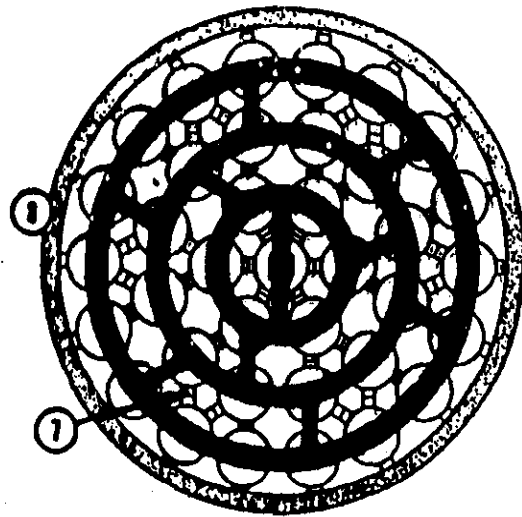
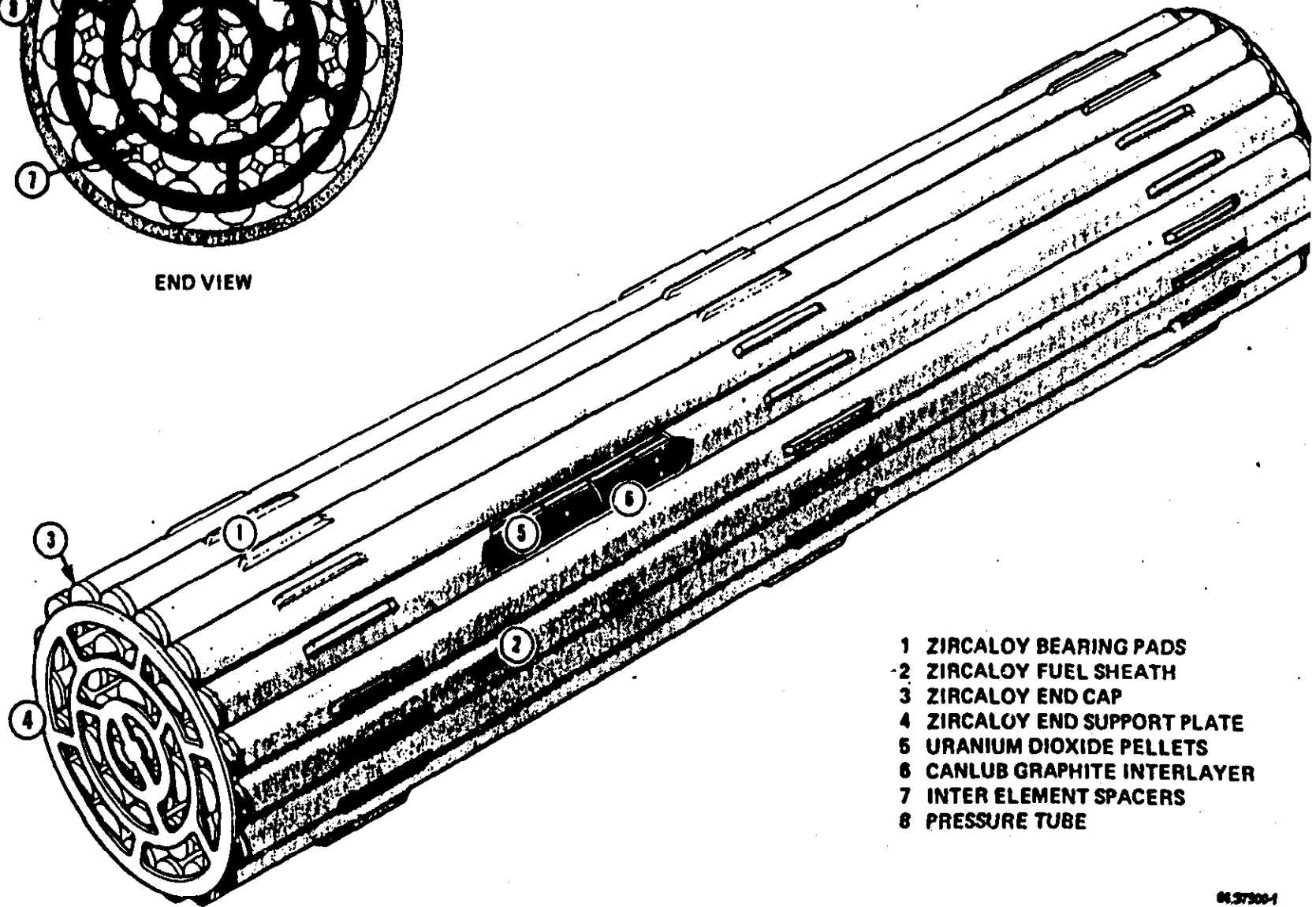


FIGURE 2.1-2 SITE LAYOUT

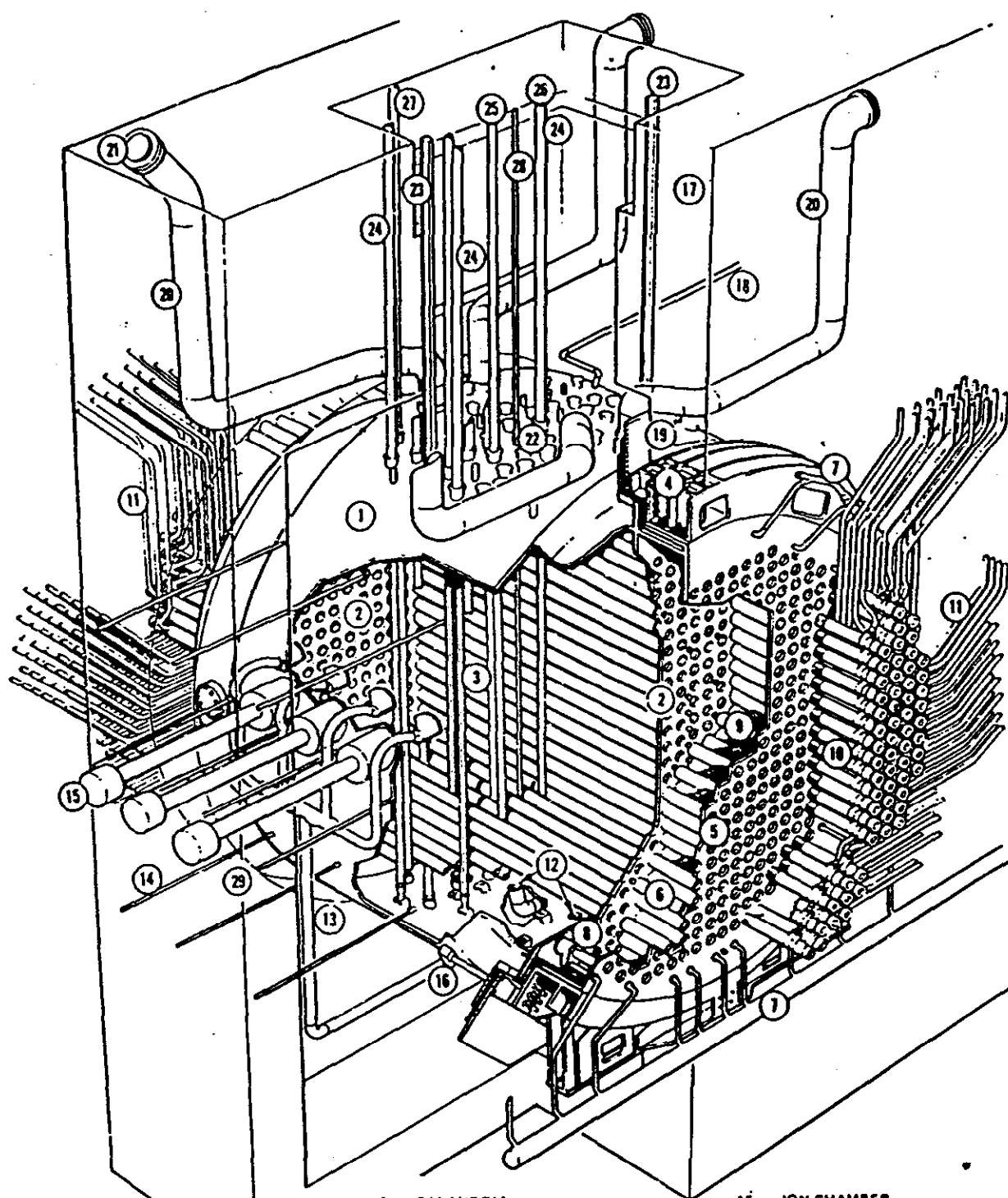


END VIEW



- 1 ZIRCALOY BEARING PADS
- 2 ZIRCALOY FUEL SHEATH
- 3 ZIRCALOY END CAP
- 4 ZIRCALOY END SUPPORT PLATE
- 5 URANIUM DIOXIDE PELLETS
- 6 CANLUB GRAPHITE INTERLAYER
- 7 INTER ELEMENT SPACERS
- 8 PRESSURE TUBE

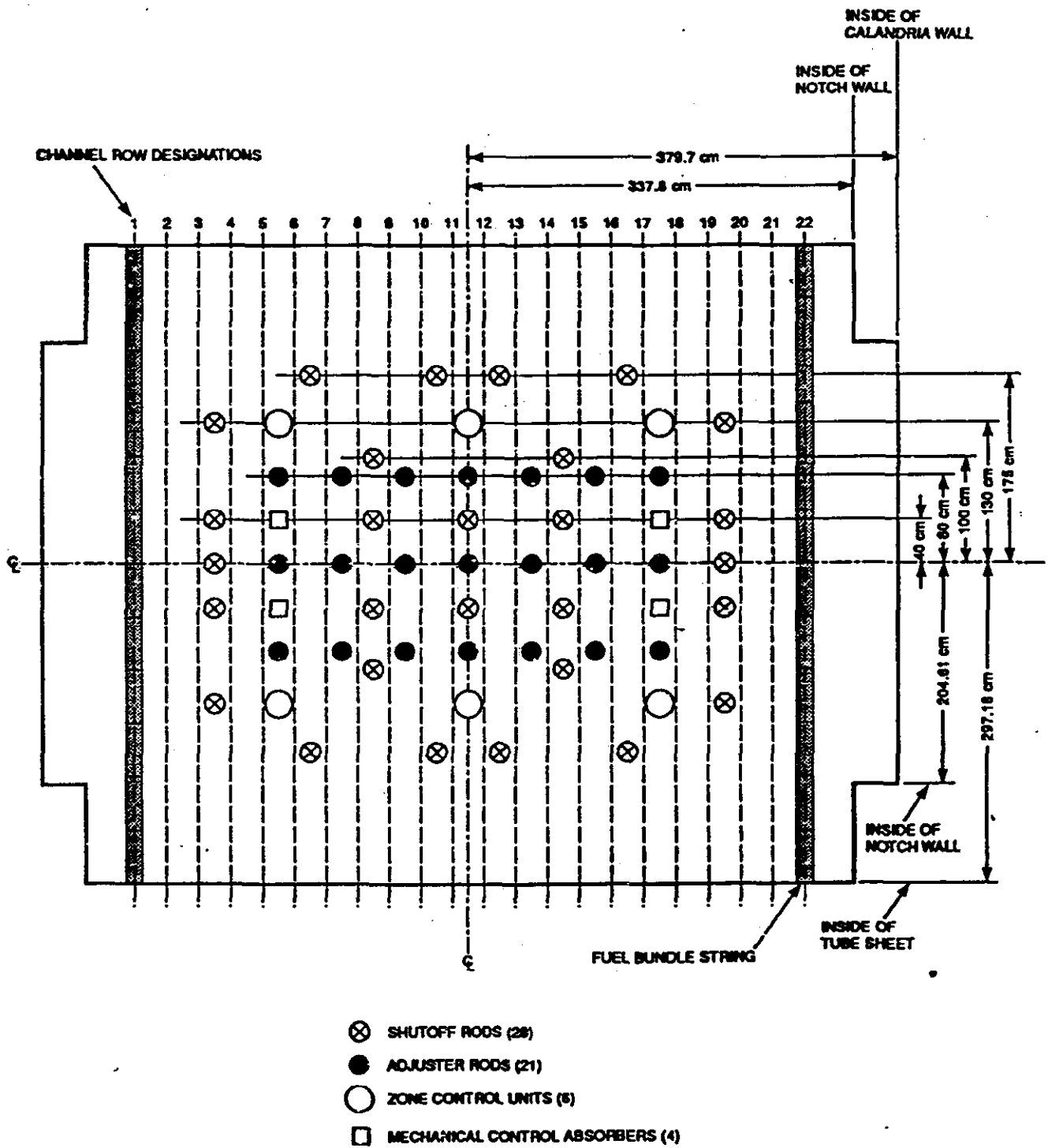
FIGURE 4.5 - 1 37-ELEMENT FUEL BUNDLE



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

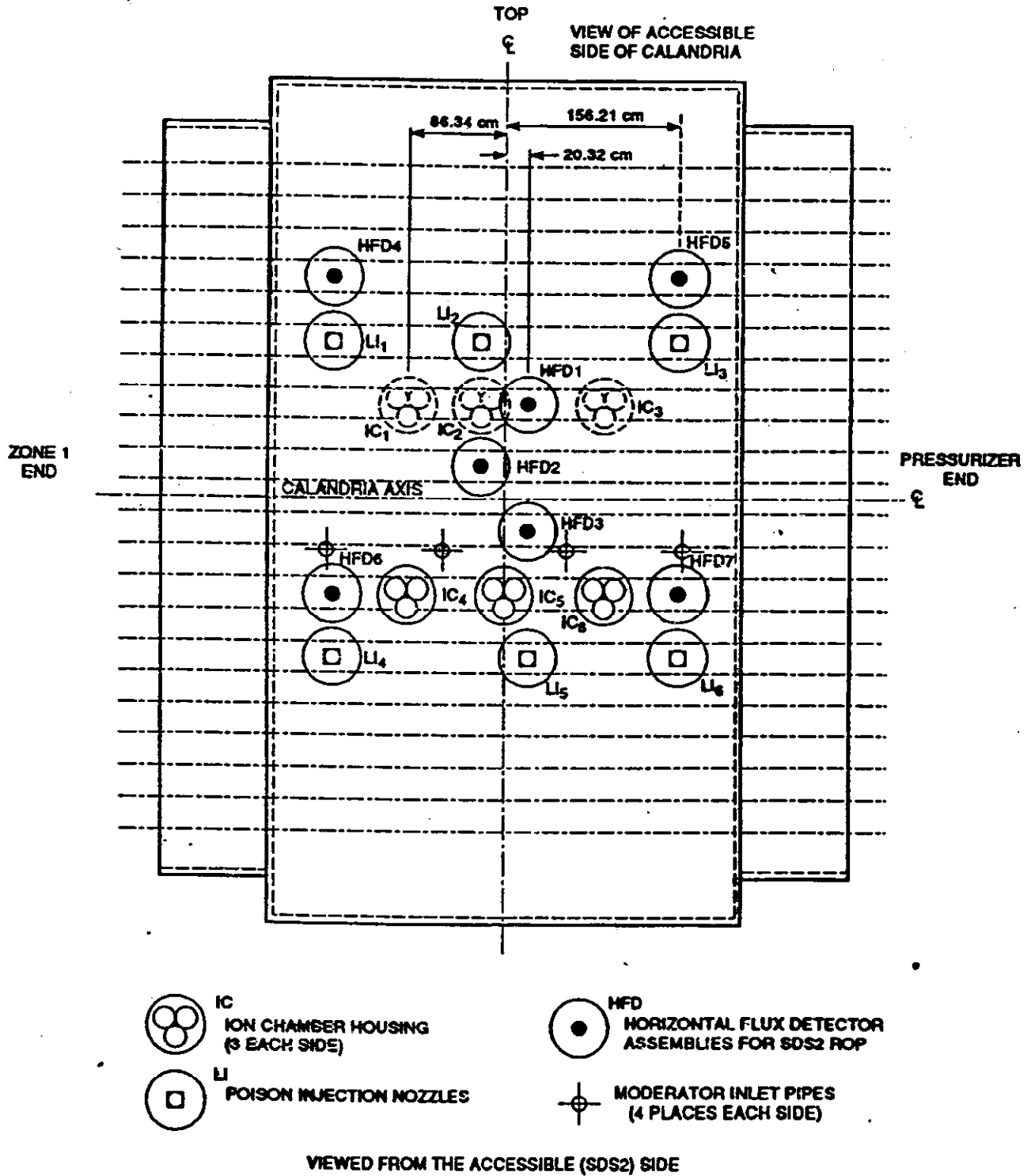
FIGURE 4.1.0 - 1 REACTOR ASSEMBLY

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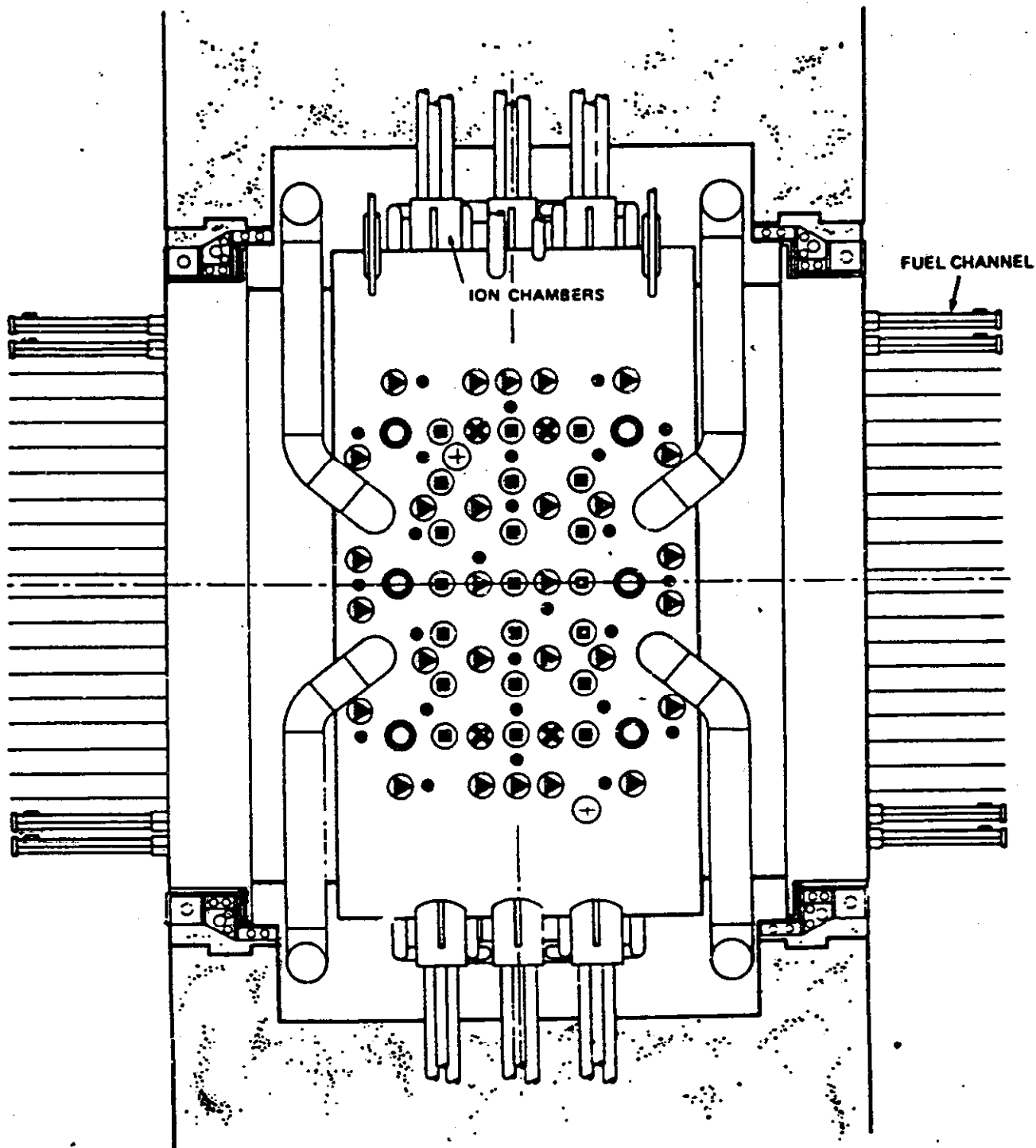
800083 4.3.3-5

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



630003 4.3.3-6

FIGURE 4.3.3-6 LOCATION OF HORIZONTAL REACTIVITY CONTROL UNITS



- 26 ● VERTICAL FLUX DETECTOR UNIT
- 21 ⊙ ADJUSTER UNIT
- 28 ⊙ SHUTOFF UNIT

- 6 ⊙ ZONE CONTROL UNIT
- 4 ⊗ CONTROL ABSORBER UNIT
- ⊕ VIEWING PORT

FIGURE 4.1.1 - 1 REACTOR GENERAL ARRANGEMENT - PLAN

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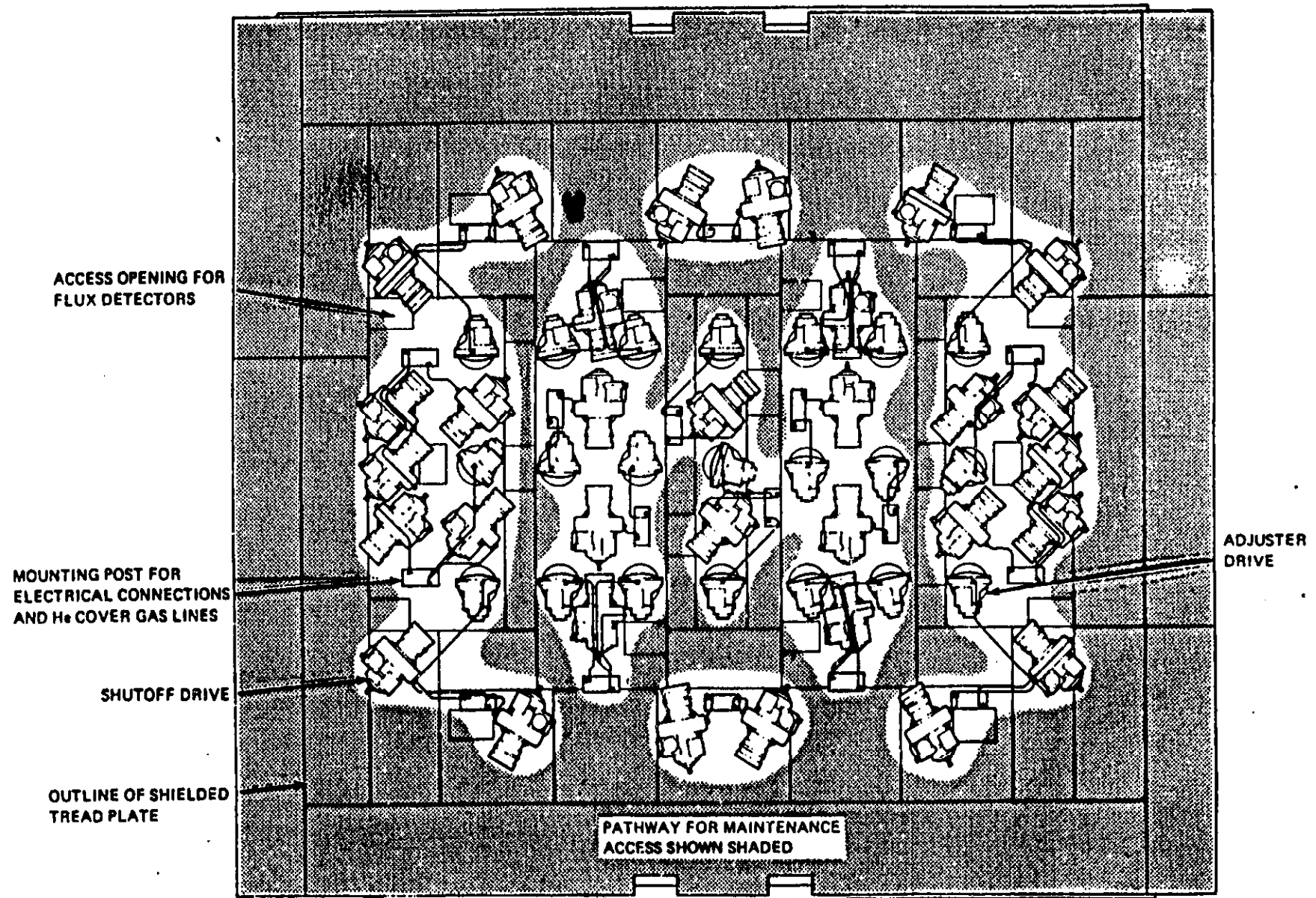


FIGURE 4.1.2 - 8 REACTIVITY MECHANISM DECK - PLAN VIEW

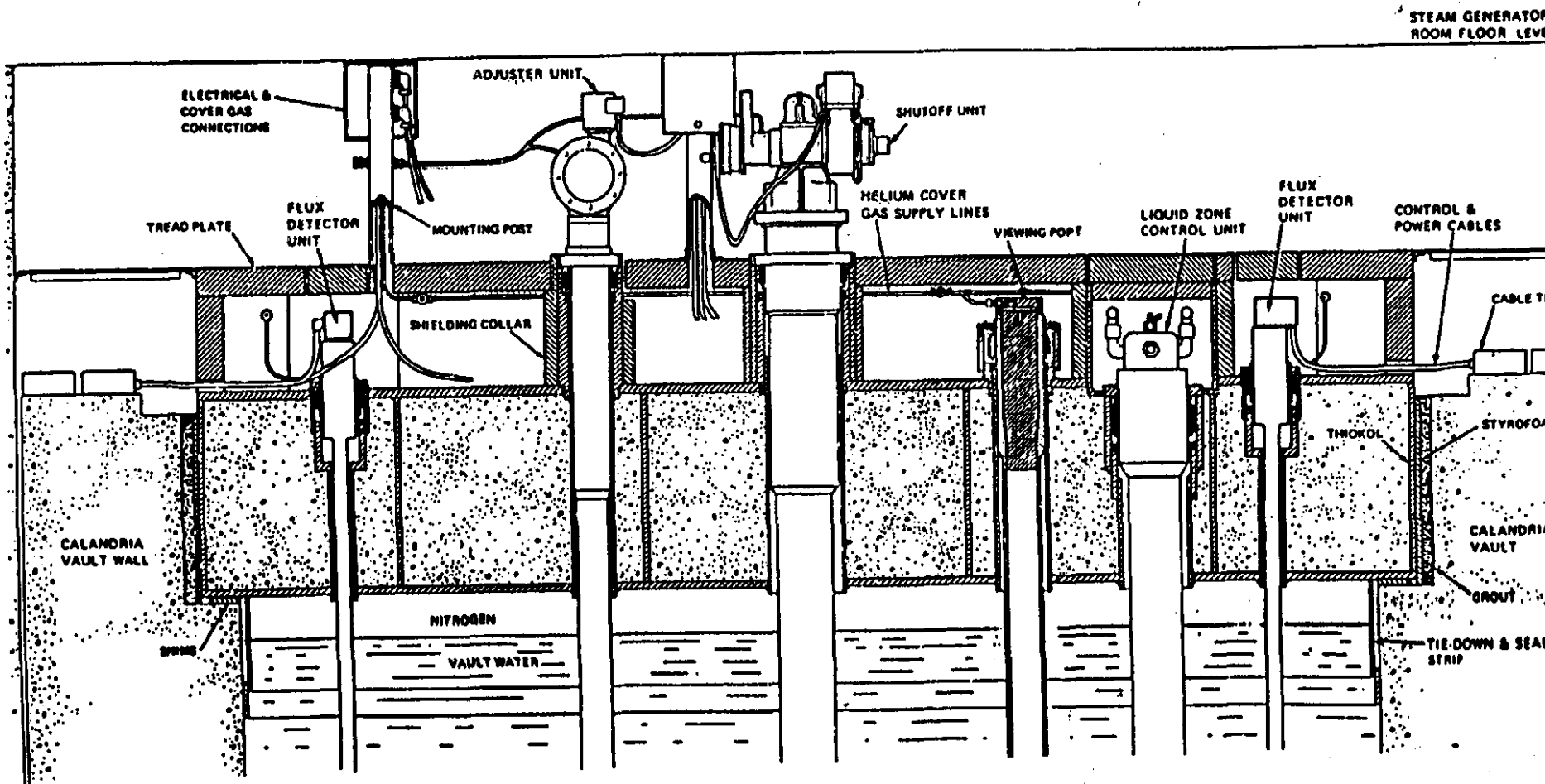


FIGURE 4.1.2-7 REACTIVITY MECHANISM DECK

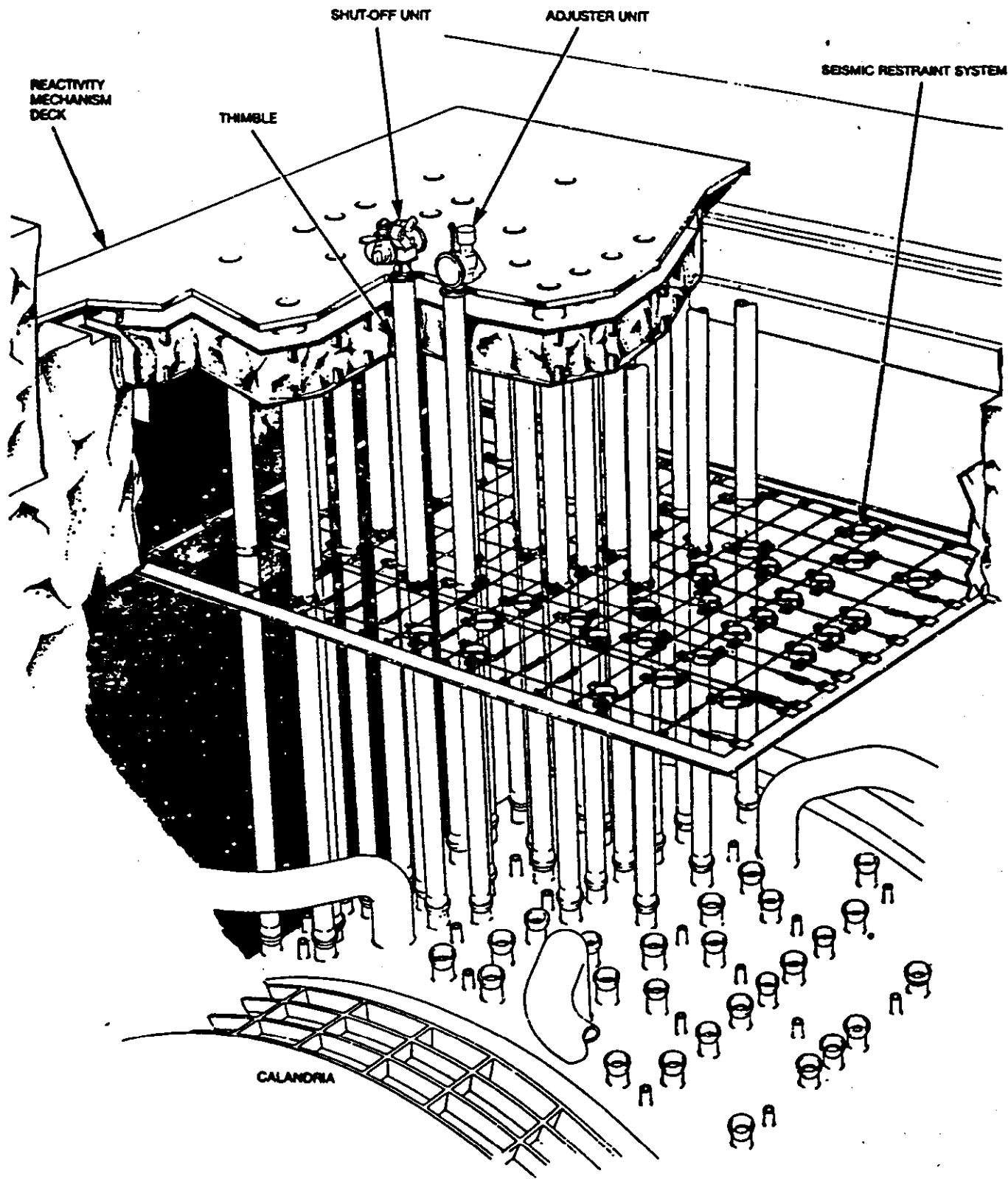
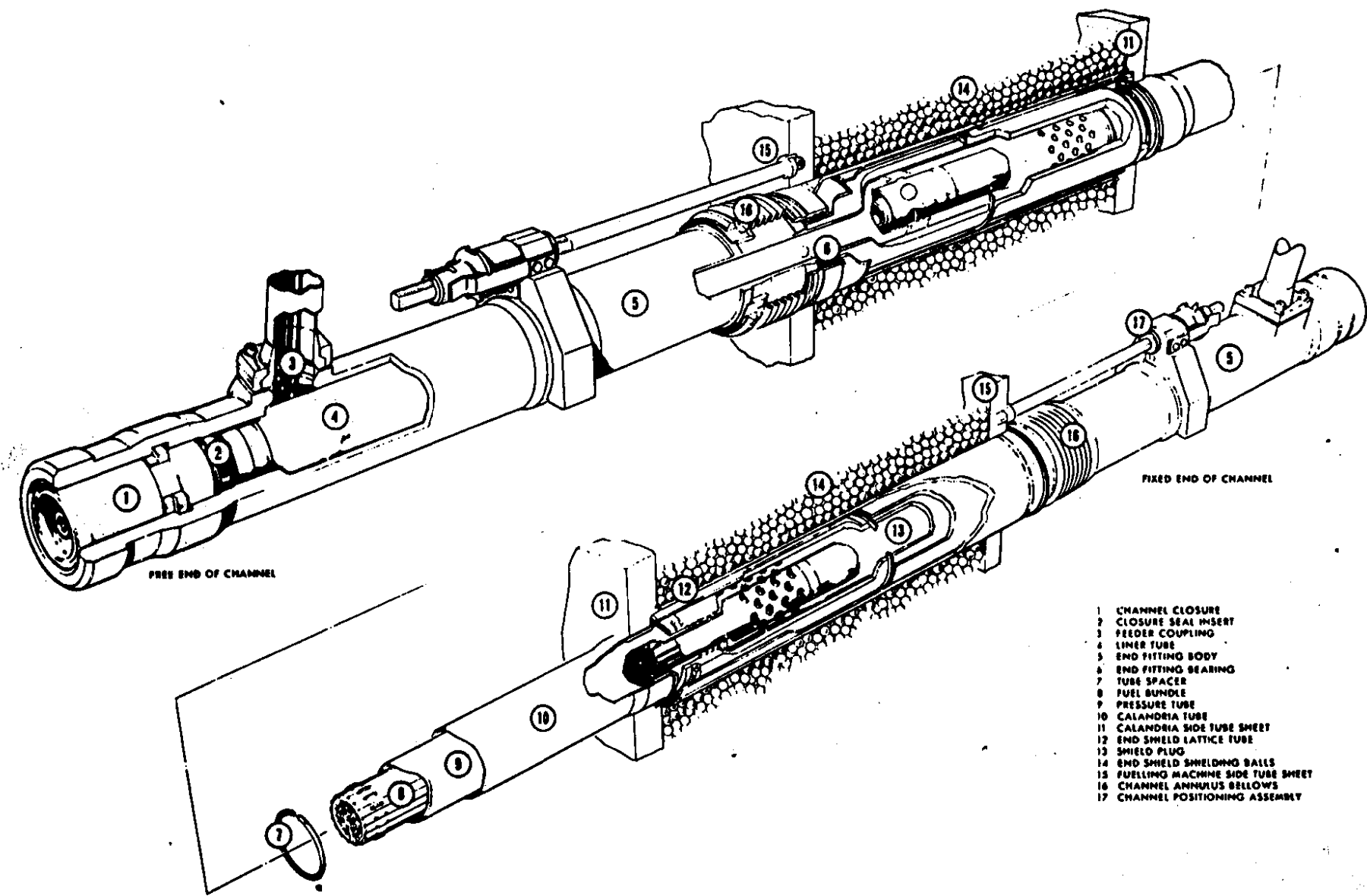


FIGURE 4.2.2-5 SEISMIC RESTRAINT SYSTEM FOR REACTIVITY MECHANISM THIMBLES

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FREE END OF CHANNEL

FIXED END OF CHANNEL

- 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

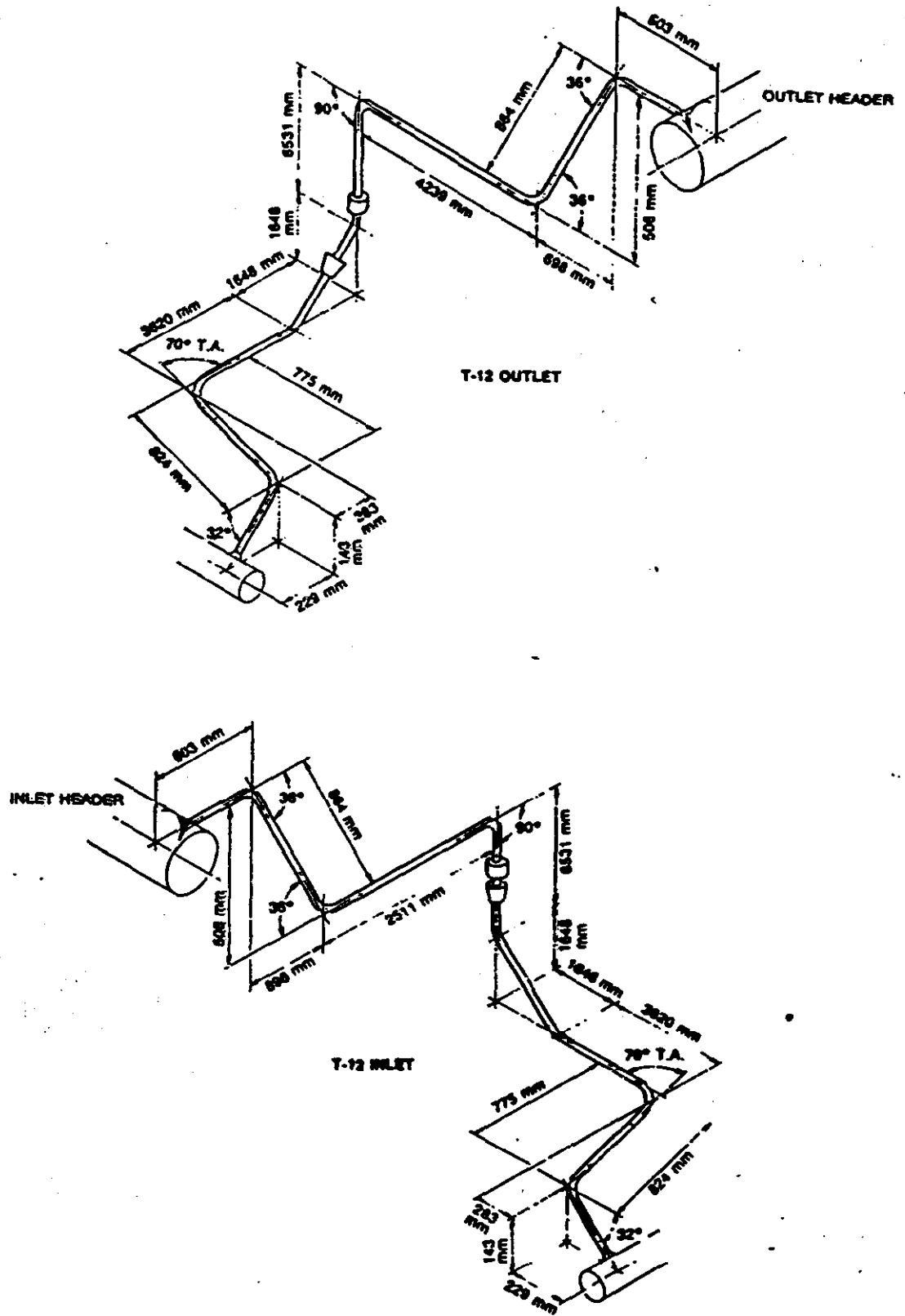


FIGURE 4.4-1 HEAT TRANSPORT SYSTEM — TYPICAL FEEDER CONFIGURATION

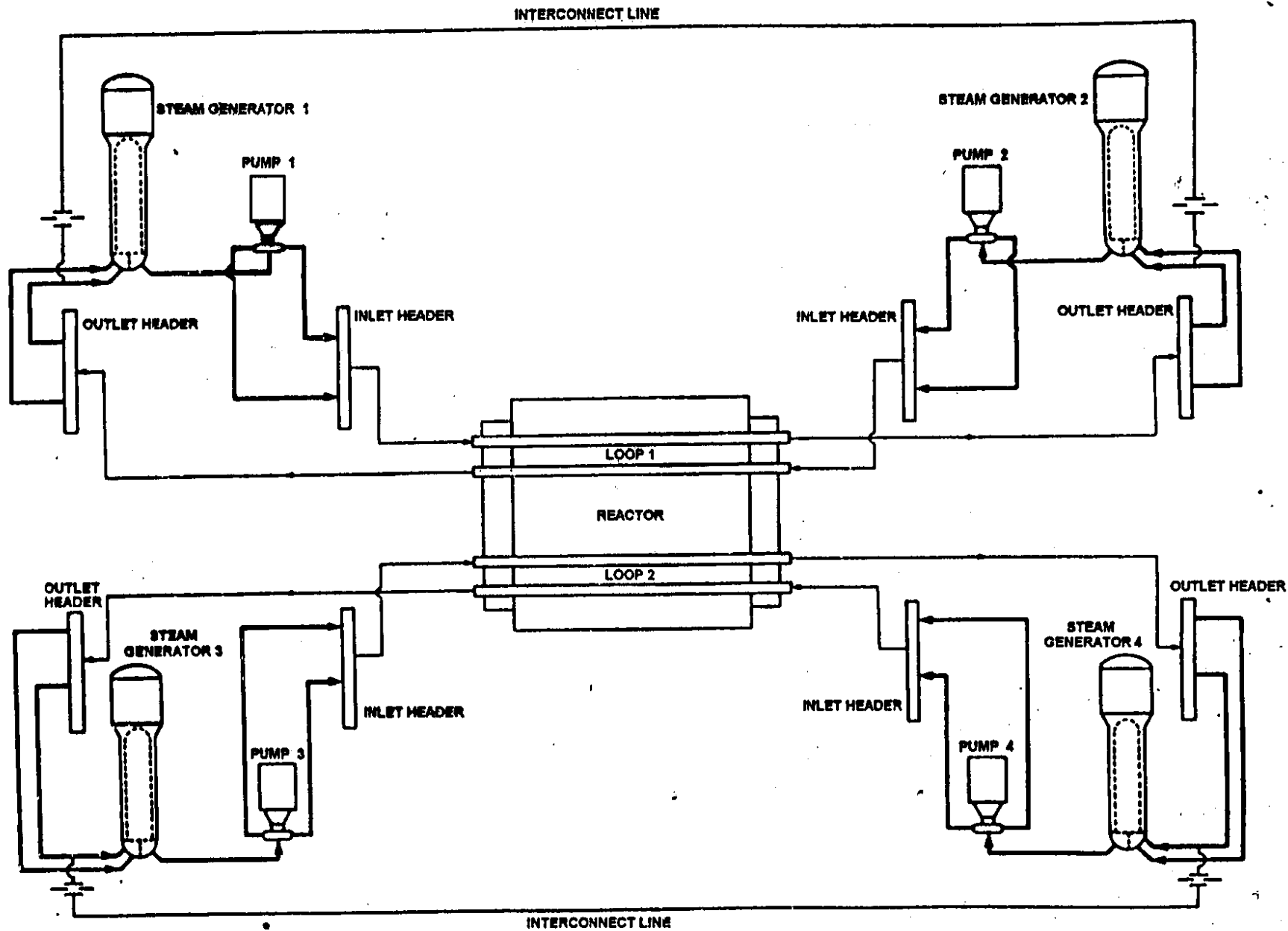


FIGURE 5.1.1 - 1 HEAT TRANSPORT SYSTEM - MAIN CIRCUIT FLOWSHEET

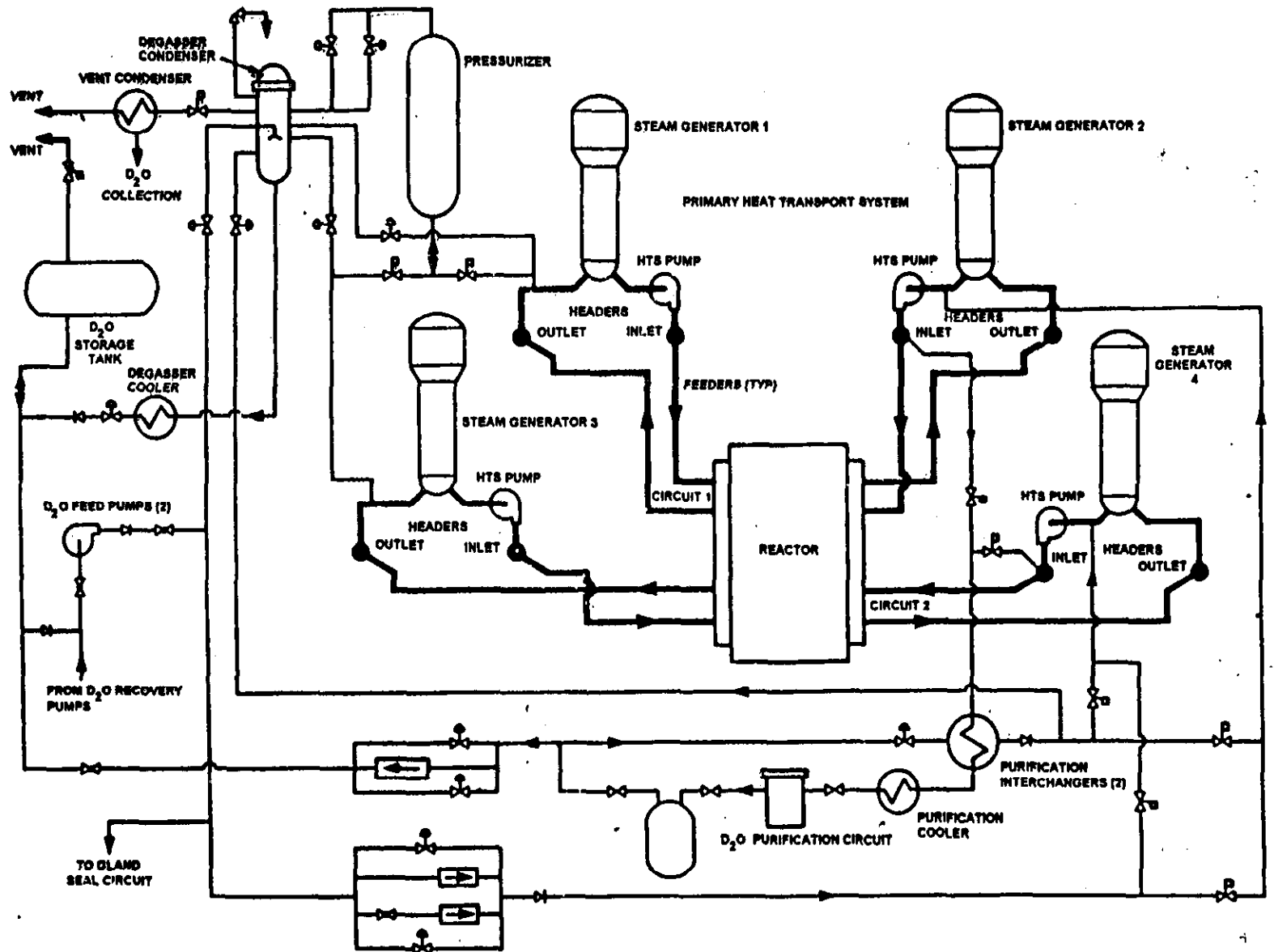
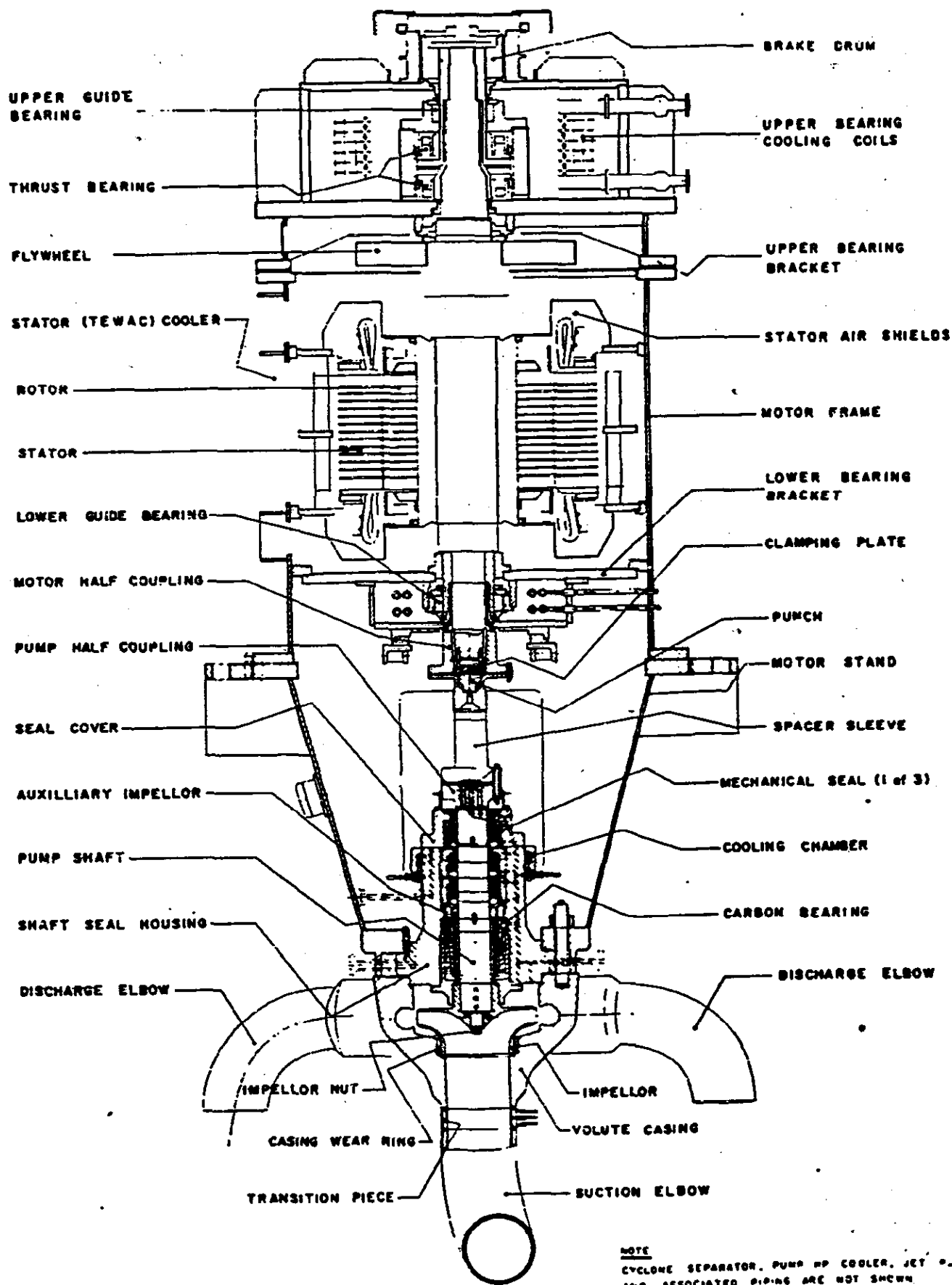


FIGURE 5.1-1 HEAT TRANSPORT SYSTEM NORMAL OPERATION FLOWSHEET



NOTE
 CYCLONE SEPARATOR, PUMP HP COOLER, JET PUMP
 AND ASSOCIATED PIPING ARE NOT SHOWN

FIGURE 5.5-1 PRIMARY HEAT TRANSPORT PUMP

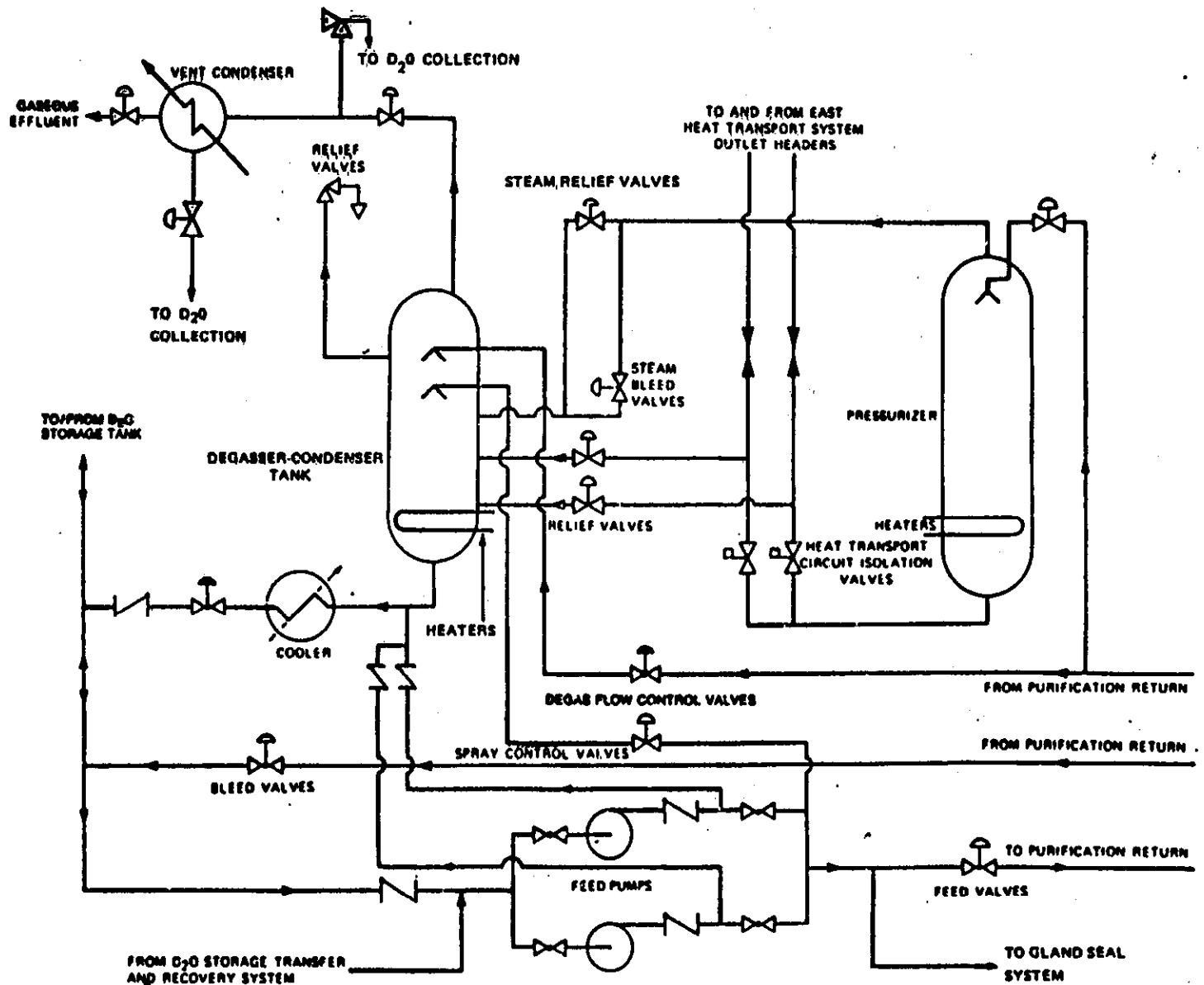
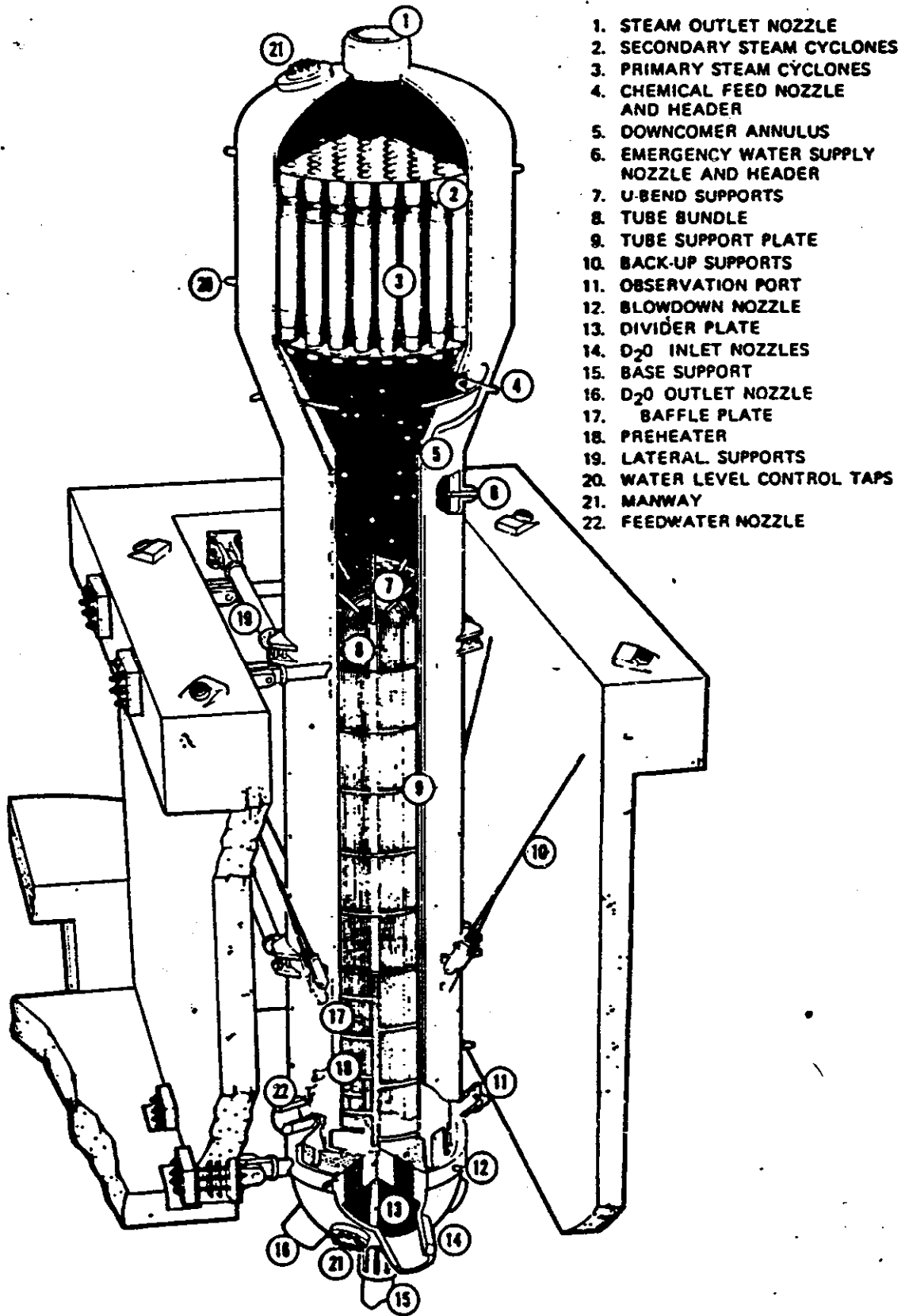


FIGURE 5.1.4-1 HEAT TRANSPORT SYSTEM - PRESSURE AND INVENTORY CONTROL SYSTEM



1. STEAM OUTLET NOZZLE
2. SECONDARY STEAM CYCLONES
3. PRIMARY STEAM CYCLONES
4. CHEMICAL FEED NOZZLE AND HEADER
5. DOWNCOMER ANNULUS
6. EMERGENCY WATER SUPPLY NOZZLE AND HEADER
7. U-BEND SUPPORTS
8. TUBE BUNDLE
9. TUBE SUPPORT PLATE
10. BACK-UP SUPPORTS
11. OBSERVATION PORT
12. BLOWDOWN NOZZLE
13. DIVIDER PLATE
14. D₂O INLET NOZZLES
15. BASE SUPPORT
16. D₂O OUTLET NOZZLE
17. BAFFLE PLATE
18. PREHEATER
19. LATERAL SUPPORTS
20. WATER LEVEL CONTROL TAPS
21. MANWAY
22. FEEDWATER NOZZLE

FIGURE 5.5-3 HEAT TRANSPORT SYSTEM STEAM GENERATOR

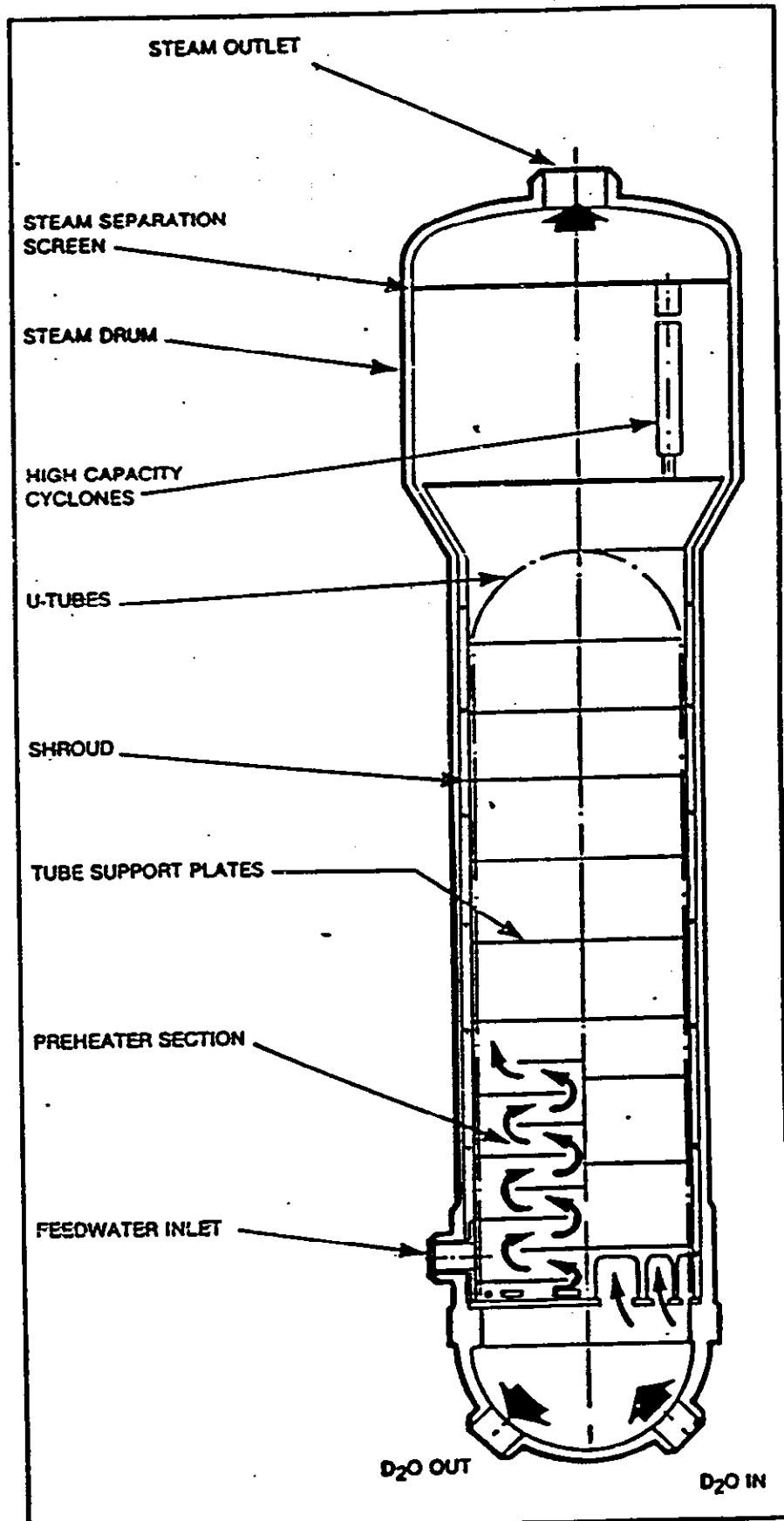


Figure 5.6 Générateur de vapeur.

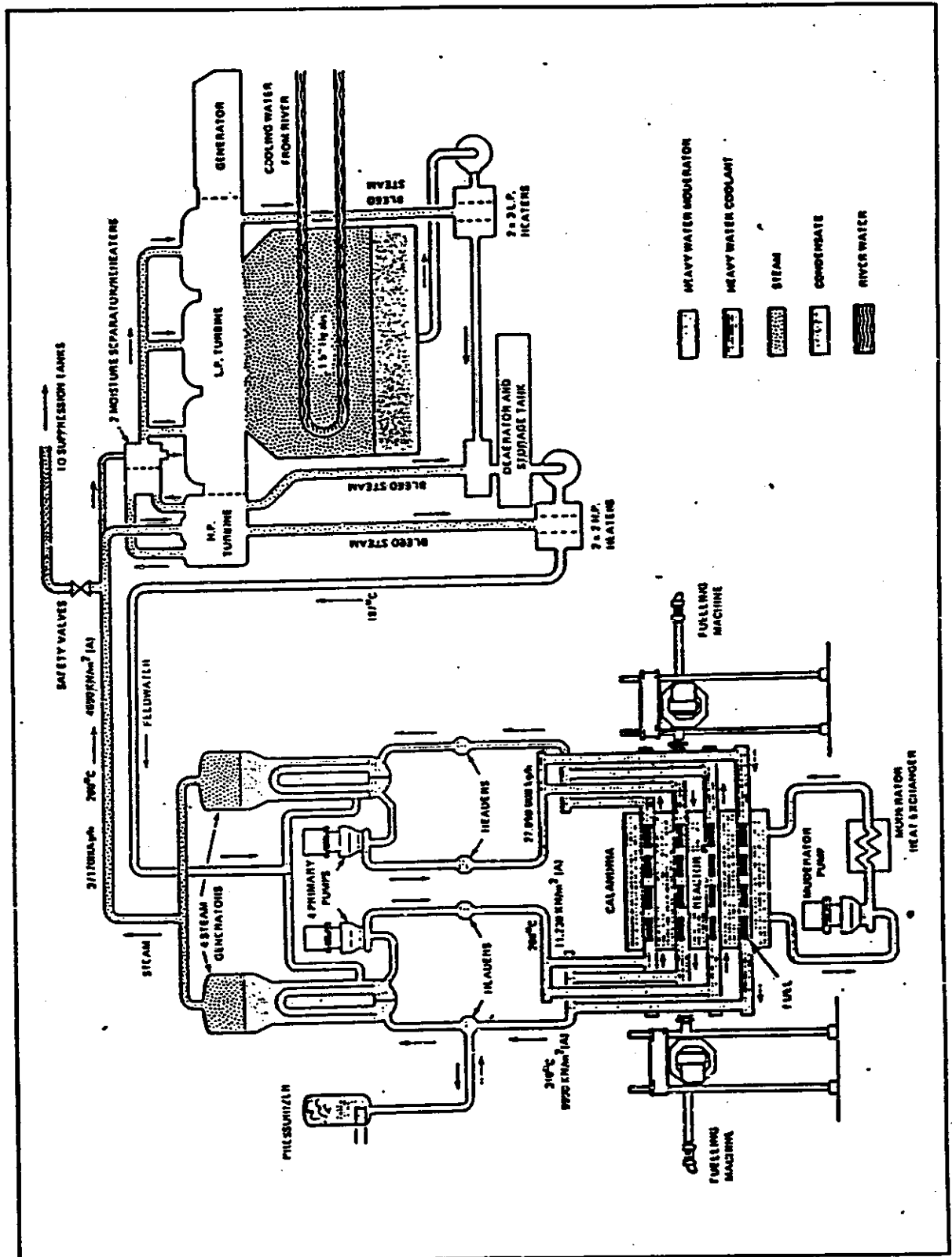


Figure 5.9 Les circuits primaire et secondaire d'une centrale CANDU.

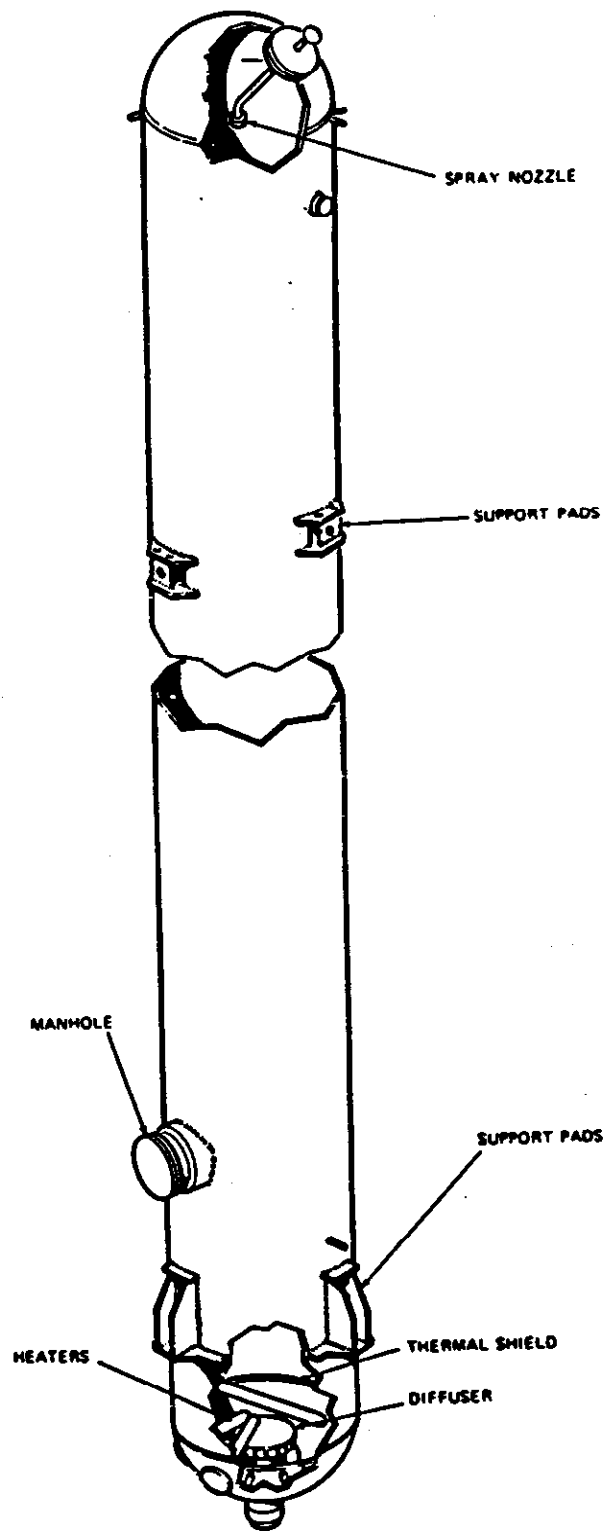


FIGURE 5.6.4-1 PRESSURIZER ARRANGEMENT

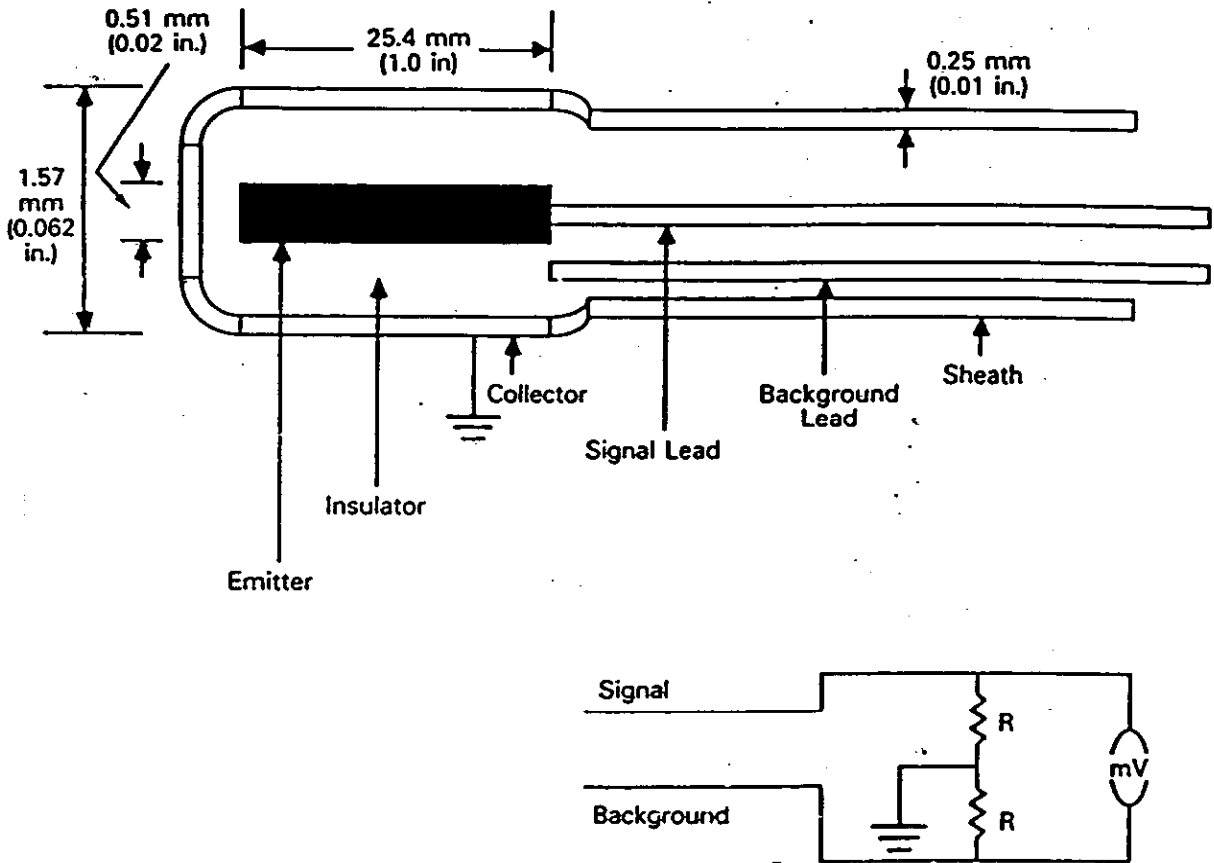


Fig. 1. Schematic of SPND with automatic background subtraction.

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

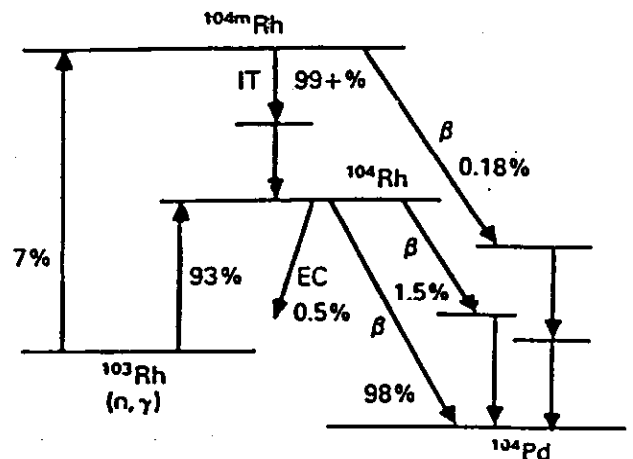
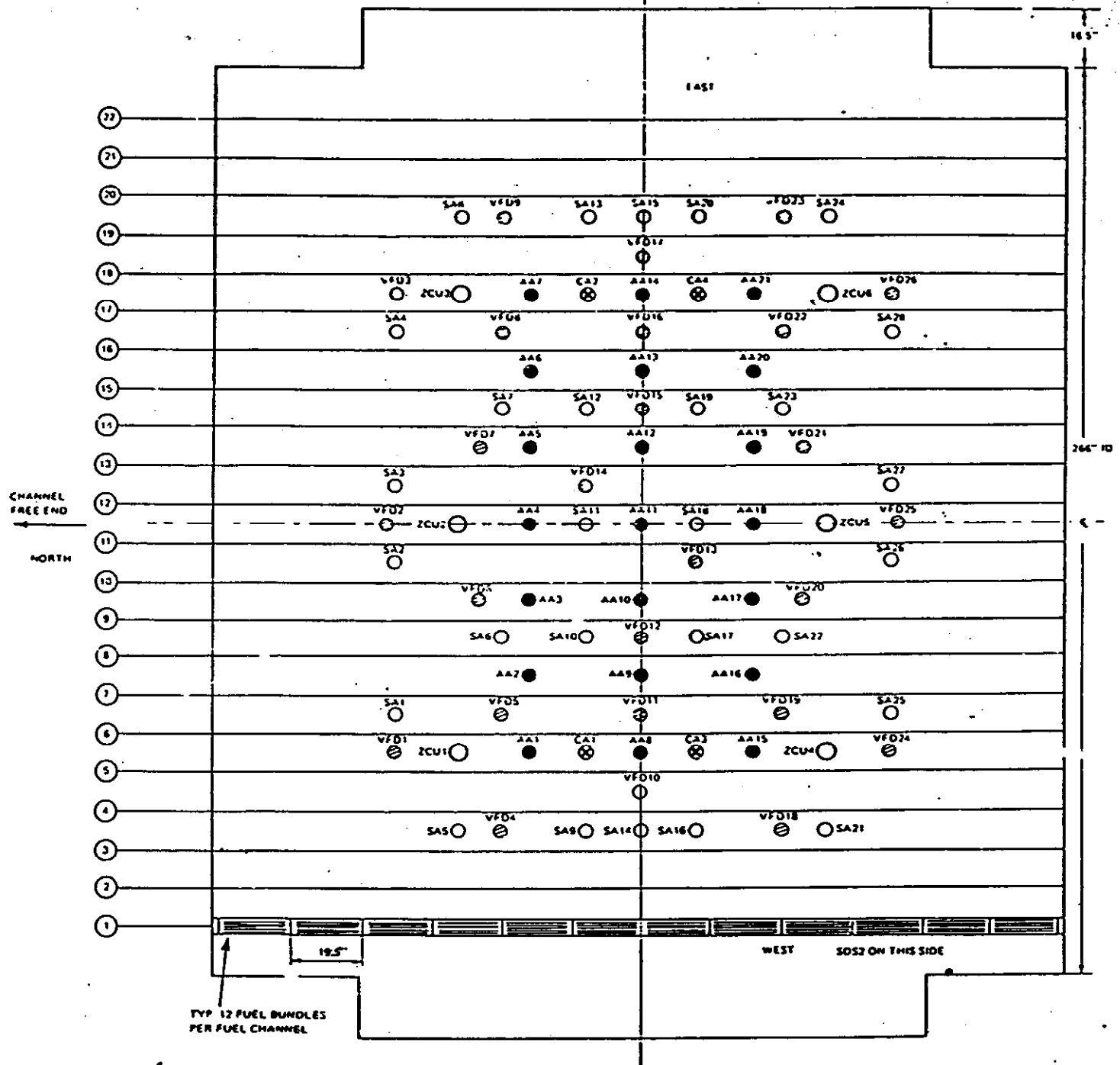


Fig. 2. Decay scheme of rhodium relevant to SPND.

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.

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



- LEGEND**
- ⊙ VFD - VERTICAL FLUX ASSEMBLIES
 - ZCU - ZONE CONTROL UNIT
 - AA - ADJUSTER RODS
 - SA - SHUT OFF RODS
 - ⊗ CA - CONTROL ABSORBER RODS

CALANORIA SHELL PLAN VIEW

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.

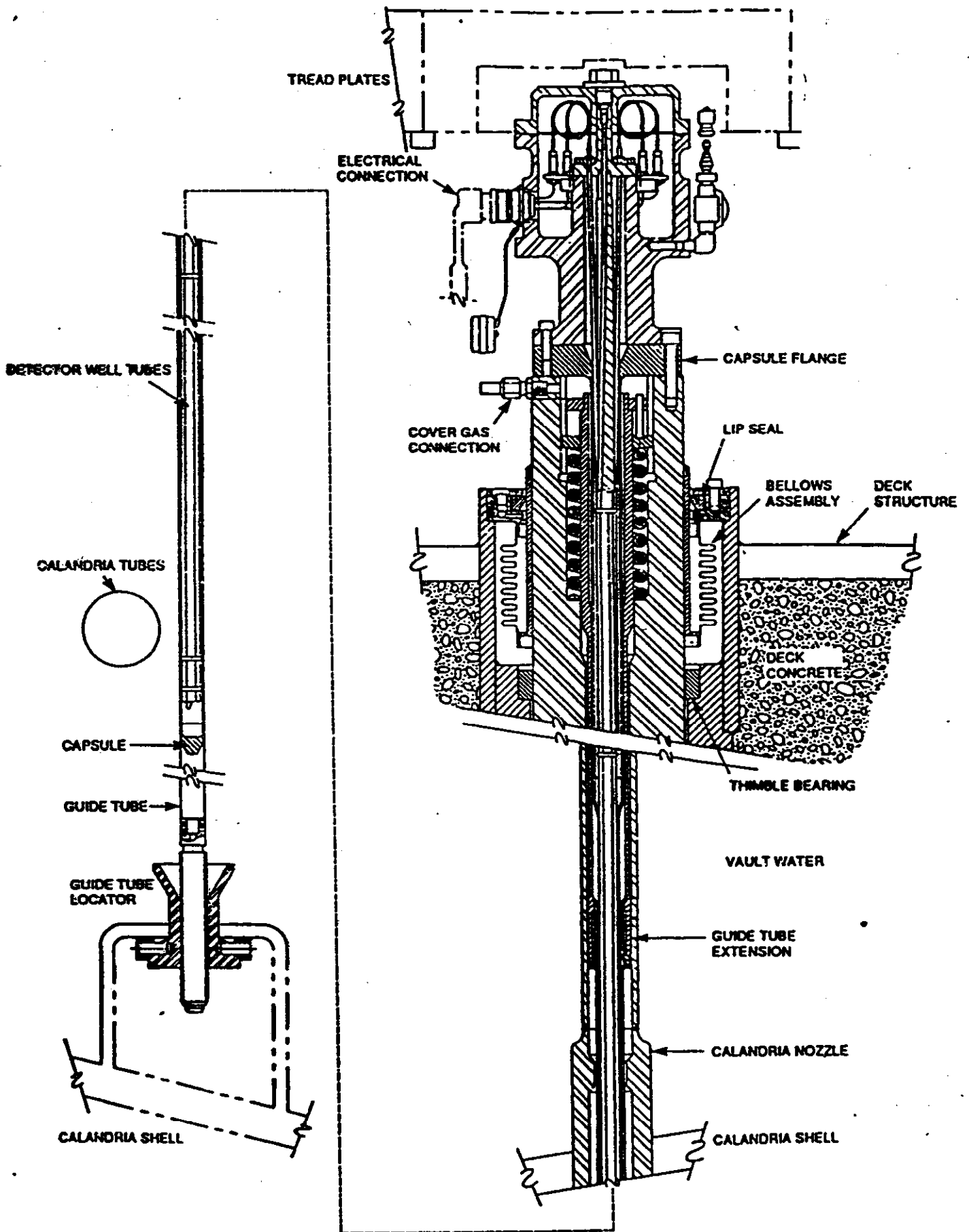


FIGURE 4.1.2-1 FLUX DETECTOR UNIT

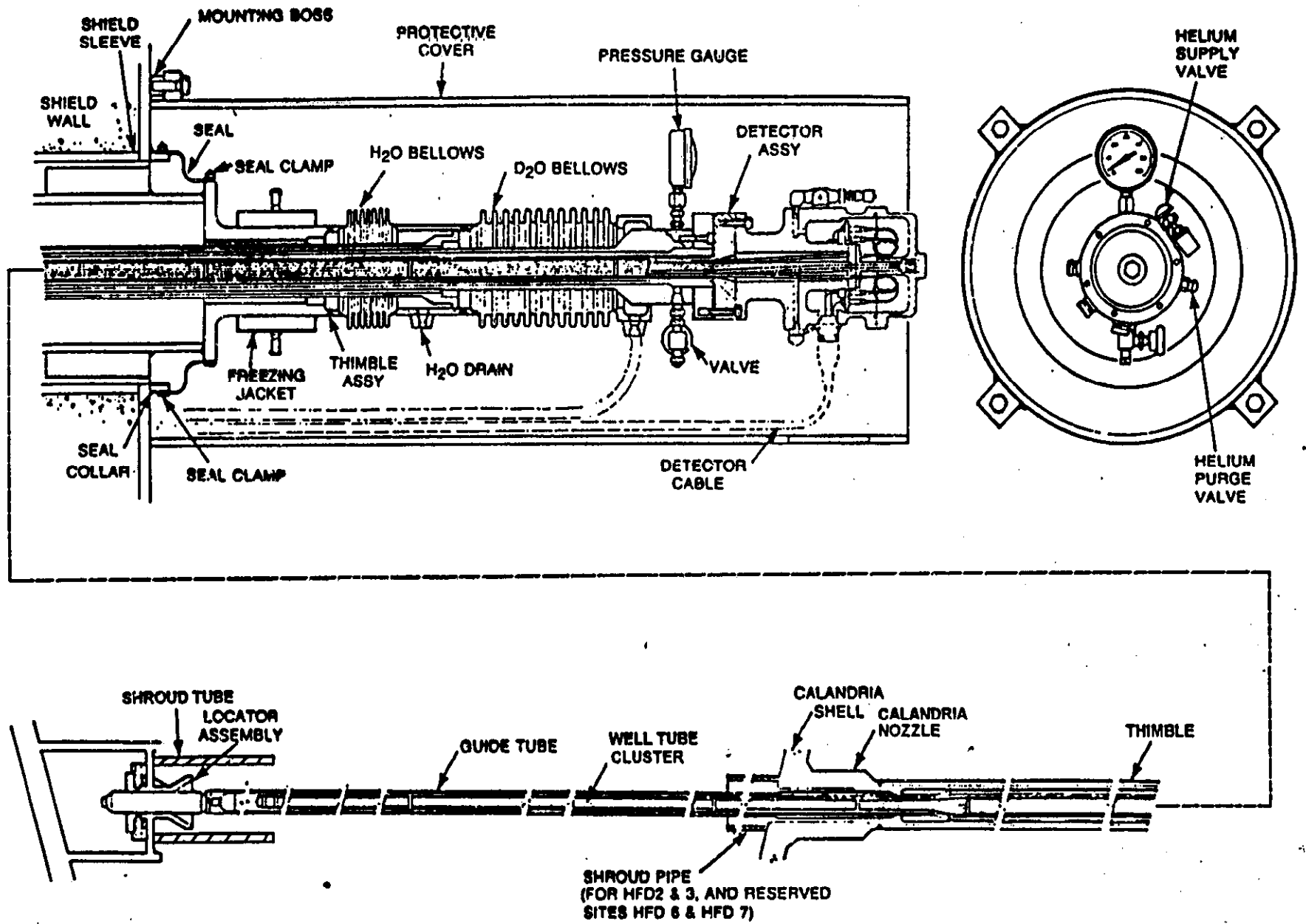


FIGURE 4.1.2-6 HORIZONTAL FLUX DETECTOR UNIT

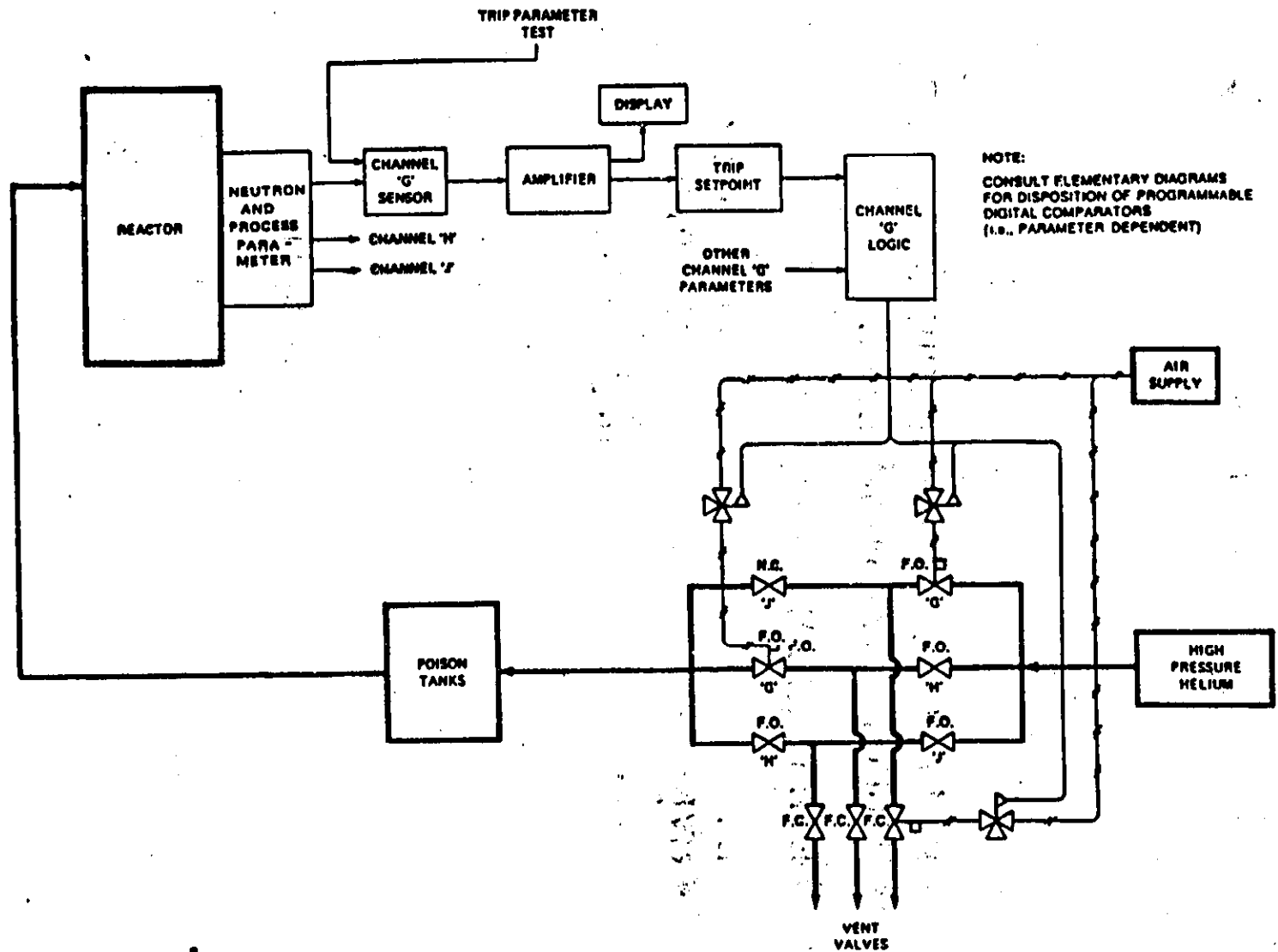
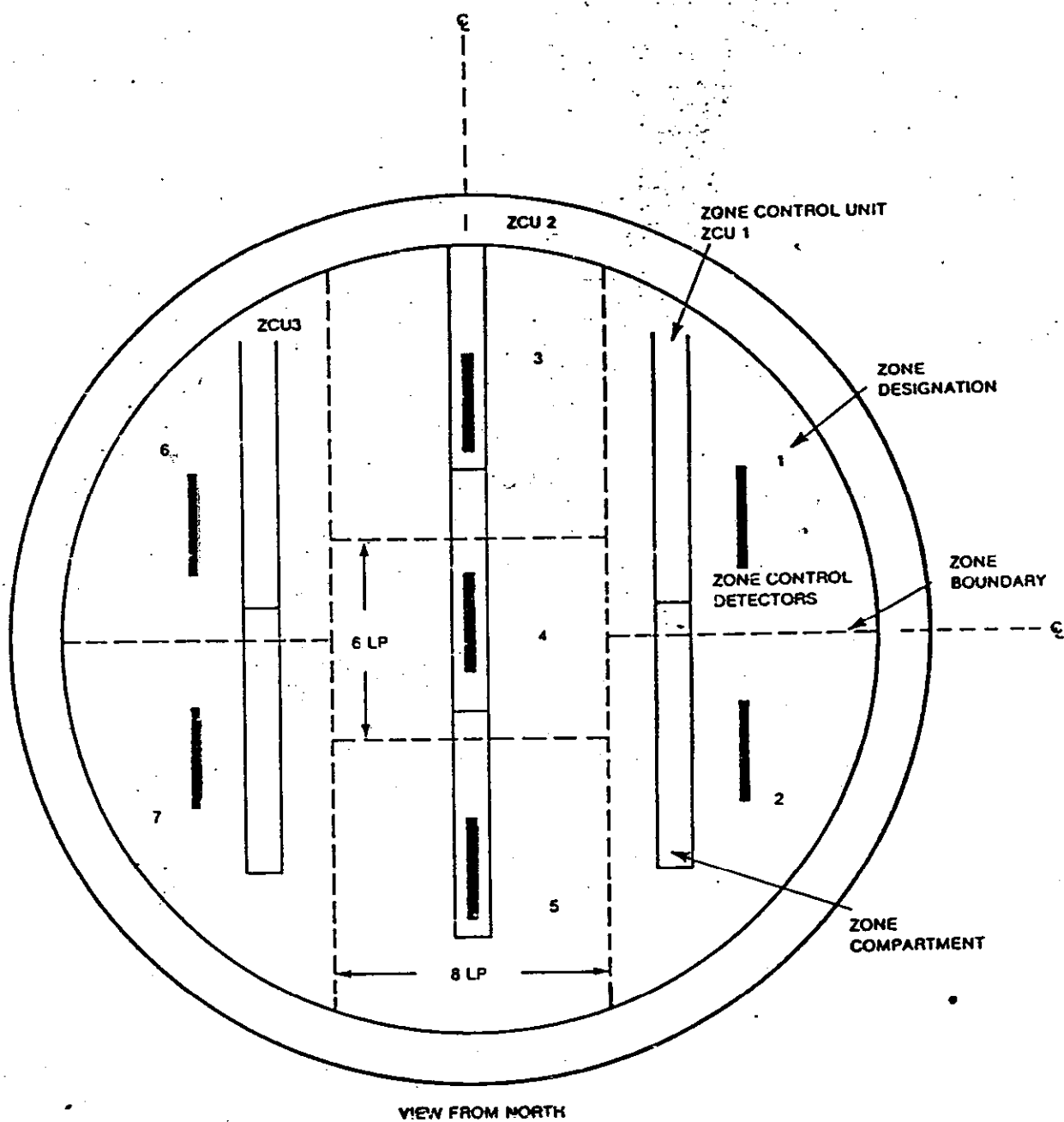


FIGURE 6.5-2 SHUTDOWN SYSTEM NO. 2 - BLOCK DIAGRAM



- 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

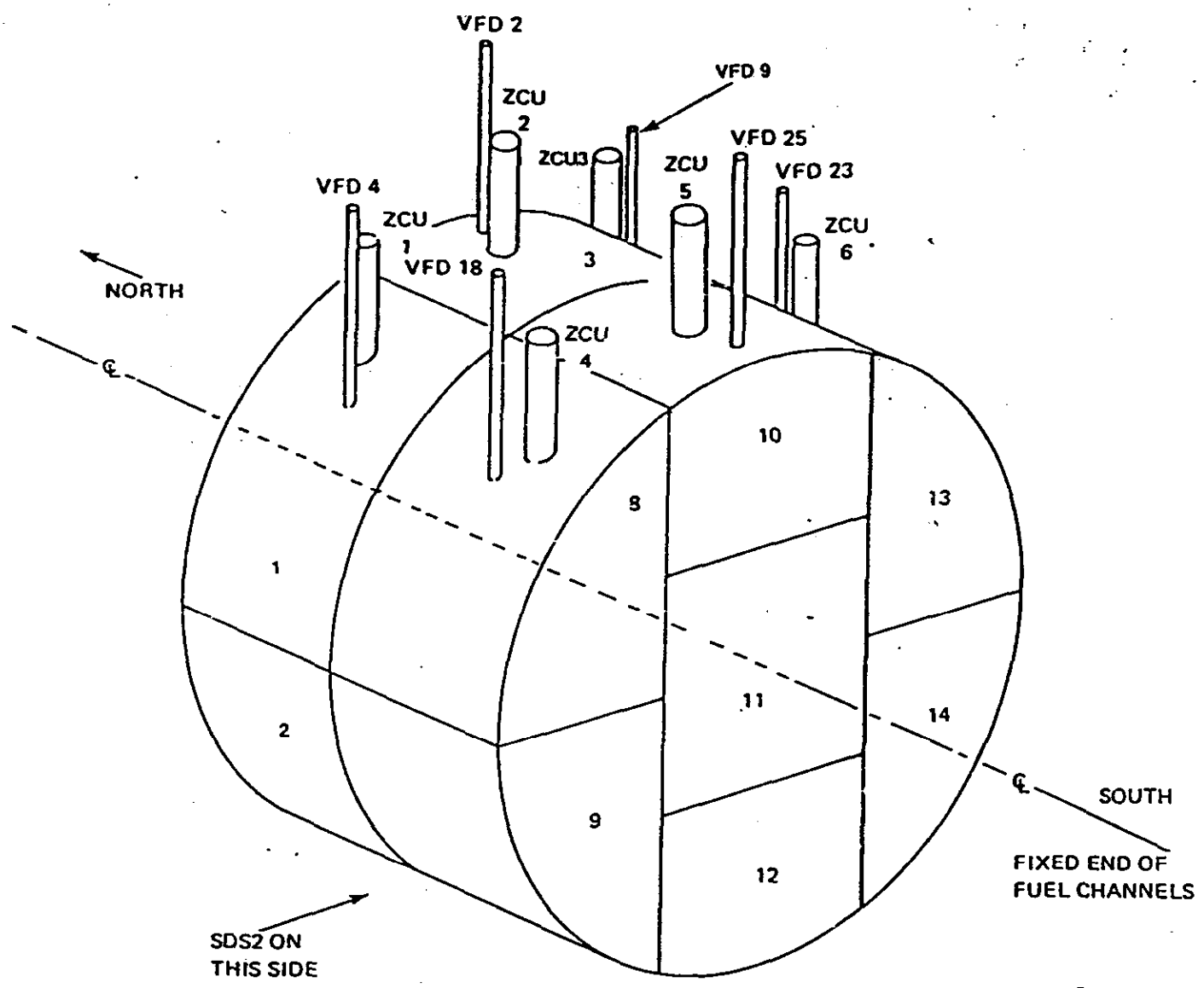


FIGURE 3.8-1 RELATION OF ZONE CONTROL UNITS (ZCU) TO THE FOURTEEN ZONES AND THE REACTOR ZONE CONTROL DETECTOR ASSEMBLIES VFD 2, 4, 9, 18, 23, 25

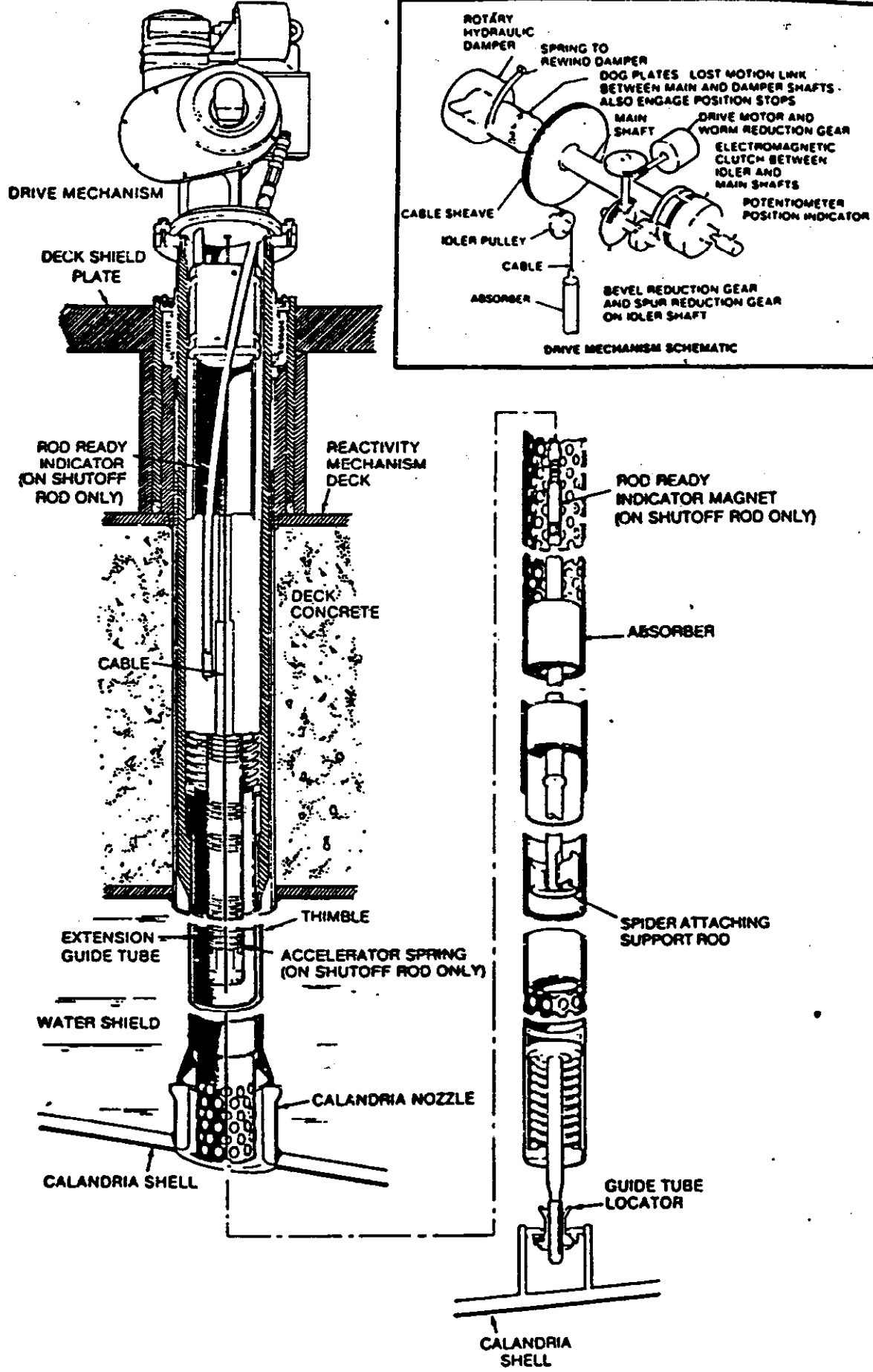


FIGURE 4.1.2-5 SHUTOFF AND CONTROL ABSORBER UNIT

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00-24

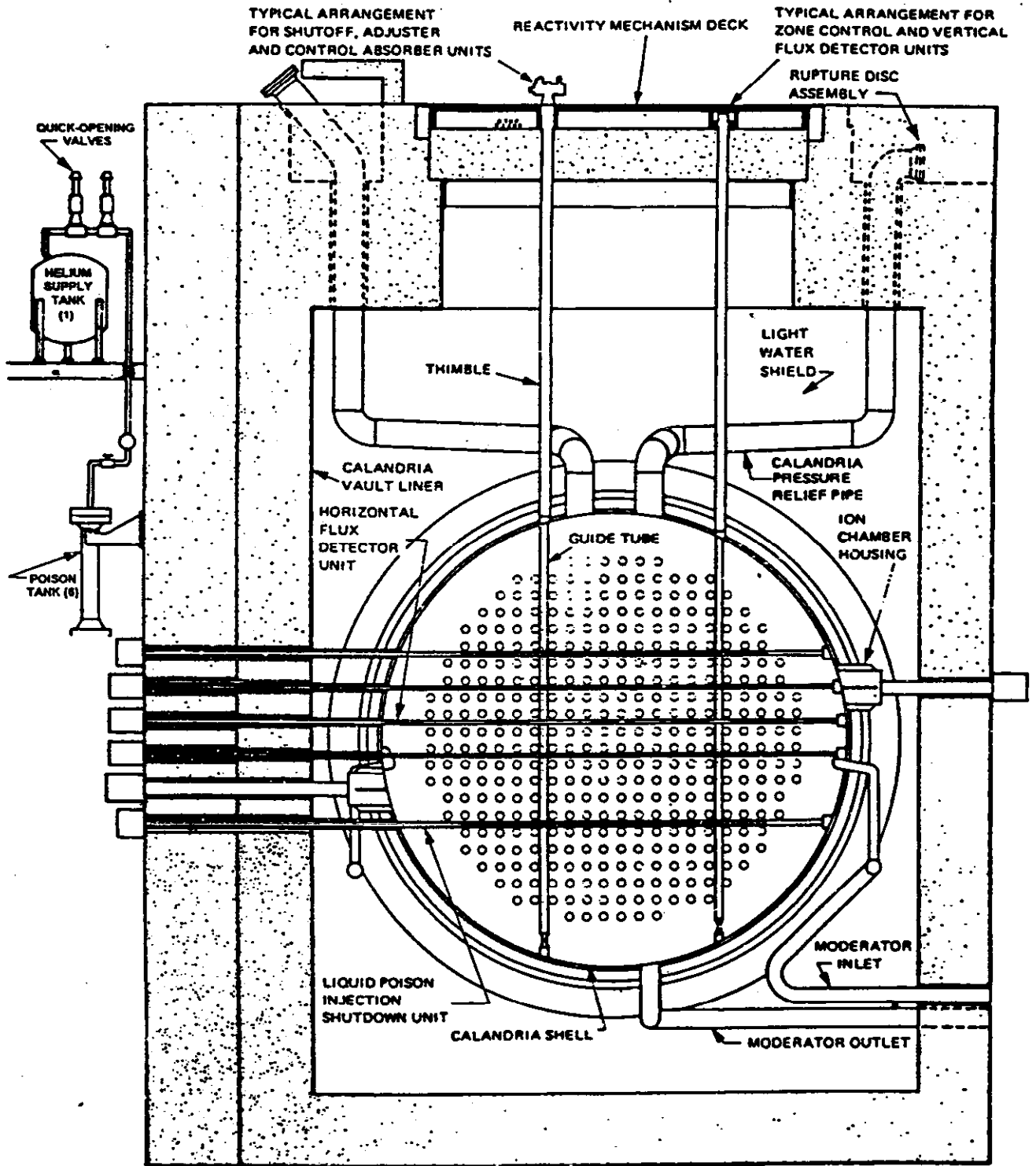


FIGURE 4.1.1-2 REACTOR LAYOUT - ELEVATION

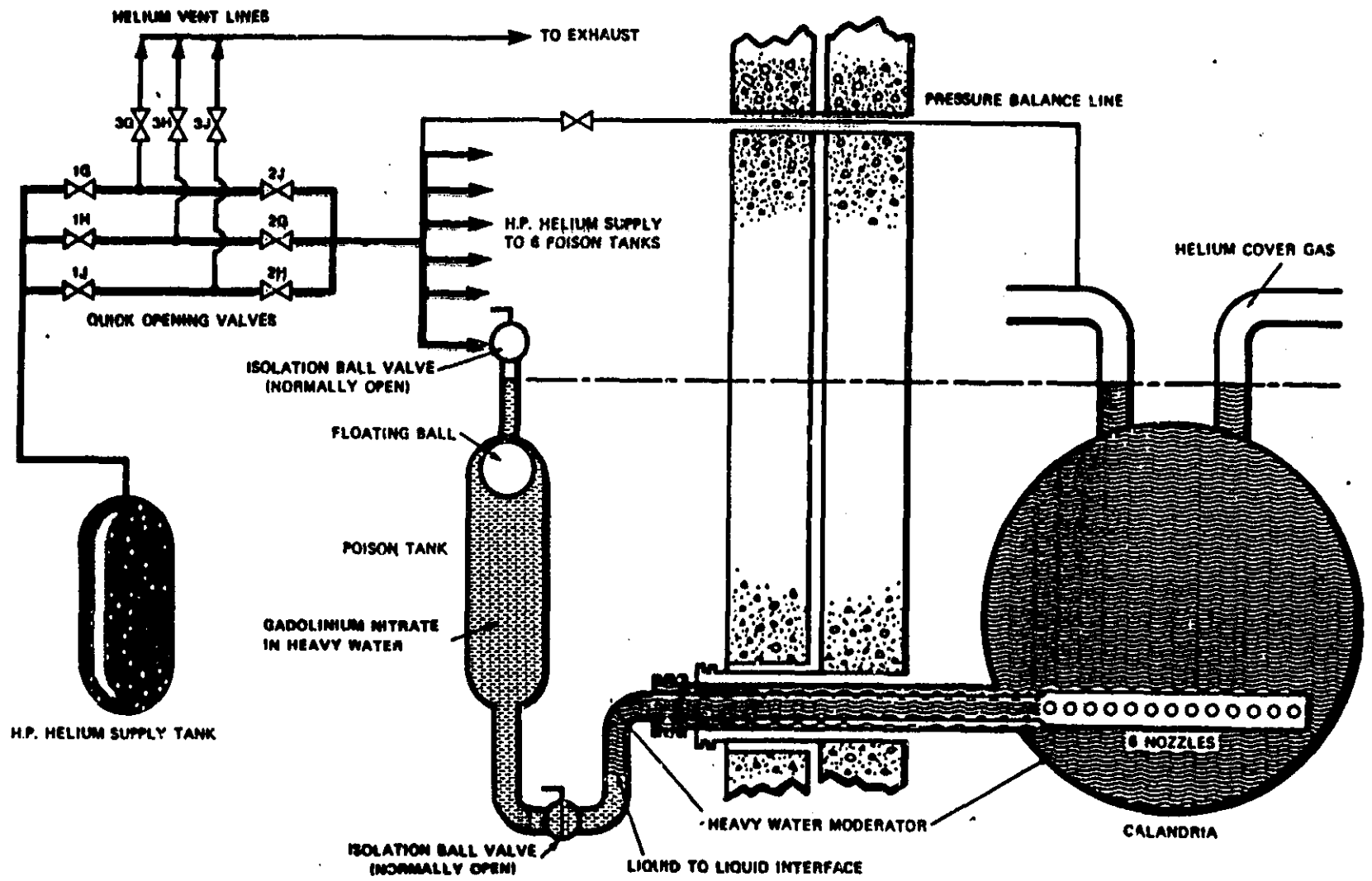


FIGURE 6.8 - 3 SHUTDOWN SYSTEM NO. 2

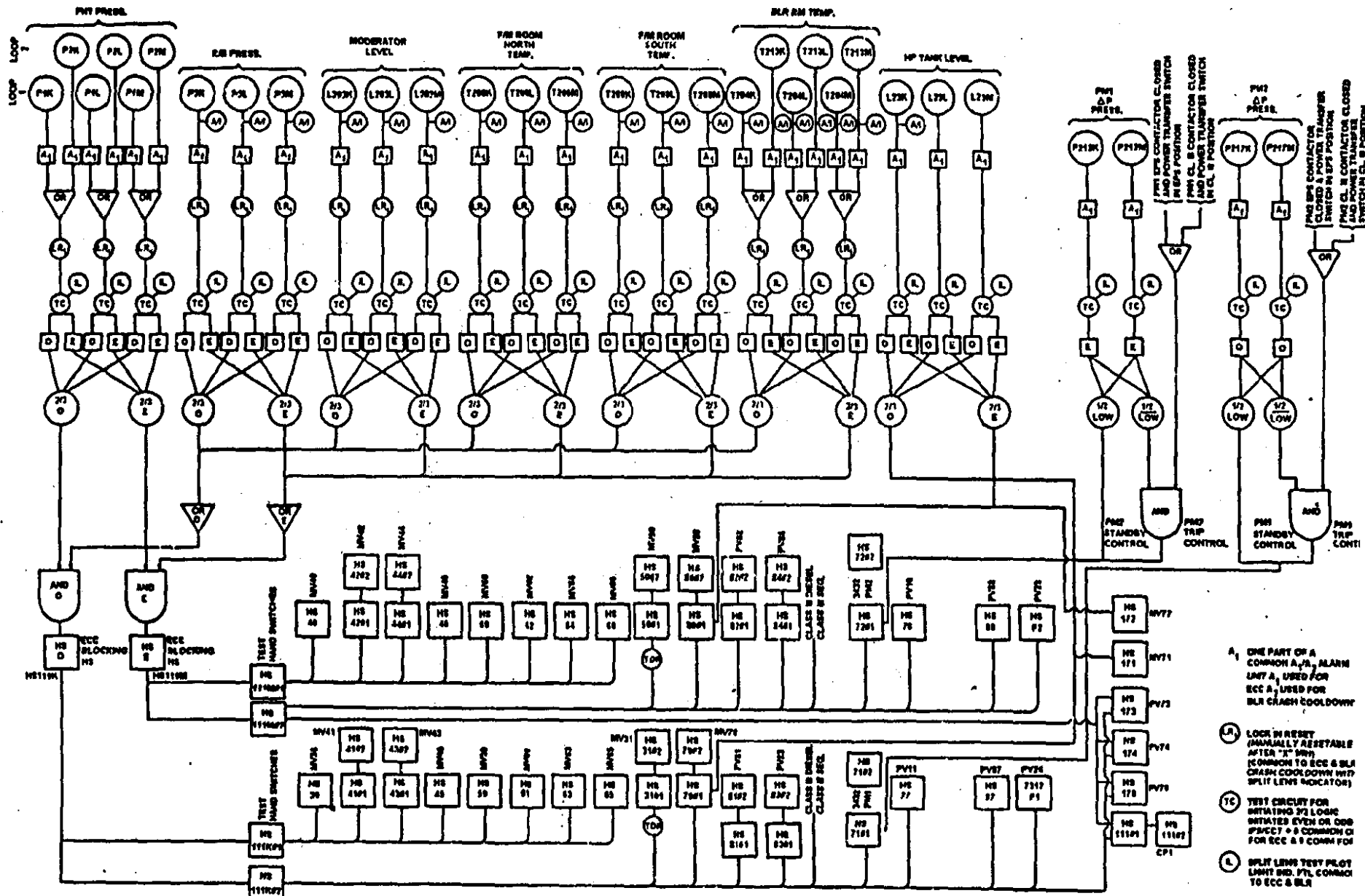


FIGURE 6.3-3 SIMPLIFIED INJECTION LOGIC SKETCH

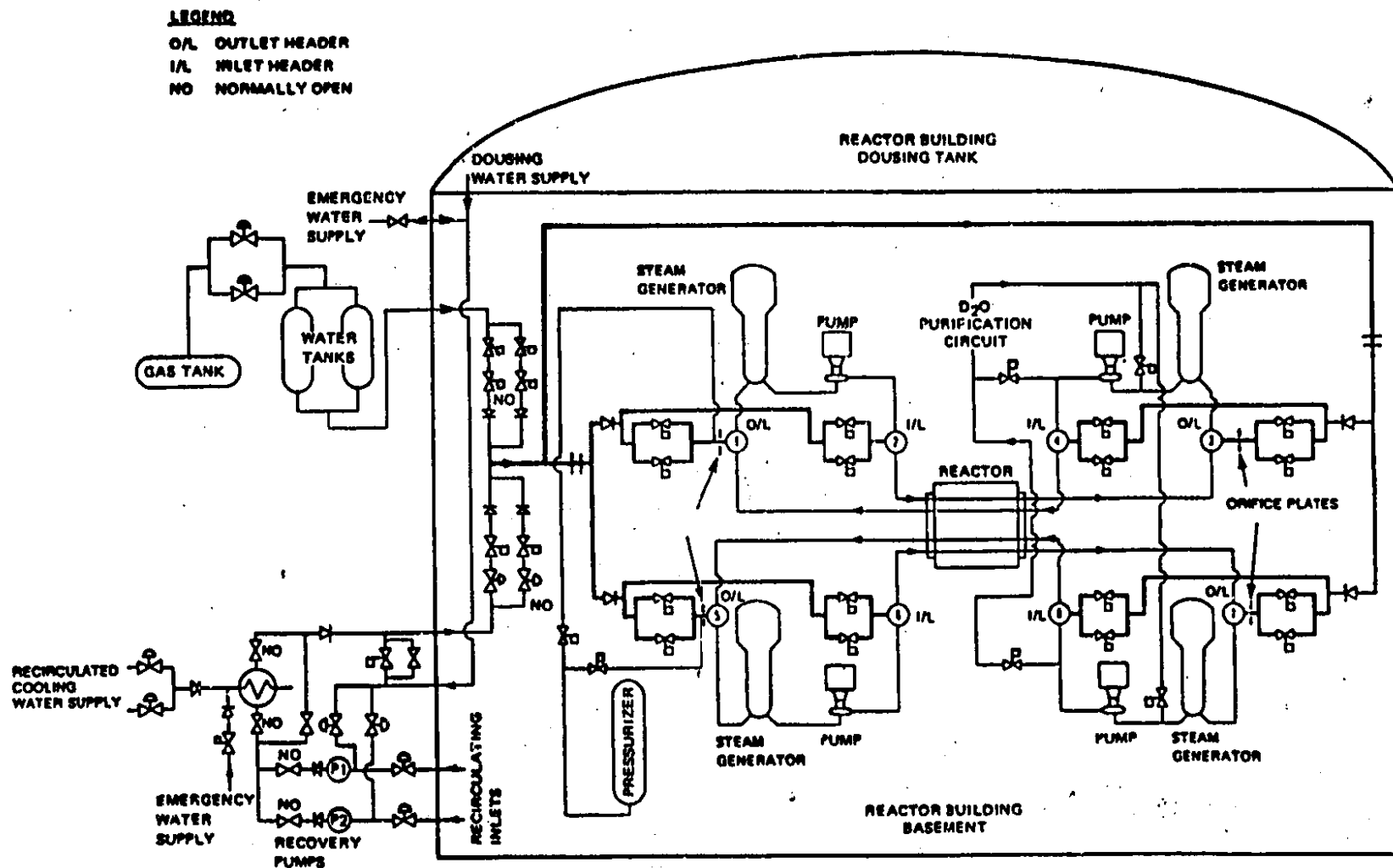


FIGURE 8.3-2 SCHEMATIC DIAGRAM OF HEAT TRANSPORT AND EMERGENCY CORE COOLING SYSTEMS

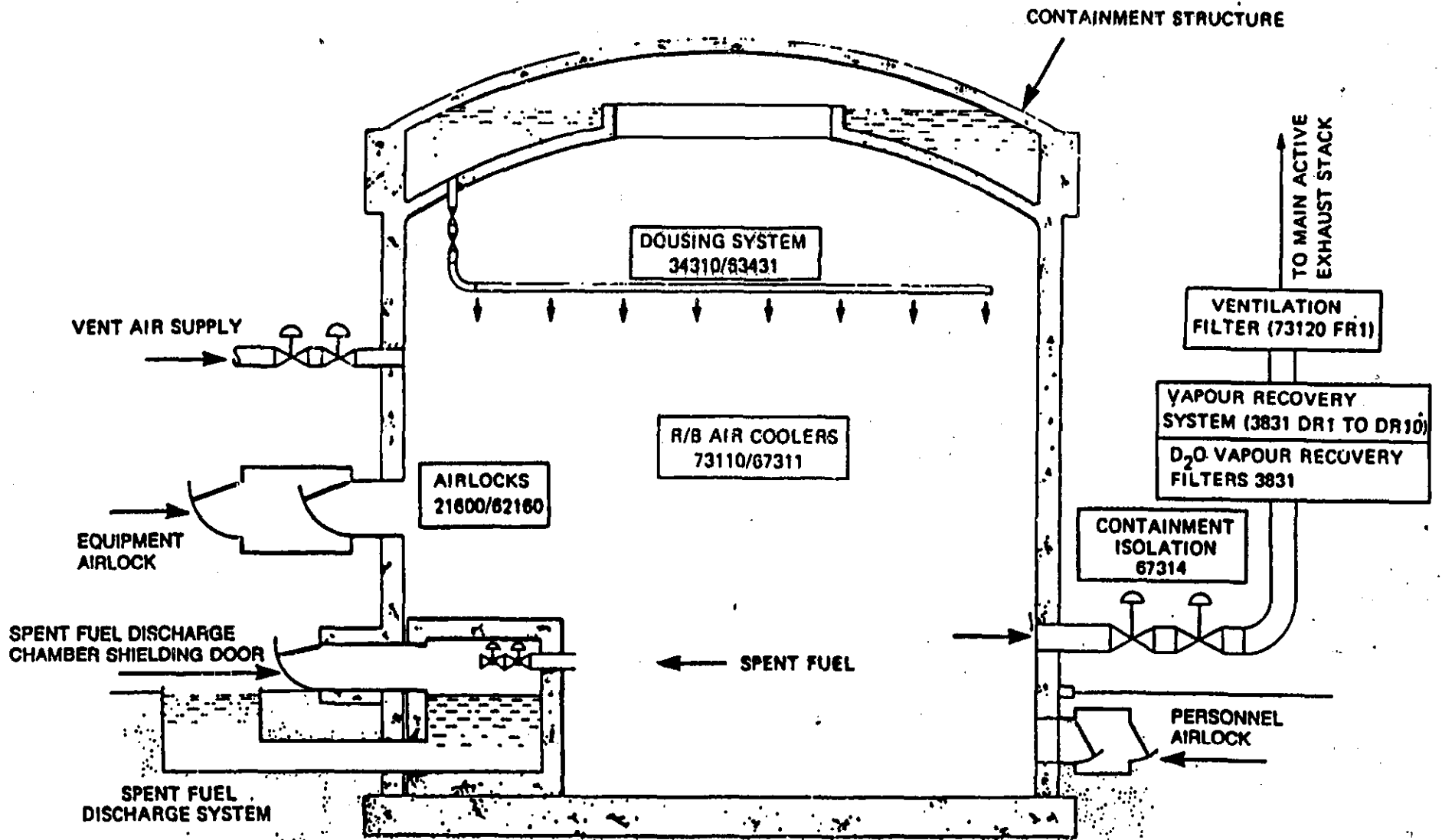


FIGURE 8.2-1 SIMPLIFIED DIAGRAM OF CONTAINMENT ENVELOPE

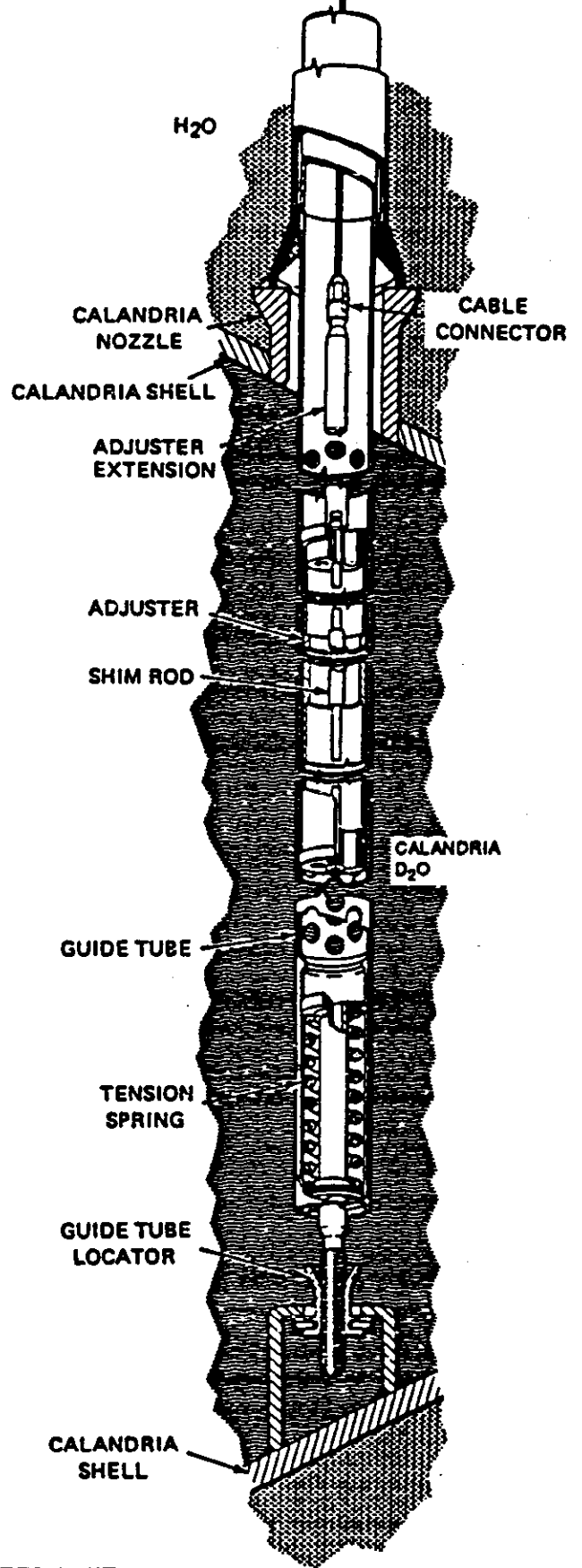
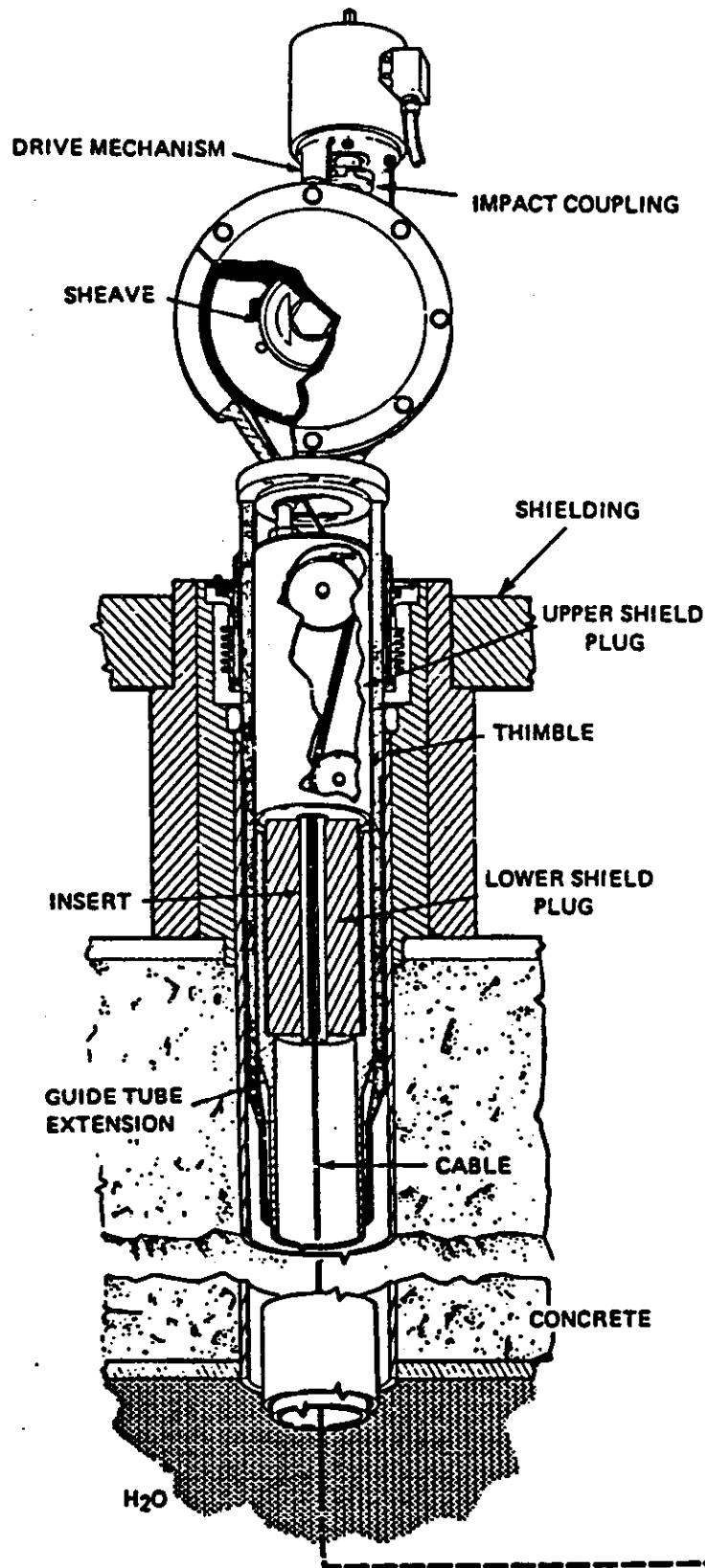


FIGURE 4.1.2-3 ADJUSTER UNIT

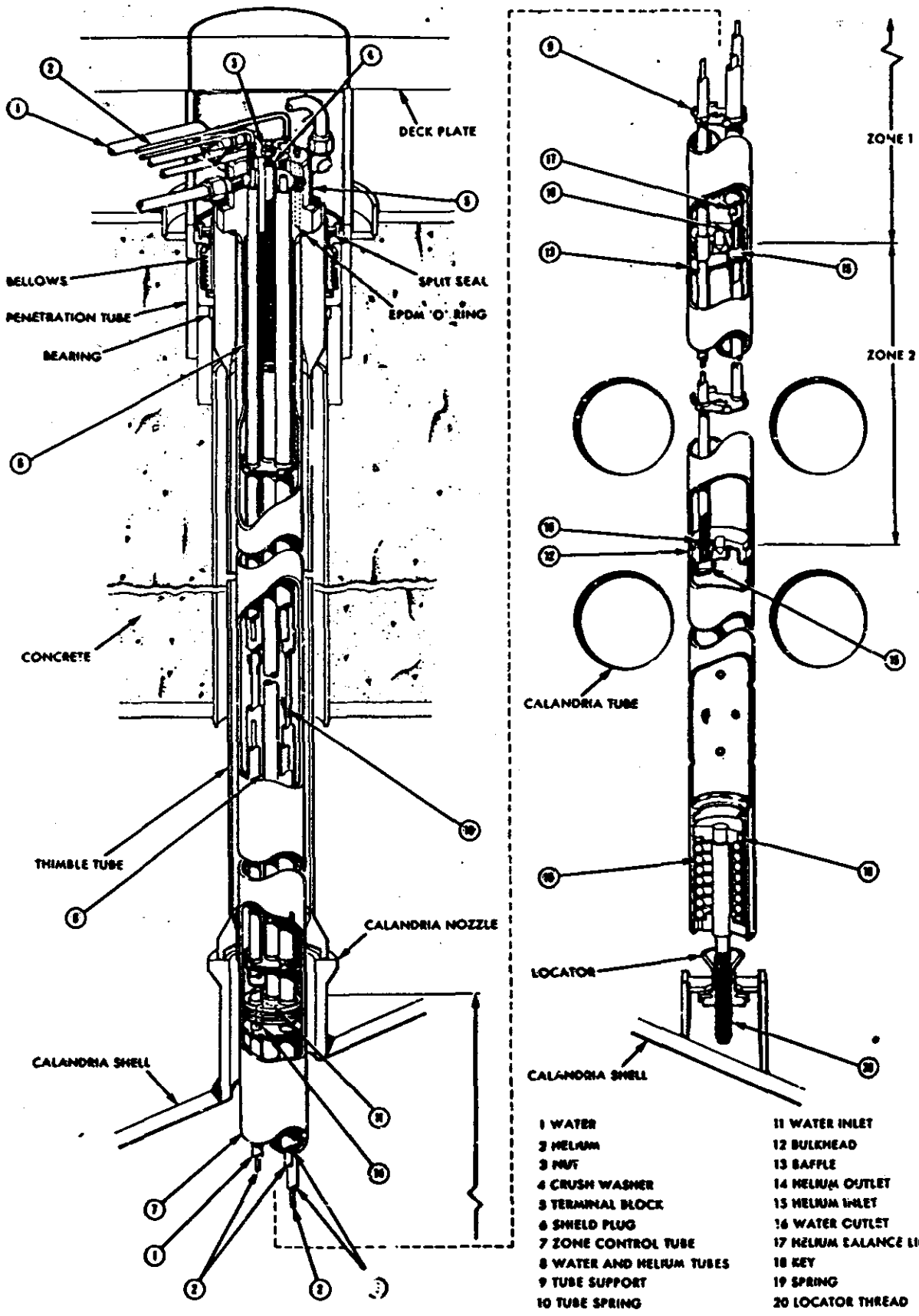


FIGURE 4.1.2 - 4 ZONE CONTROL UNIT

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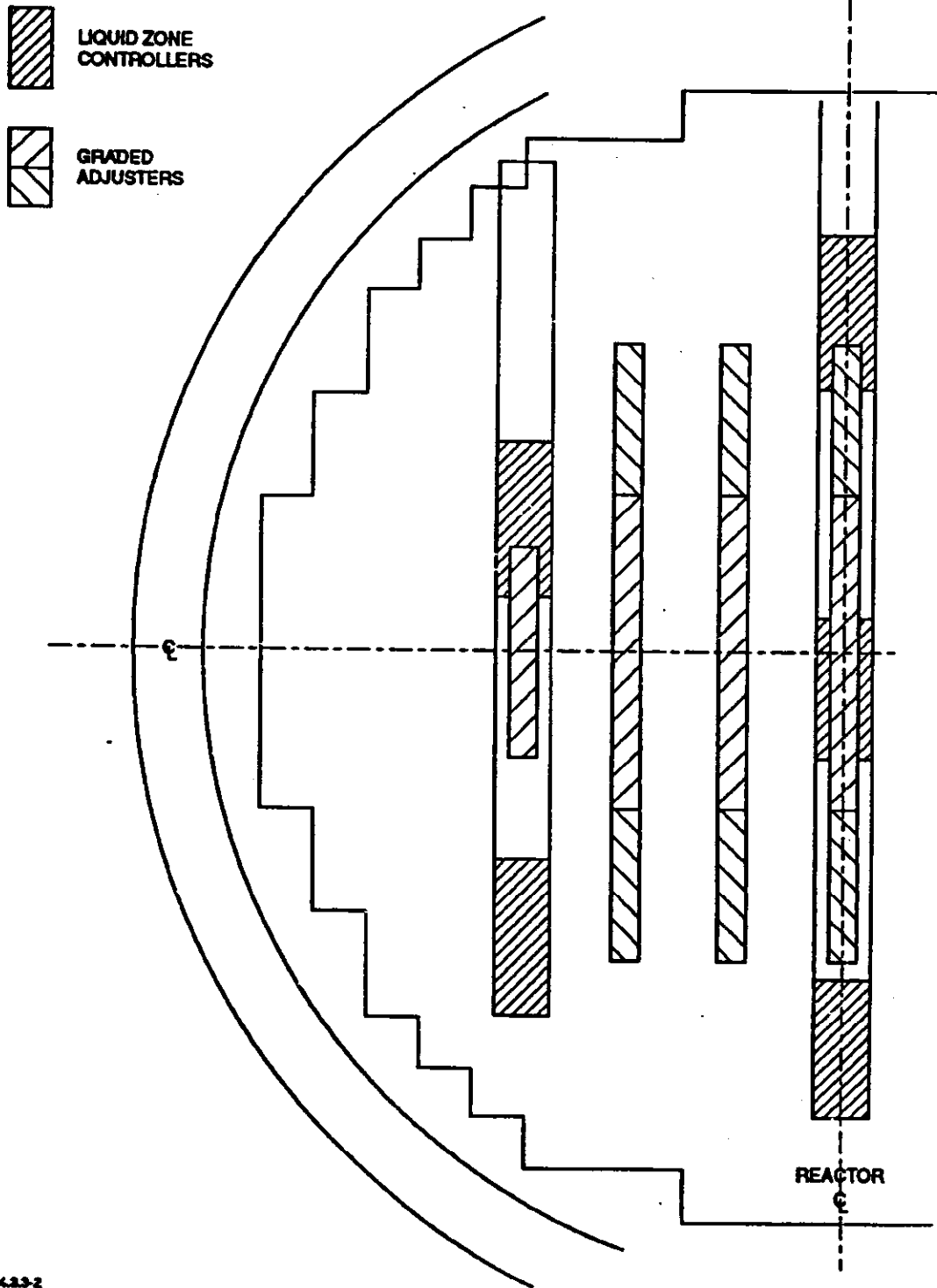


FIGURE 4.3.3-2 REACTIVITY DEVICE LAYOUT AND ZONE CONTROLLERS

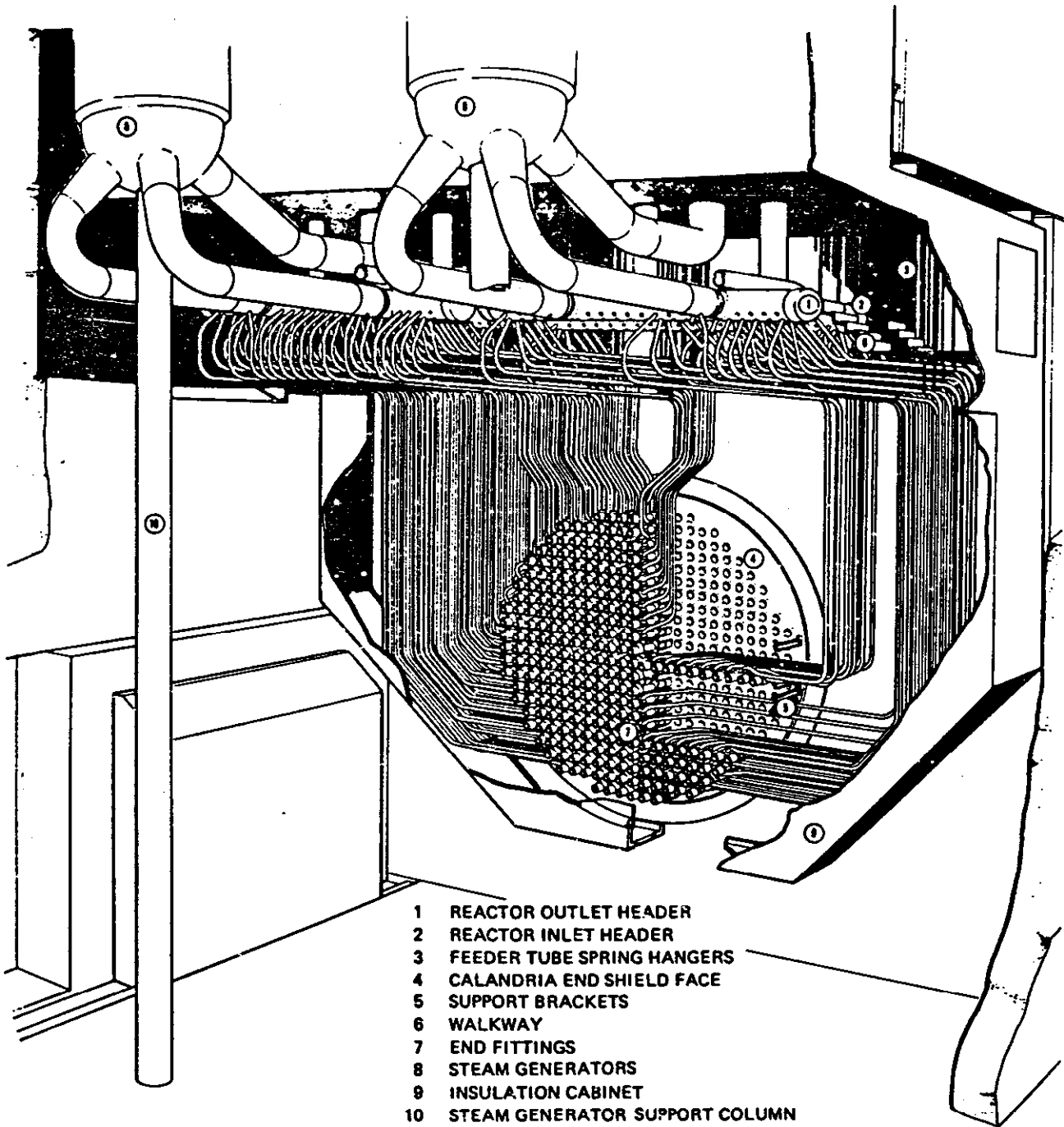


FIGURE 5.1.1 - 3 HEAT TRANSPORT SYSTEM – TYPICAL FEEDER AND HEADER ARRANGEMENT

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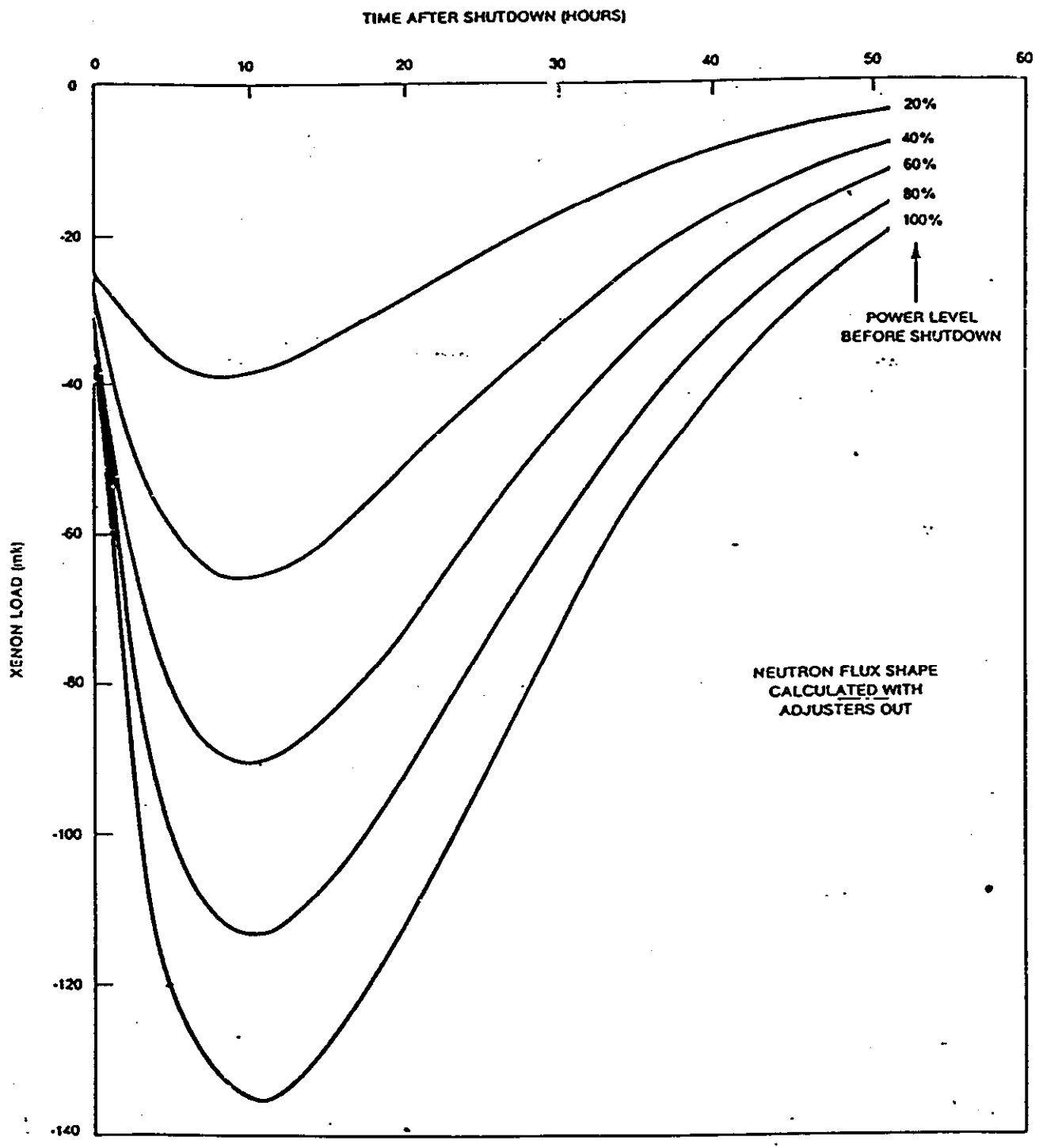


FIGURE 3.7-1 XENON TRANSIENTS AFTER SHUTDOWN FROM VARIOUS POWER LEVELS

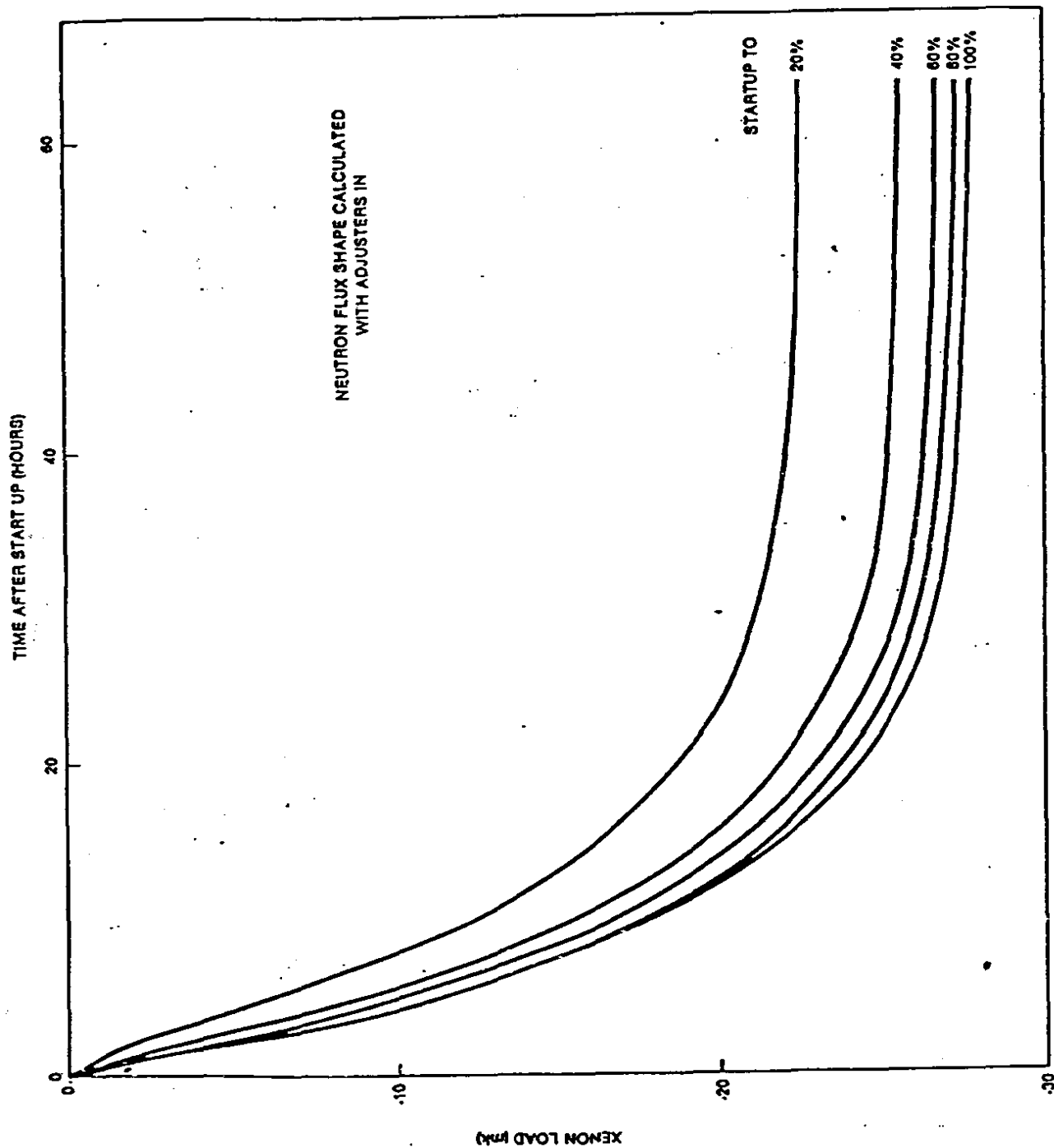


FIGURE 3.7-2 XENON REACTIVITY TRANSIENTS AFTER STARTUP TO VARIOUS POWER LEVELS

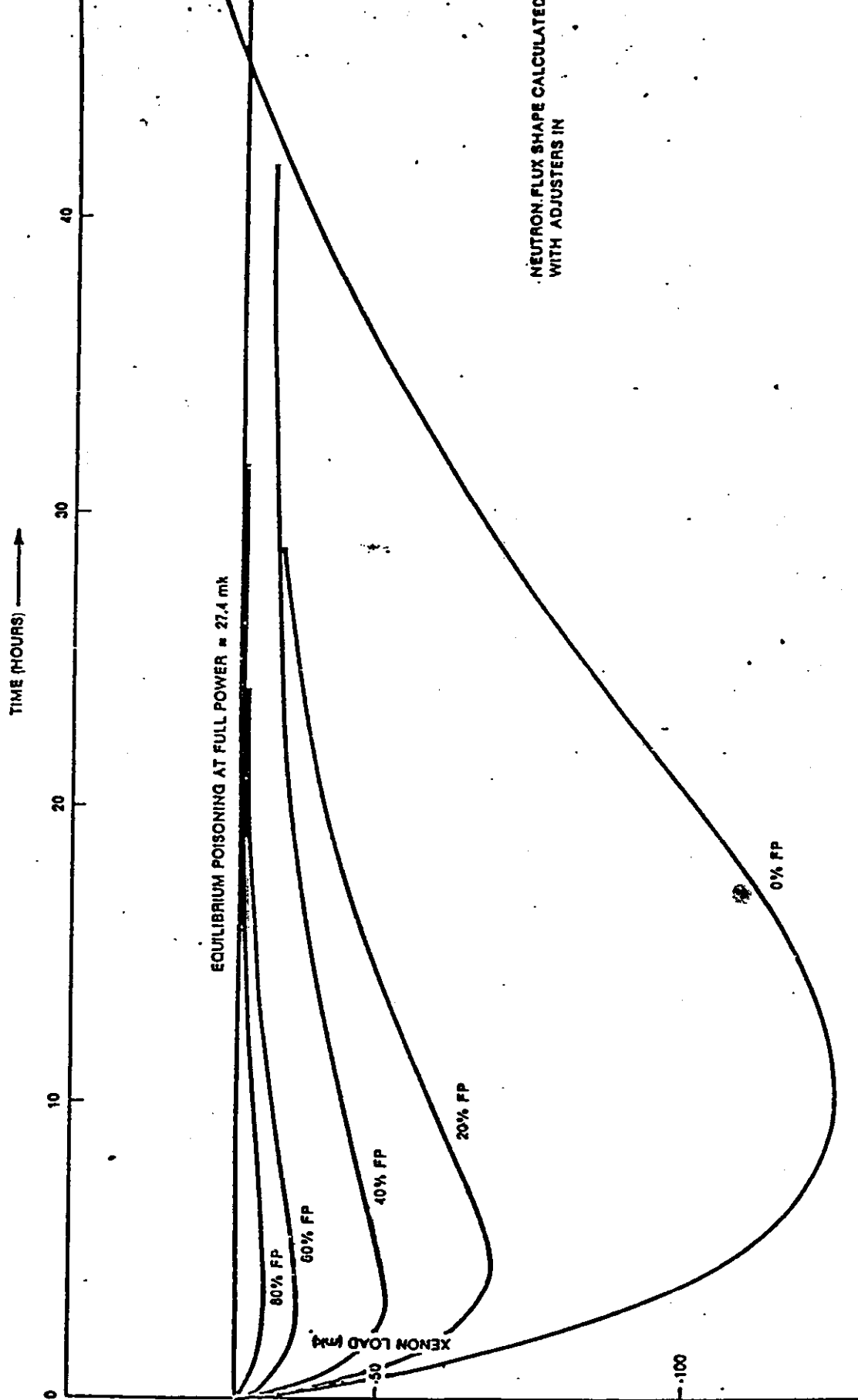


FIGURE 3.7-3 VARIATION OF XENON LOAD FOLLOWING STEP POWER REDUCTIONS TO 0,20,40,60 AND 80% OF FULL POWER FROM EQUILIBRIUM FULL POWER CONDITION

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