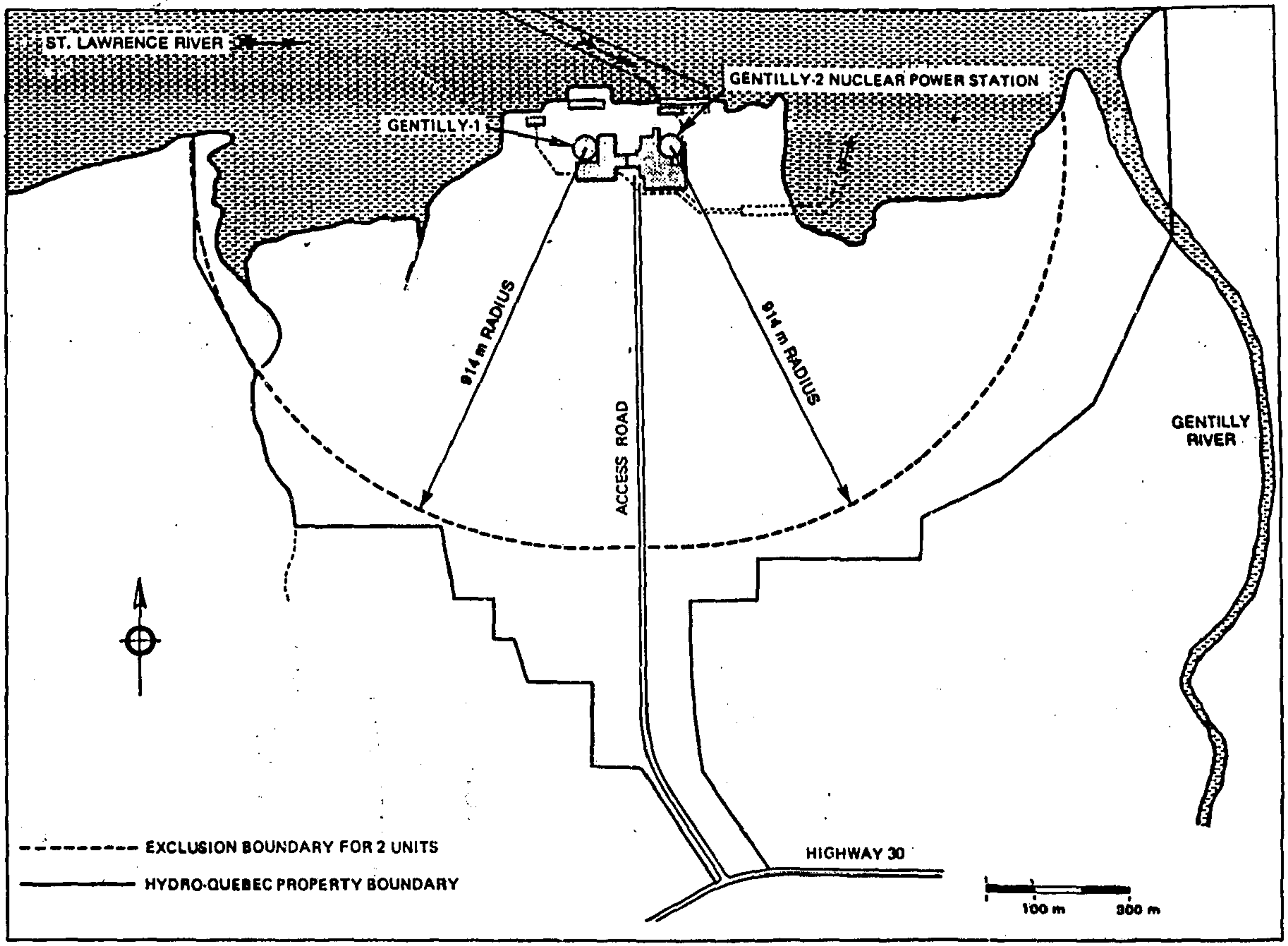


FIGURE 2.1–2 SITE LAYOUT

1990
66 SR

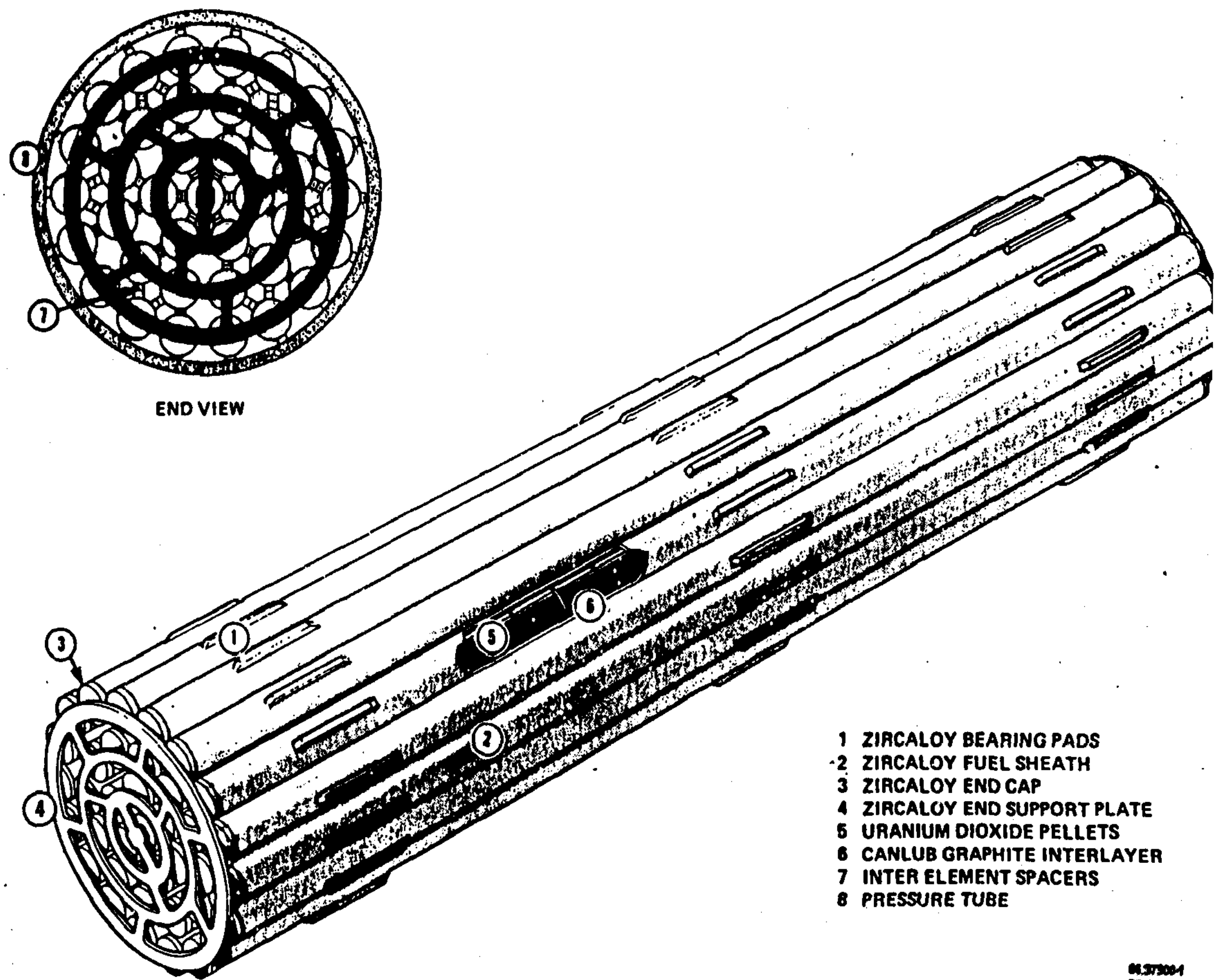
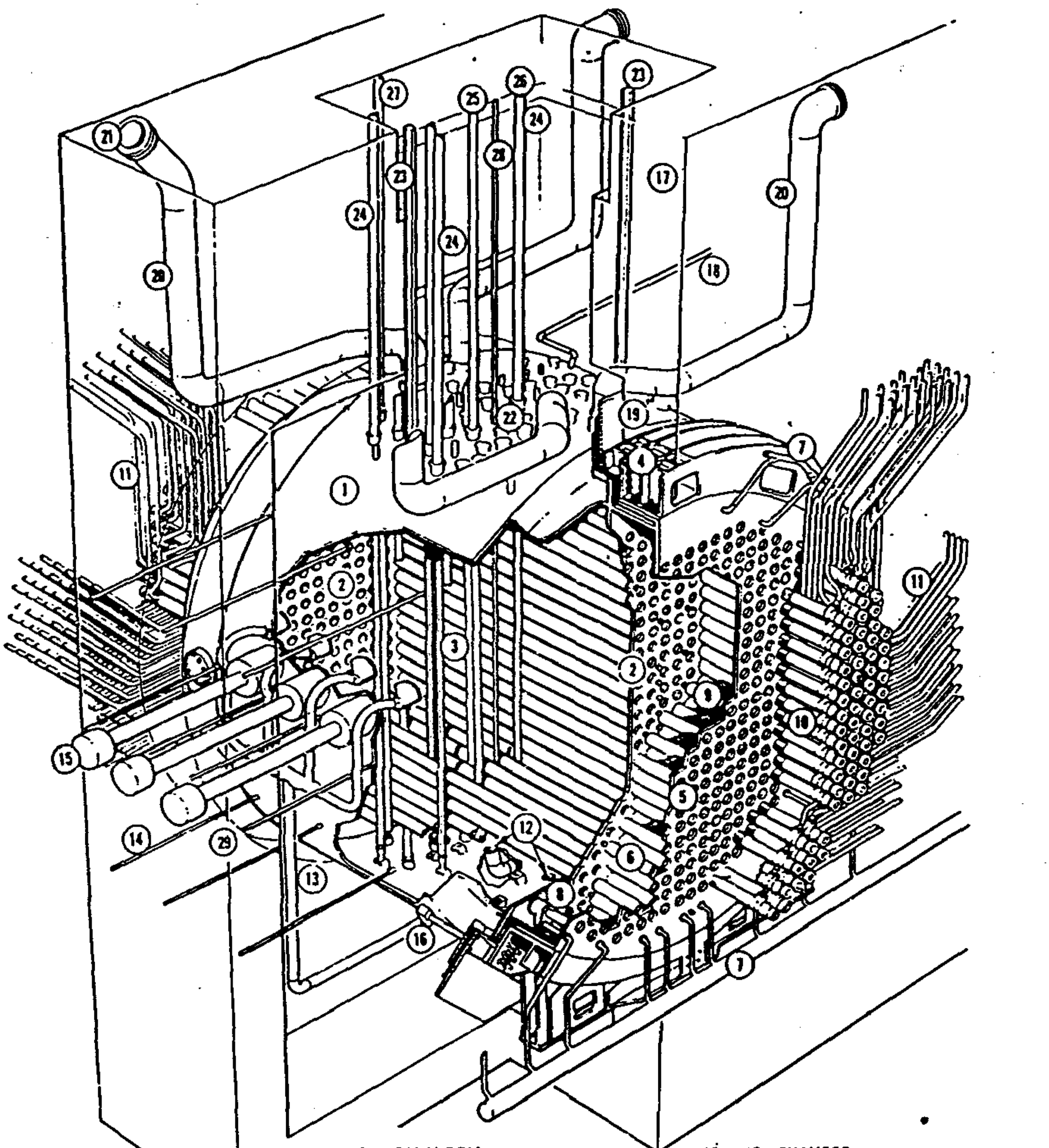


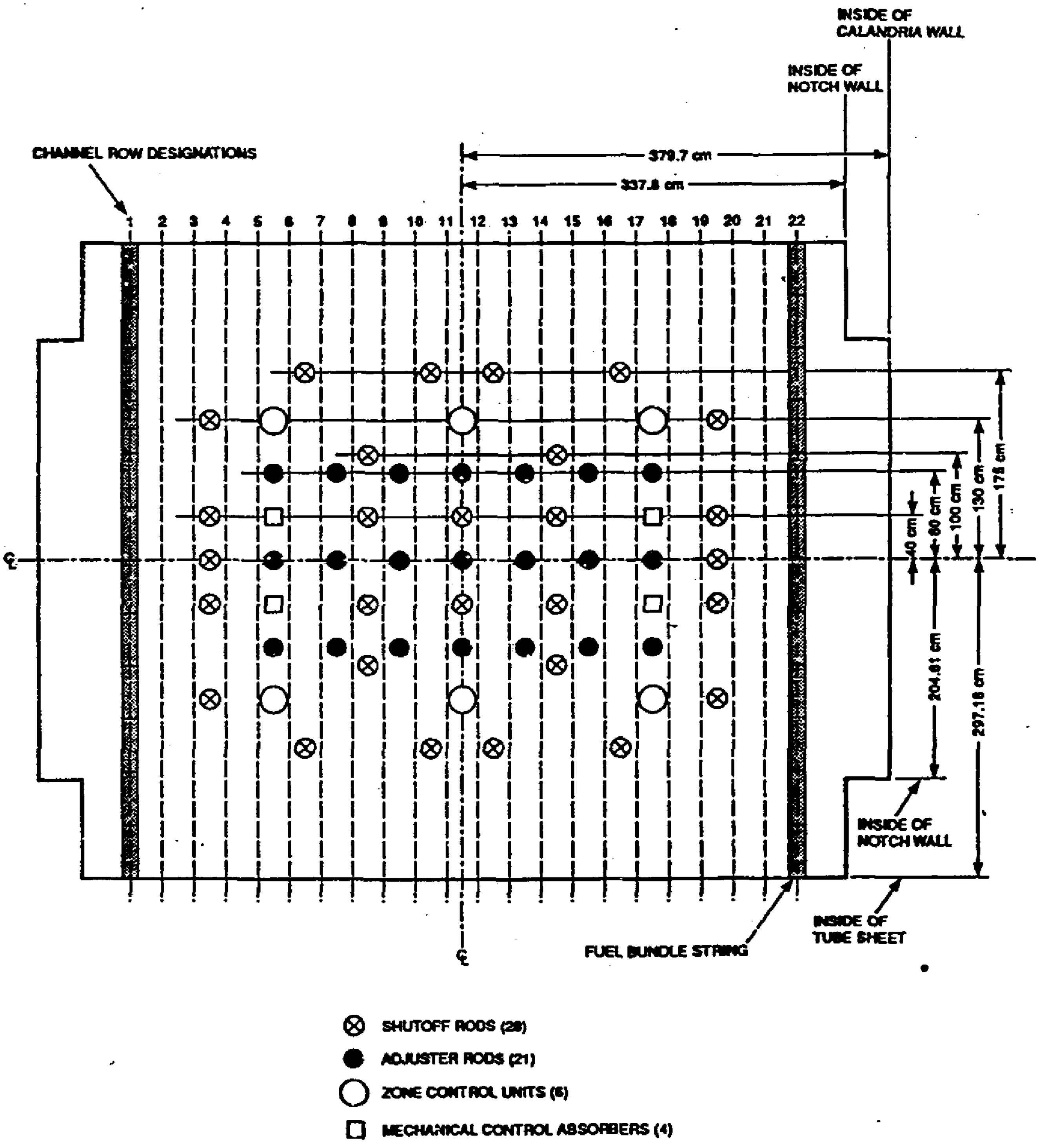
FIGURE 4.5 - 1 37-ELEMENT FUEL BUNDLE



1. CALANDRIA
2. CALANDRIA – SIDE TUBESHEET
3. CALANDRIA TUBES
4. EMBEDMENT RING
5. FUELLING MACHINE – SIDE TUBESHEET
6. END SHIELD LATTICE TUBES
7. END SHIELD COOLING PIPES
8. INLET-OUTLET STRAINER.
9. STEEL BALL SHIELDING
10. END FITTINGS
11. FEEDER PIPES
12. MODERATOR OUTLET
13. MODERATOR INLET
14. HORIZONTAL FLUX DETECTOR UNIT
15. ION CHAMBER
16. EARTHQUAKE RESTRAINT
17. CALANDRIA VAULT WALL
18. MODERATOR EXPANSION TO HEAD TANK
19. CURTAIN SHIELDING SLABS
20. PRESSURE RELIEF PIPES
21. RUPTURE DISC
22. REACTIVITY CONTROL UNIT NOZZLES
23. VIEWING PORT
24. SHUTOFF UNIT
25. ADJUSTER UNIT
26. CONTROL ABSORBER UNIT
27. ZONE CONTROL UNIT
28. VERTICAL FLUX DETECTOR UNIT.
29. LIQUID INJECTION SHUTDOWN NOZZLE

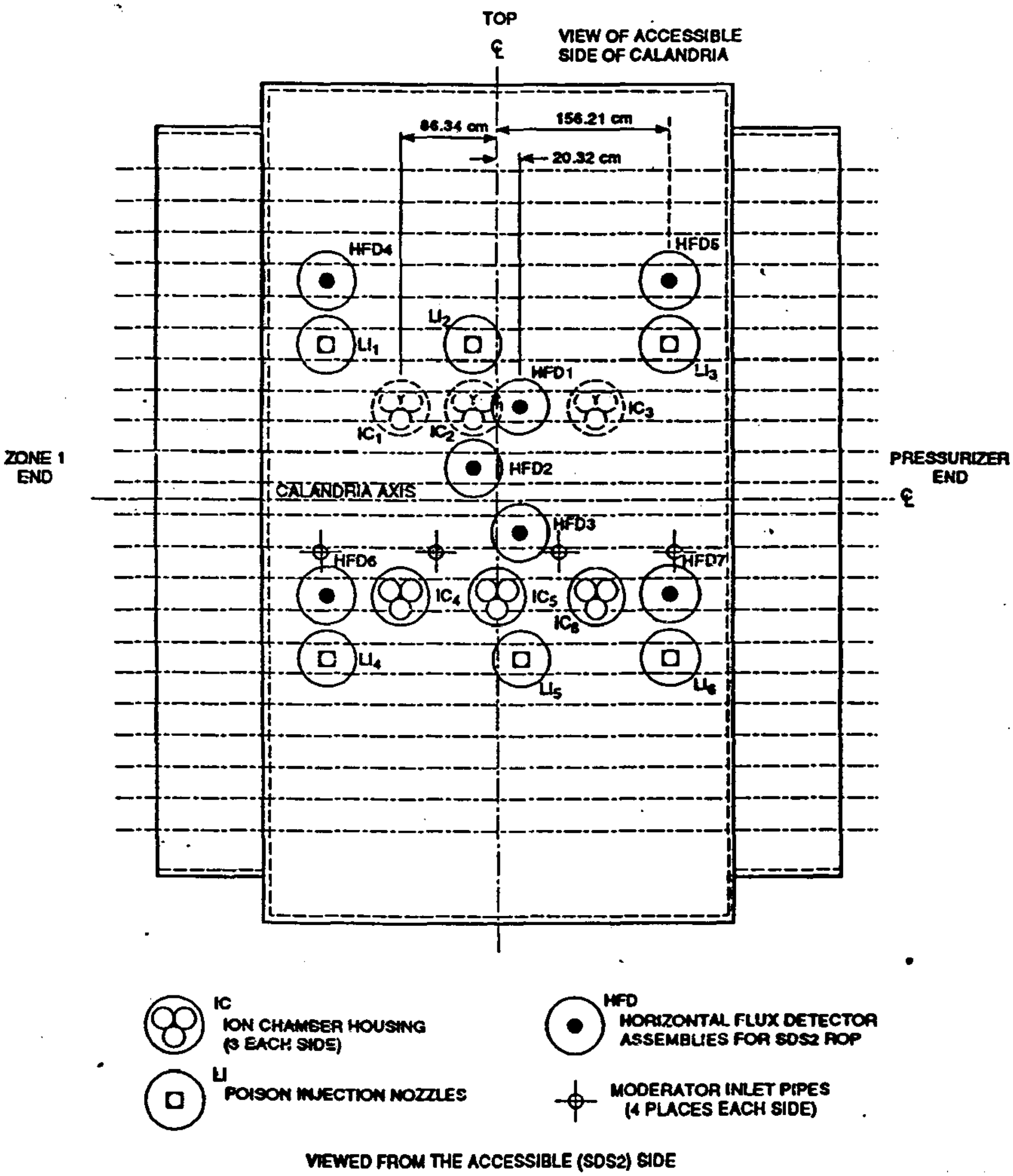
FIGURE 4.1.0 - 1 REACTOR ASSEMBLY

66.31000-1
REV. 3 1978 APR.
66 FSR



930083 4.3.3-5

FIGURE 4.3.3-5 PLAN VIEW OF REACTOR SHOWING PRINCIPAL CALANDRIA DIMENSIONS AND LAYOUT OF REACTIVITY DEVICES



930063 4.3.3-6

FIGURE 4.3.3-6 LOCATION OF HORIZONTAL REACTIVITY CONTROL UNITS

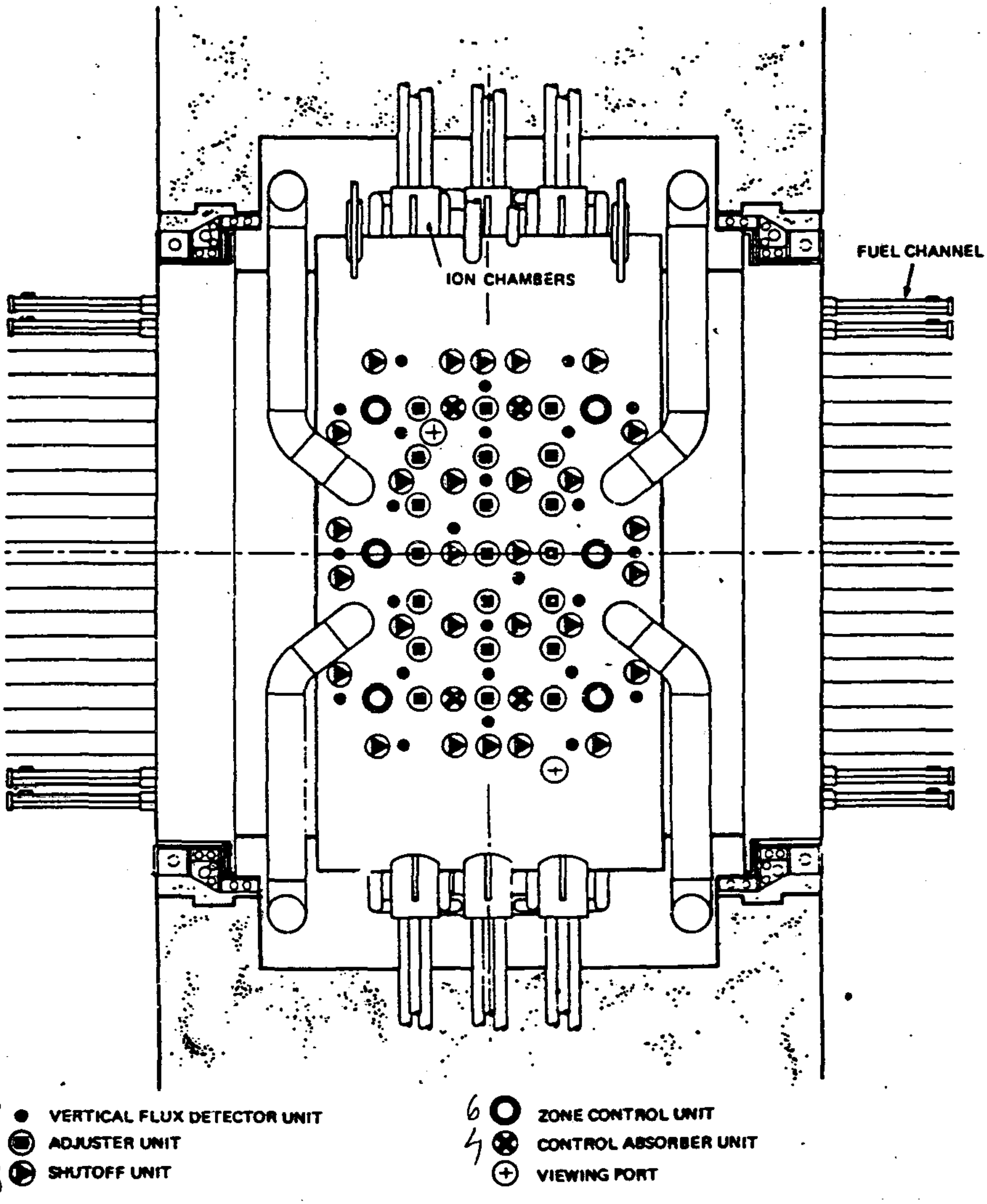


FIGURE 4.1.1 - 1 REACTOR GENERAL ARRANGEMENT — PLAN

66.31000-4
REV. 2 1978 AP.
66 FSR

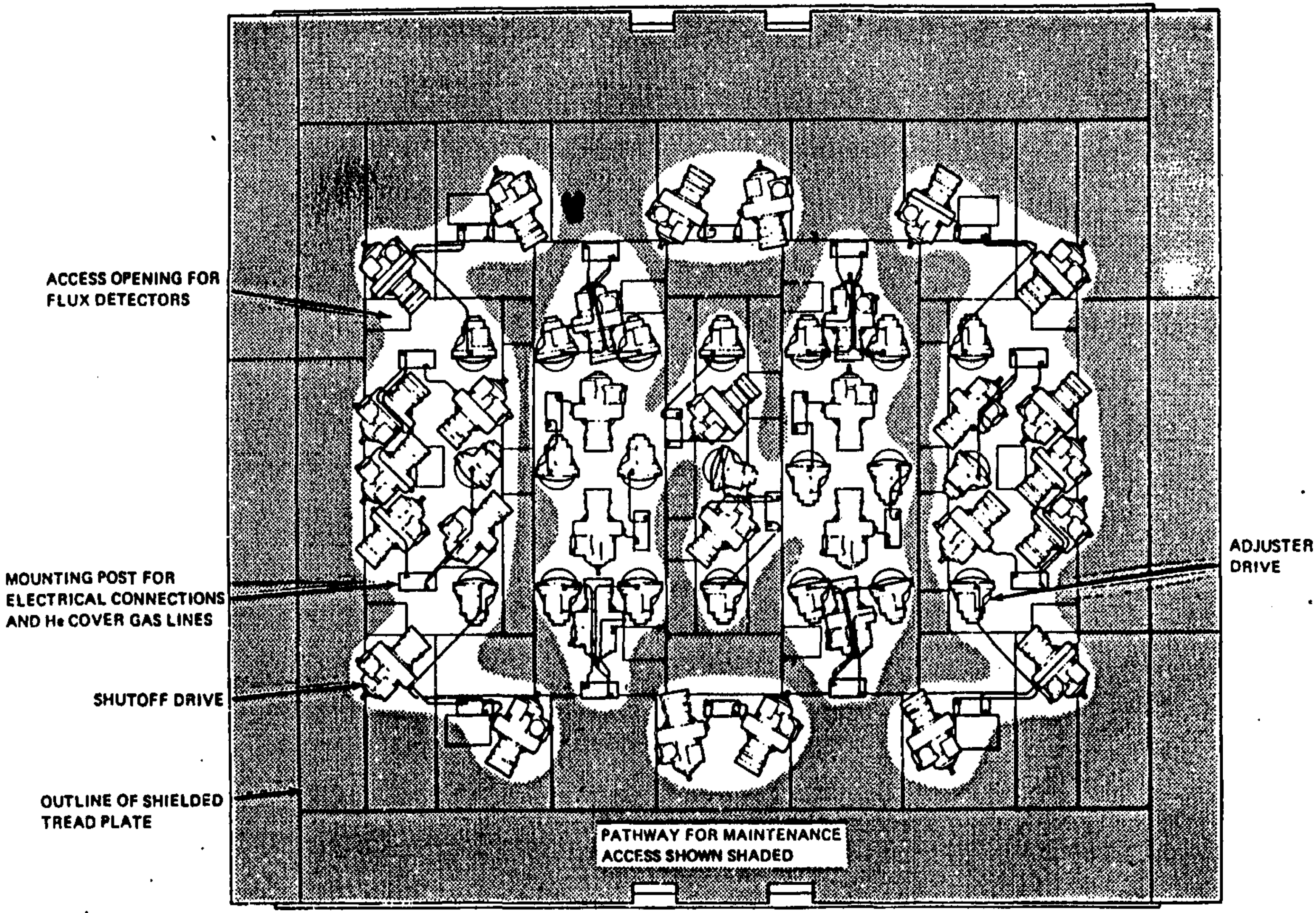


FIGURE 4.1.2 - 8 REACTIVITY MECHANISM DECK – PLAN VIEW

66 3171(
1978 API
66 FSR

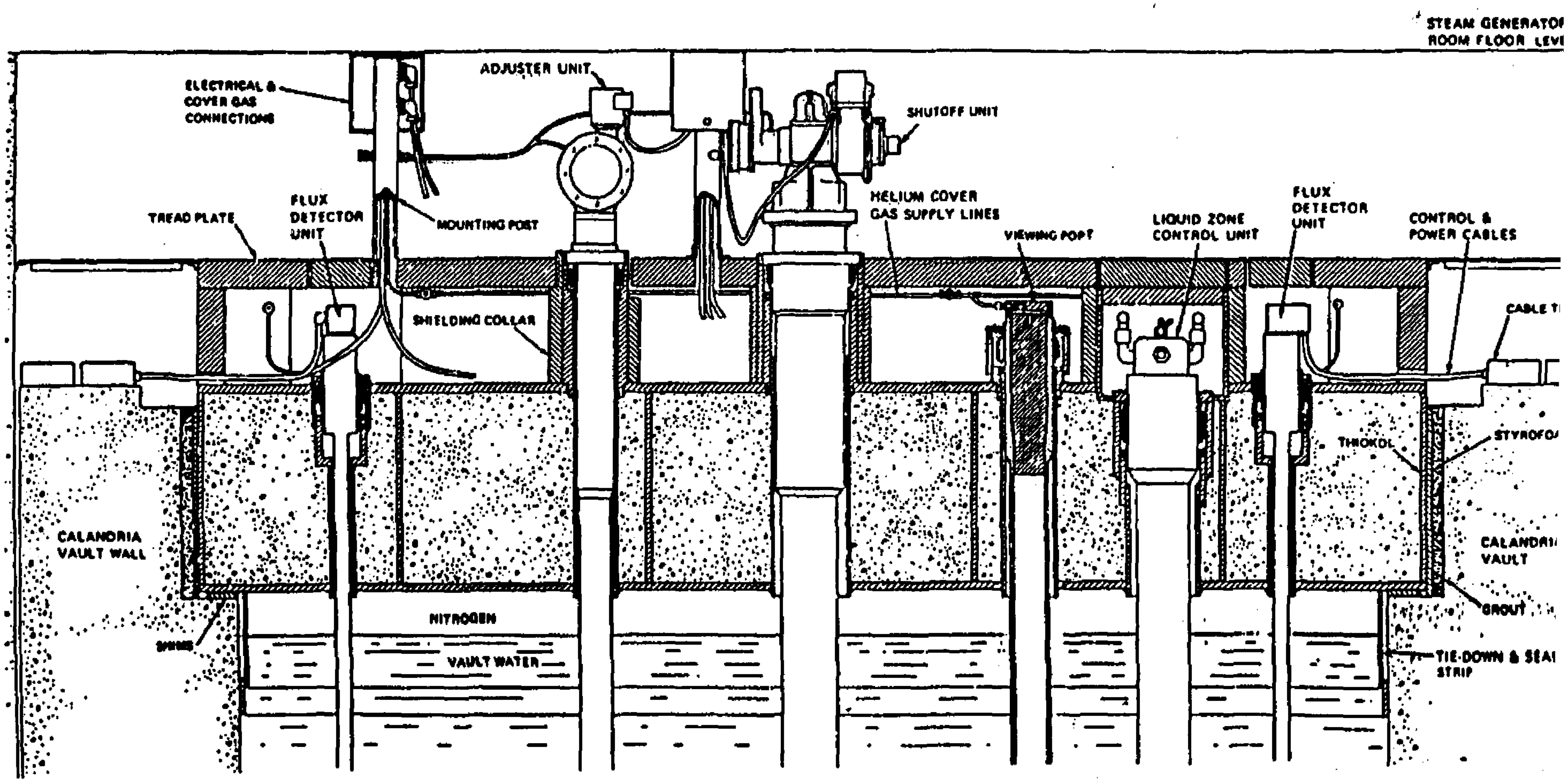


FIGURE 4.1.2-7 REACTIVITY MECHANISM DECK

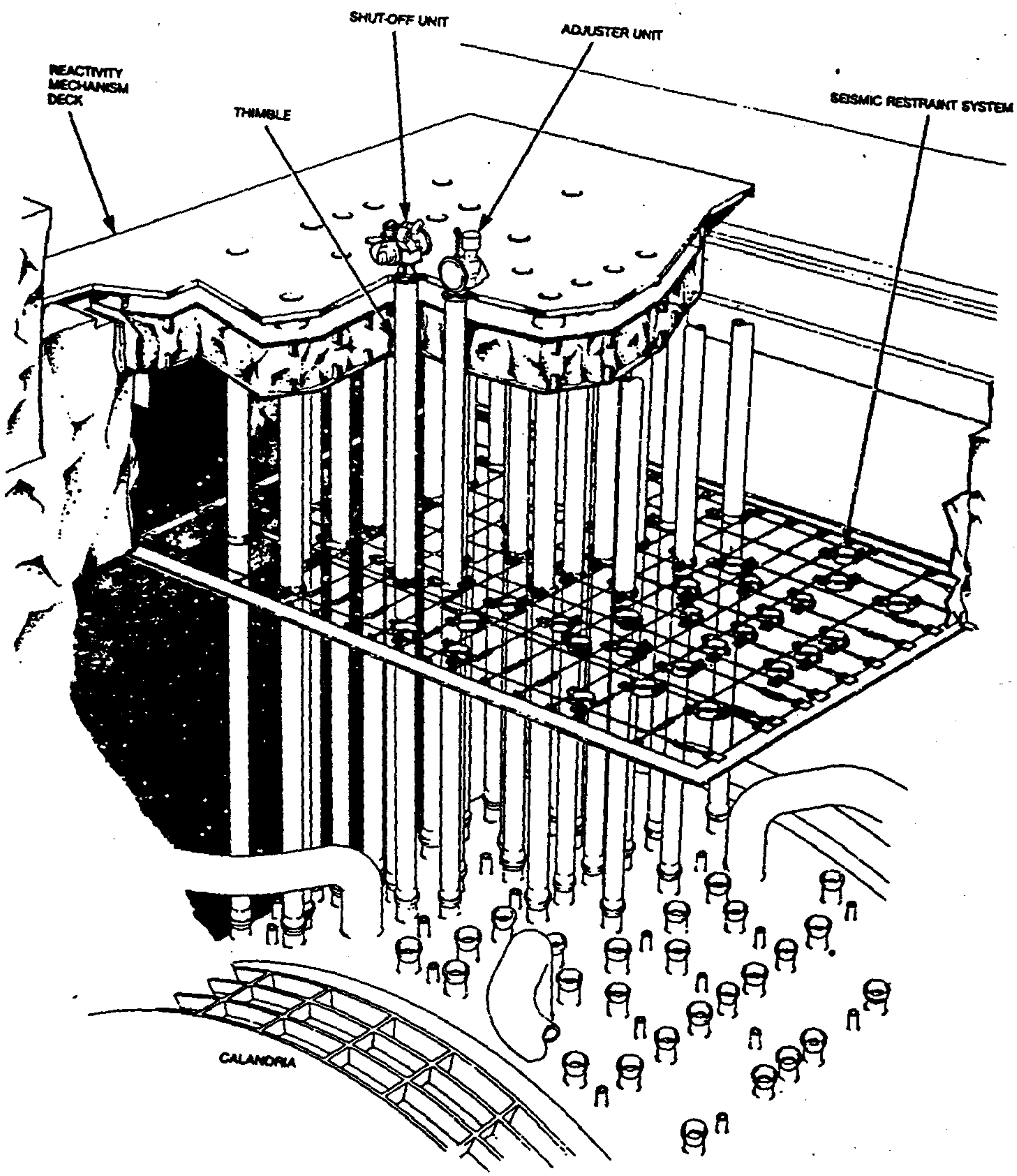
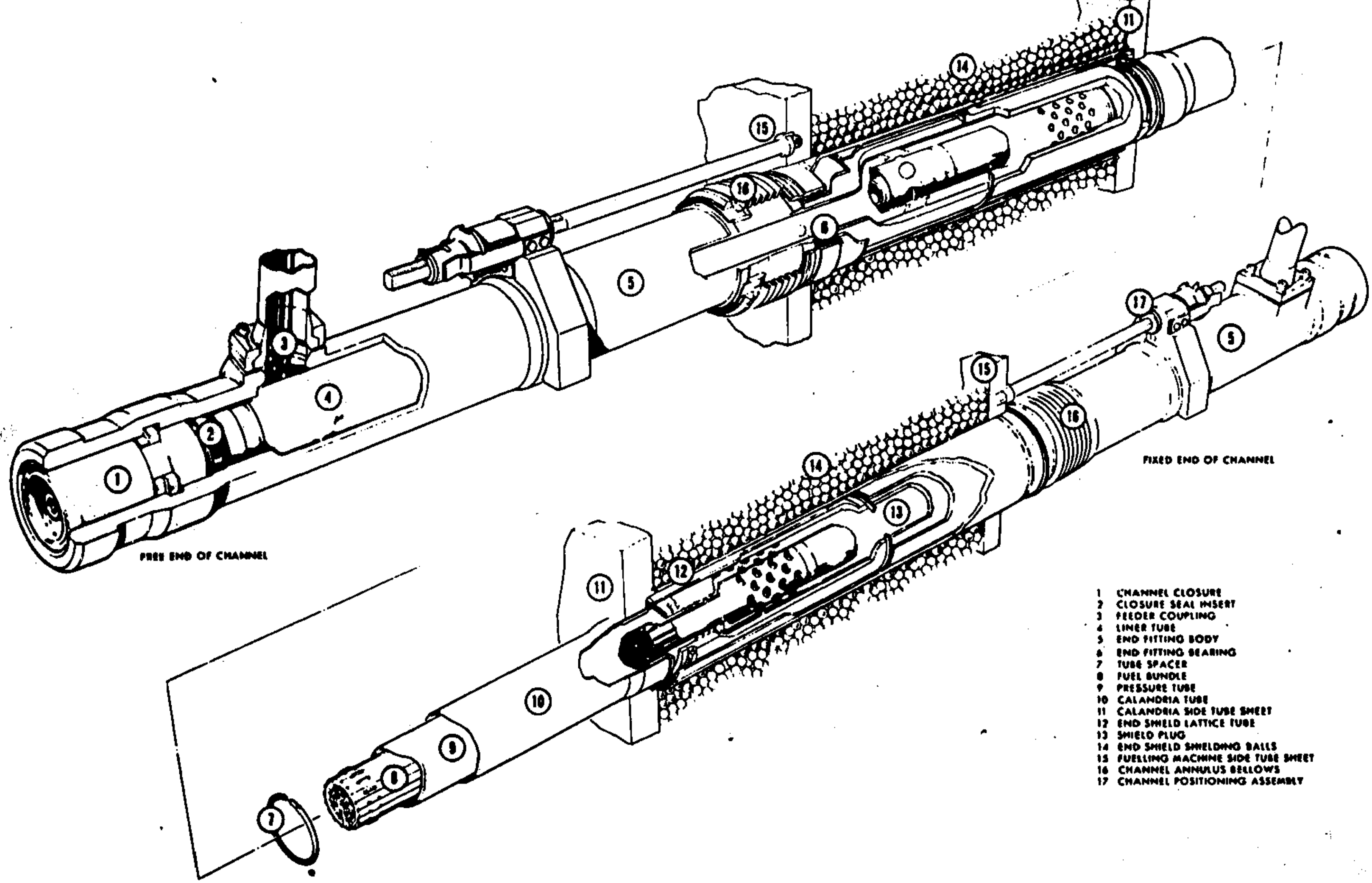


FIGURE 4.2.2-5 SEISMIC RESTRAINT SYSTEM FOR REACTIVITY MECHANISM THIMBLES

86-31700-23
1980
86-FSR



1 CHANNEL CLOSURE
2 CLOSURE SEAL INSERT
3 FEEDER COUPLING
4 LINER TUBE
5 END FITTING BODY
6 END FITTING BEARING
7 TUBE SPACER
8 FUEL BUNDLE
9 PRESSURE TUBE
10 CALANDRIA TUBE
11 CALANDRIA SIDE TUBE SHEET
12 END SHIELD LATTICE TUBE
13 SHIELD PLUG
14 END SHIELD SHIELDING BALLS
15 FUELLING MACHINE SIDE TUBE SHEET
16 CHANNEL ANNULUS BELLOWS
17 CHANNEL POSITIONING ASSEMBLY

FIGURE 5.1.2-1 FUEL CHANNEL ASSEMBLY

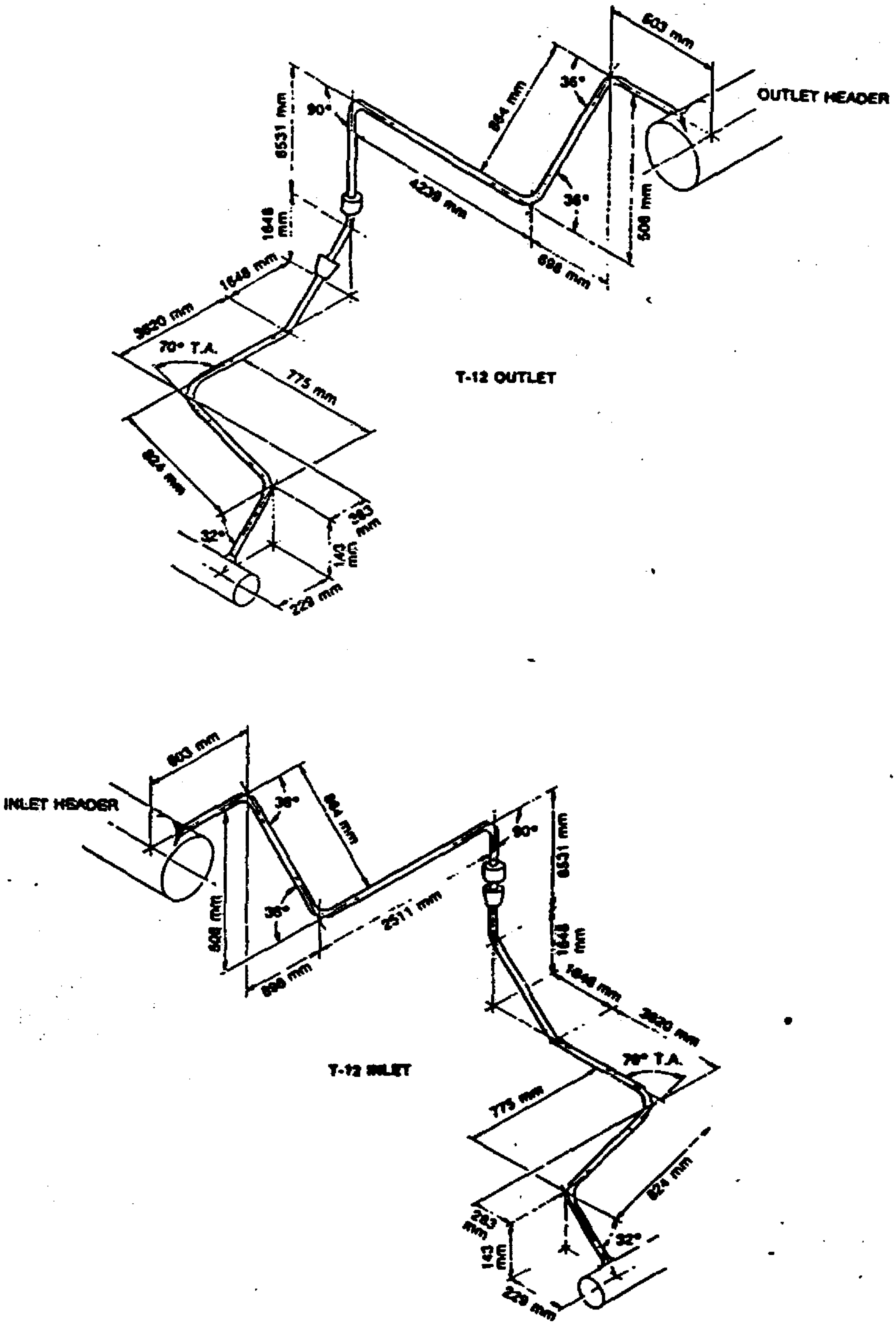


FIGURE 4.4-1 HEAT TRANSPORT SYSTEM — TYPICAL FEEDER CONFIGURATION

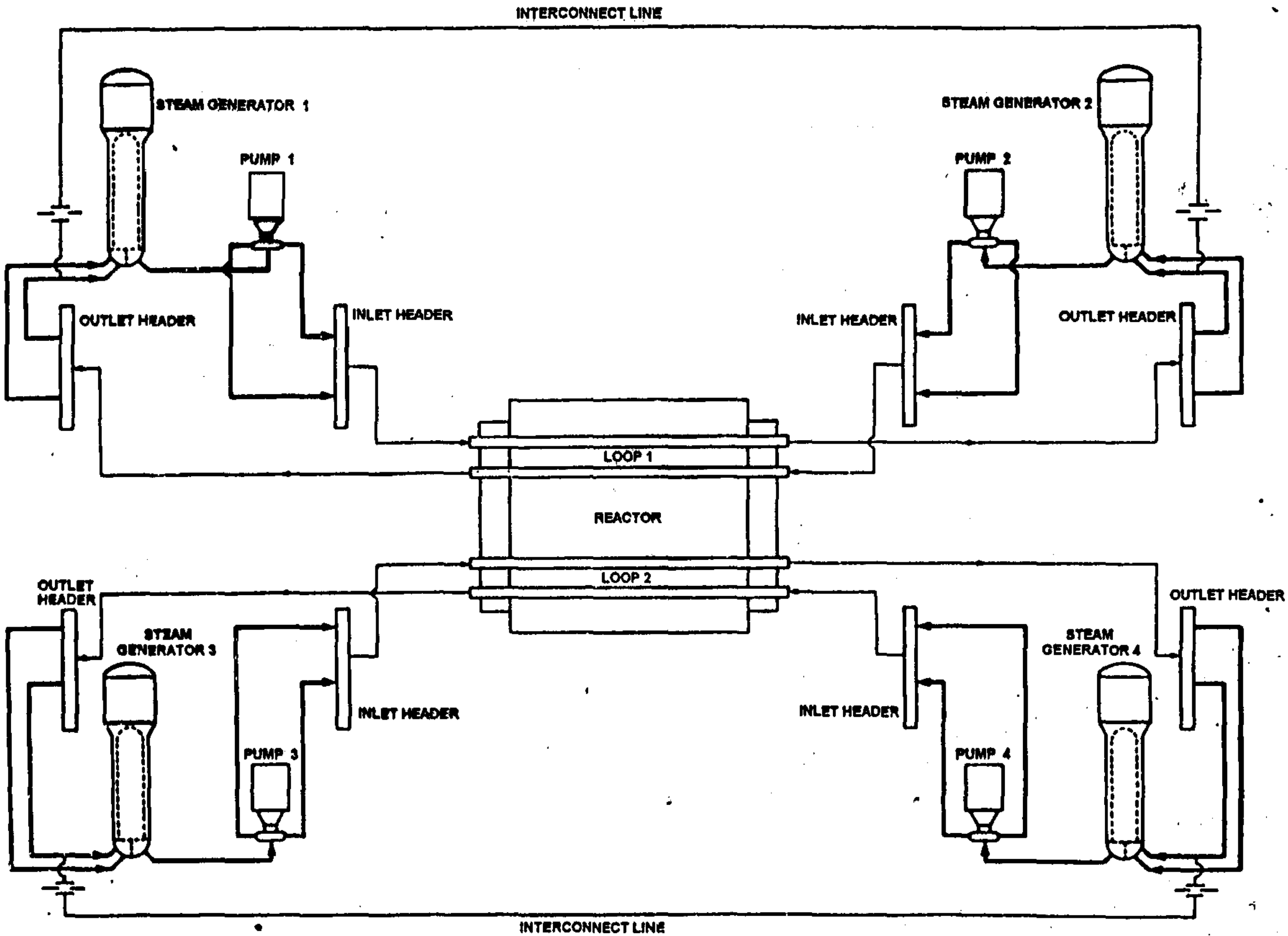


FIGURE 5.1.1 - 1 HEAT TRANSPORT SYSTEM – MAIN CIRCUIT FLOWSHEET

86.33100.3
1984
66 SR

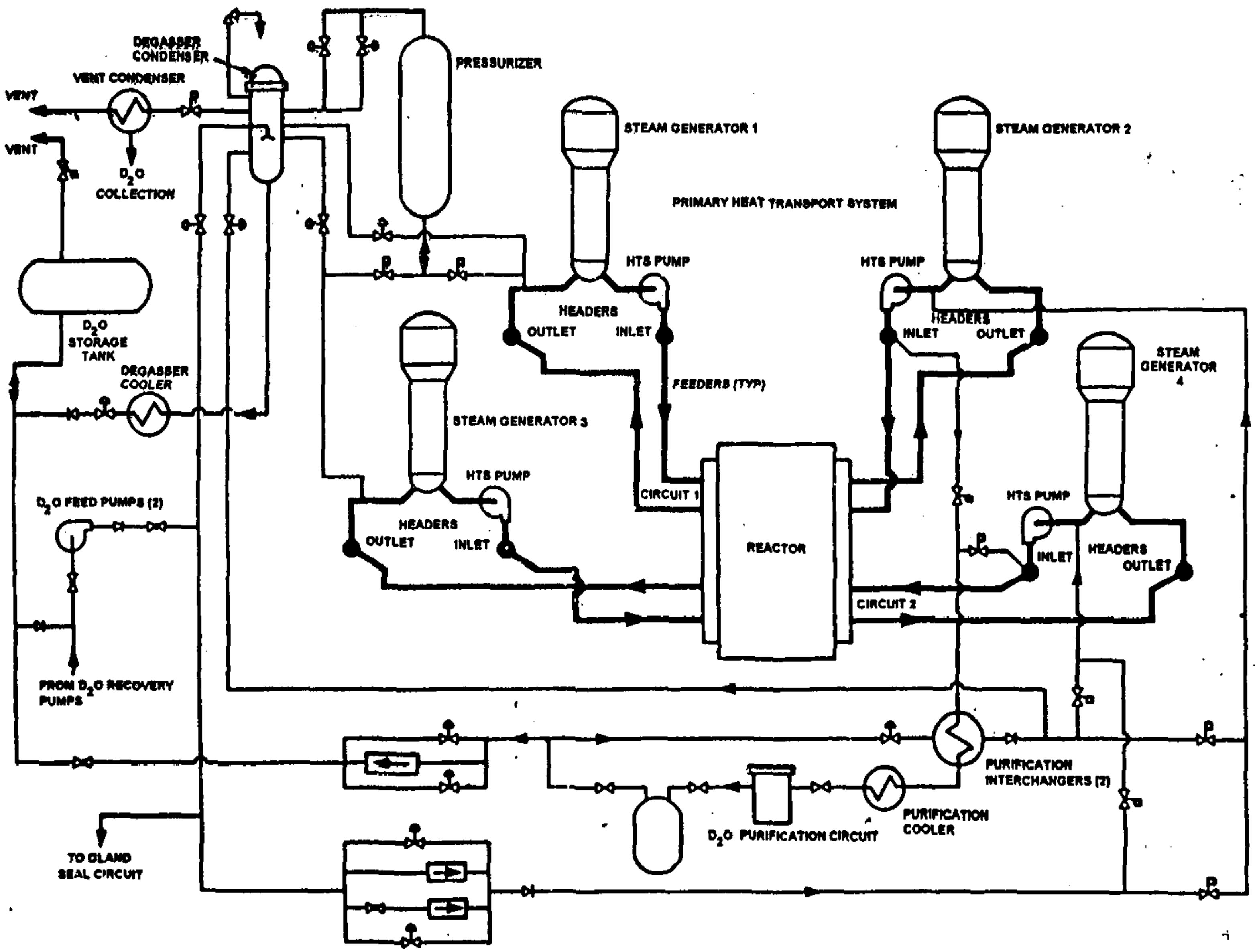


FIGURE 5.1-1 HEAT TRANSPORT SYSTEM NORMAL OPERATION FLOWSHEET

86 33000 18
663R
1987

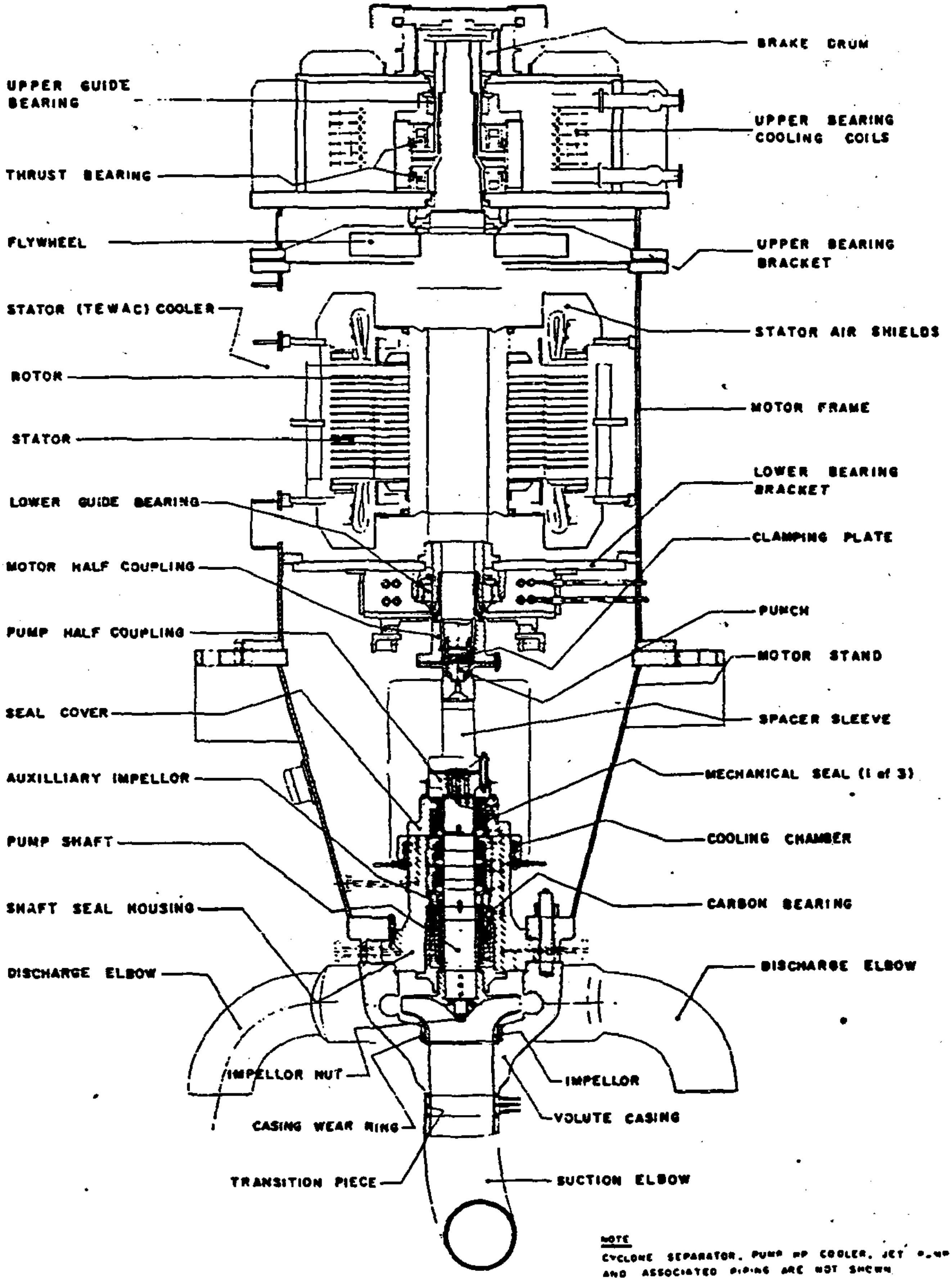


FIGURE 5.5-1 PRIMARY HEAT TRANSPORT PUMP

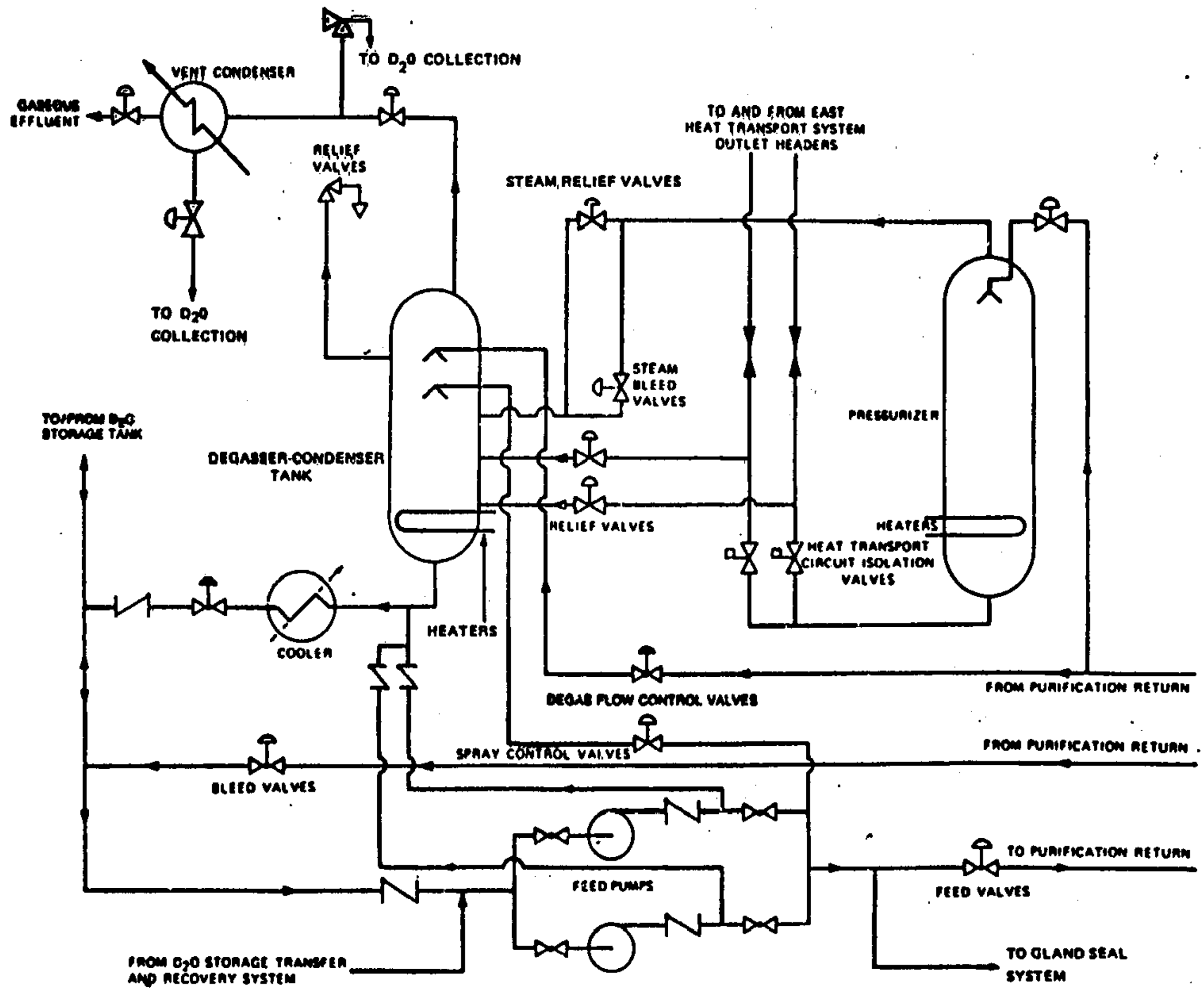


FIGURE 5.1.4 - 1 HEAT TRANSPORT SYSTEM – PRESSURE AND INVENTORY CONTROL SYSTEM

68.33300-1

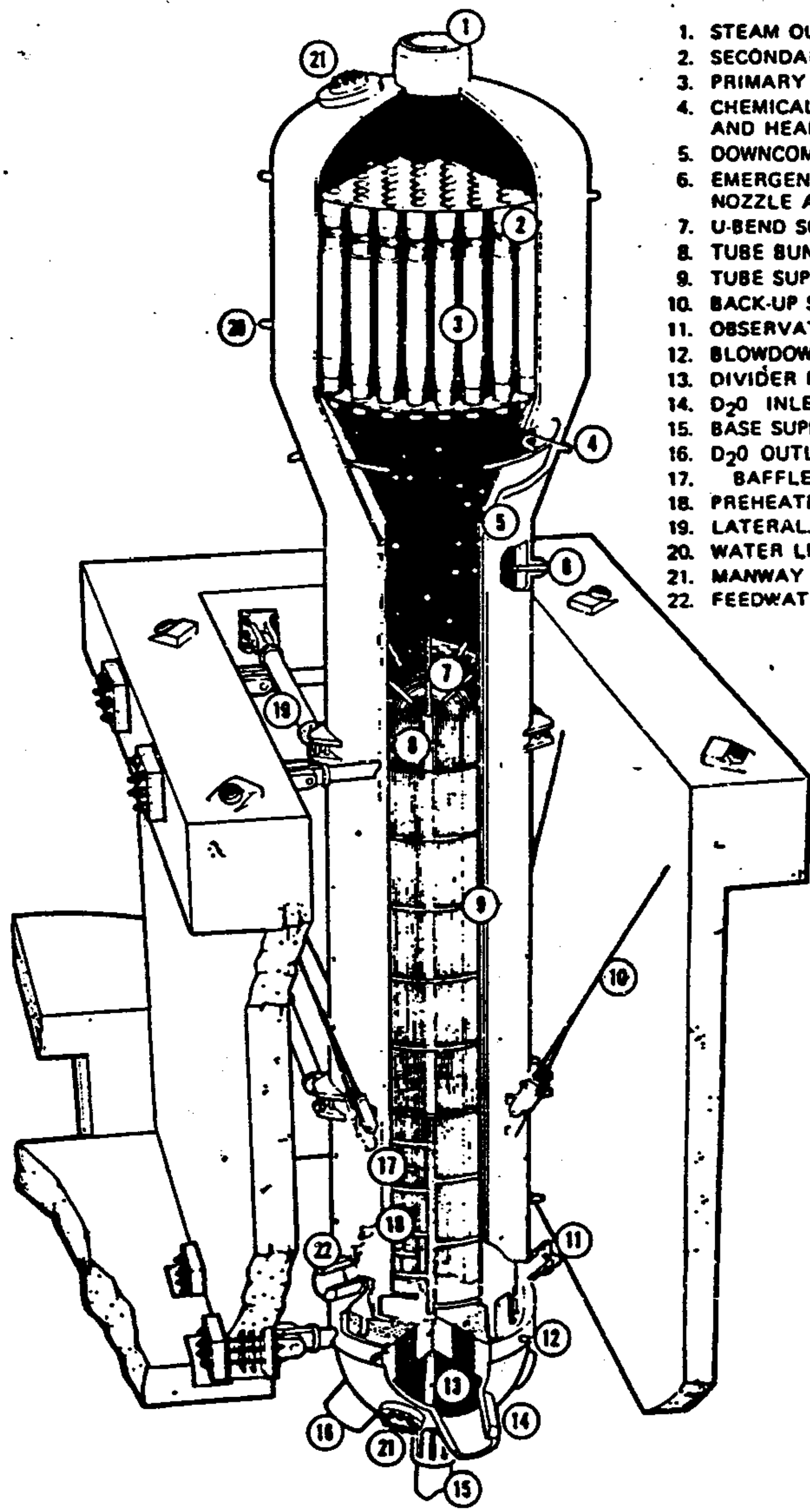


FIGURE 5.5-3 HEAT TRANSPORT SYSTEM STEAM GENERATOR

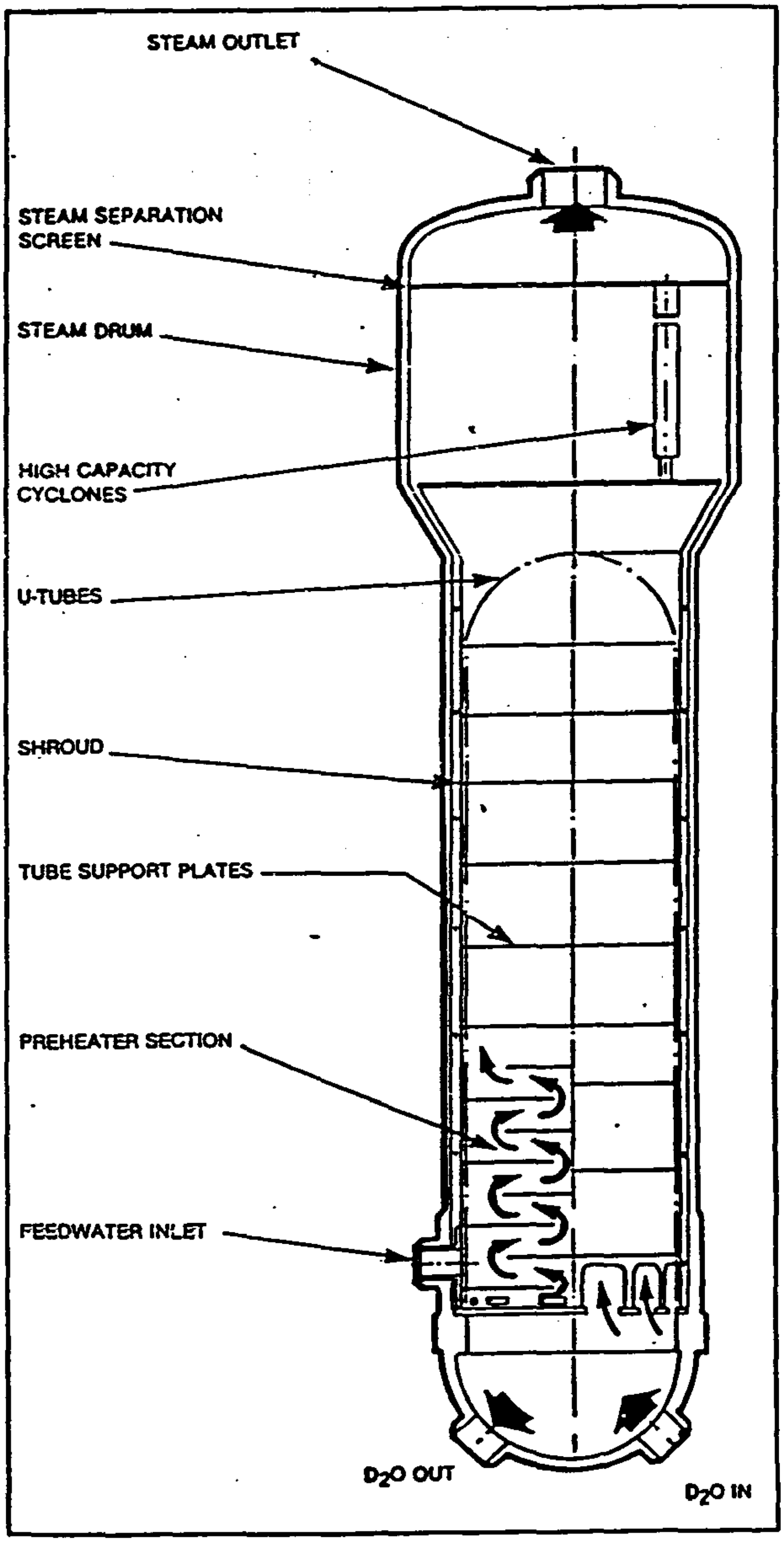


Figure 5.6 Générateur de vapeur.

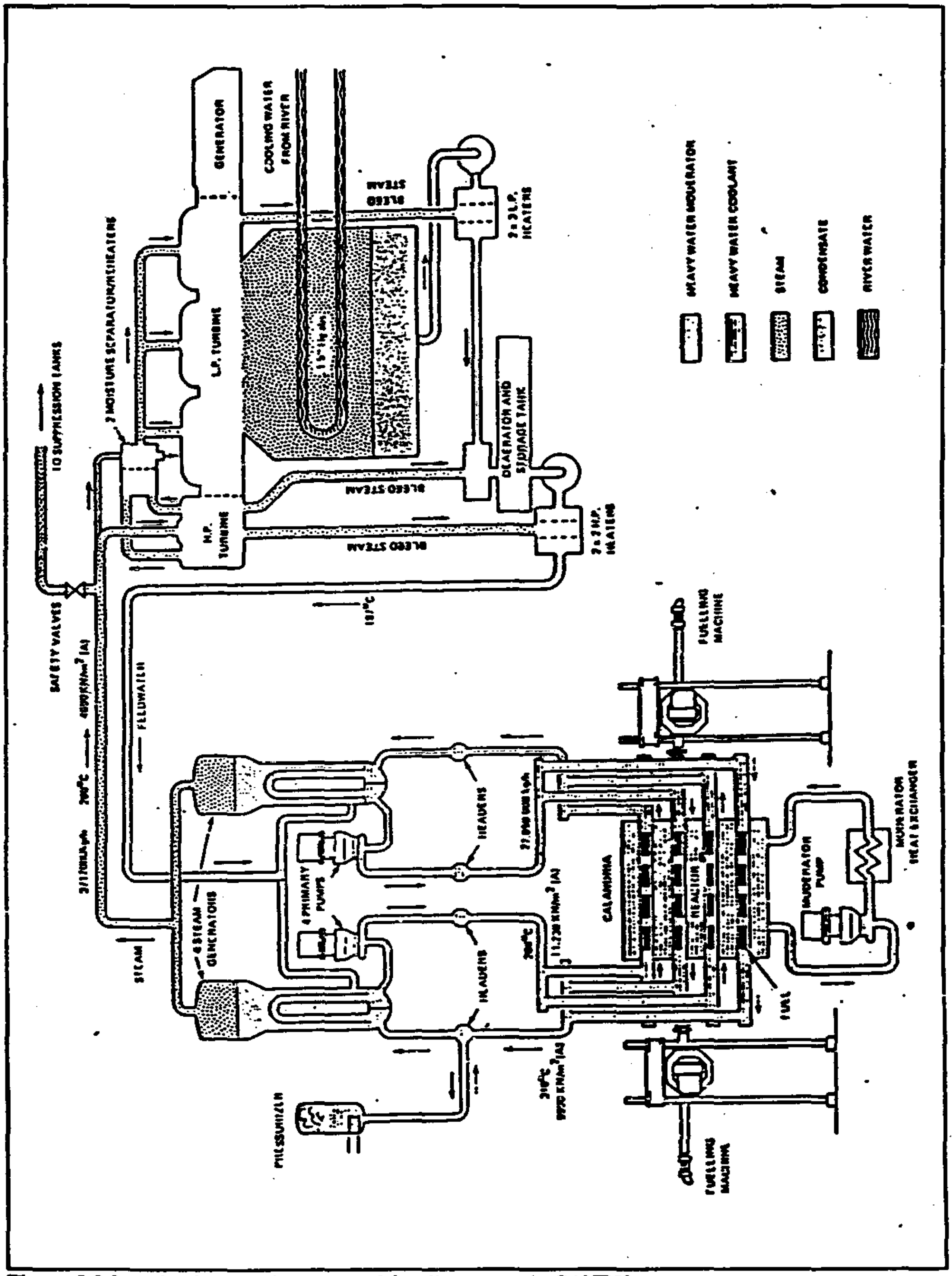


Figure 5.9 Les circuits primaire et secondaire d'une centrale CANDU.

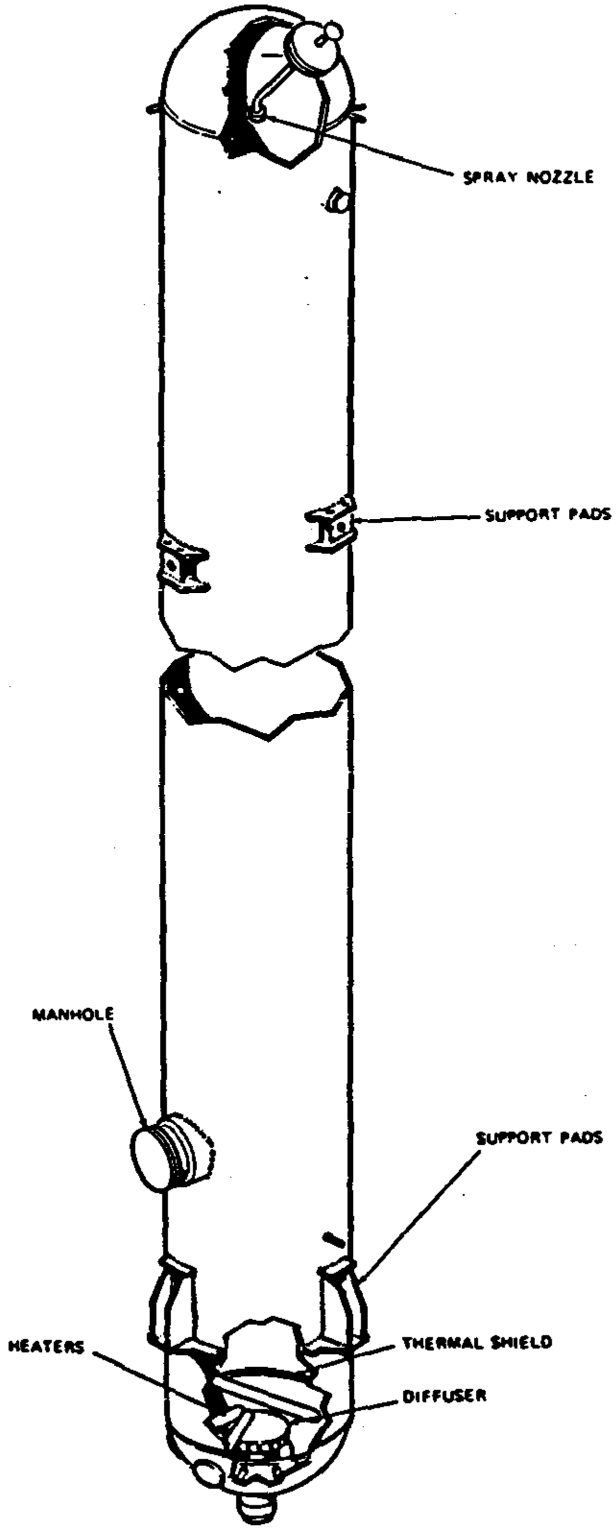


FIGURE 5.6.4-1 PRESSURIZER ARRANGEMENT

66.33000-17
REV. 1 1973
66 FSR

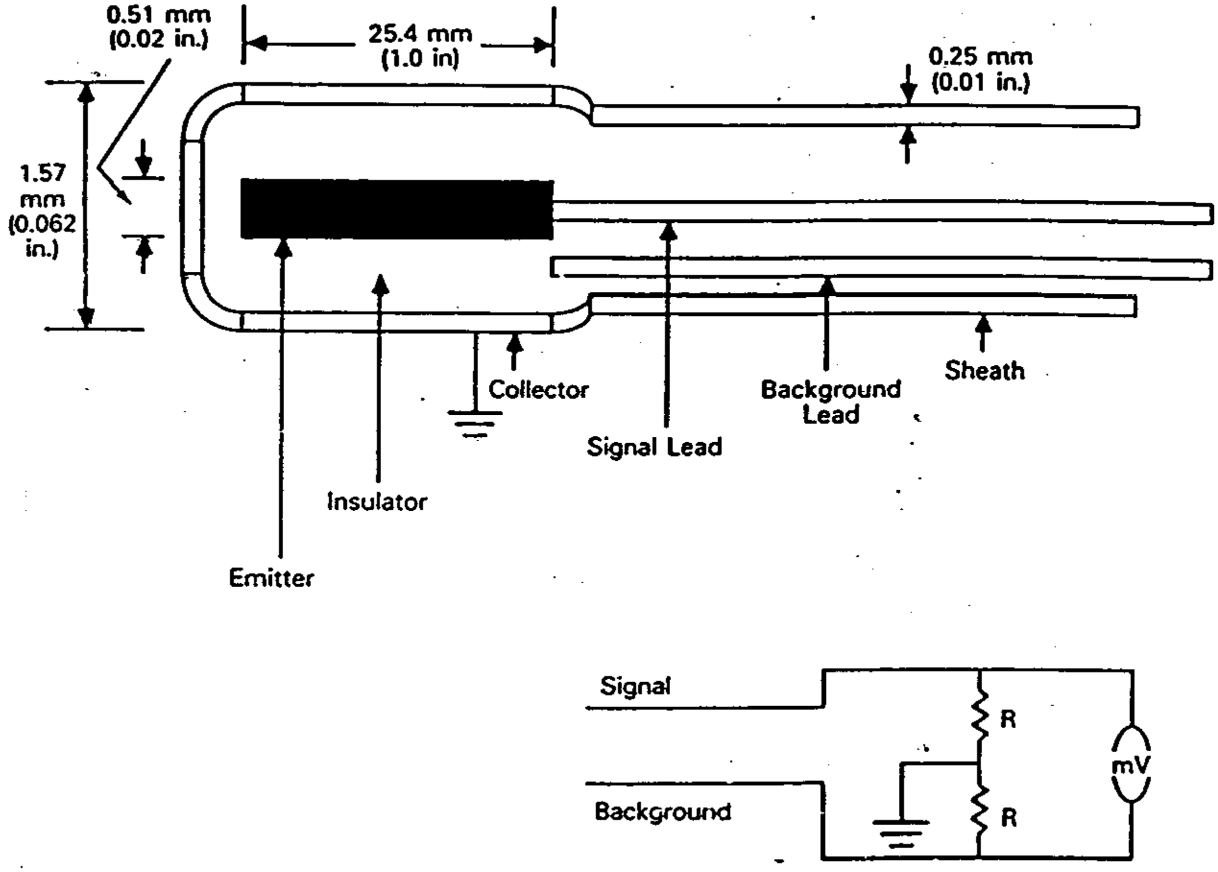


Fig. 1. Schematic of SPND with automatic background subtraction.

methods and is adaptable to other SPND types and sizes. In the analog method, the components of the electronic circuits are specified, and actual values and results obtained under realistic reactor conditions are shown. Unlike other approaches, the background compensation is dynamic and automatic.[6] The problem with small currents, a result of small emitters, is handled in a manner that minimizes external noise interference. In the digital method, all constants are determined from basic physical parameters independent of the detector type, size, or environment.

II. THEORY OF THE RSPND DYNAMIC RESPONSE

The RSPND used in this work and shown in Fig. 1 is made up of three primary parts: the emitter, the insulator, and the collector. Neutrons that pass through the collector and the insulator can be absorbed by the rhodium emitter and lead to activation products that will decay through the emission of beta particles as shown in Fig. 2. Those electrons having sufficient energy to permanently escape from the emitter give rise to a current that can be measured. Since the current is produced from neutrons being absorbed in the rhodium, the magnitude of the current is proportional to the magnitude of the neutron flux at steady state.

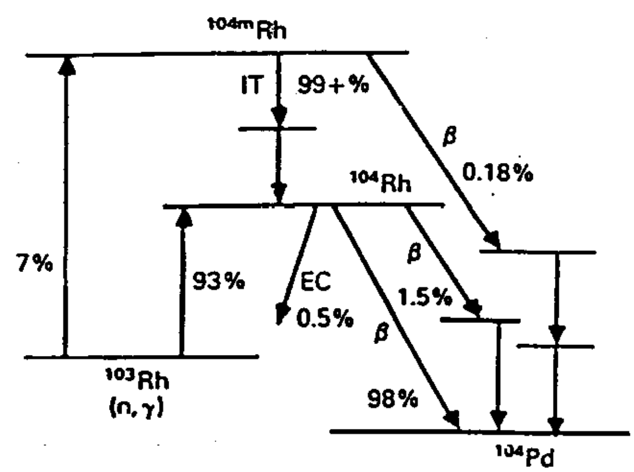


Fig. 2. Decay scheme of rhodium relevant to SPND.

The current from an RSPND can be written in terms of the processes that lead to production of energetic

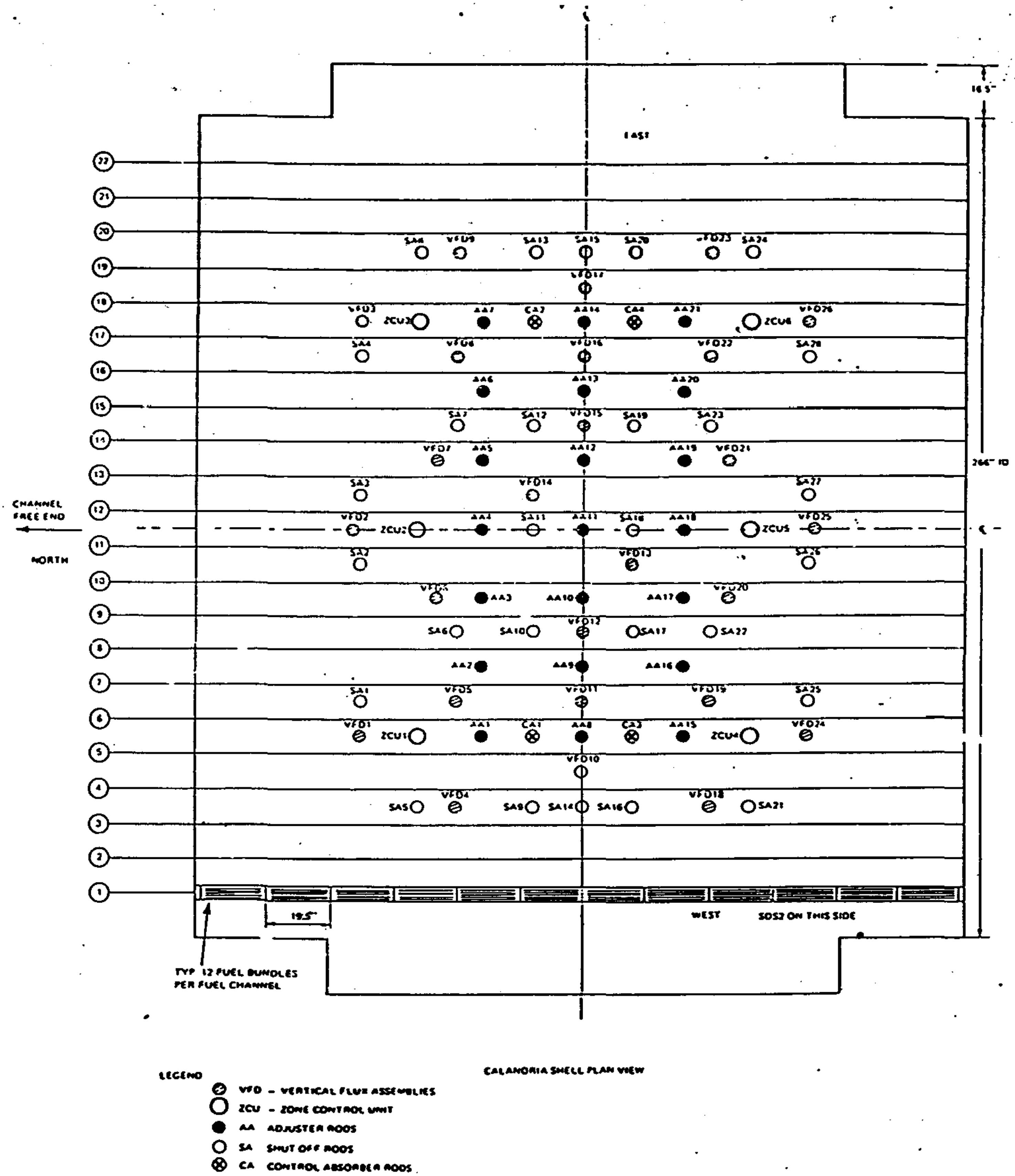


FIGURE 3.8-3 LAYOUT OF THE REACTOR DECK SHOWING LOCATIONS OF THE ZONE CONTROL UNITS AND ZONE CONTROL DETECTOR ASSEMBLIES VFD 2, 4, 9, 18, 23, 25.

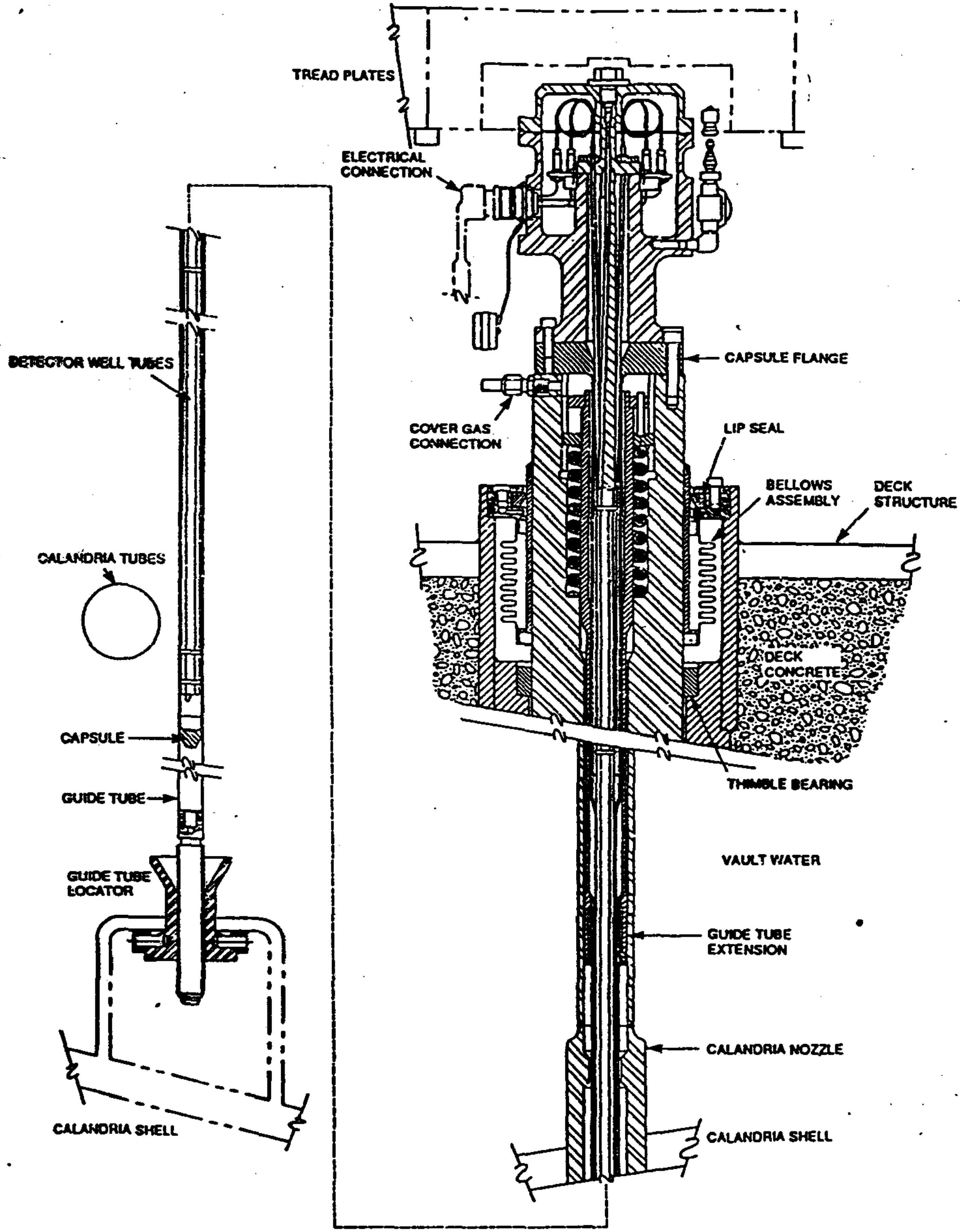
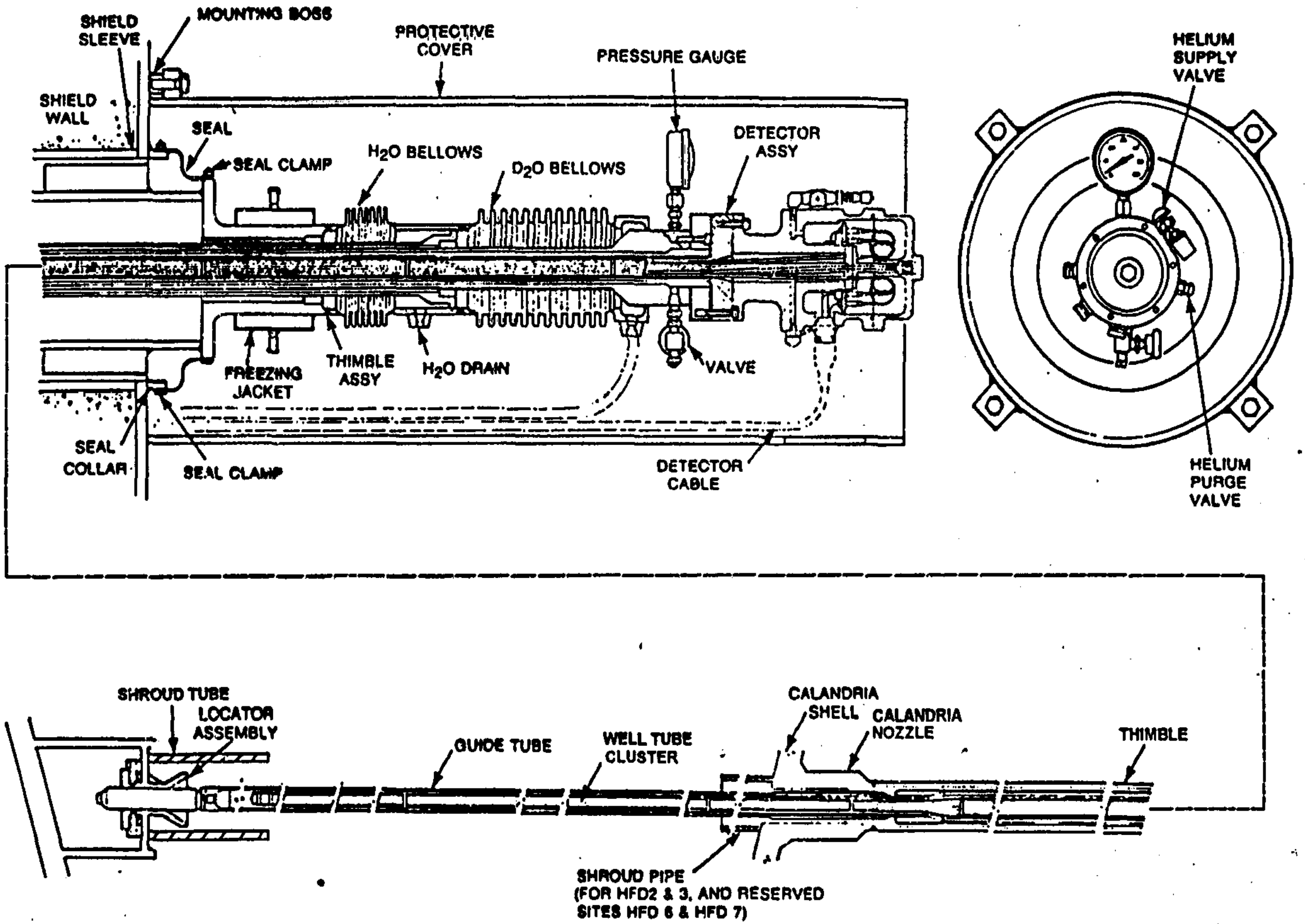


FIGURE 4.1.2-1 FLUX DETECTOR UNIT

1993



1993

FIGURE 4.1.2-8 HORIZONTAL FLUX DETECTOR UNIT

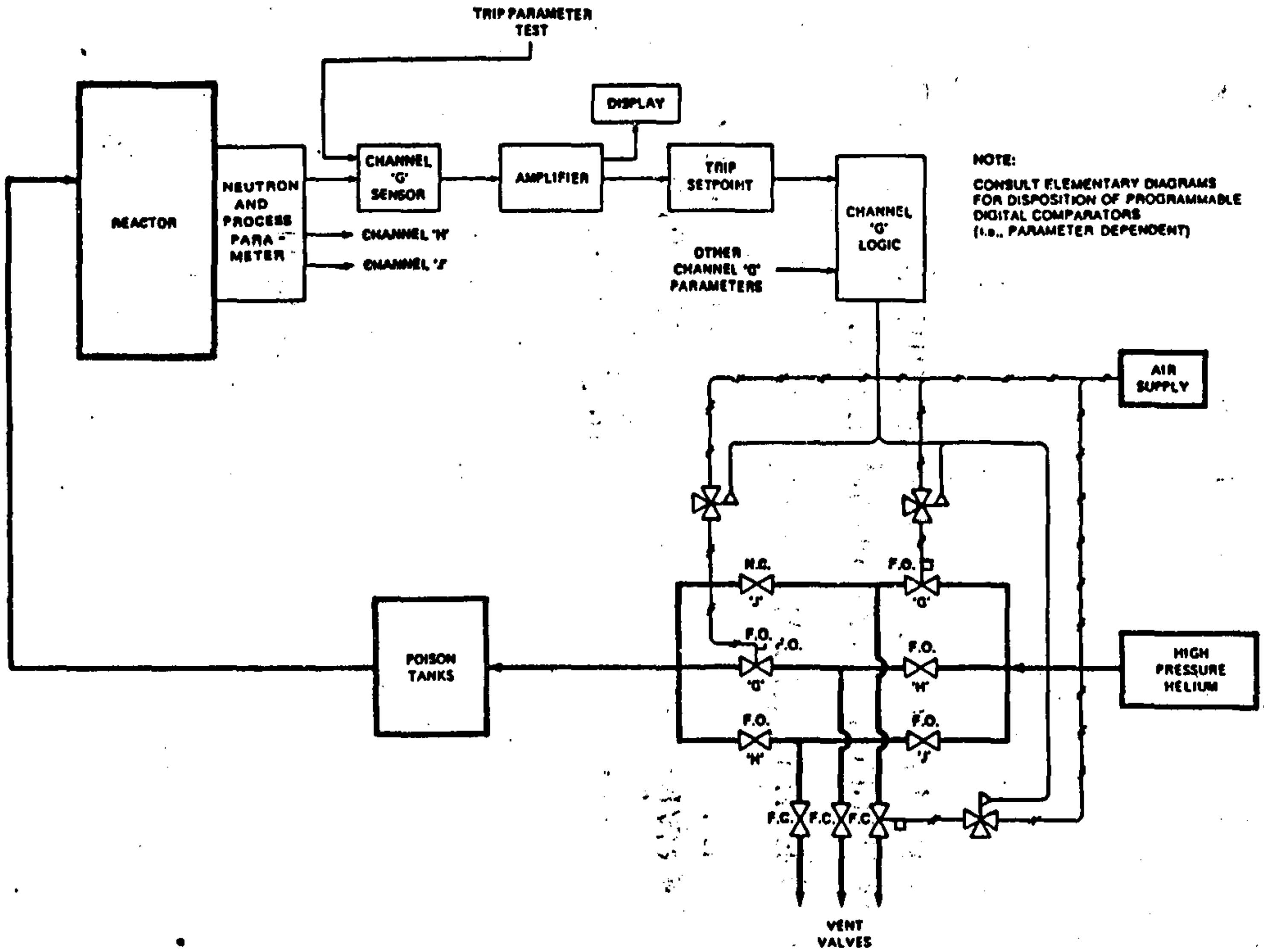
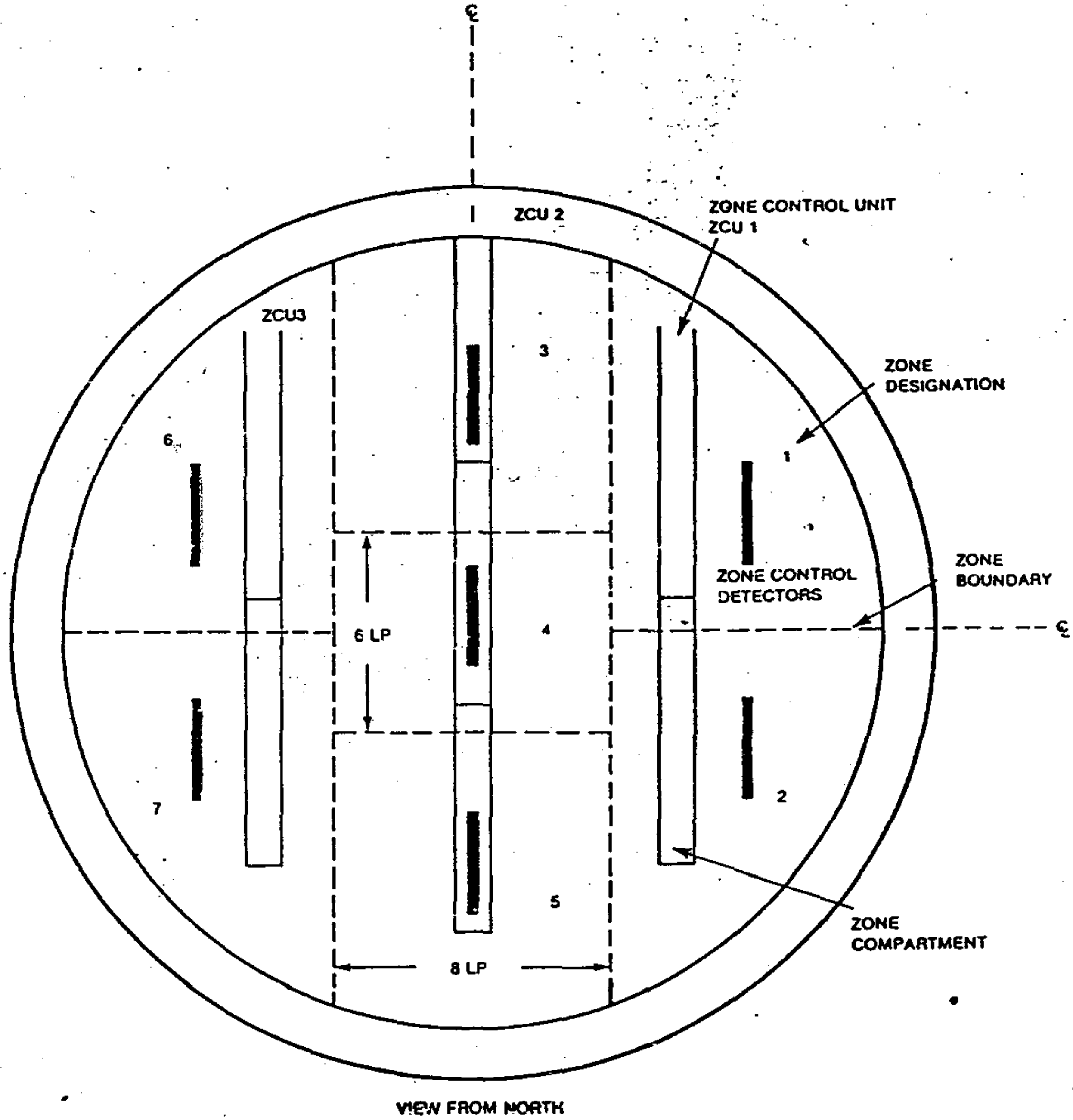


FIGURE 6.5-2 SHUTDOWN SYSTEM NO. 2 - BLOCK DIAGRAM

66-68300



NOTES
1. LP = LATTICE PITCH
2. ALL ZONE CONTROL DETECTORS ARE 3 LATTICE PITCHES LONG
3. THE BANK OF CONTROLLERS ON THE SOUTH SIDE IS SYMMETRIC TO THIS.

FIGURE 3.8-2 POSITION OF ZONE CONTROL DETECTORS WITH RESPECT TO ZONE COMPARTMENTS

DM-66-01110

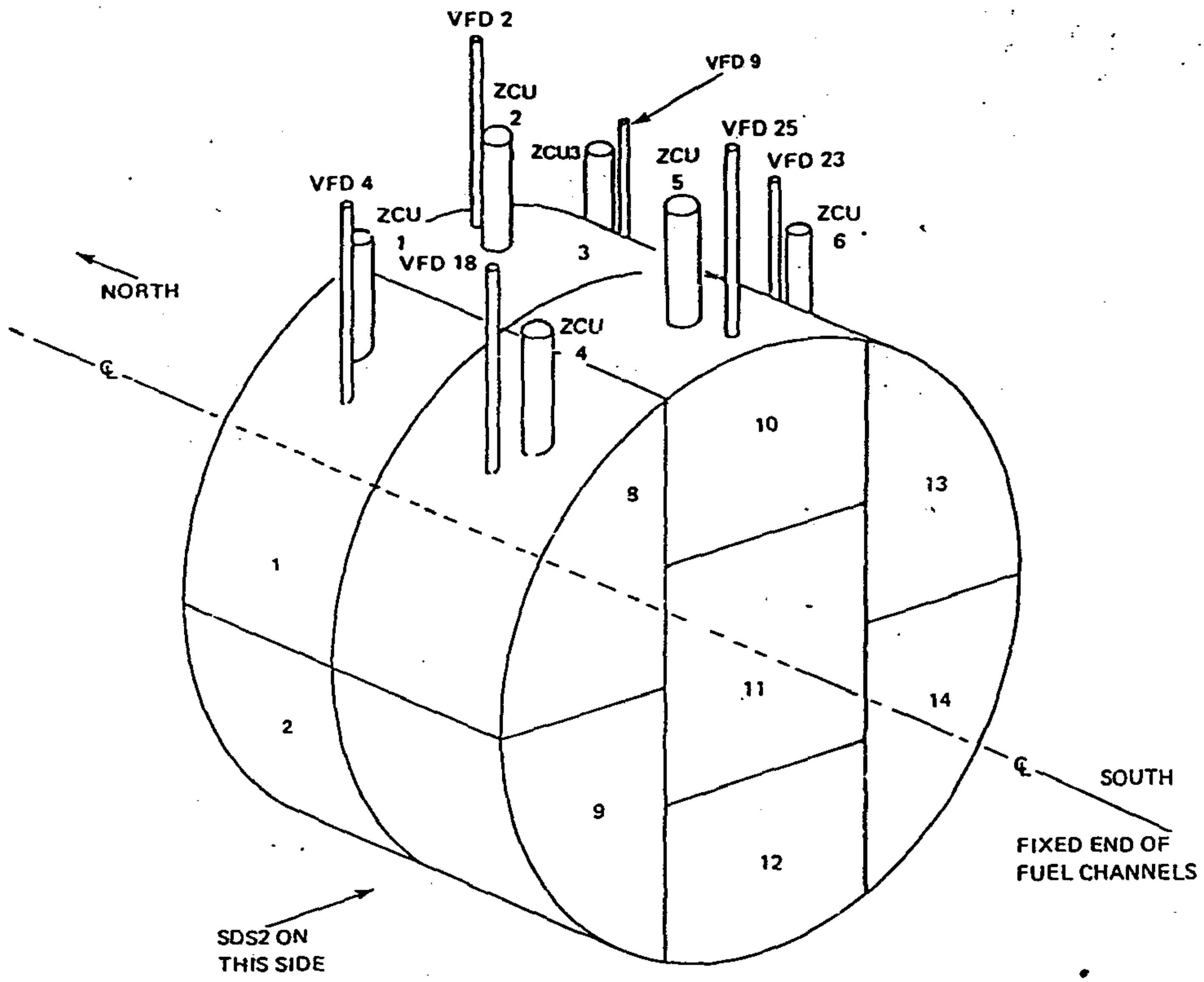


FIGURE 3.8-1 RELATION OF ZONE CONTROL UNITS (ZCU) TO THE FOURTEEN ZONES AND THE REACTOR ZONE CONTROL DETECTOR ASSEMBLIES VFD 2, 4, 9, 18, 23, 25

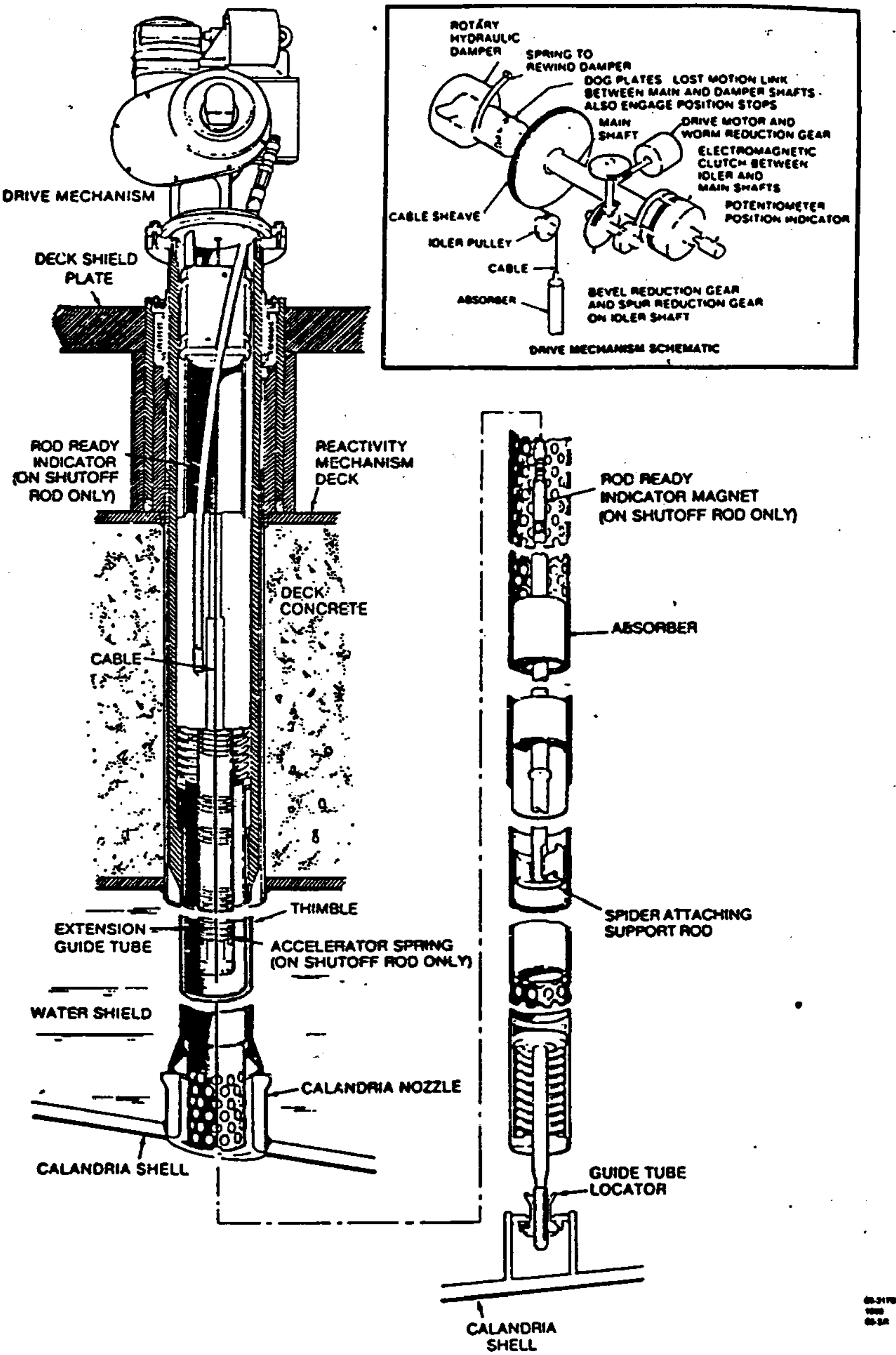


FIGURE 4.1.2-5 SHUTOFF AND CONTROL ABSORBER UNIT

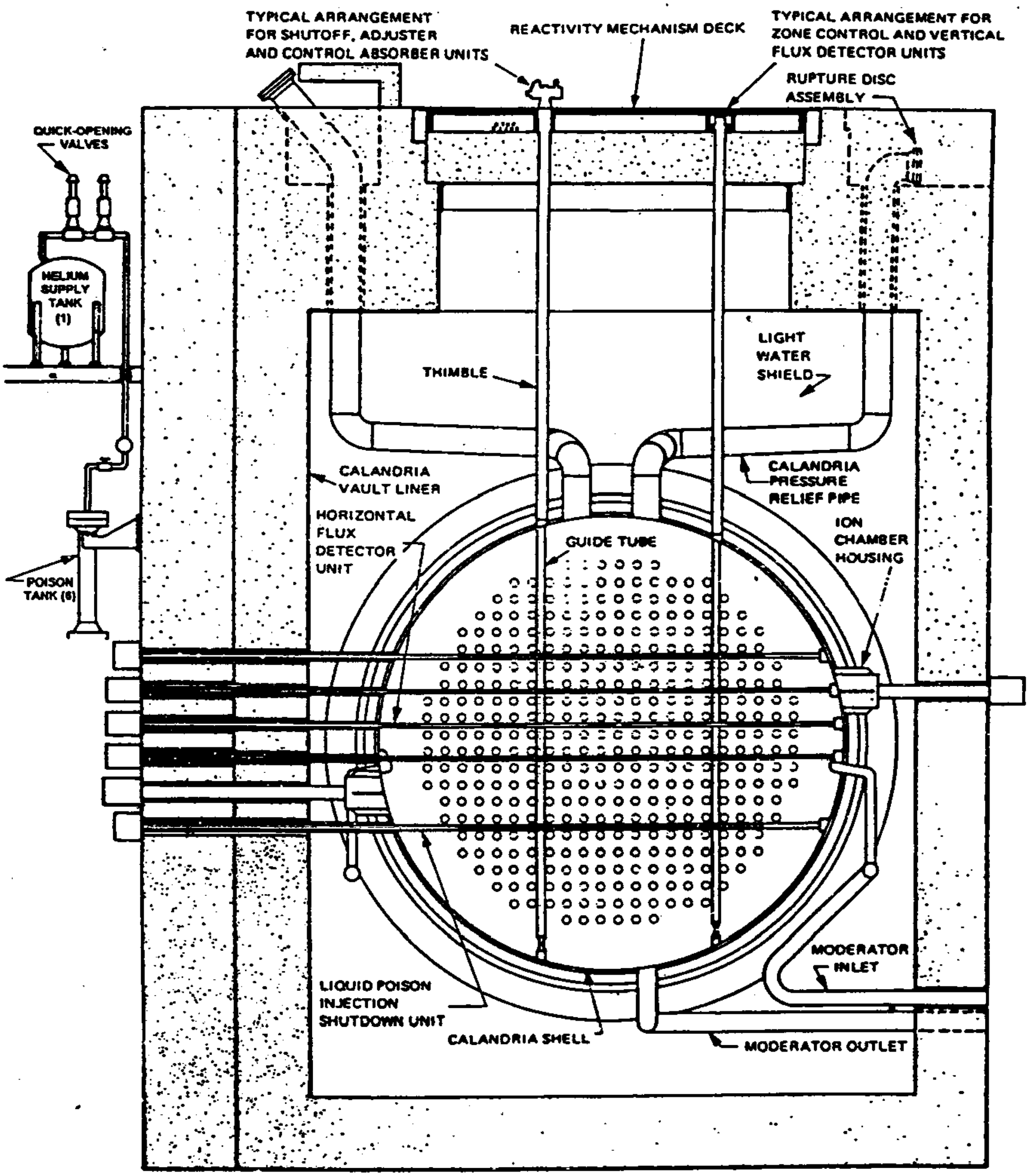


FIGURE 4.1.1-2 REACTOR LAYOUT – ELEVATION

66.31000 - 5
REV. 2 APRIL 1978
66 FSR

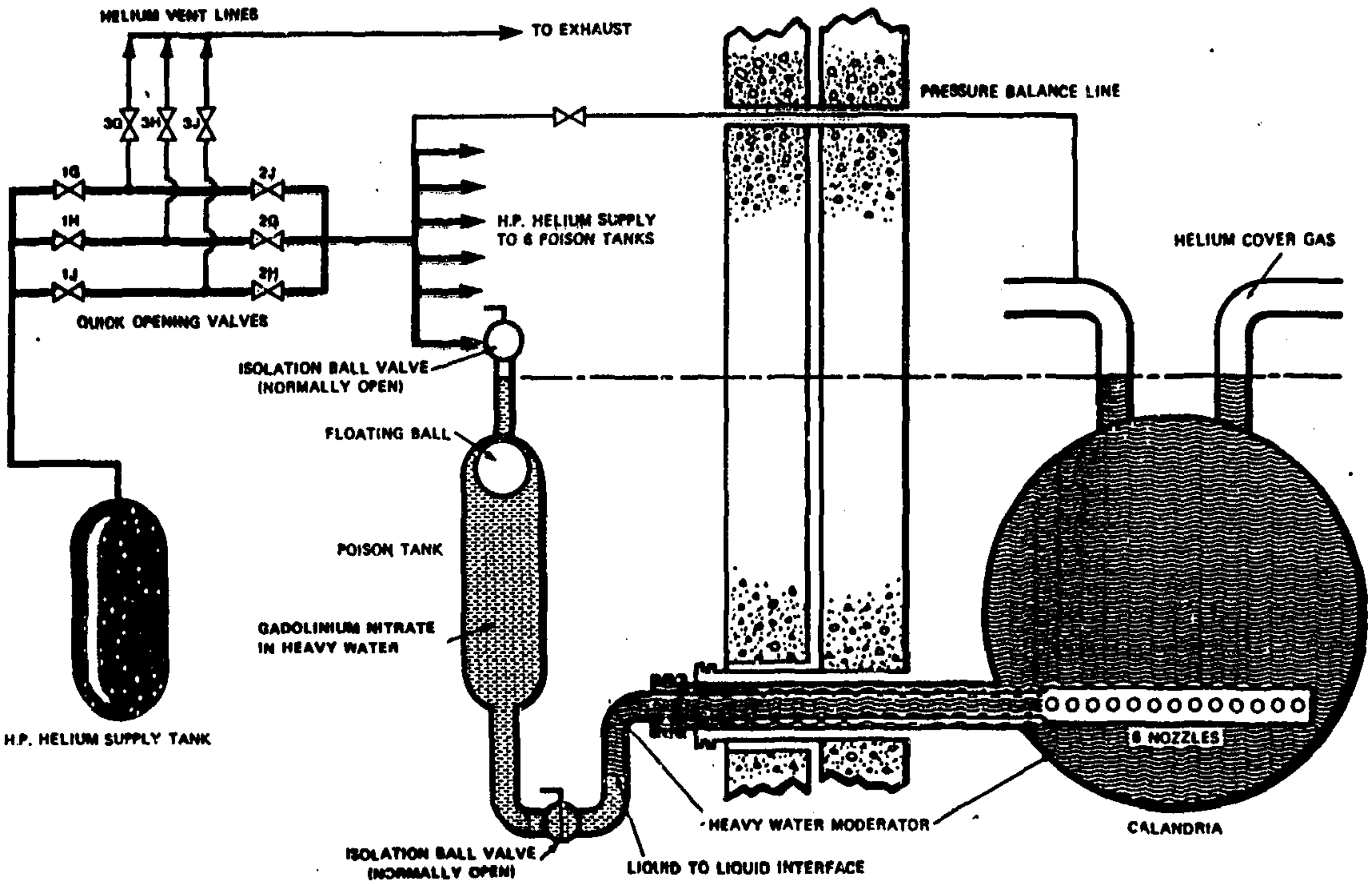


FIGURE 6.5 - 3 SHUTDOWN SYSTEM NO. 2

66.32700 1
1977 APR
86 FSR

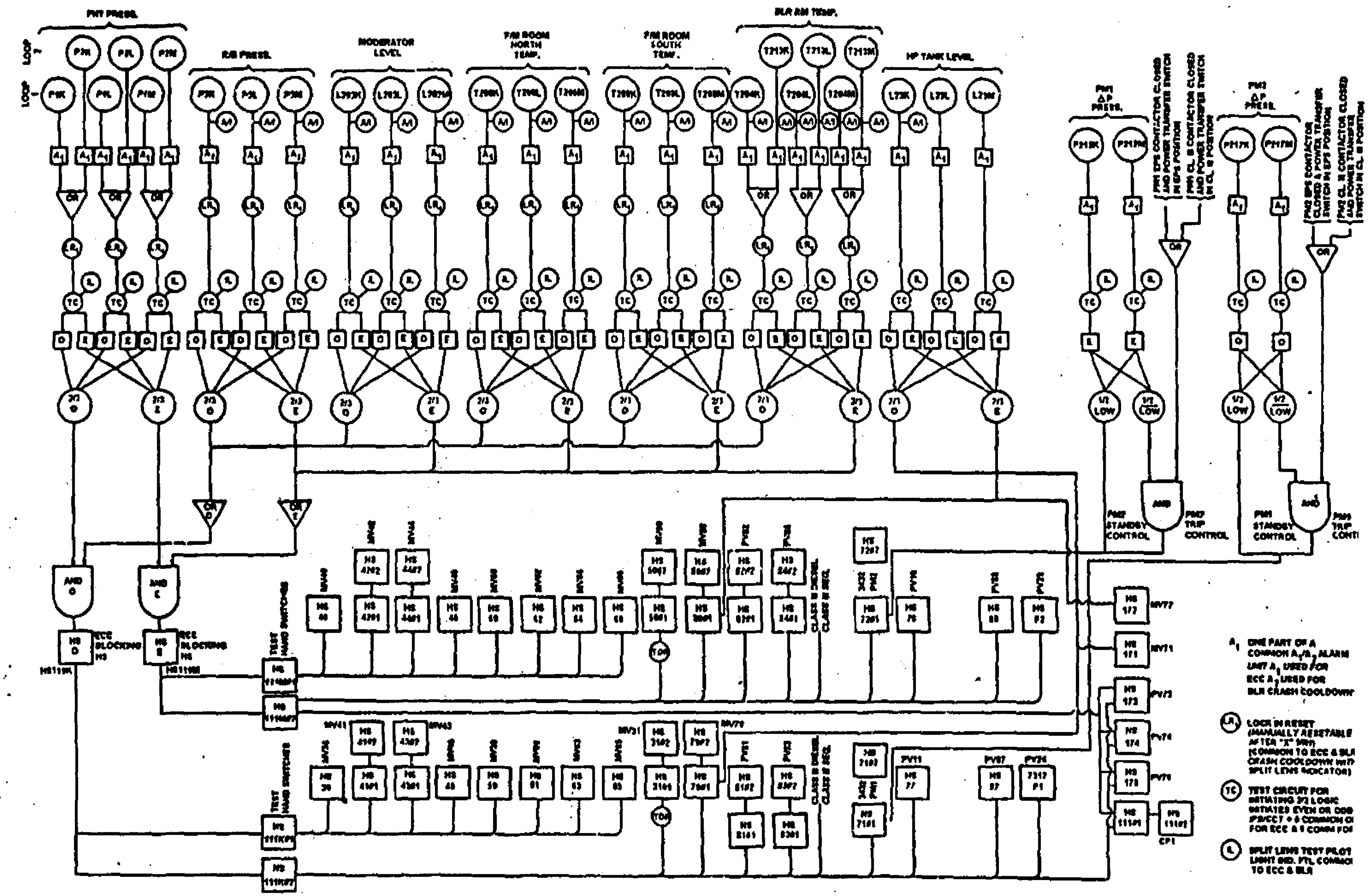


FIGURE 6.3-3 SIMPLIFIED INJECTION LOGIC SKETCH

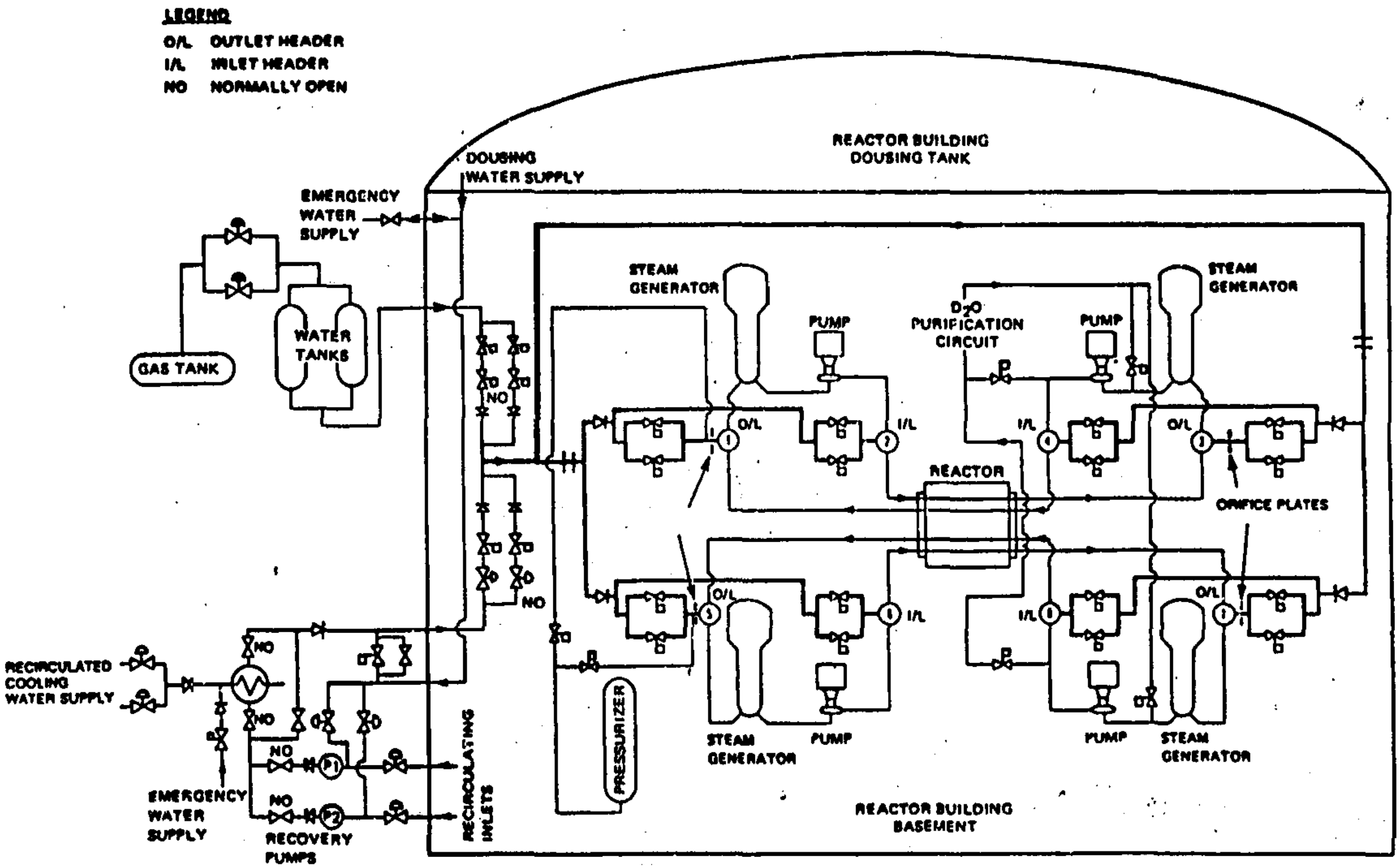


FIGURE 6.3-2 SCHEMATIC DIAGRAM OF HEAT TRANSPORT AND EMERGENCY CORE COOLING SYSTEMS

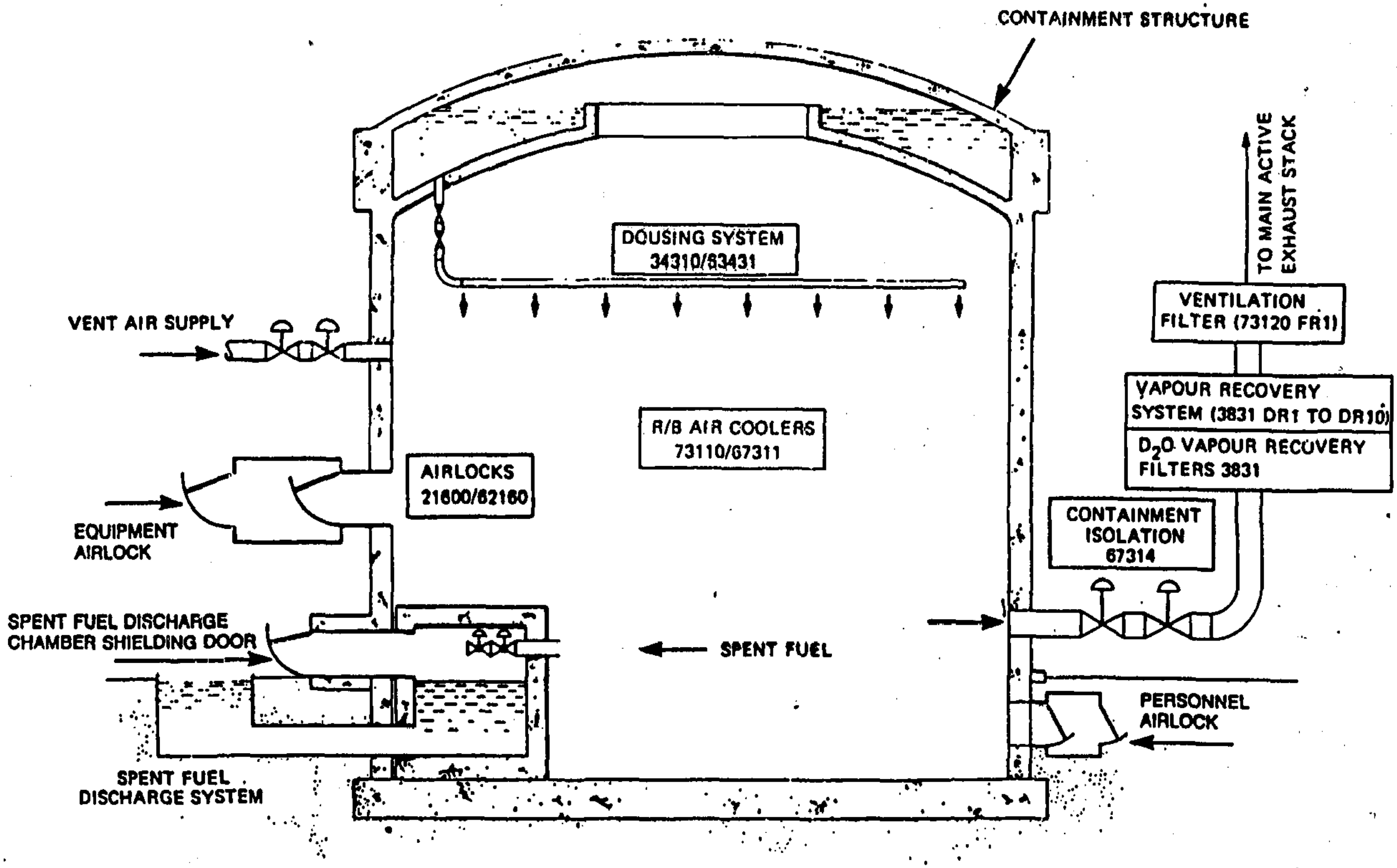


FIGURE 6.2-1 SIMPLIFIED DIAGRAM OF CONTAINMENT ENVELOPE

86-21000-1
86SR
1987

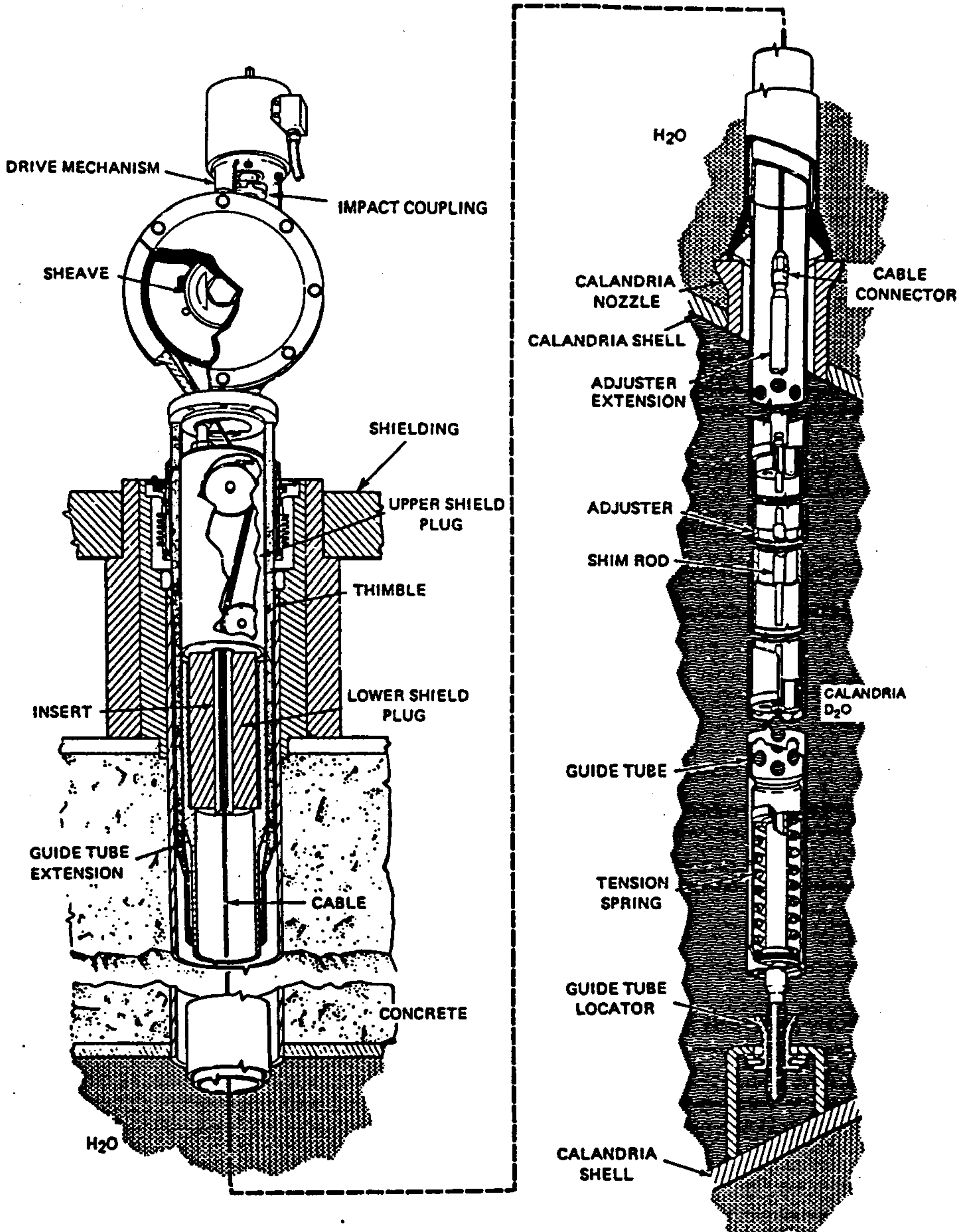


FIGURE 4.1.2-3 ADJUSTER UNIT

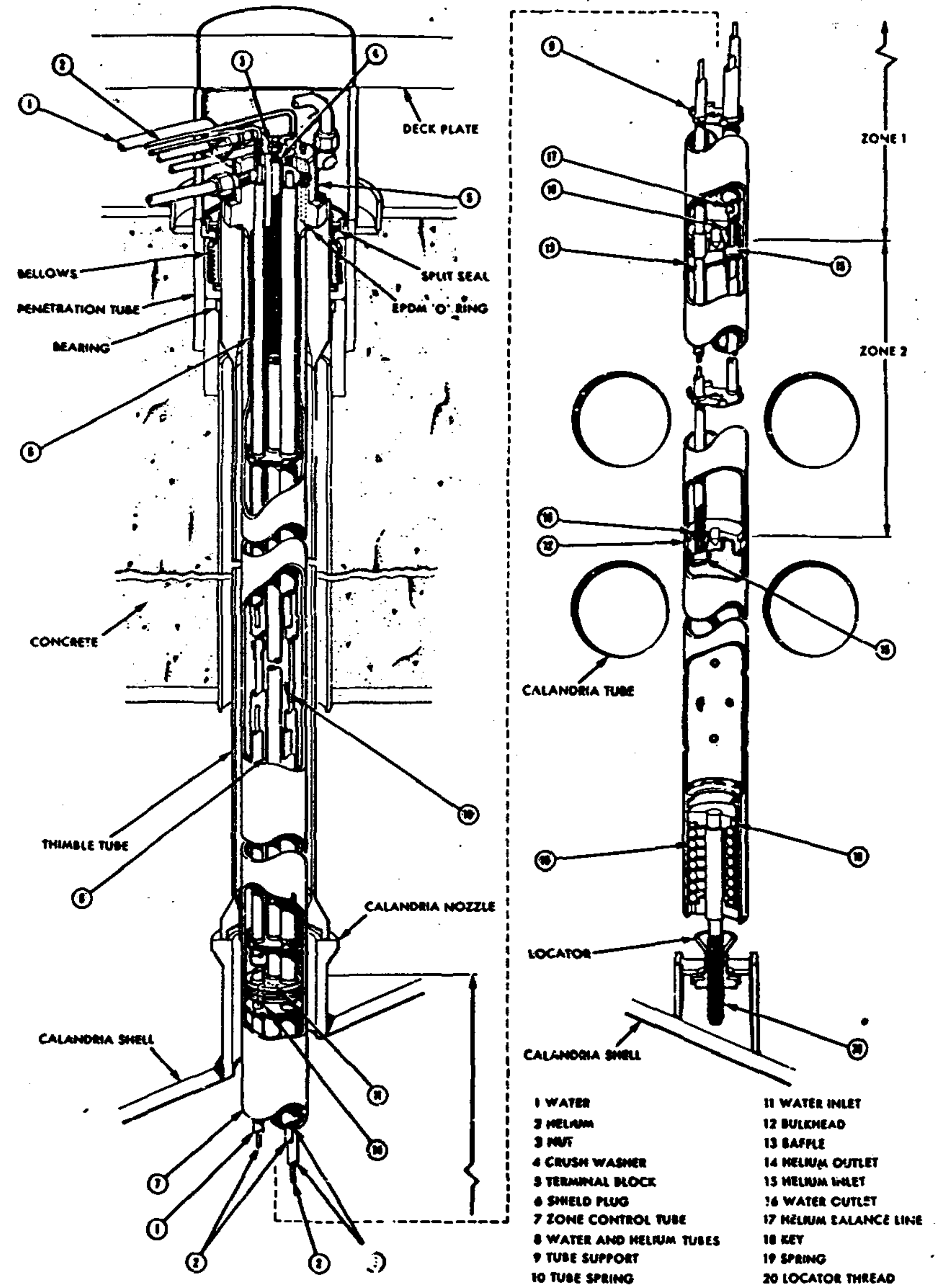
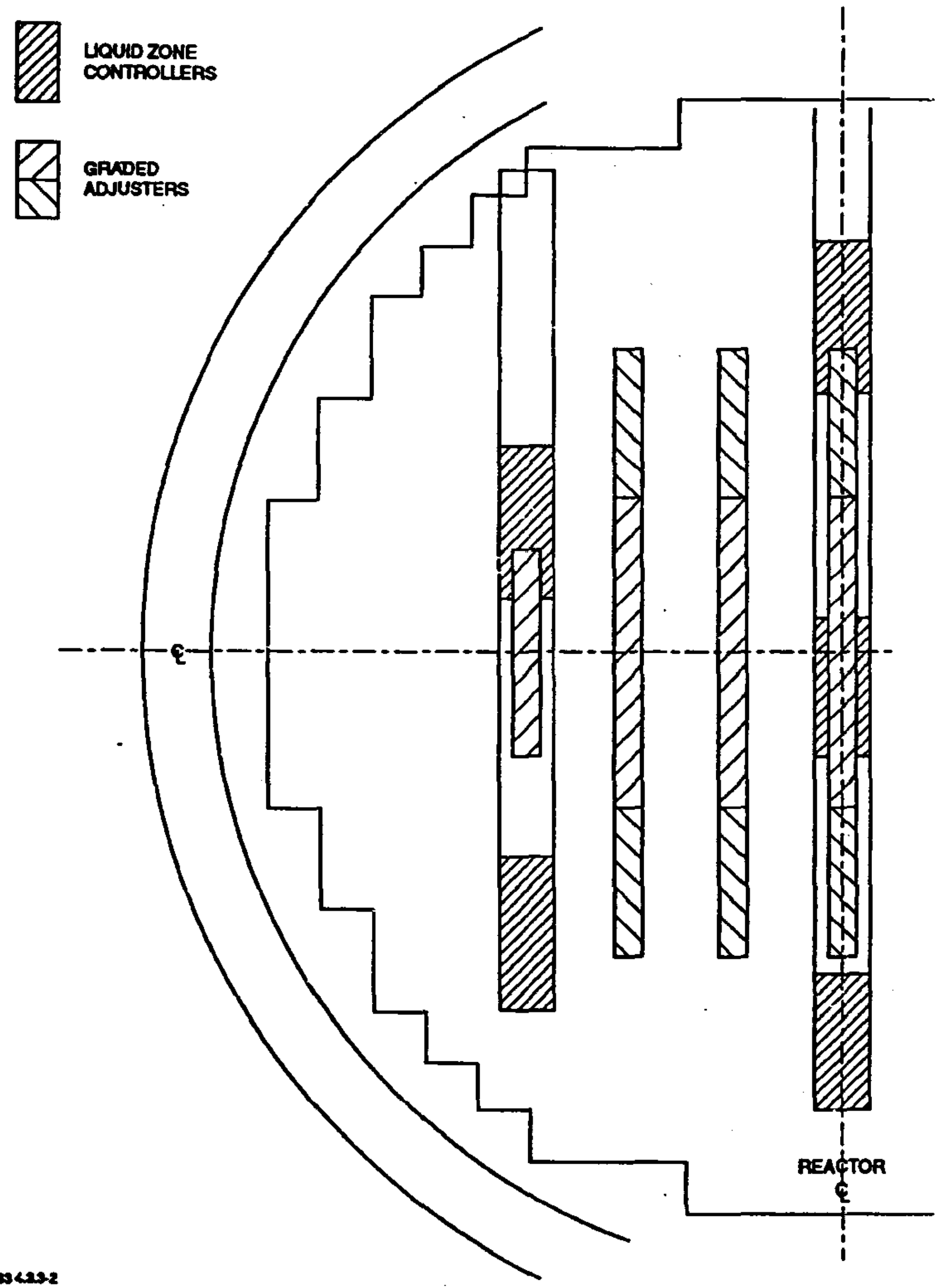


FIGURE 4.1.2-4 ZONE CONTROL UNIT

66.31751-1
REV. 1 1978 APR.
66 FSR



930083 4.3.3-2

FIGURE 4.3.3-2 REACTIVITY DEVICE LAYOUT AND ZONE CONTROLLERS

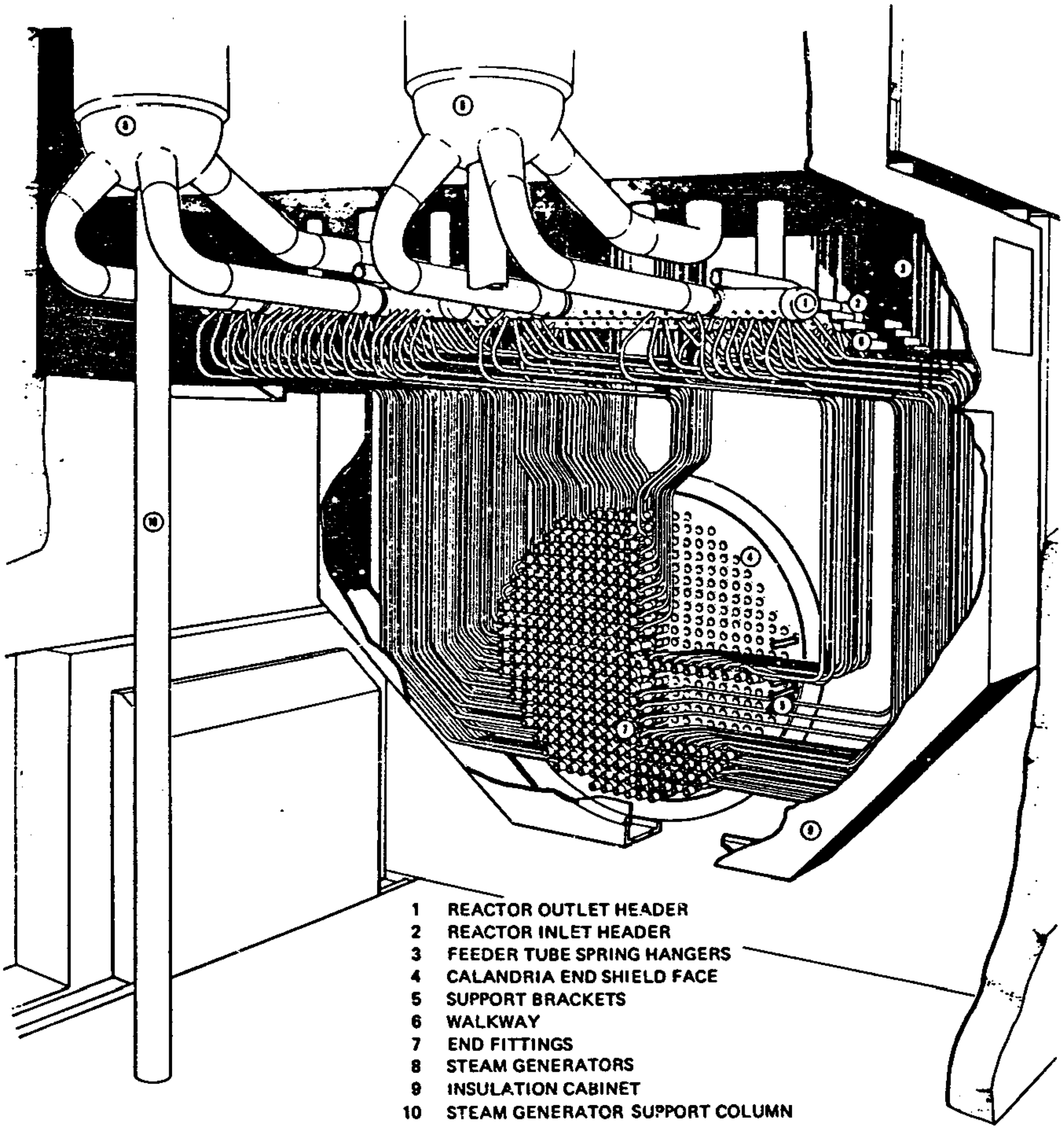


FIGURE 5.1.1 - 3 HEAT TRANSPORT SYSTEM – TYPICAL FEEDER AND HEADER ARRANGEMENT

66.33120-1
APRIL 1977
66 FSR

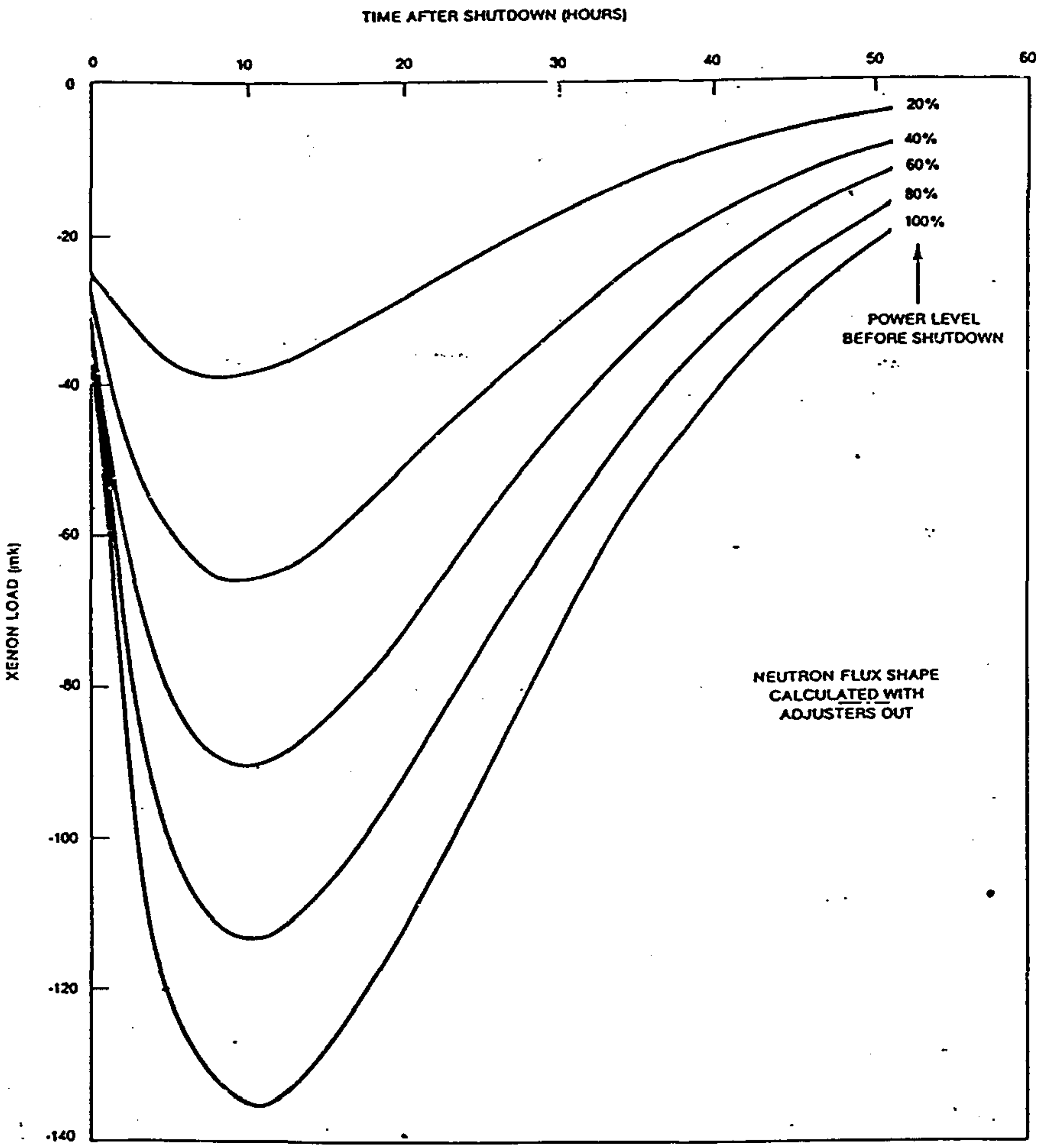


FIGURE 3.7-1 XENON TRANSIENTS AFTER SHUTDOWN FROM VARIOUS POWER LEVELS

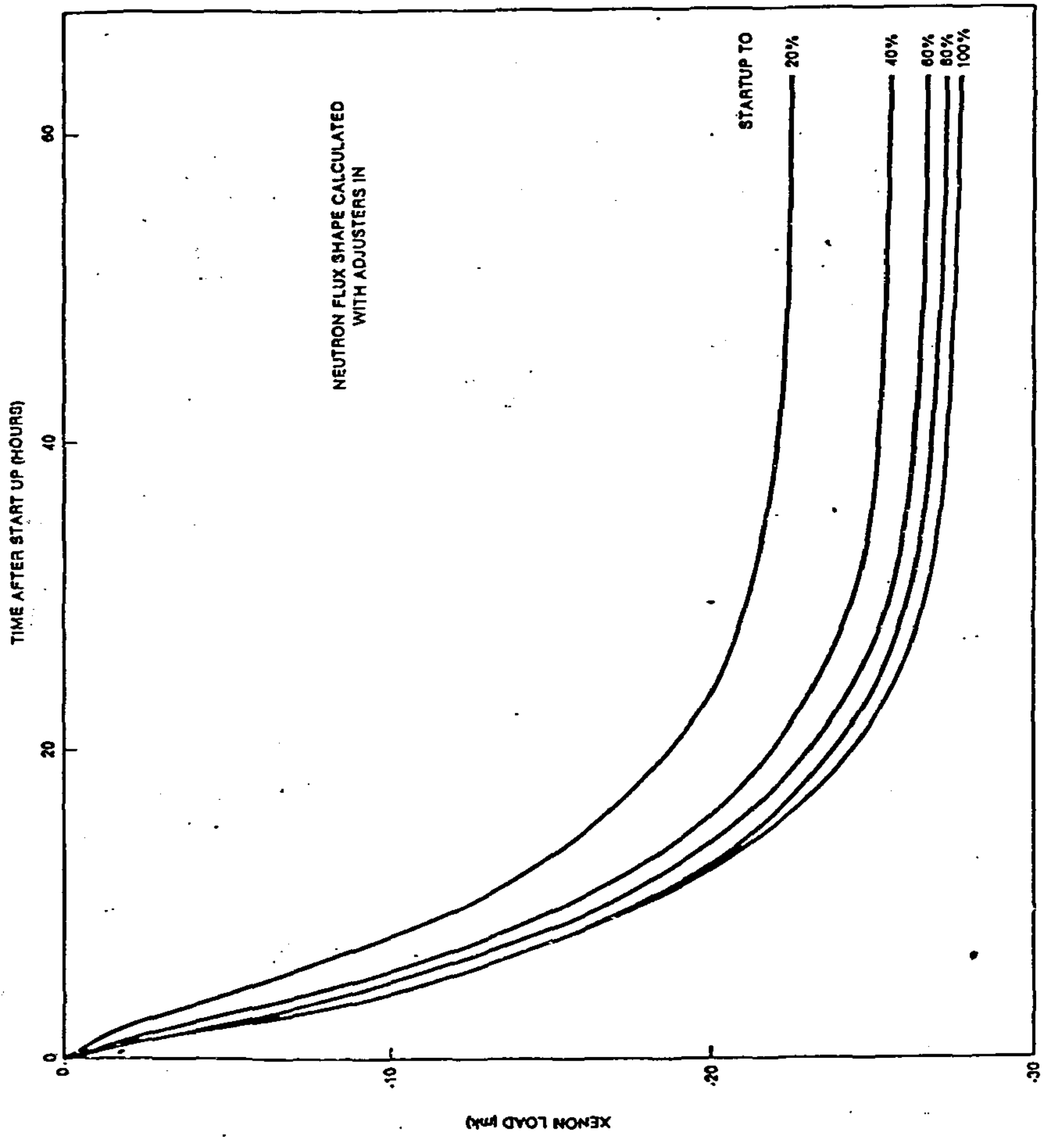


FIGURE 3.7-2 XENON REACTIVITY TRANSIENTS AFTER STARTUP TO VARIOUS POWER LEVELS

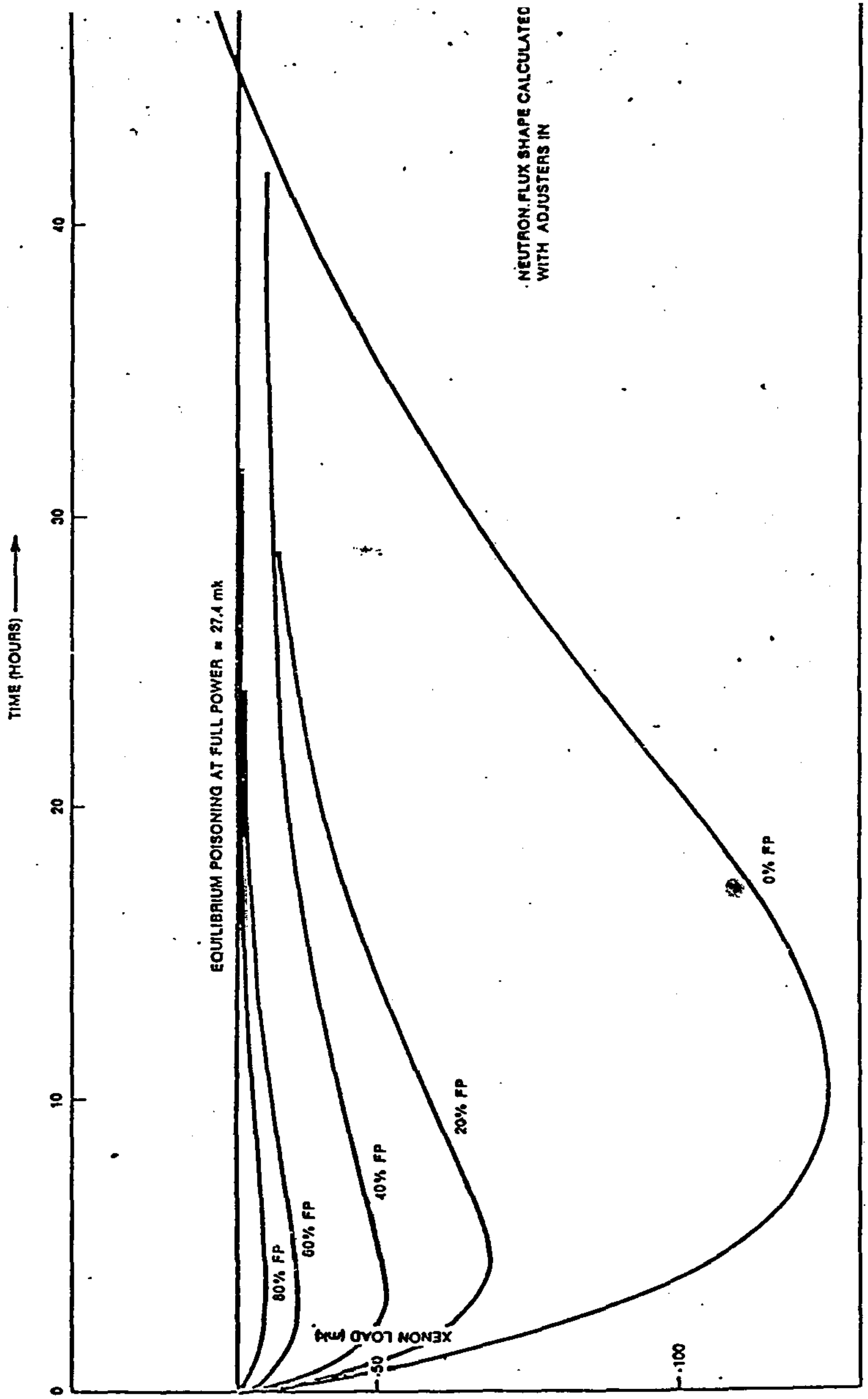


FIGURE 3.7-3 VARIATION OF XENON LOAD FOLLOWING STEP POWER REDUCTIONS TO 0,20,40,60 AND 80% OF FULL POWER FROM EQUILIBRIUM FULL POWER CONDITION

DM-66-01110