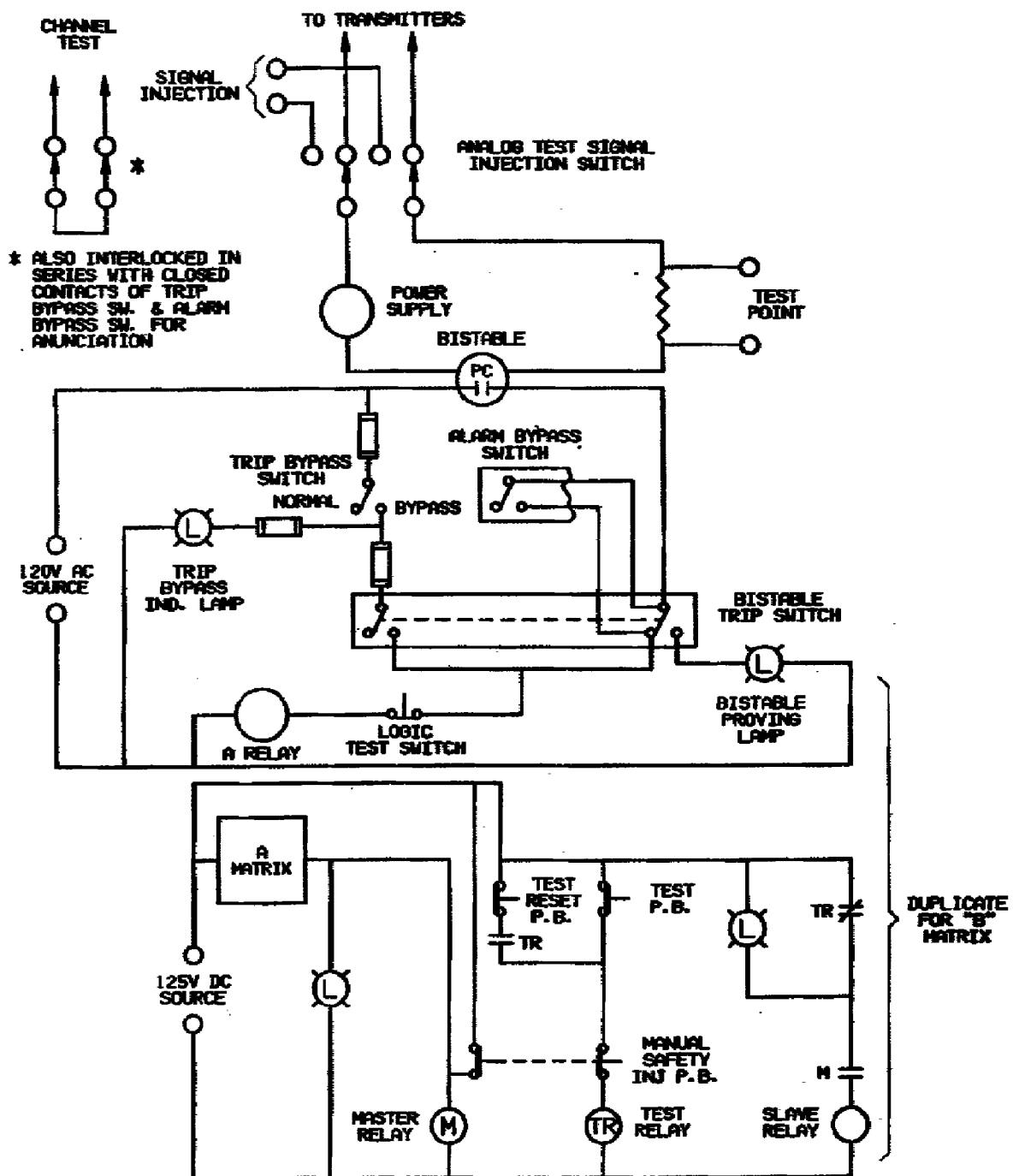
INDIAN POINT 3 FSAR UPDATE

SIMPLIFIED DIAGRAM FOR OVERALL  
LOGIC RELAY TEST SCHEME

REV. 1 JUN 2000 | FIGURE 7.2-16



INDIAN POINT 3 FSAR UPDATE	
SIMPLIFIED ANALOG AND LOGIC RELAY TESTING	
REV. 2 JUN 2000	FIG. NO. 7.2-17



REF - MOD 98-3-021 RPC

(IMPLEMENTED ON CHANNEL IV  
ONLY, RACKS B9 & B10)

THIS SCHEME APPLIES TO BISTABLES FOR:

REACTOR TRIP

OVERPOWER DELTA T

OVER TEMPERATURE DELTA T

LO-LO STEAM GENERATOR LEVEL

LO-LO STEAM GENERATOR LEVEL

STEAM FLOW > FEEDWATER FLOW

MISMATCH

PRESSURIZER HI PRESSURE

PRESSURIZER LO PRESSURE

PRESSURIZER HI LEVEL

LOW REACTOR COOLANT FLOW

FOR ATOM LITURBANCE

AUTO SAFETY INJECTION  
ACTUATION

HIGH CONTAINMENT PRESSURE

STEAM LINE DELTA P

HIGH STEAM FLOW S1

LOW STEAM LINE PRESSURE

LOW TAVG.

LOW PRESSURIZER PRESSURE

REACTOR TRIP

STEAM GENERATOR HI-HI

LEVEL

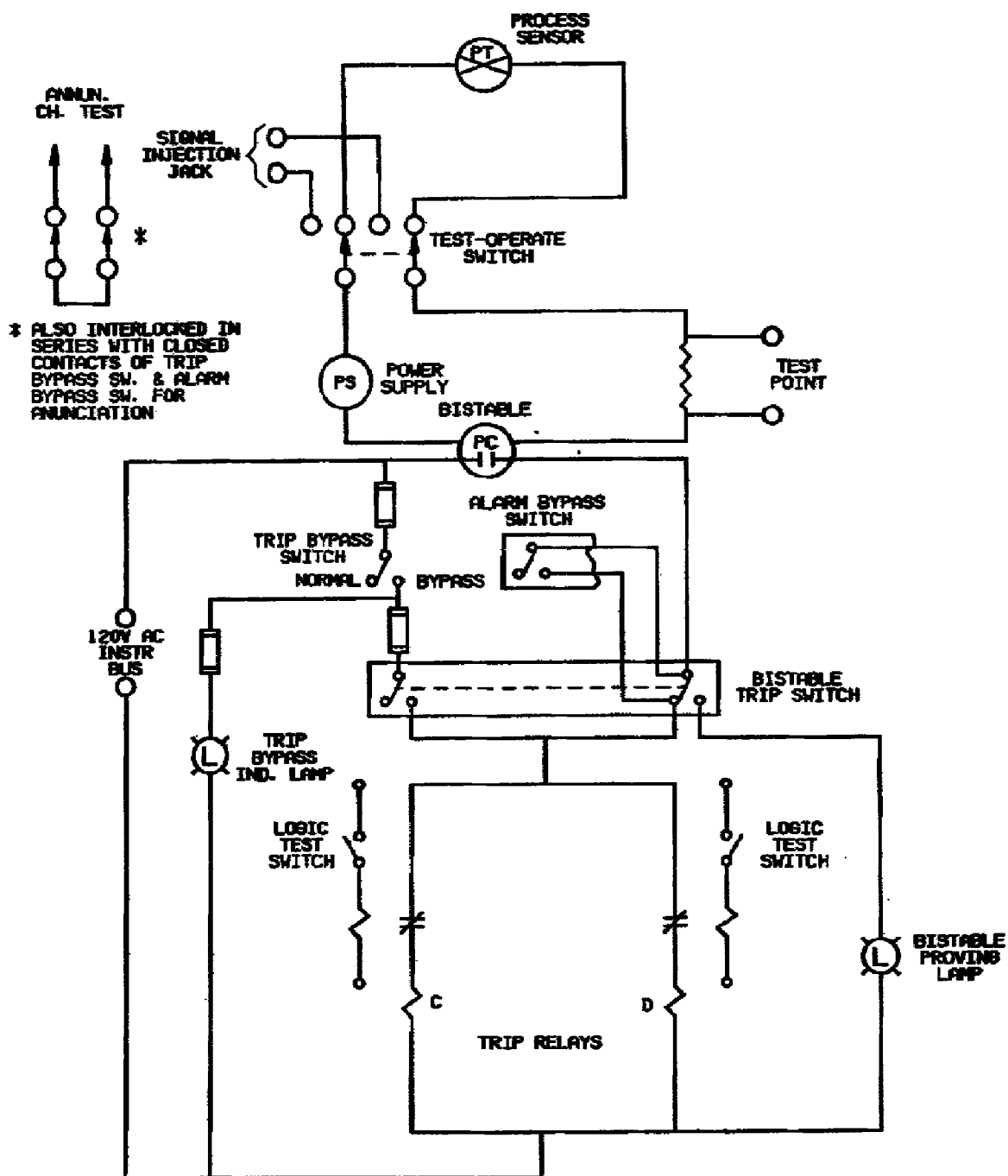


INDIAN POINT 3 FSAR UPDATE

SIMPLIFIED ANALOG AND LOGIC  
RELAY TRIP BYPASS TESTING

REV. 4

FIG. NO. 7.2-20



REF - MOD 98-3-021 RPC

(IMPLEMENTED ON CHANNEL IV  
ONLY, RACKS B9 & B10)

THIS SCHEME APPLIES TO BISTABLES FOR:

REACTOR TRIP

OVERPOWER DELTA T  
OVER TEMPERATURE DELTA T  
LO STEAM GENERATOR LEVEL  
LO-LO STEAM GENERATOR LEVEL  
STEAM FLOW > FEEDWATER FLOW  
MISMATCH

PRESSURIZER HI PRESSURE  
PRESSURIZER LO PRESSURE  
PRESSURIZER HI LEVEL  
LOW REACTOR COOLANT FLOW  
and STOP UTTHRAVAL

AUTO SAFETY INJECTION  
ACTUATION

HIGH CONTAINMENT PRESSURE  
STEAM LINE DELTA P  
HIGH STEAM FLOW SI  
LOW STEAM LINE PRESSURE  
LOW TAVG.  
LOW PRESSURIZER PRESSURE

REACTOR TRIP

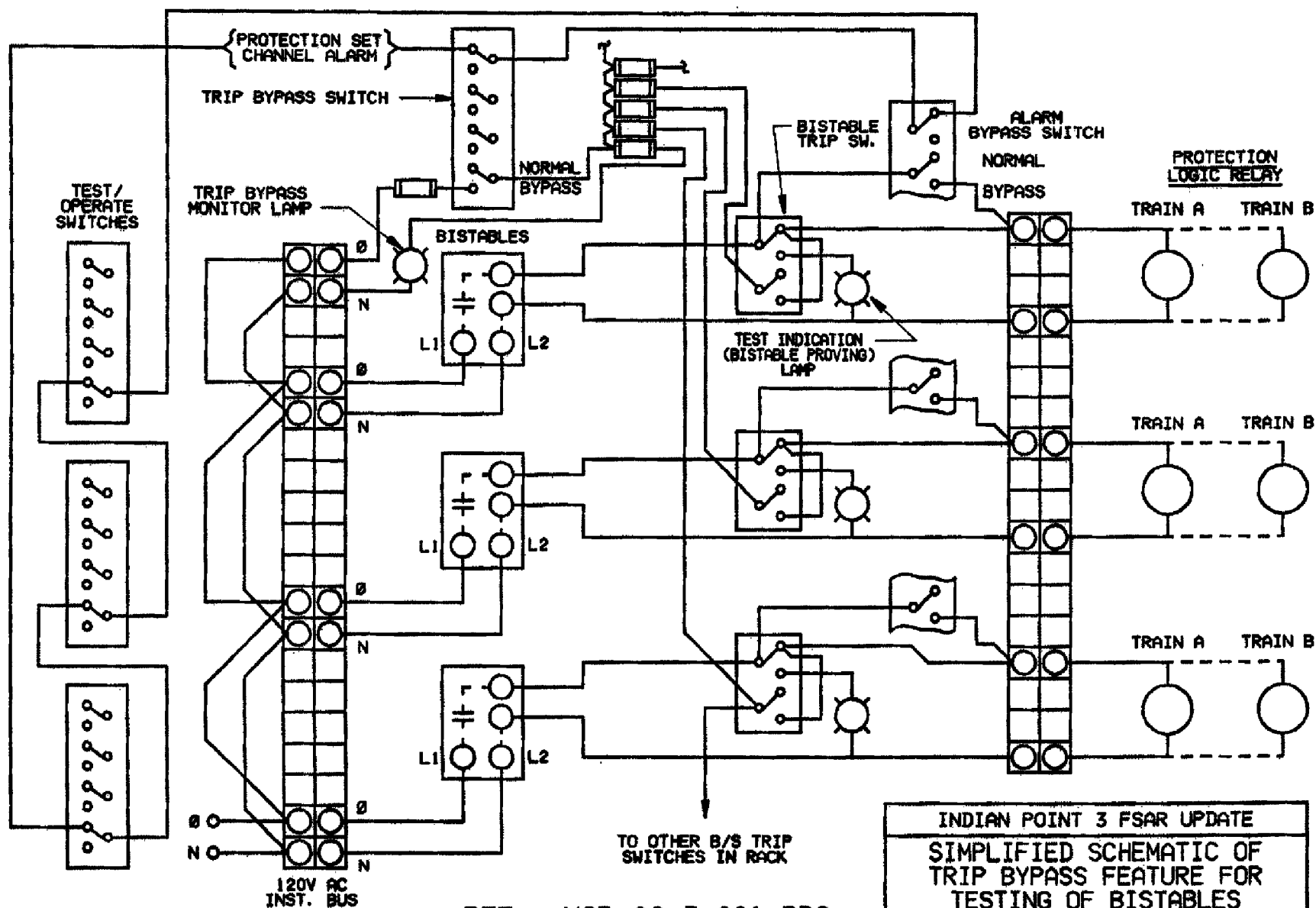
STEAM GENERATOR HI-HI  
LEVEL

INDIAN POINT 3 FSAR UPDATE

TYPICAL ANALOG CHANNEL  
TRIP BYPASS TESTING ARRANGEMENT

REV. 4

FIG. NO. 7.2-21

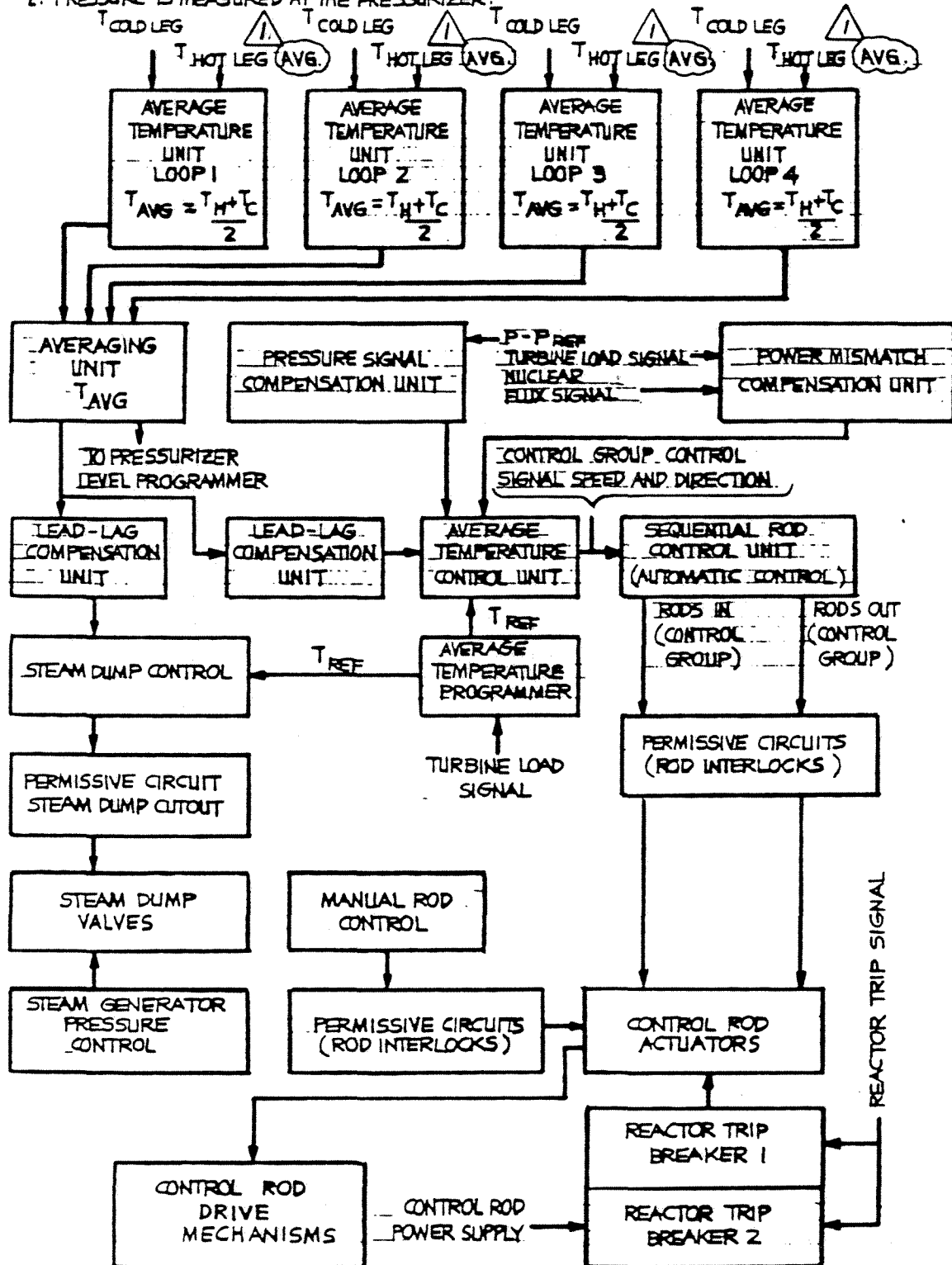


REF - MOD 98-3-021 RPC  
(IMPLEMENTED ON CHANNEL IV  
ONLY, RACKS B9 & B10)

INDIAN POINT 3 FSAR UPDATE	
SIMPLIFIED SCHEMATIC OF TRIP BYPASS FEATURE FOR TESTING OF BISTABLES	
REV. 4	FIG. NO. 7.2-22

NOTES :

1. TEMPERATURES ARE MEASURED AT STEAM GENERATOR'S INLET AND OUTLET
2. PRESSURE IS MEASURED AT THE PRESSURIZER.



INDIAN POINT 3

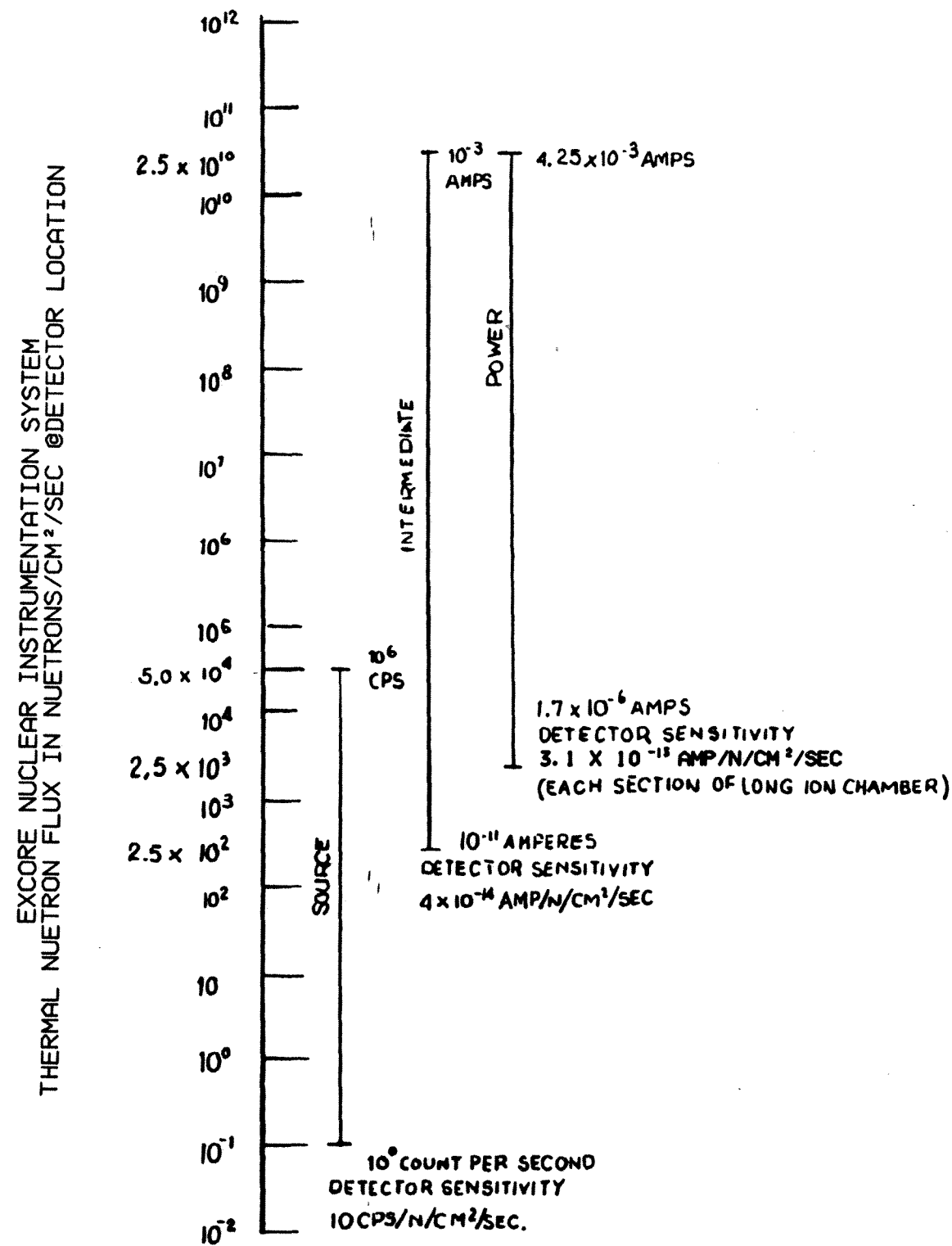
FSAR UPDATE

BLOCK DIAGRAM  
REACTOR CONTROL SYSTEM

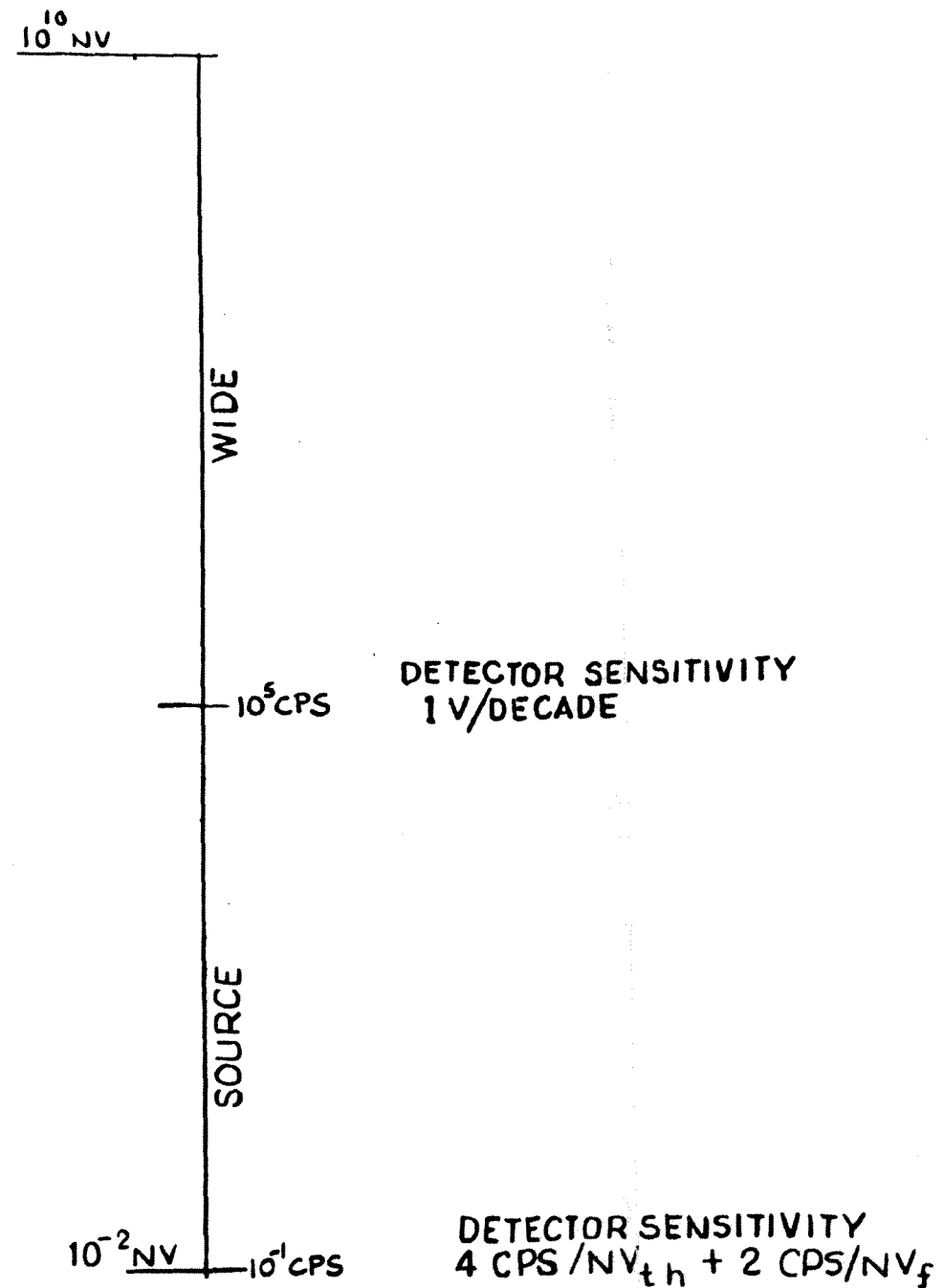
REV.1 JULY, 1990

FIGURE NO. 7.3-1





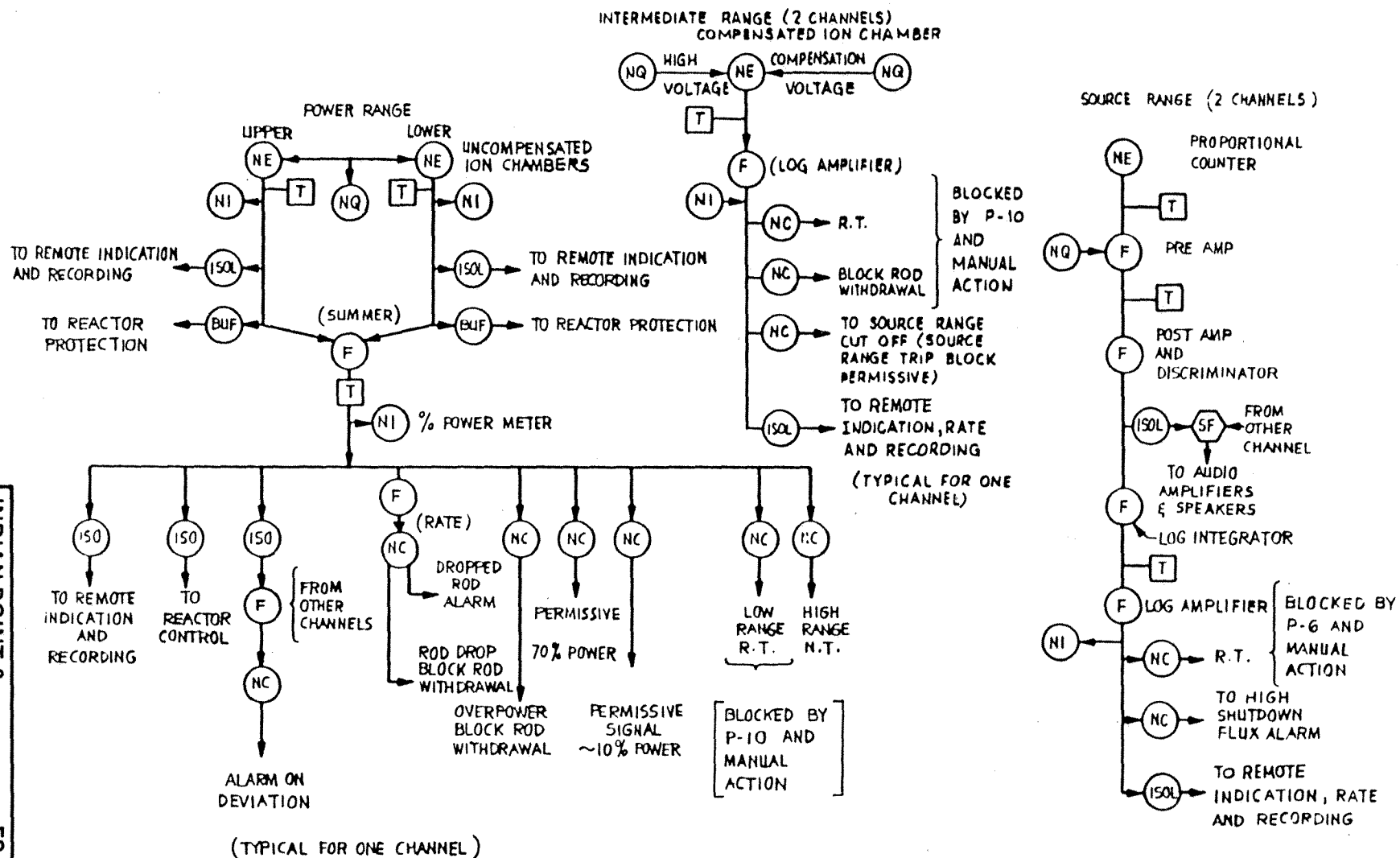
EXCORE NEUTRON FLUX MONITORING SYSTEM  
THERMAL NEUTRON FLUX IN (NEUTRONS/CM<sup>2</sup>/SEC.) = (NV)  
@ DETECTOR LOCATION

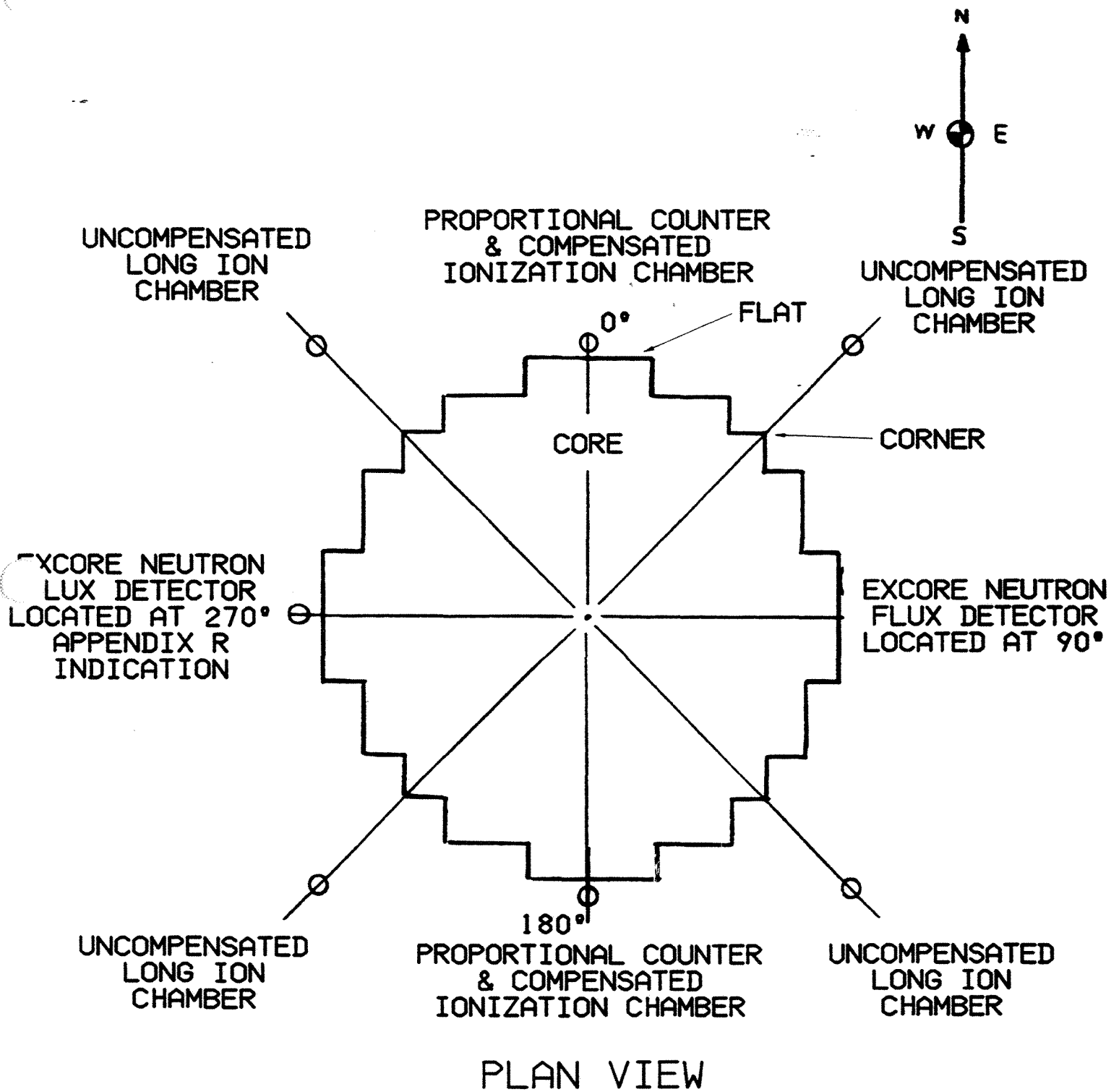


NOTE:  
DETECTOR SENSITIVITIES REFLECT ORIGINAL PLANT DESIGN, BUT DURING OPERATION ARE A CONSTANTLY  
CHANGING PARAMETER. THIS FIGURE IS A GRAPHIC ILLUSTRATION OF THE NIS RANGE OVERLAP (SR, IR, PR).  
SEE PLANT DOCUMENTATION FOR CURRENT SETTINGS / SENSITIVITIES (EX.: OP'S GRAPHS, VENDOR MANUALS)

NV<sub>th</sub> = THERMAL NEUTRON VOLT  
NV<sub>f</sub> = FAST NEUTRON VOLT

INDIAN POINT 3 FSAR UPDATE	
NEUTRON DETECTORS AND RANGE OF OPERATION	
REV. 2 JUN 2000	FIGURE 7.4-1

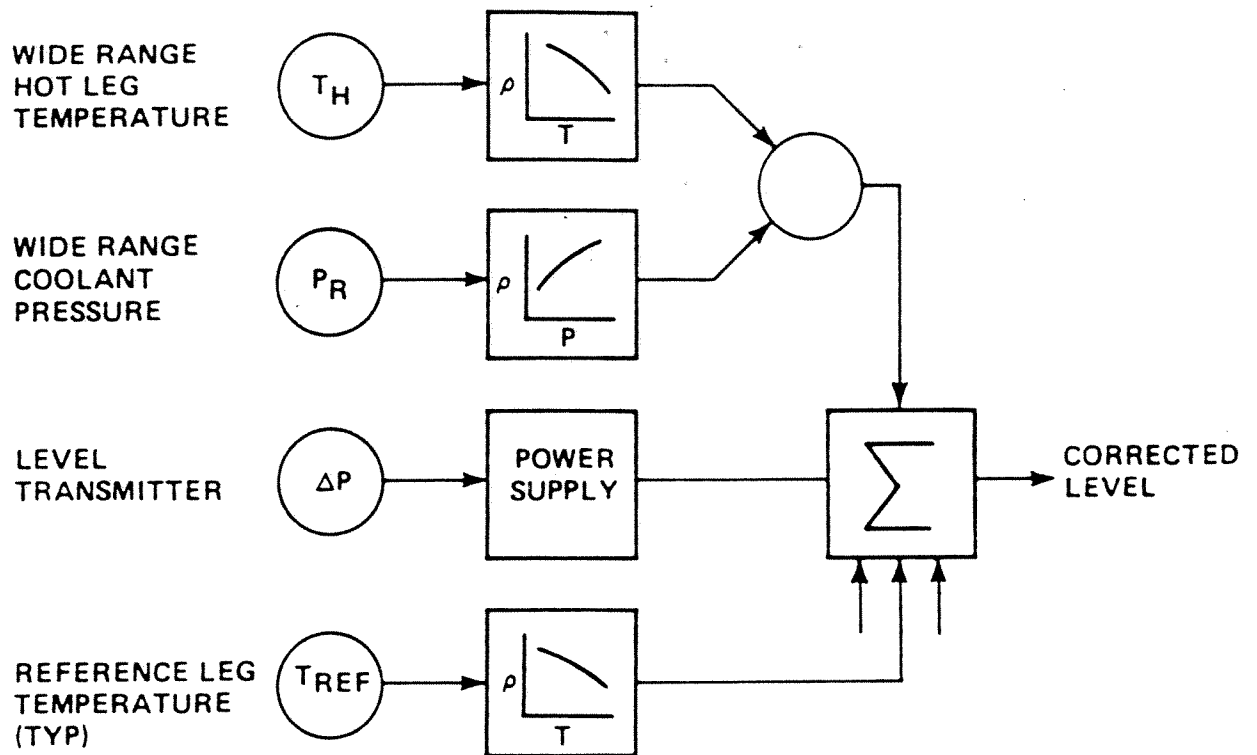




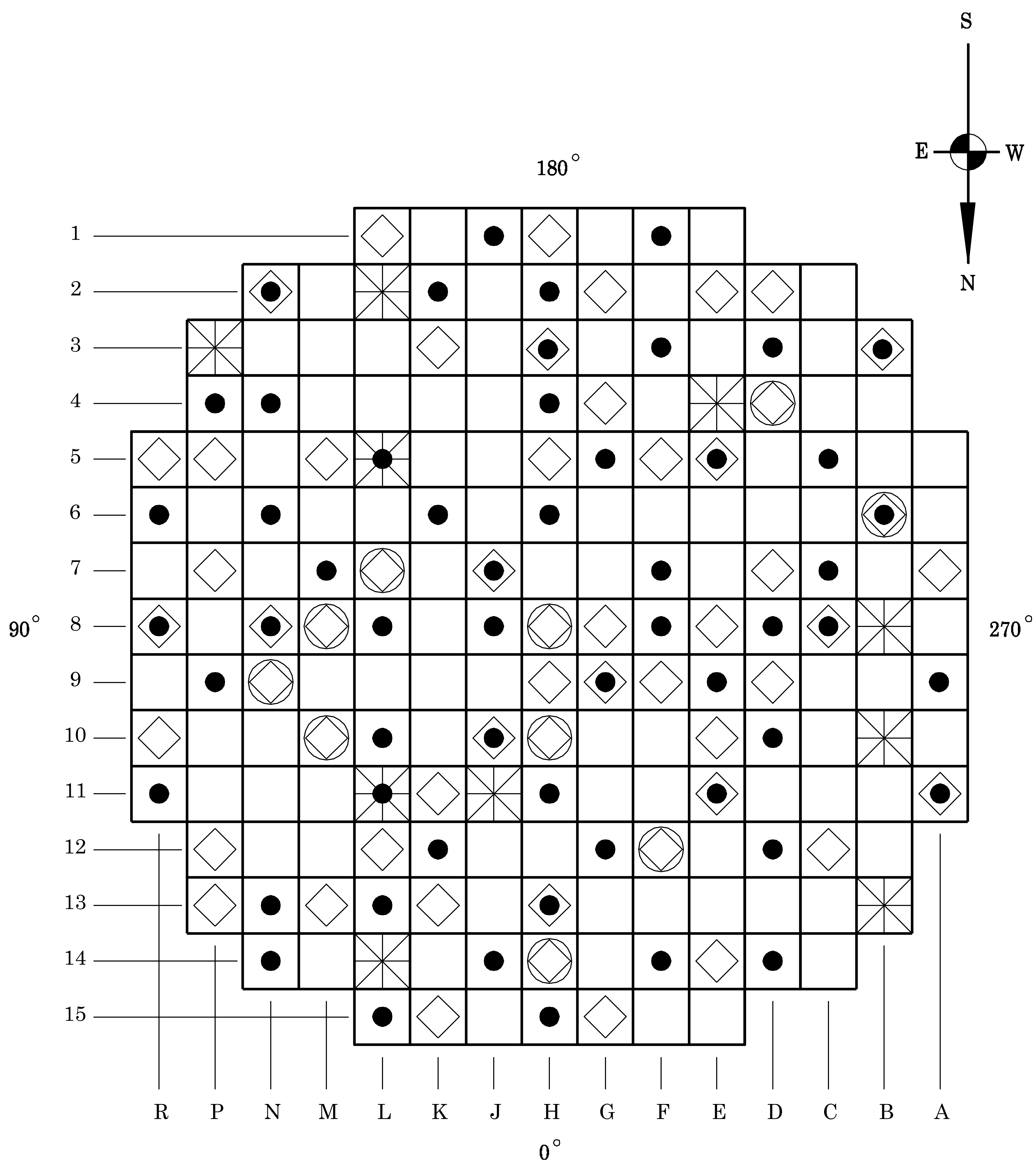
INDIAN POINT 3 FSAR UPDATE

DETECTOR LOCATION  
RELATIVE TO CORE

REV. 3 JUN 2000 FIG. NO. 7.4-3



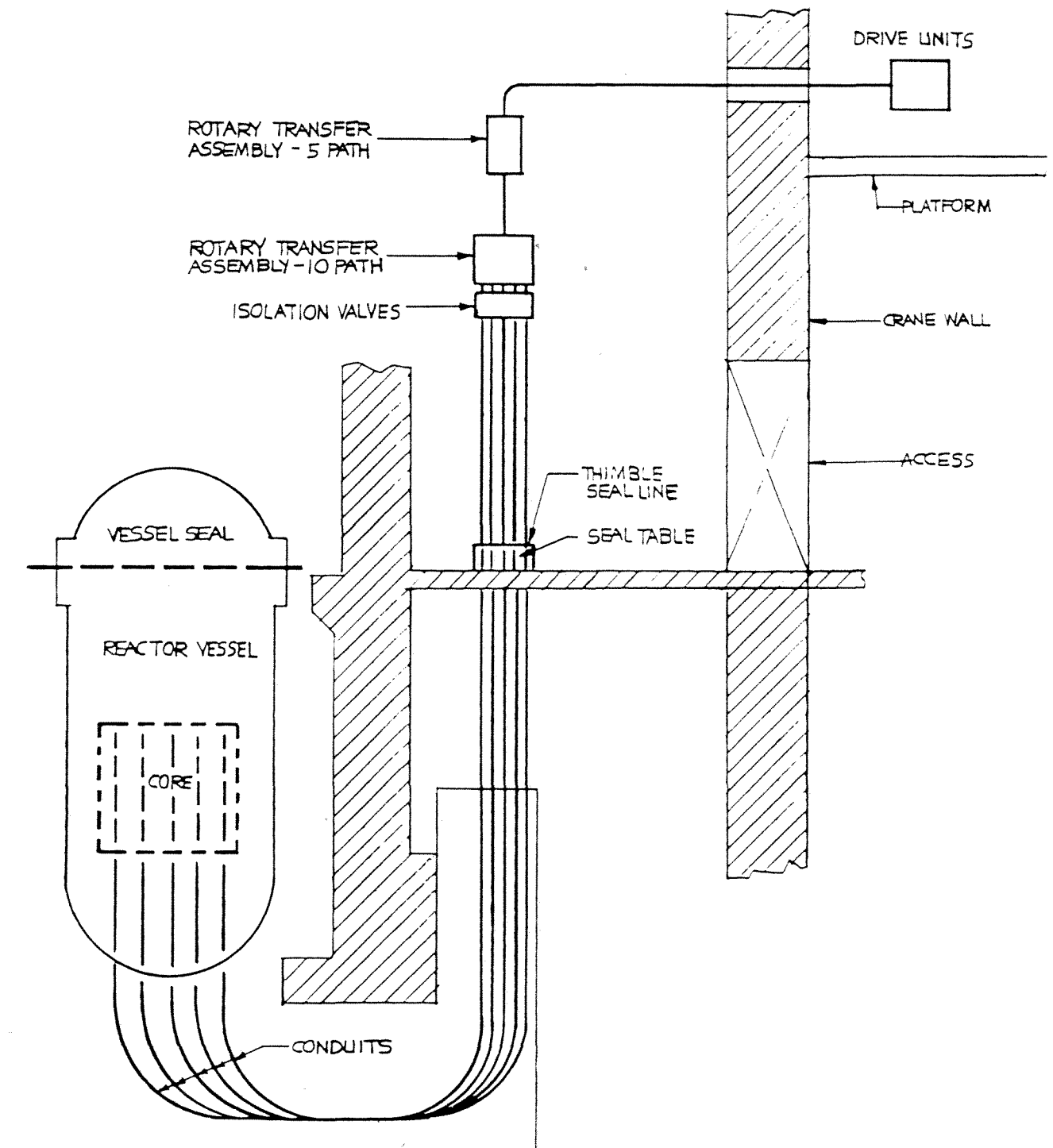
INDIAN POINT 3		FSAR UPDATE
SIMPLIFIED SCHEMATIC DIAGRAM OF DENSITY OF COMPENSATION SYSTEM (RVLIS)		
REV. 0	JULY 1988	FIGURE NO. 7.5 - 2



- MOVEABLE FLUX DETECTOR THIMBLE
- ⊠ EXIT THERMOCOUPLE LOCATION RETIRED IN PLACE
- ◇ EXIT THERMOCOUPLE WITH MIXING DEVICE
- ◊ EXIT THERMOCOUPLE WITHOUT MIXING DEVICE

NOTE: FLUX THIMBLE AT LOCATION E-11 IS RETIRED

INDIAN POINT 3 FSAR UPDATE	
INCORE INSTRUMENTATION THERMOCOUPLES AND DETECTORS	
REV. 4    SEP 2015	FIG. NO. 7.6-1



INDIAN POINT 3

FSAR UPDATE

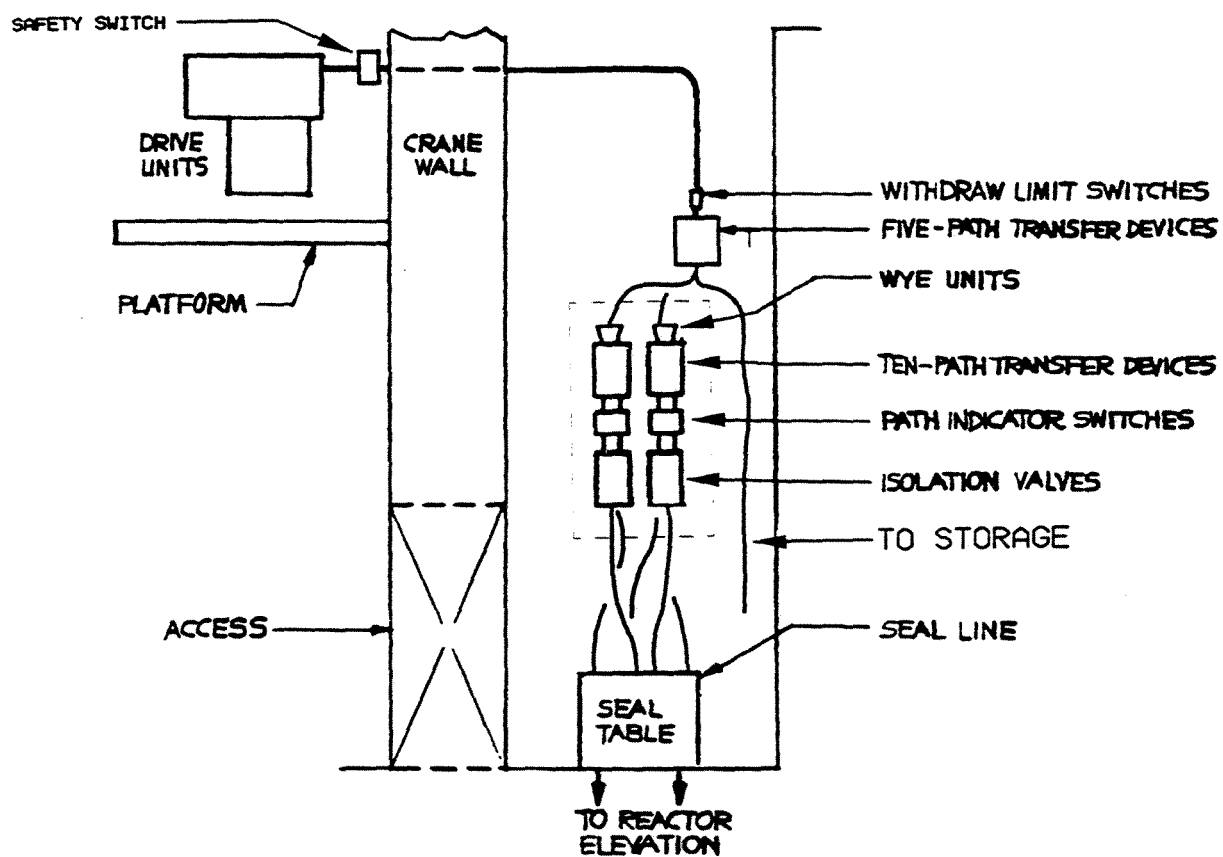
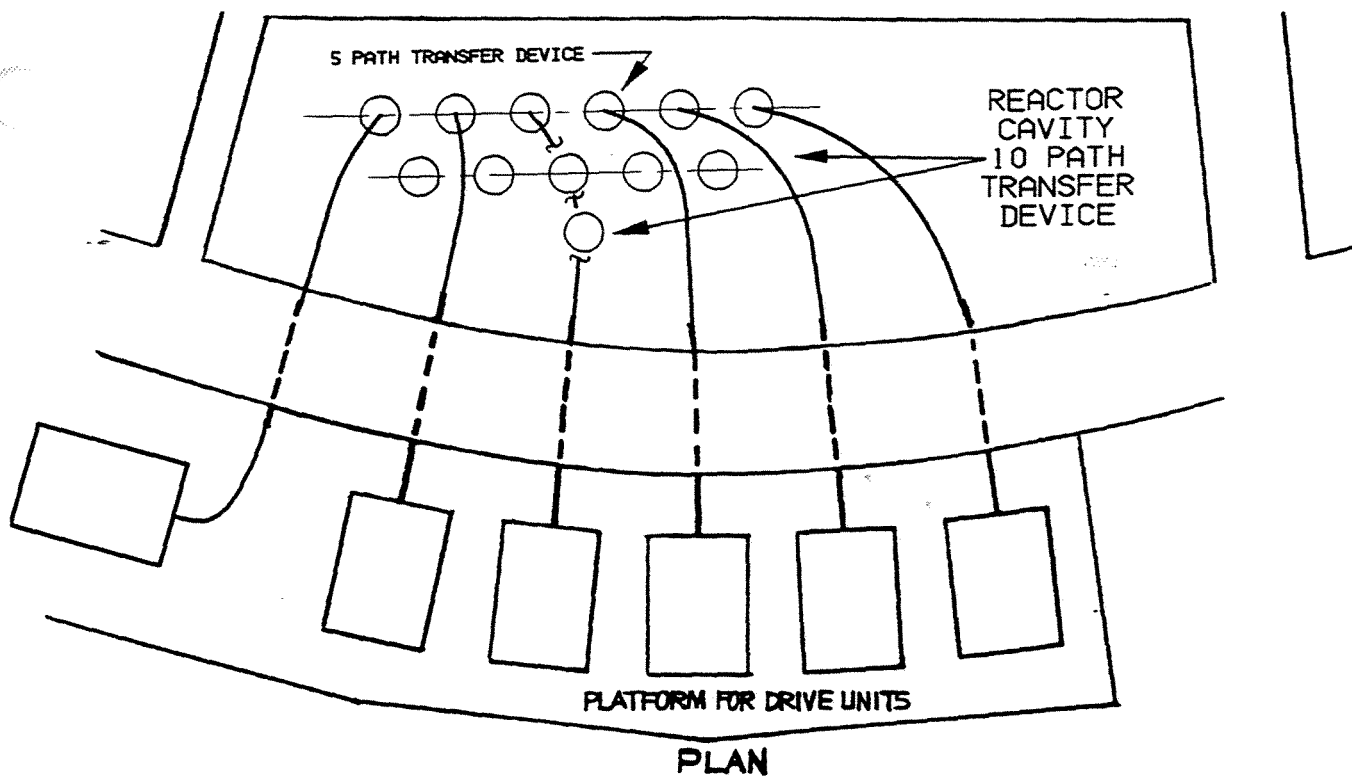
TYPICAL ARRANGEMENT OF  
MOVABLE MINIATURE NEUTRON FLUX  
DETECTOR SYSTEM (ELEVATION VIEW)

REV. 0

JULY, 1982

FIGURE NO

7.6-2



INDIAN POINT 3 FSAR UPDATE

ARRANGEMENT OF  
IN-CORE FLUX DETECTOR

REV. 1 JUN 2000 | FIGURE 7.6-3

