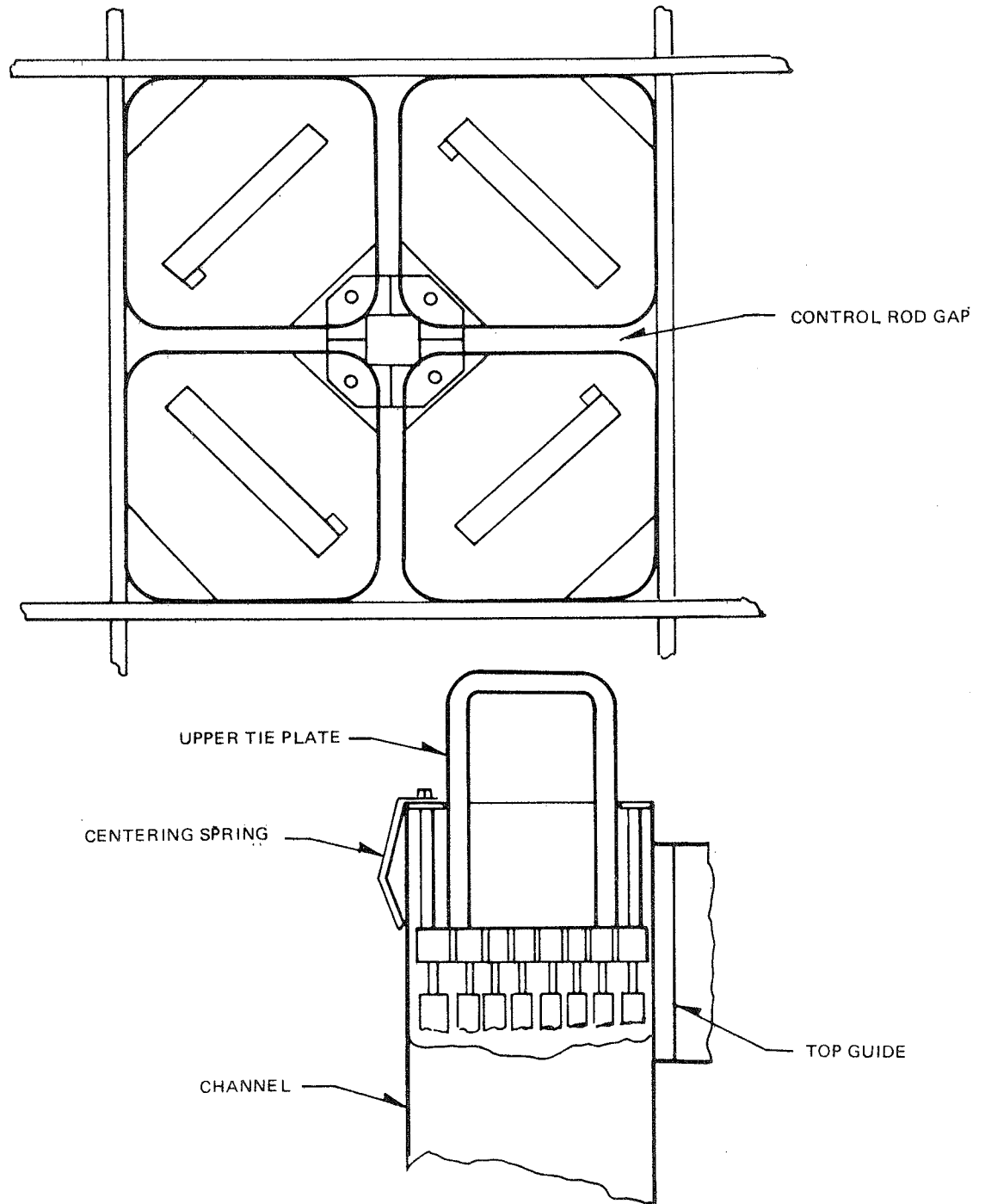


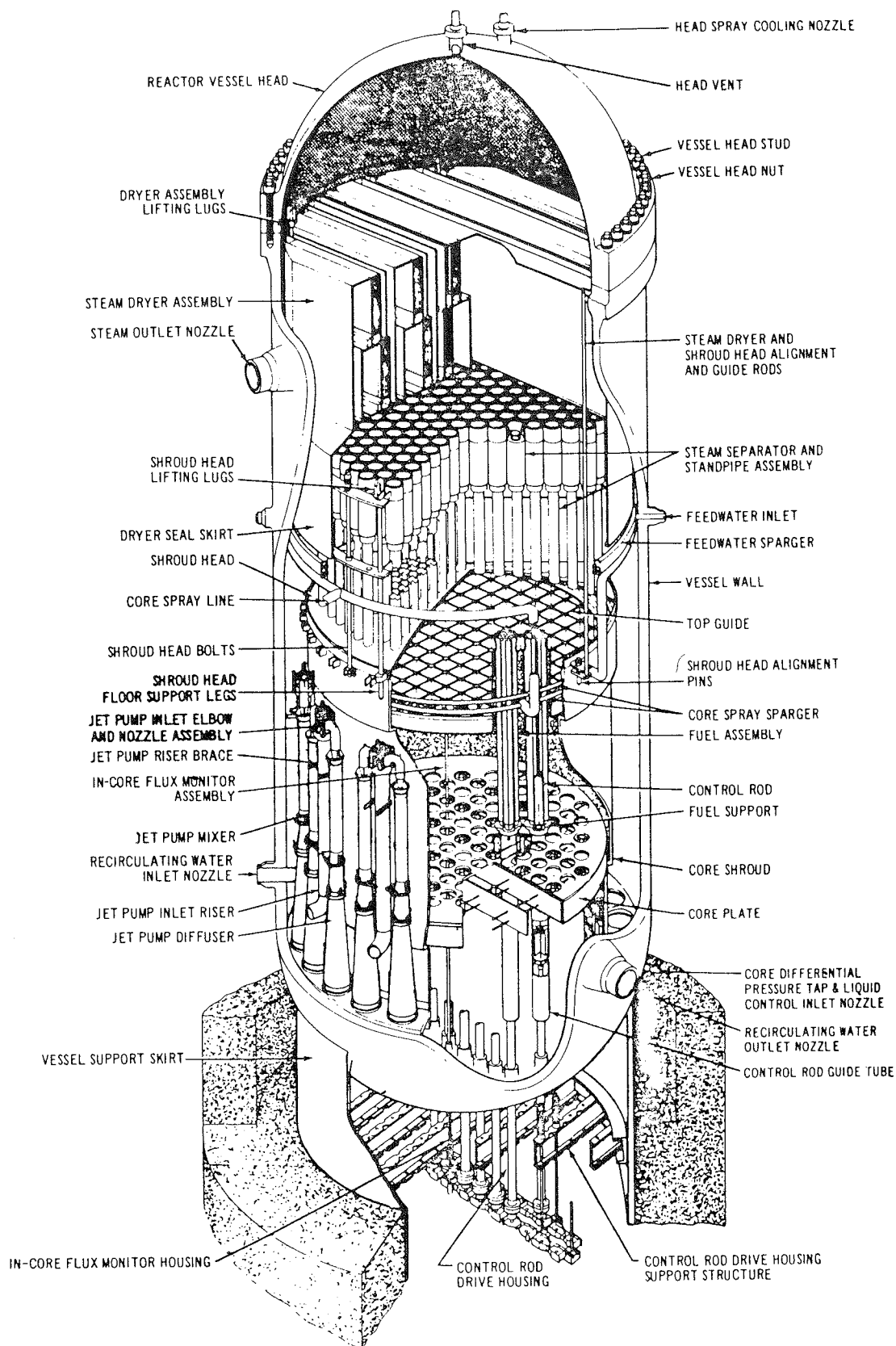
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COOPER NUCLEAR STATION  
UPDATED SAFETY ANALYSIS REPORT (USAR)

Typical GE BWR Fuel Assembly  
Figure III-2-1  
03/14/07



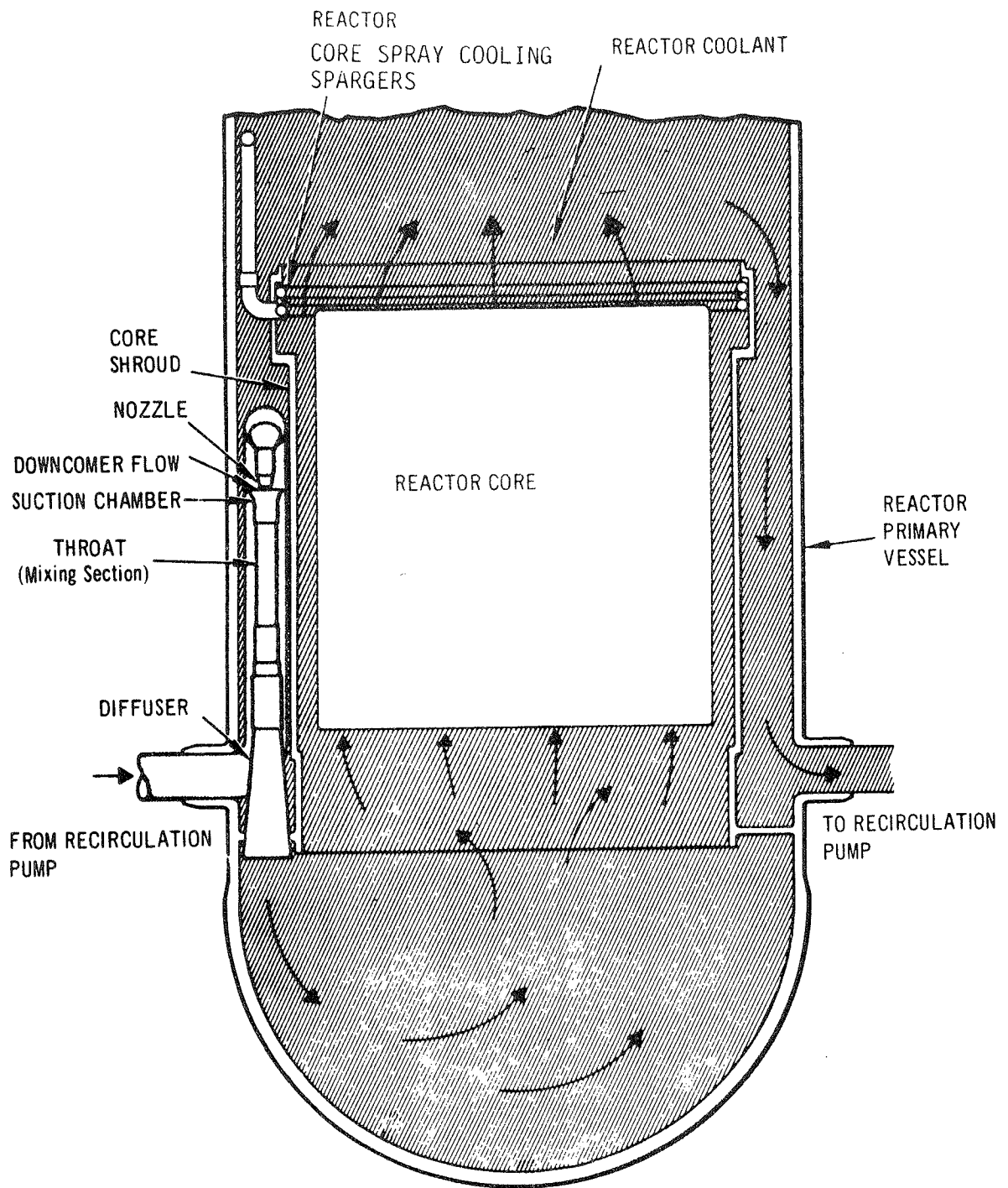
Nebraska Public Power District  
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Schematic of Four Bundle  
Cell Arrangement  
Figure III-2-4



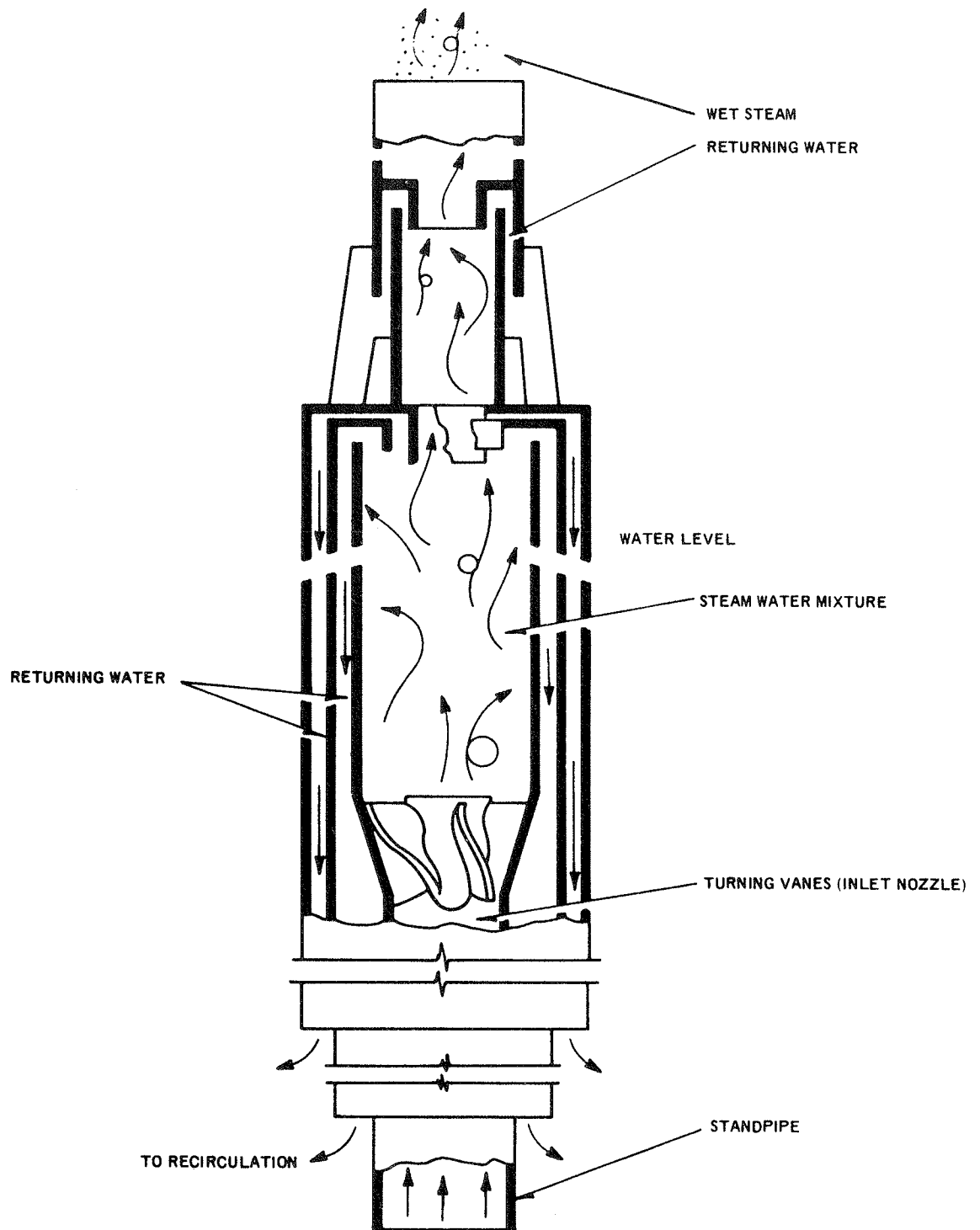
Nebraska Public Power District  
COOPER NUCLEAR STATION  
UPDATED SAFETY ANALYSIS REPORT (USAR)

Reactor Internals Arrangement  
Figure III-3-1



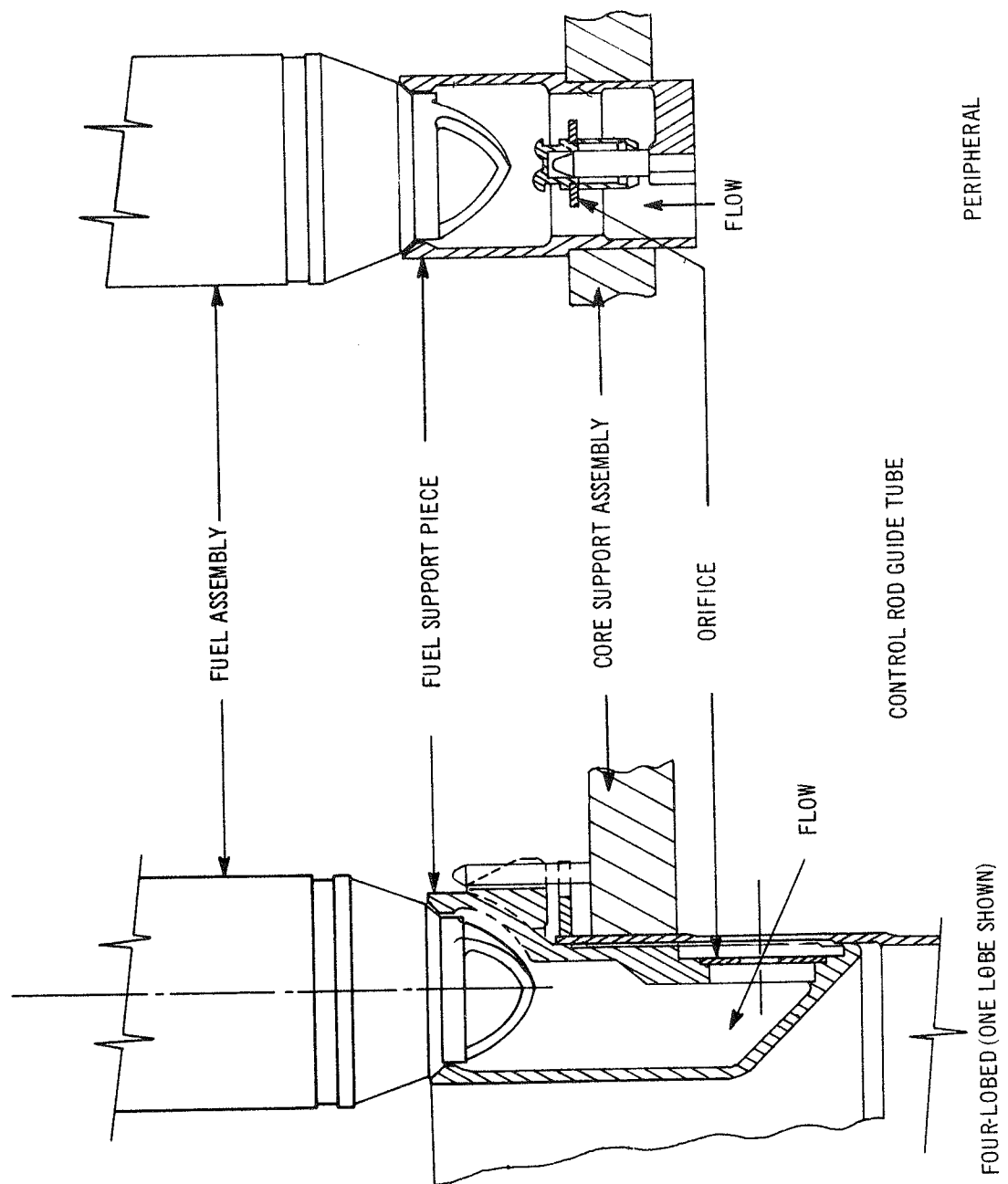
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COOPER NUCLEAR STATION  
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Reactor Internals Flow Paths  
Figure III-3-2



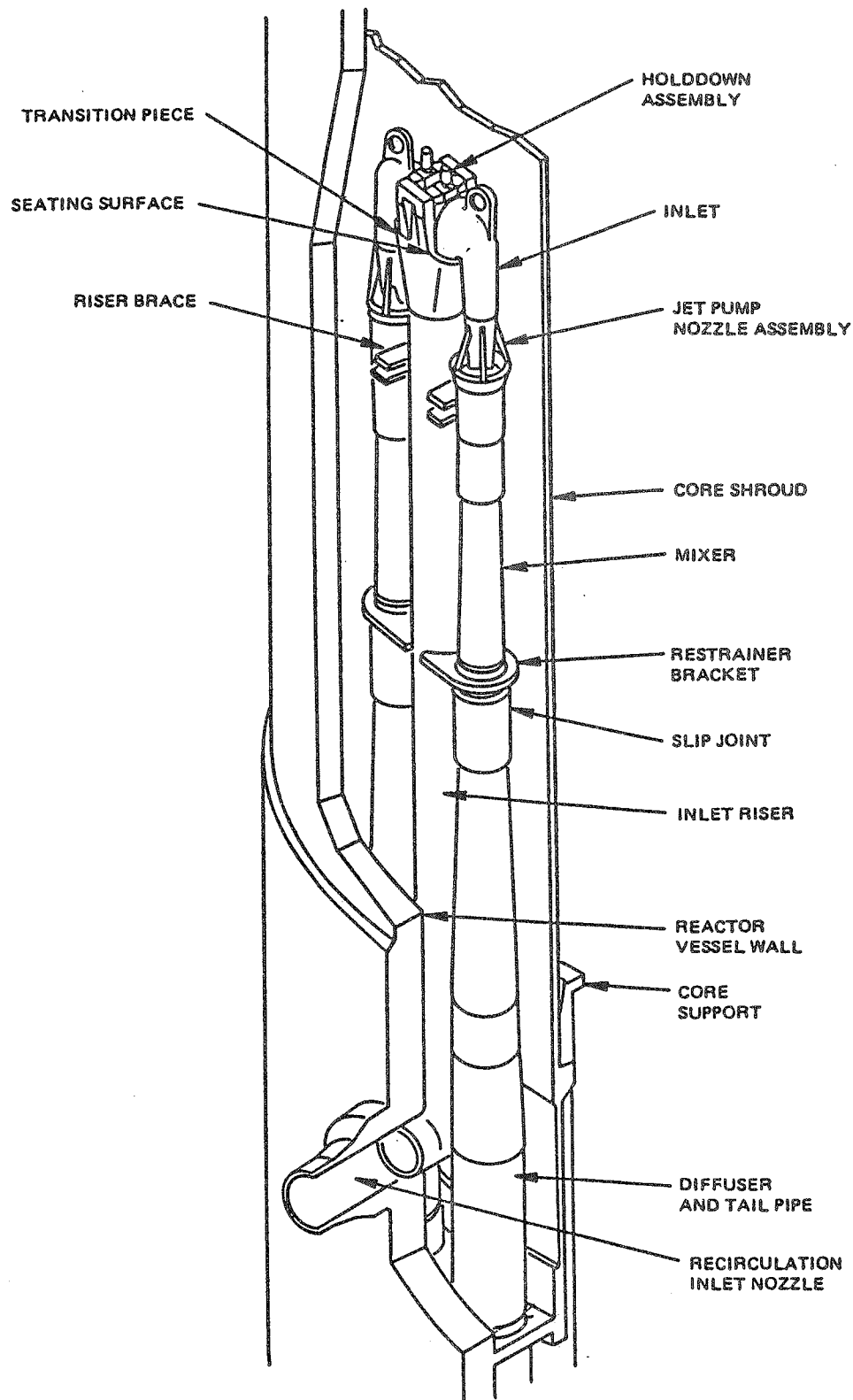
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Axial Flow Steam Separator  
Figure III-3-3



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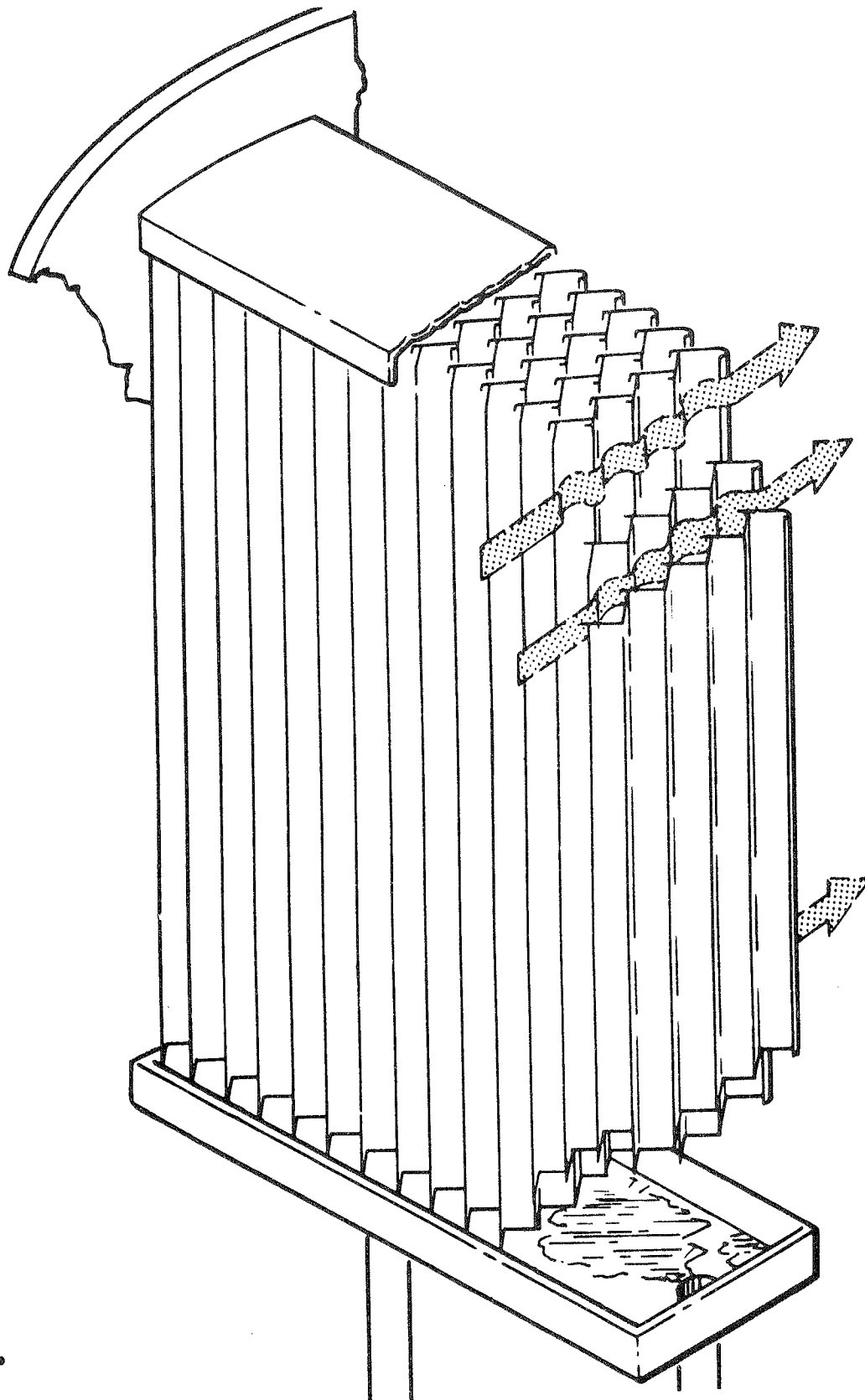
Fuel Support Pieces  
Figure III-3-4



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Jet Pump Assembly  
Figure III-3-5

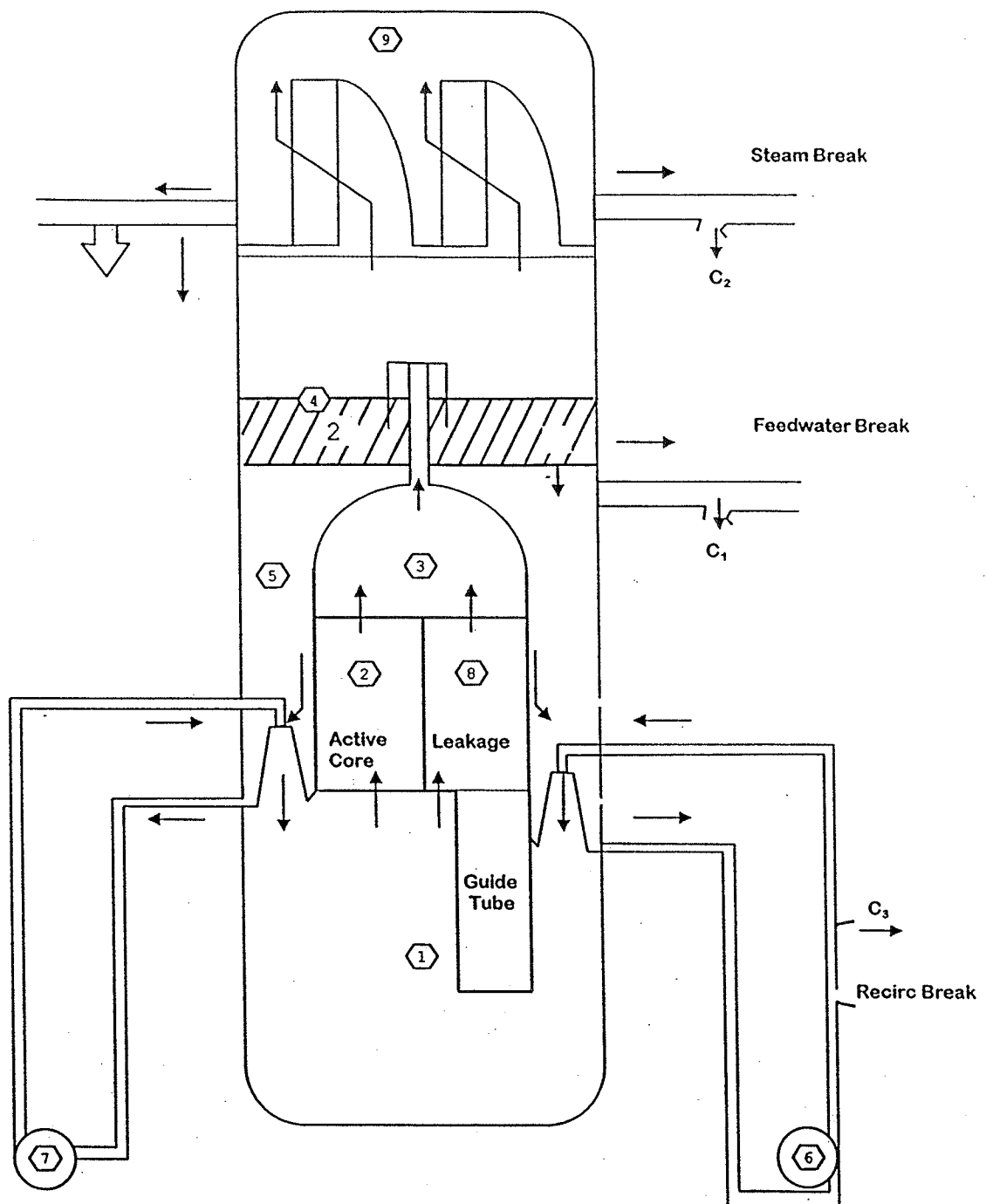
07/22/90




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Steam Dryer  
Figure III-3-6

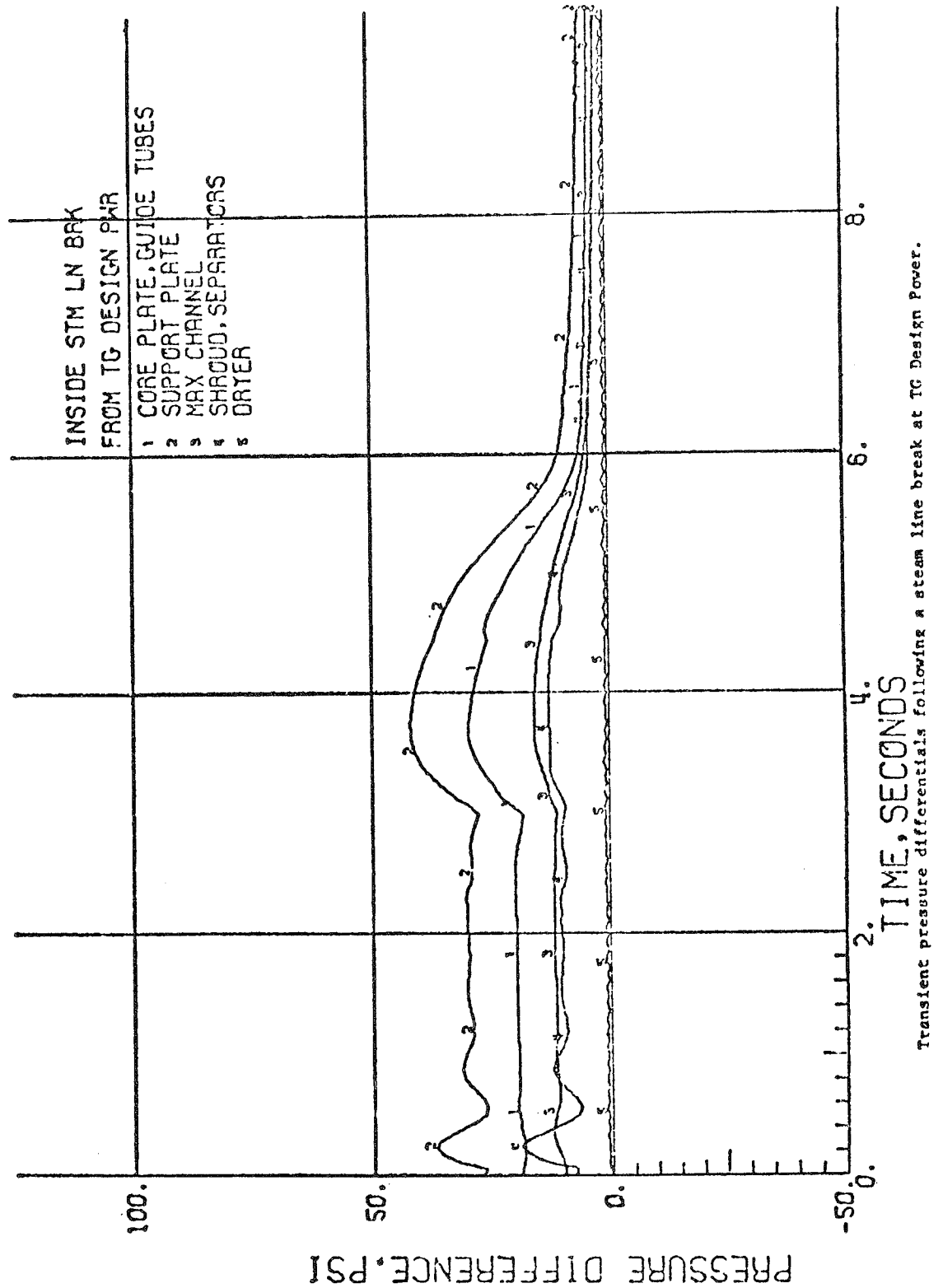




 Node Identification Number  
**C** Indicates Critical Flow

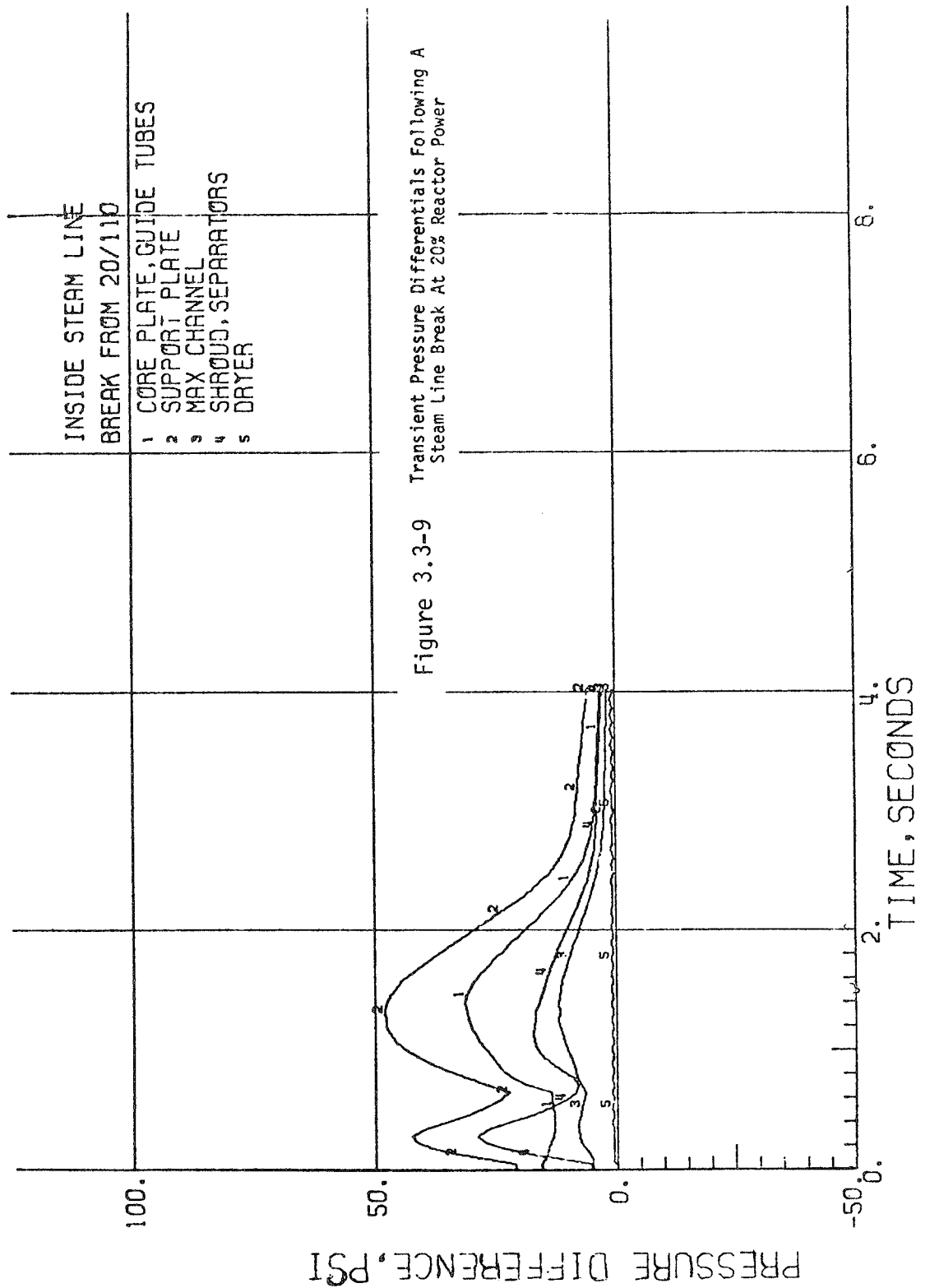
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Pressure Nodes Used for  
 Depressurization Analysis  
 Figure III-3-7 09/19/00



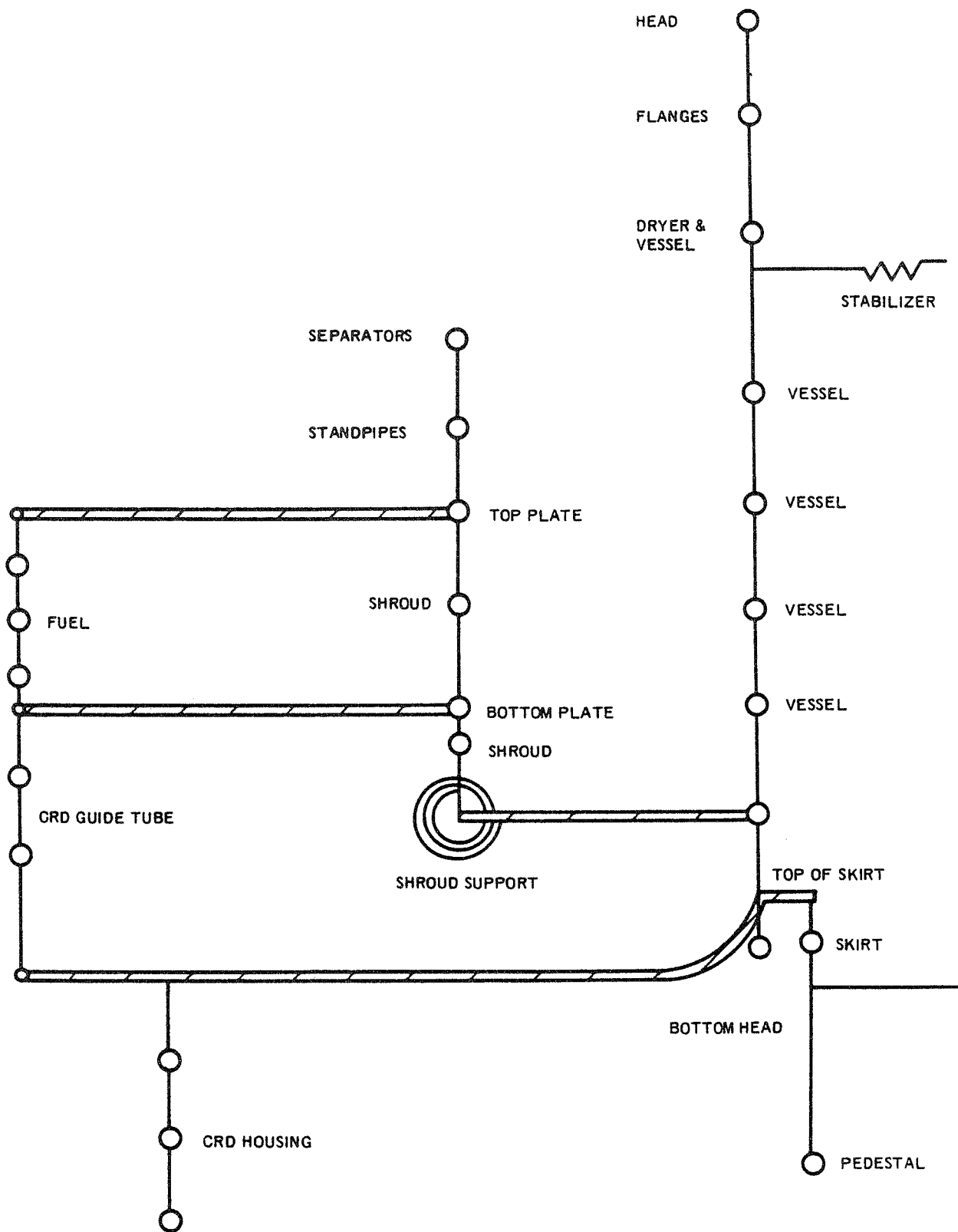
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Transient Pressure Differentials  
Following Steam Line Break at  
105-Percent Rated Steam Flow  
Figure III-3-8



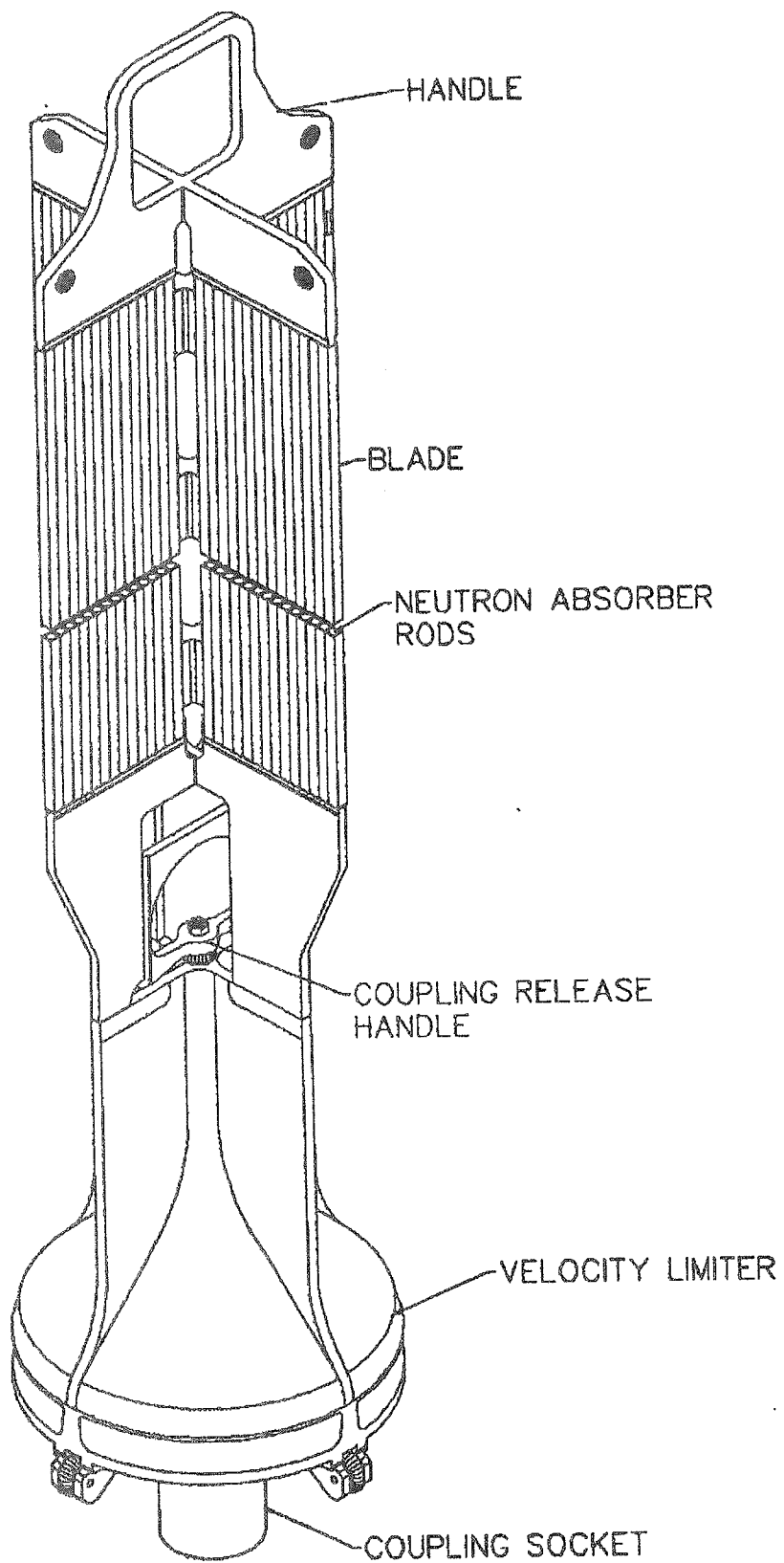
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Transient Pressure Differentials  
Following Steam Line Break at  
20-Percent Rated Power and  
110-Percent Rated Recirculation  
Flow  
Figure III-3-9



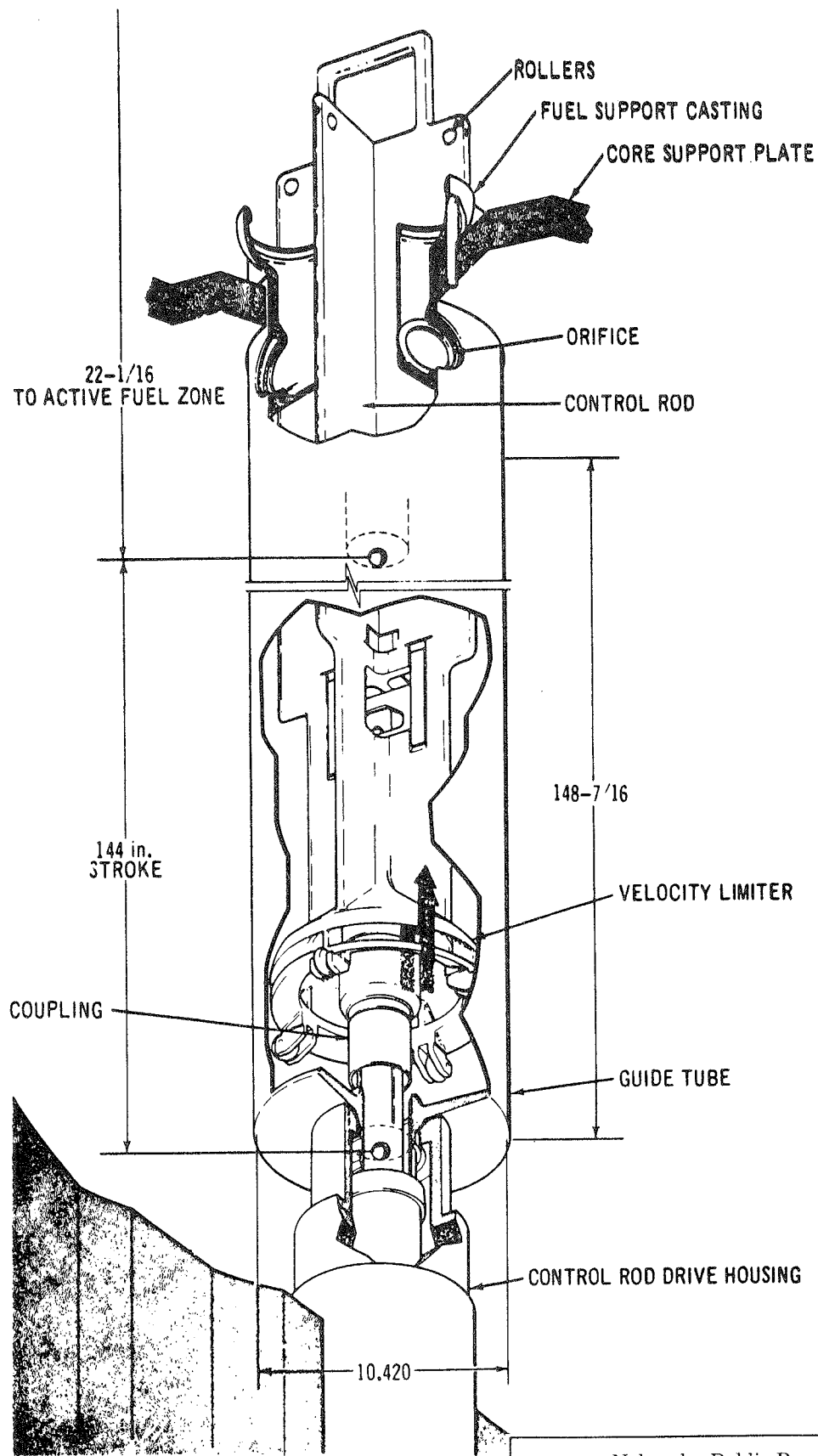
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Analytical Model of Reactor  
Vessel Internals  
Figure III-3-10



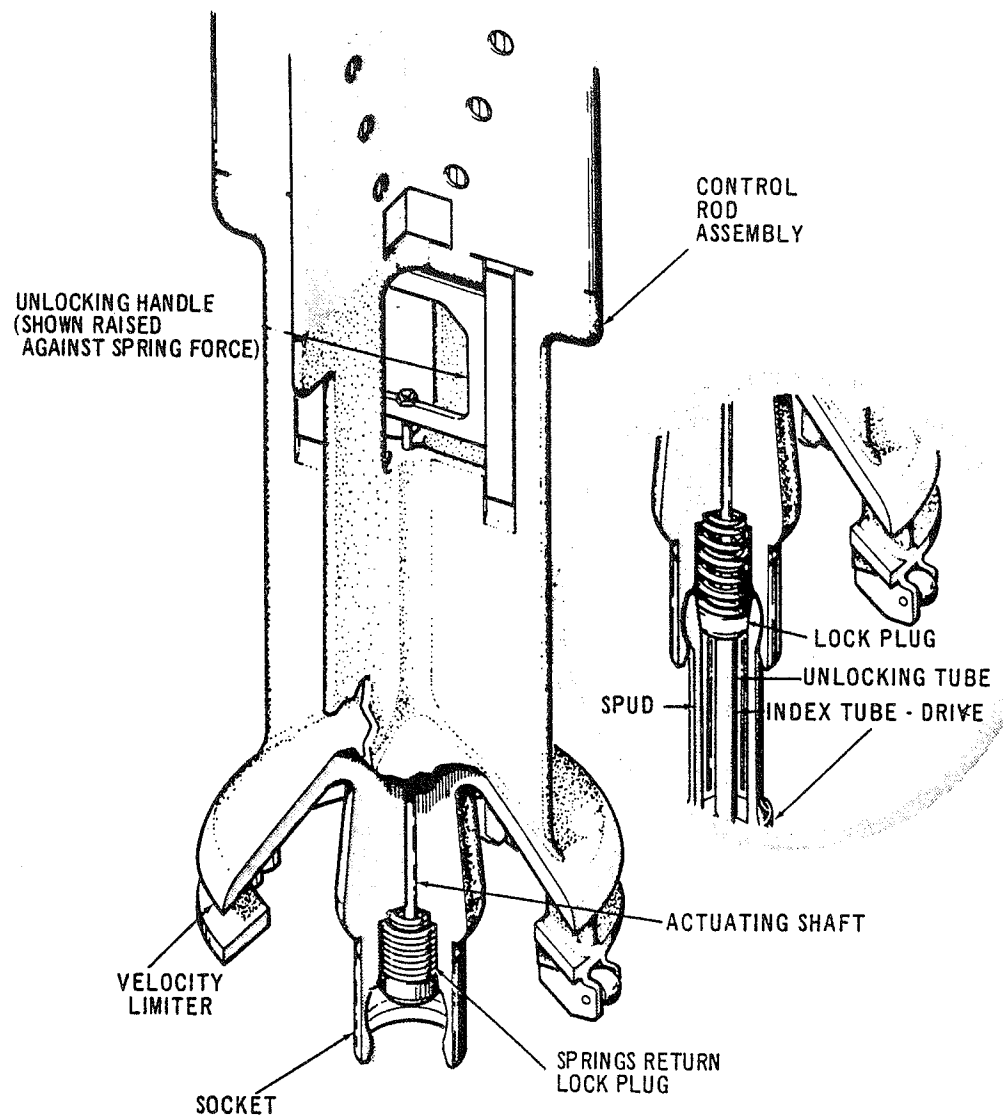
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COOPER NUCLEAR STATION  
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Marathon Control Rod Assembly  
Figure III-4-1a  
07/22/92



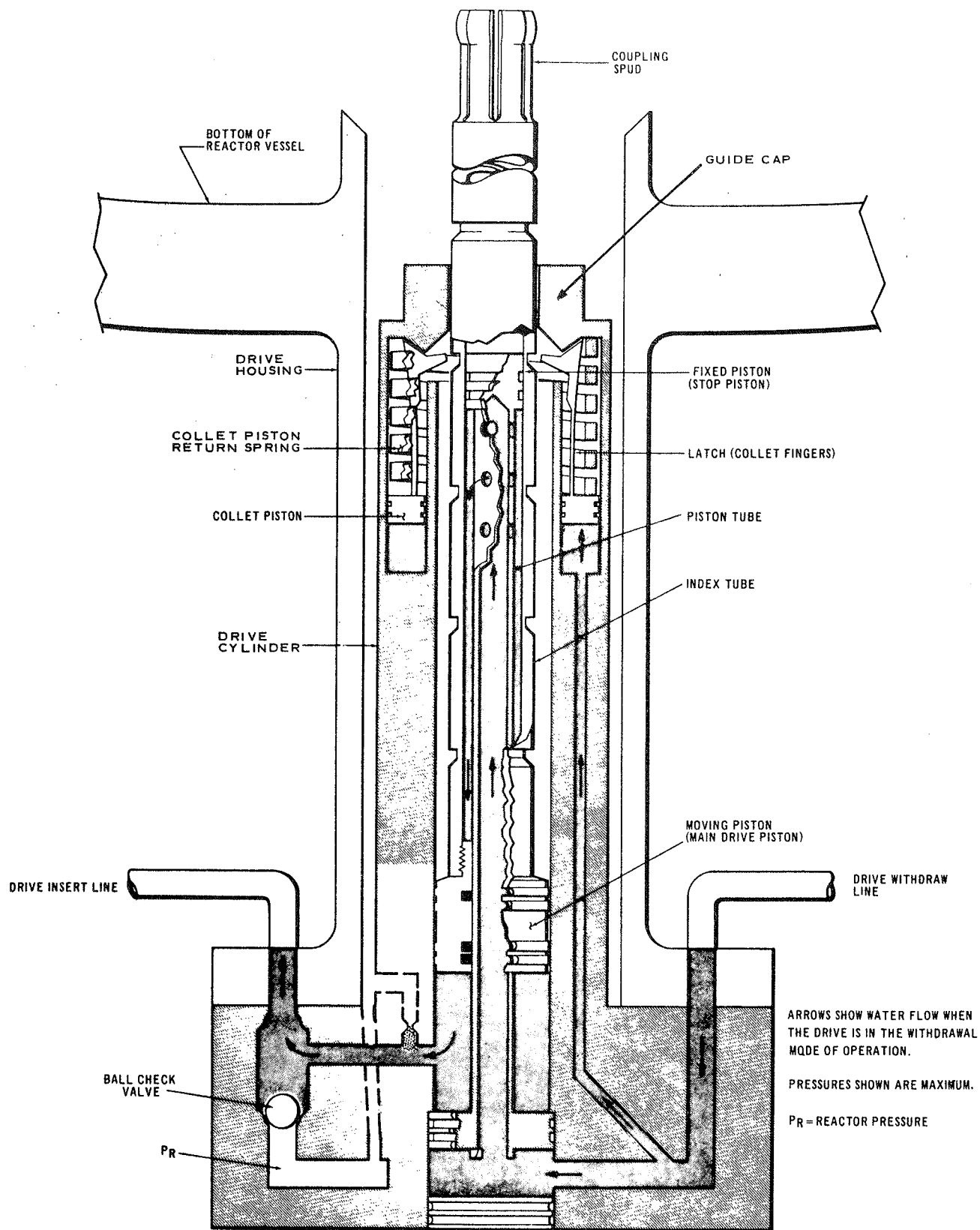
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Control Rod Velocity Limiter  
Figure III-4-2



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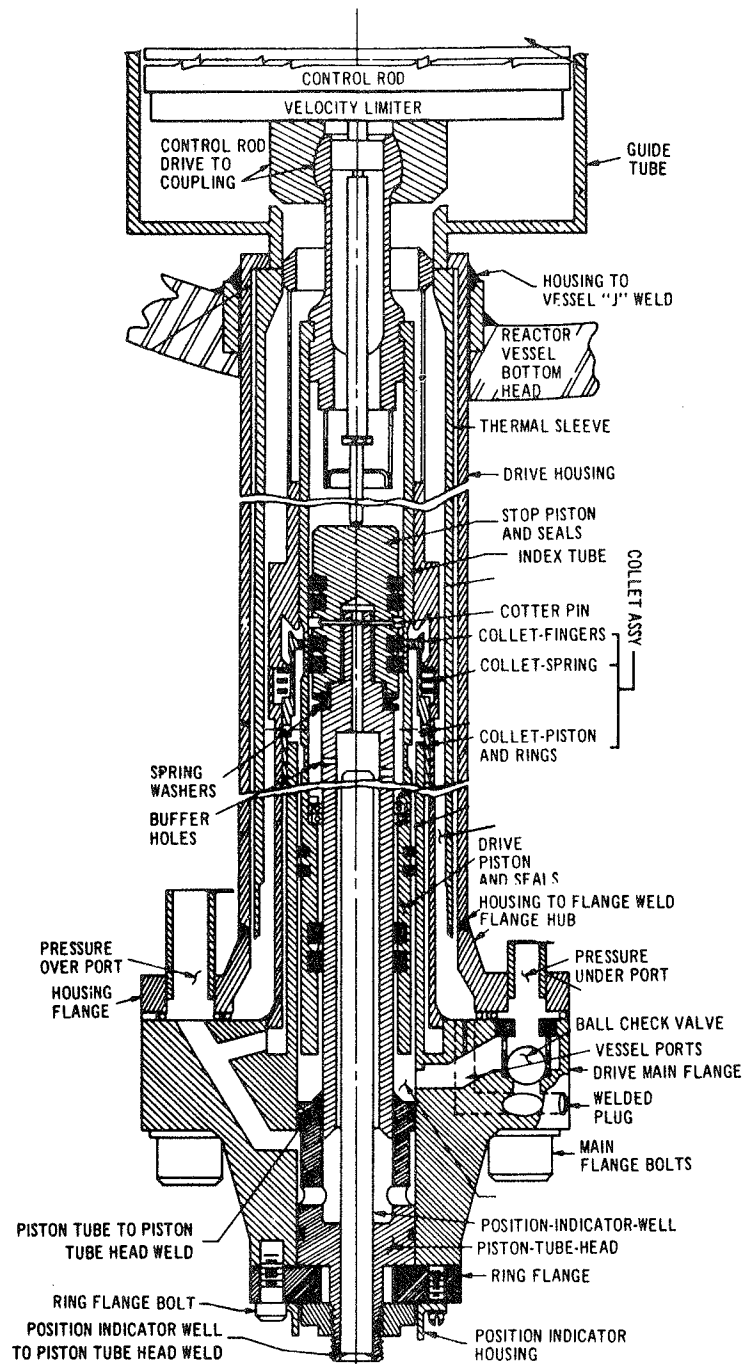
Control Rod to Control Rod  
Drive Coupling  
Figure III-5-1



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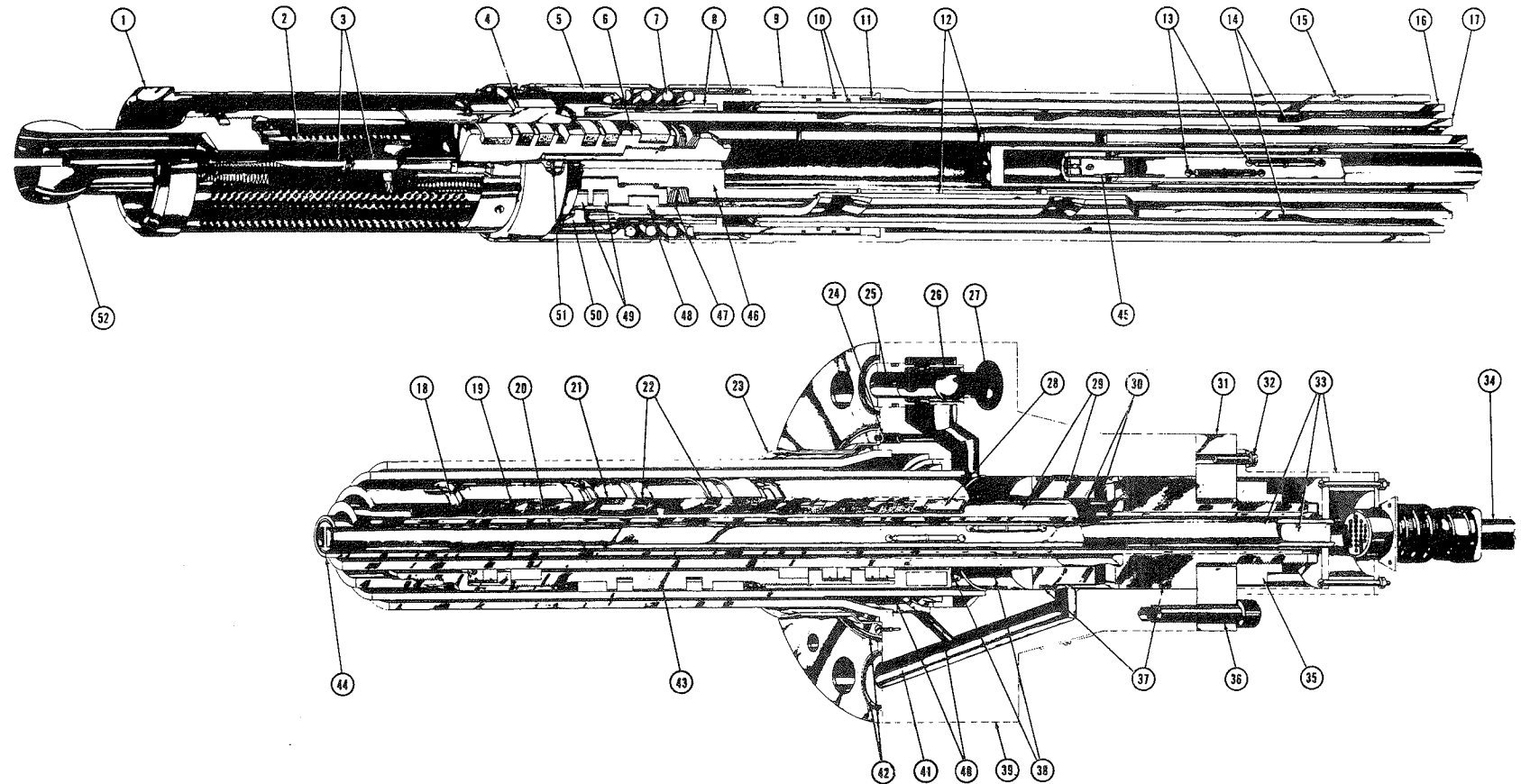
Control Rod Drive Unit  
Figure III-5-2





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UPDATED SAFETY ANALYSIS REPORT (USAR)

Control Rod Drive Unit  
(Schematic)  
Figure III-5-3



1. EXTERNAL FILTER ASSEMBLY
2. INTERNAL FILTER ASSEMBLY
3. UNCOUPLING ROD ASSEMBLY
4. GUIDE CAP
5. BARREL
6. STOP PISTON
7. COLLET SPRING
8. COLLET AND COLLET PISTON
9. COLLET HOUSING (Part of cylinder, tube and flange)
10. COLLET PISTON SEALS
11. SPACER (Part of cylinder, tube, and flange)
12. BUFFER ORIFICES (Typical)
13. POSITION INDICATOR SWITCHES (Typical)
14. LOCKING GROOVE (Typical)

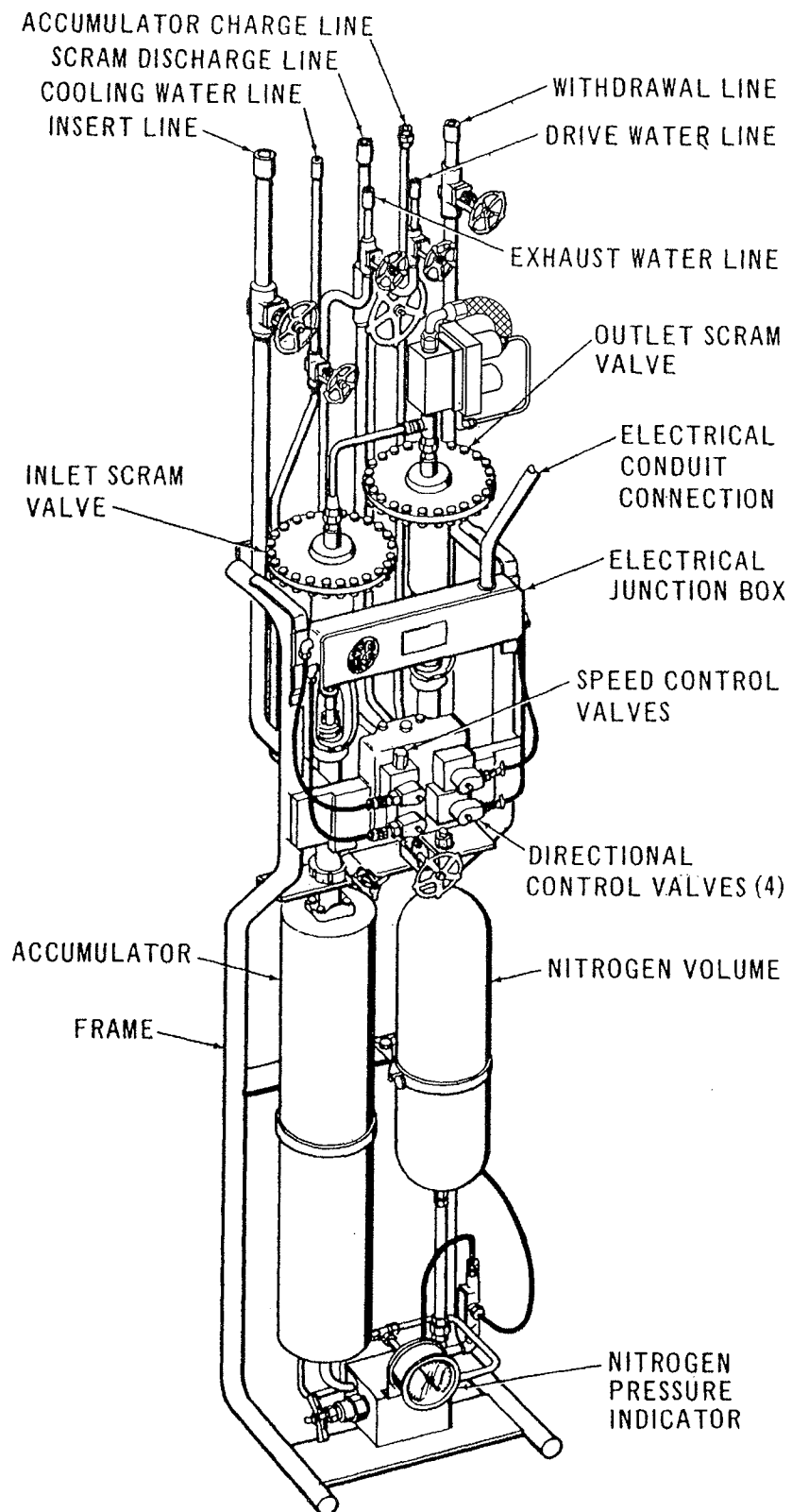
15. OUTER TUBE (Part of cylinder, tube, and flange)
16. CYLINDER TUBE
17. INDEX TUBE
18. LOCKING BAND (Typical)
19. INTERNAL PISTON SEAL RINGS (Typical)
20. INTERNAL PISTON BUSHINGS (Typical)
21. EXTERNAL PISTON BUSHINGS
22. EXTERNAL PISTON SEALS
23. STRAINER
24. COOLING WATER ORIFICE
25. DRIVE-INSERT WATER INLET  
(Normal and scram; drive-withdrawal outlet)
26. BALL-SHUTTLE VALVE
27. REACTOR WATER INLET (Through drive housing)

28. SWITCH-ACTUATING MAGNET (Part of drive piston)
29. PISTON TUBE ASSEMBLY
30. DRIVE-WITHDRAW PORTS AND ANNULUS  
(Also scram outlet)
31. RING FLANGE
32. MACHINE SCREW (Typical)
33. POSITION INDICATOR PROBE
34. POSITION INDICATOR CABLE
35. PISTON TUBE NUT
36. CAP SCREW (Typical)
37. O-RING SEALS
38. DRIVE-INSERT PORTS AND ANNULUS
39. DRIVE FLANGE (Part of cylinder, tube, and flange)
40. UNLOCKING PORT AND ANNULUS  
(Withdraw pressure to collet piston)

41. DRIVE-WITHDRAW WATER INLET  
(Also outlet for scram water)
42. METAL O-RING SEAL (Drive to housing)
43. DRIVE PISTON
44. INDICATOR TUBE (Part of piston tube)
45. THERMOCOUPLE (Part of position indicator probe)
46. STUD (Part of piston tube)
47. SPRING WASHERS
48. STOP PISTON BUSHINGS (Typical)
49. STOP PISTON SEAL RINGS (Typical)
50. COLLET FINGER (Typical)
51. COTTER PIN
52. COUPLING SPUD

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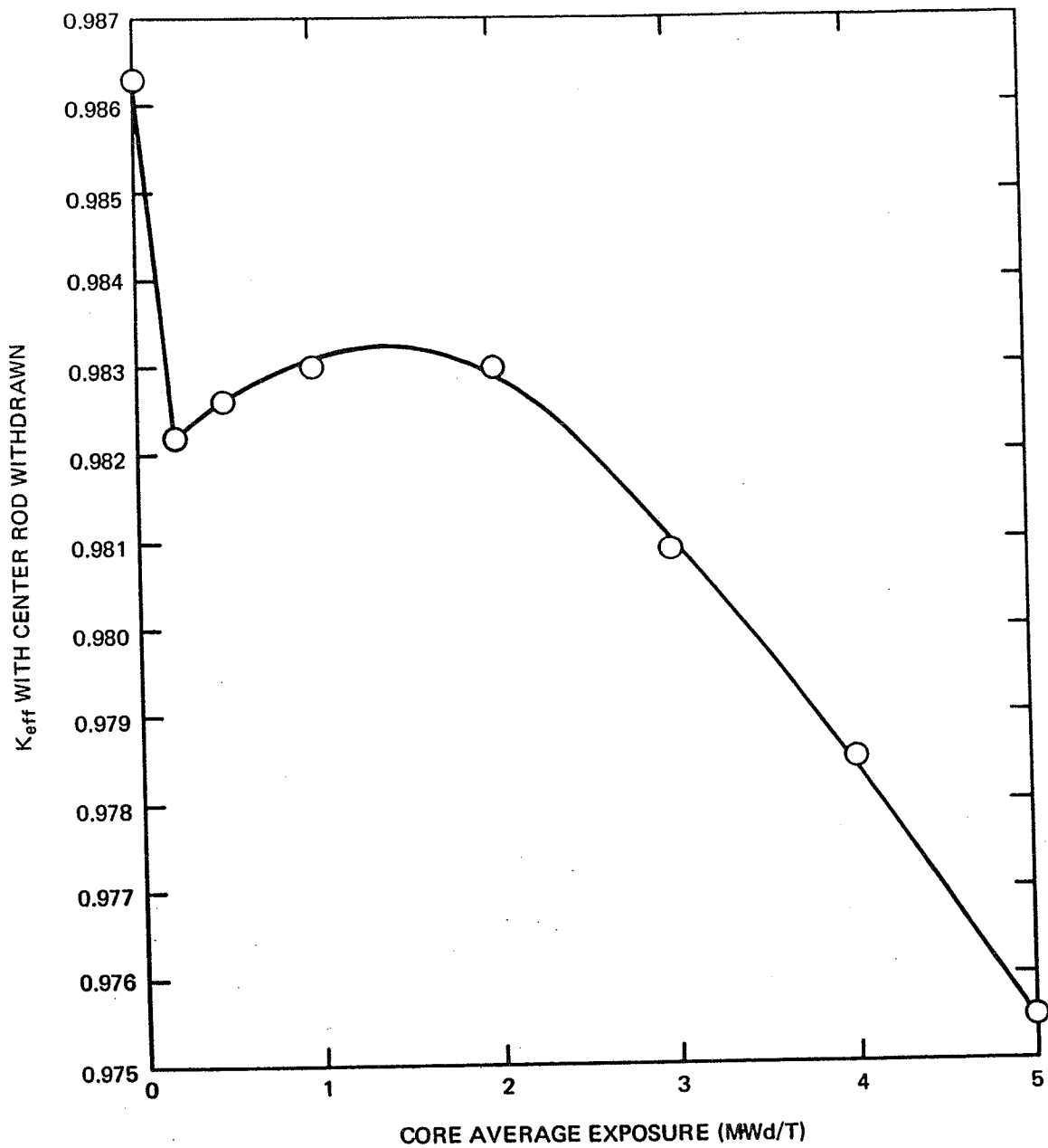
Control Rod Drive Unit  
(Cutaway)  
Figure III-5-4



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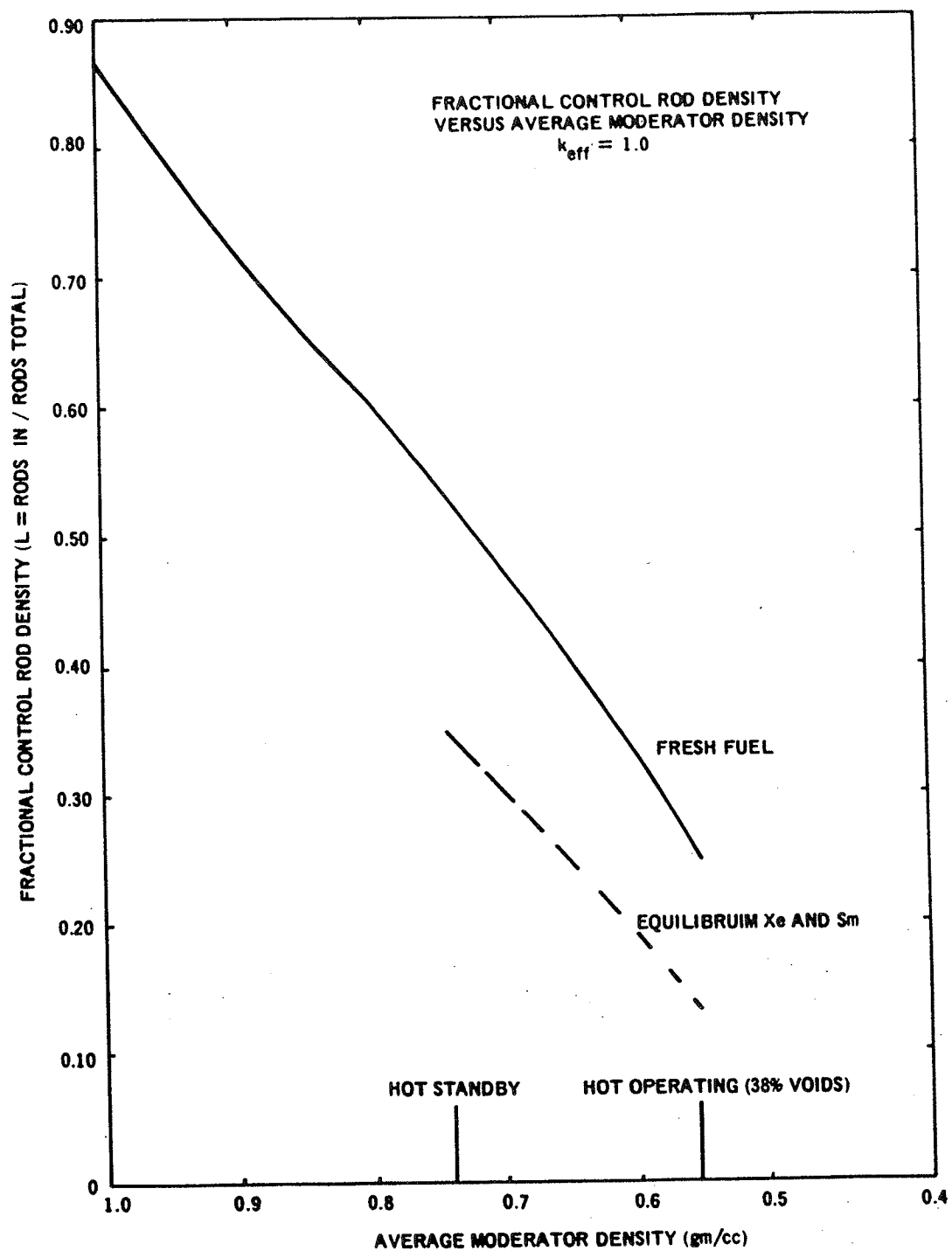
CONTROL ROD DRIVE HYDRAULIC  
CONTROL UNIT

Figure III-5-8  
6/8/04



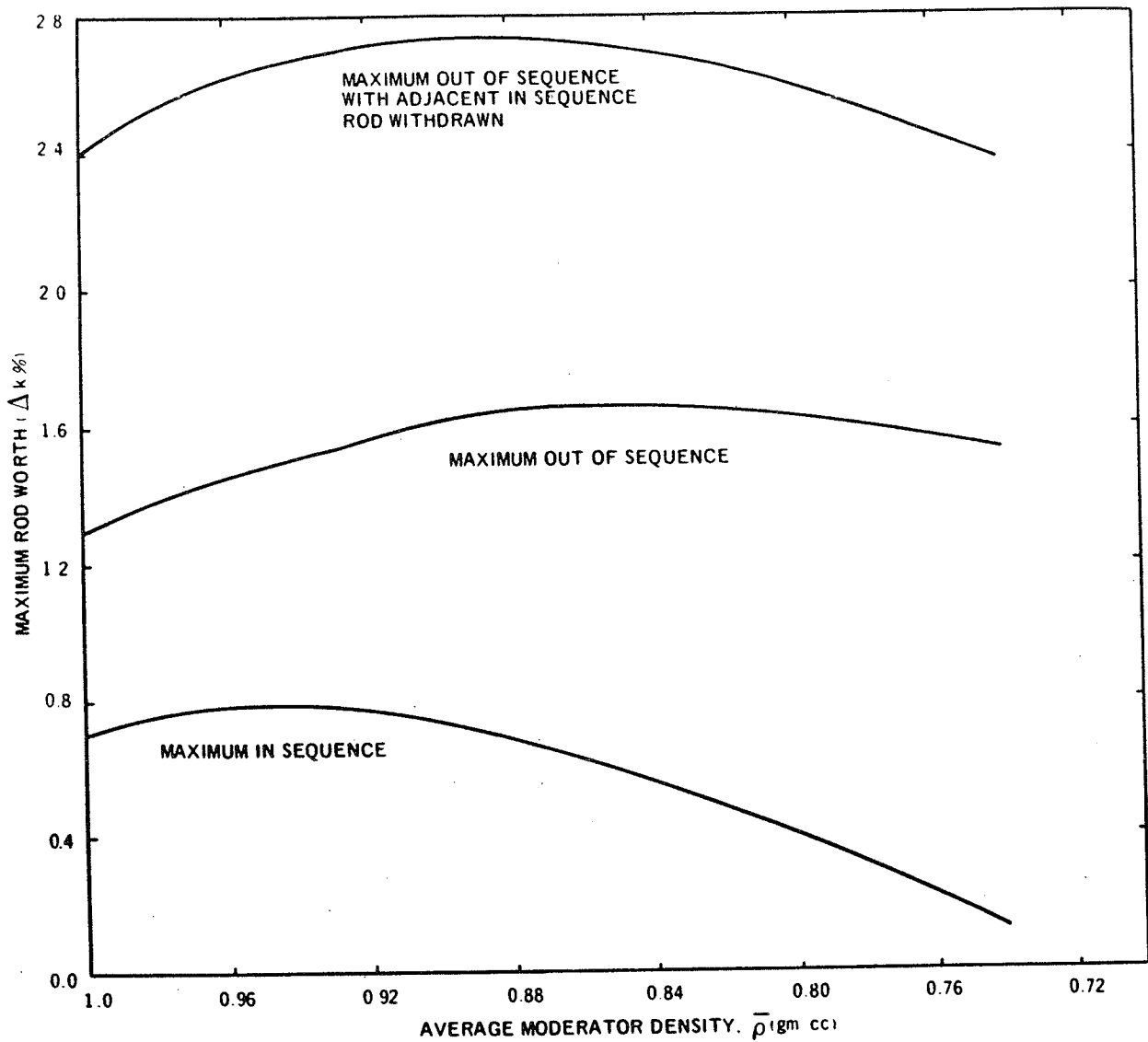
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UPDATED SAFETY ANALYSIS REPORT (USAR)

Generic Figure  
Stuck Rod Margin as Function of  
Core Average Exposure  
Figure III-6-1 03/08/00



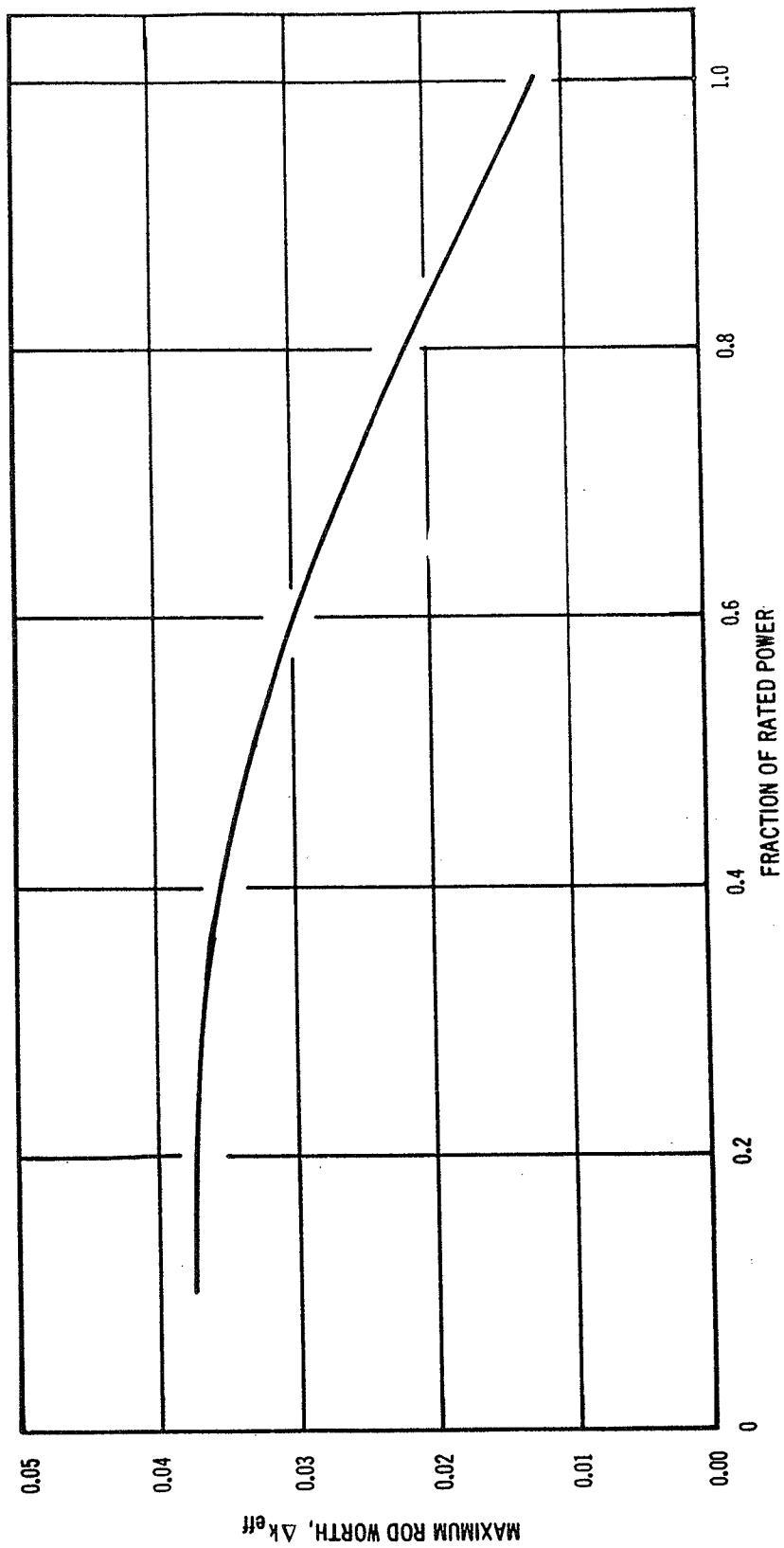
Nebraska Public Power District  
COOPER NUCLEAR STATION  
UPDATED SAFETY ANALYSIS REPORT (USAR)

Generic Figure  
Fractional Control Rod Density  
Versus Average Moderator Density  
Figure III-6-2 03/08/00



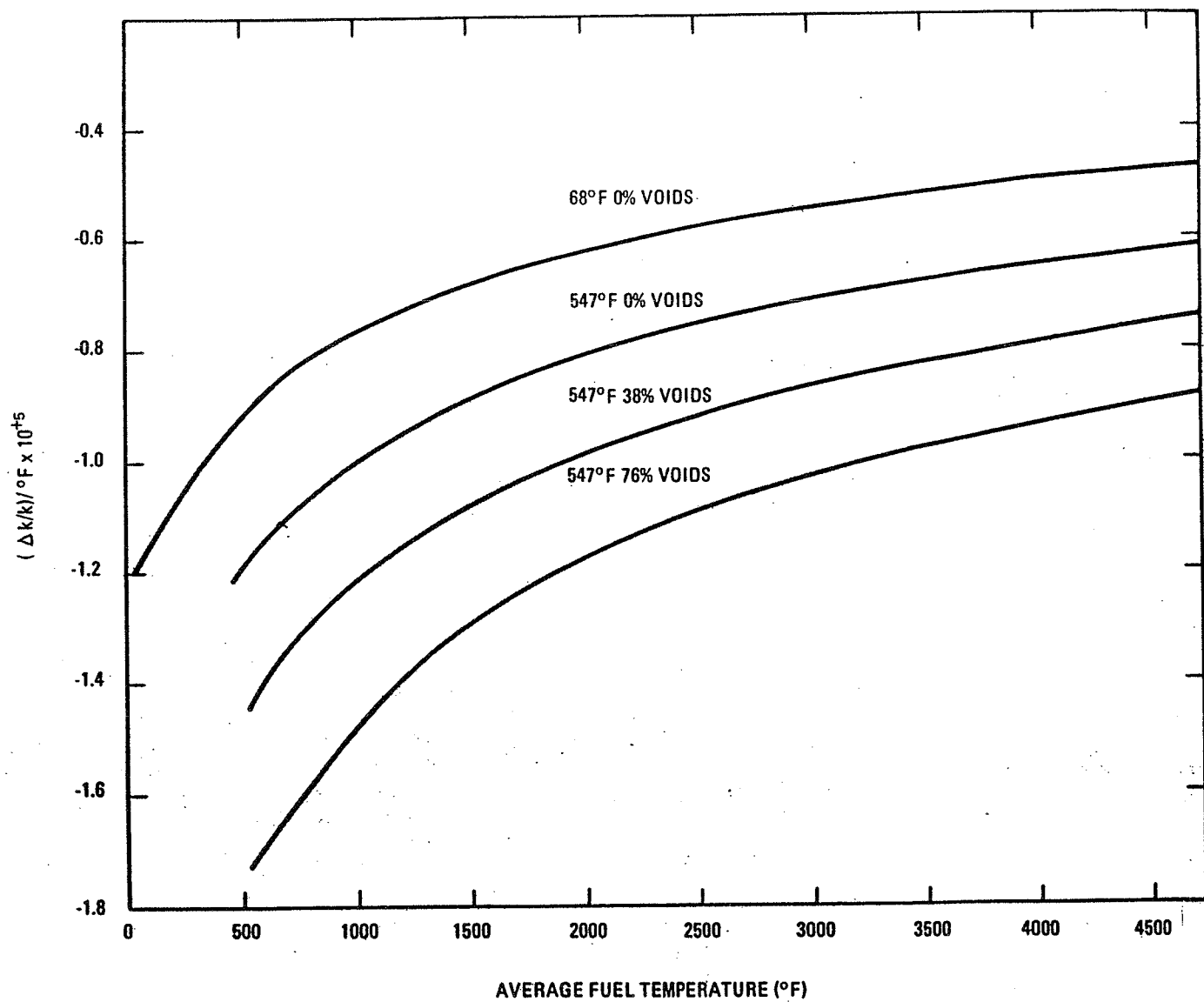
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Generic Figure  
 Maximum Rod Worth  
 Versus Moderator Density  
 Figure III-6-3 03/08/00



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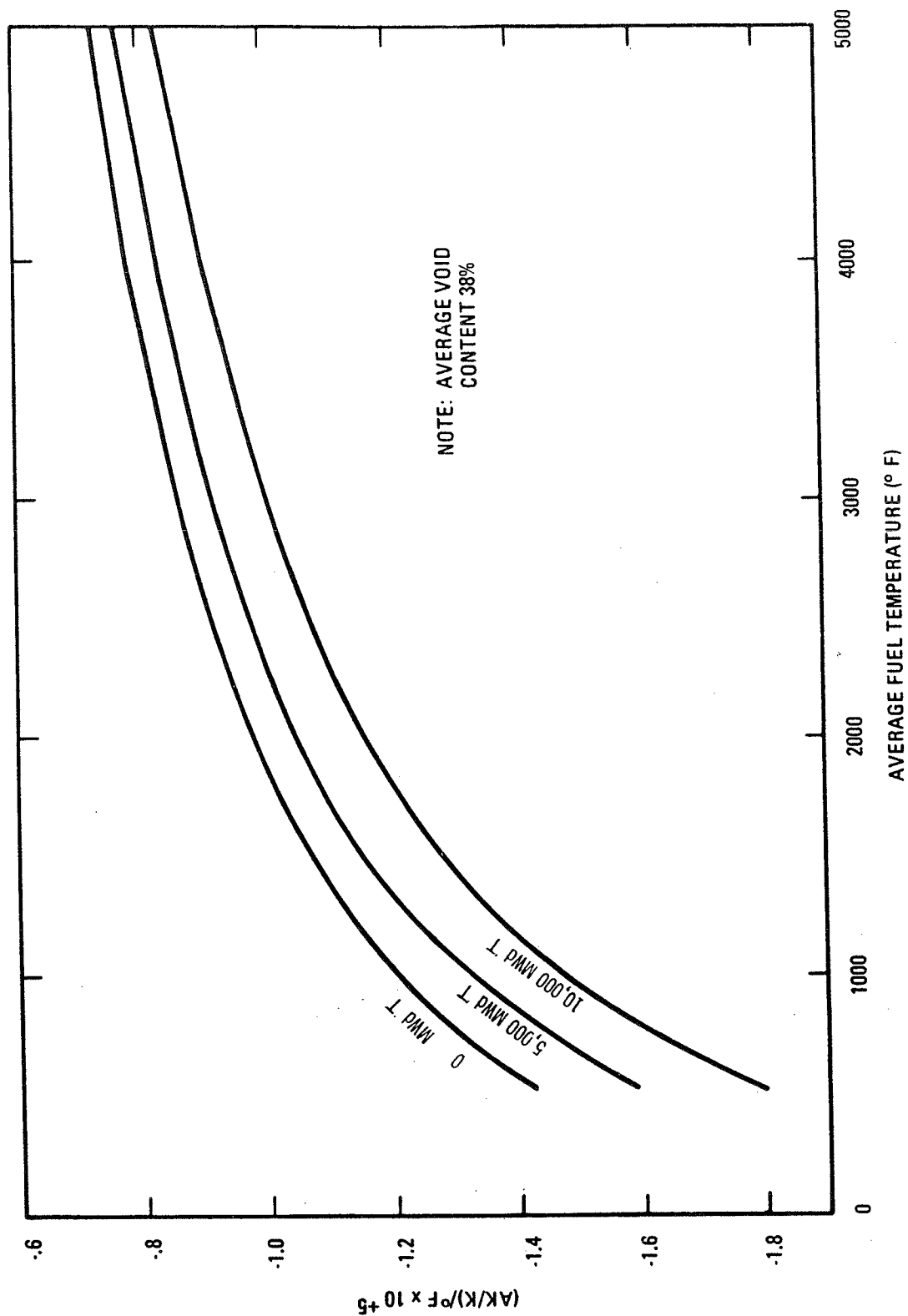
Generic Figure  
Maximum Rod Worth  
Versus Power Level  
Figure III-6-4 03/08/00



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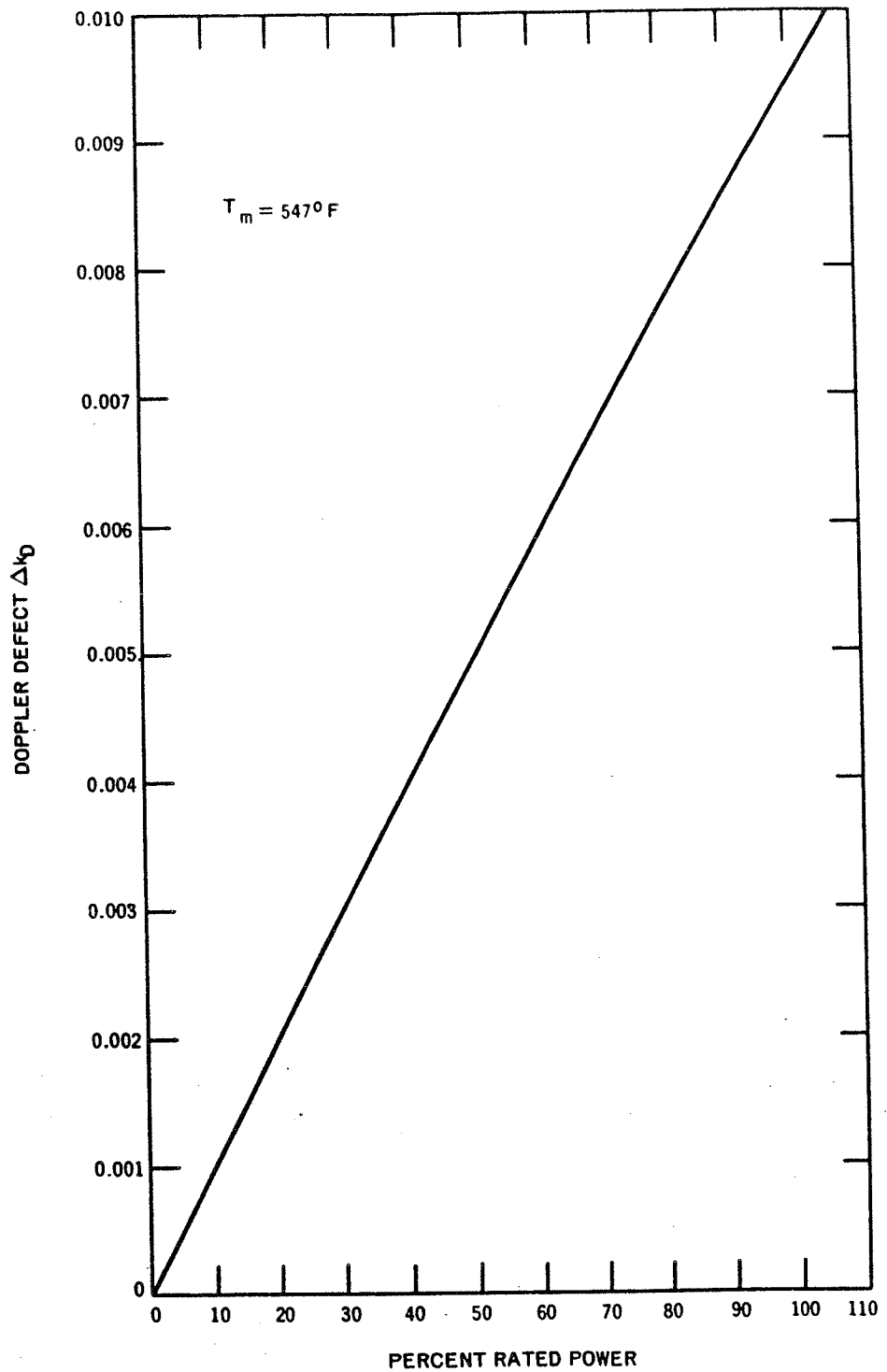
Generic Figure  
Doppler Coefficient of Reactivity  
Figure III-6-5 03/08/00





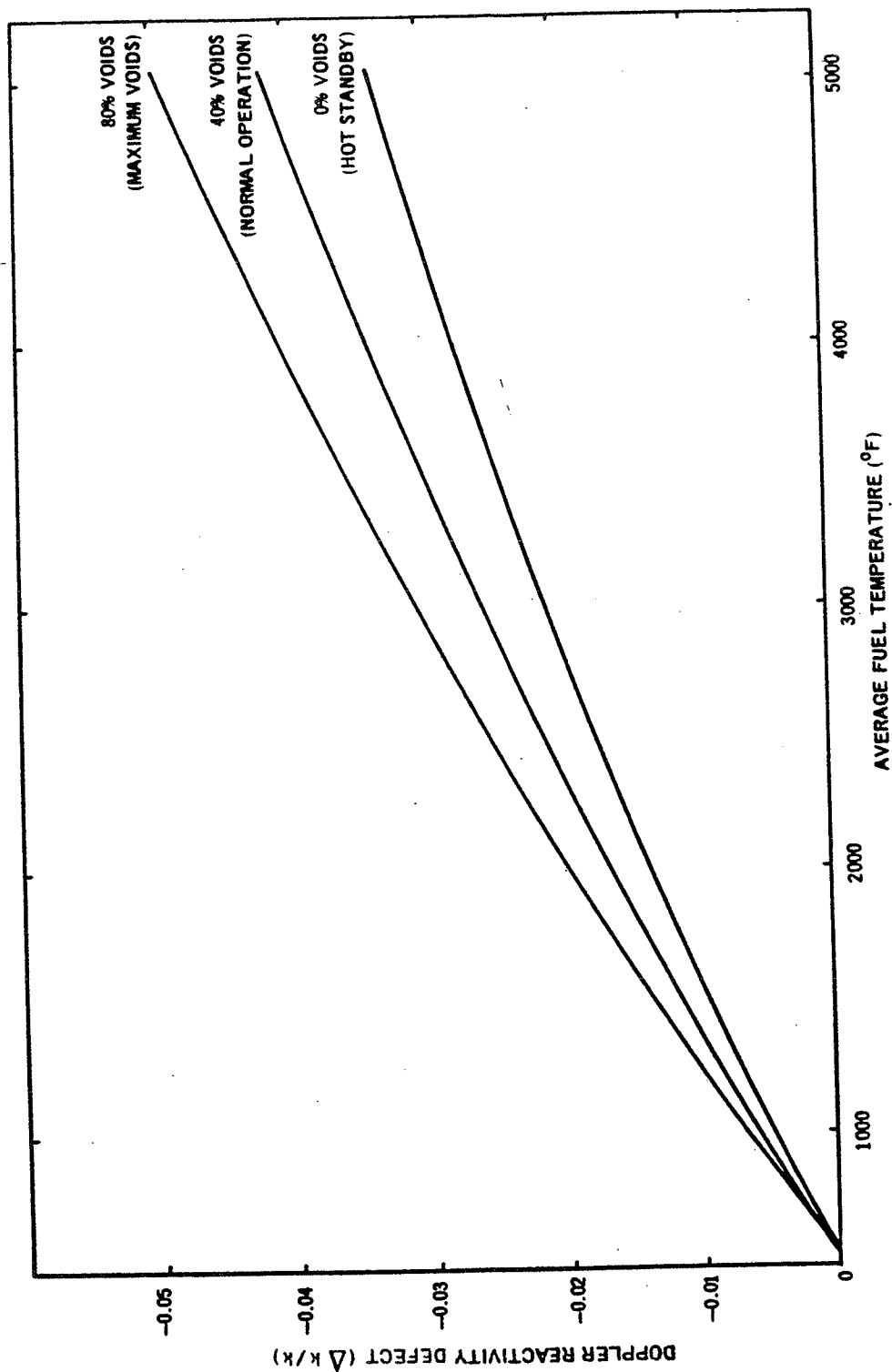
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Generic Figure  
Doppler Coefficient as  
Function of Fuel Exposure  
Figure III-6-6 03/08/00



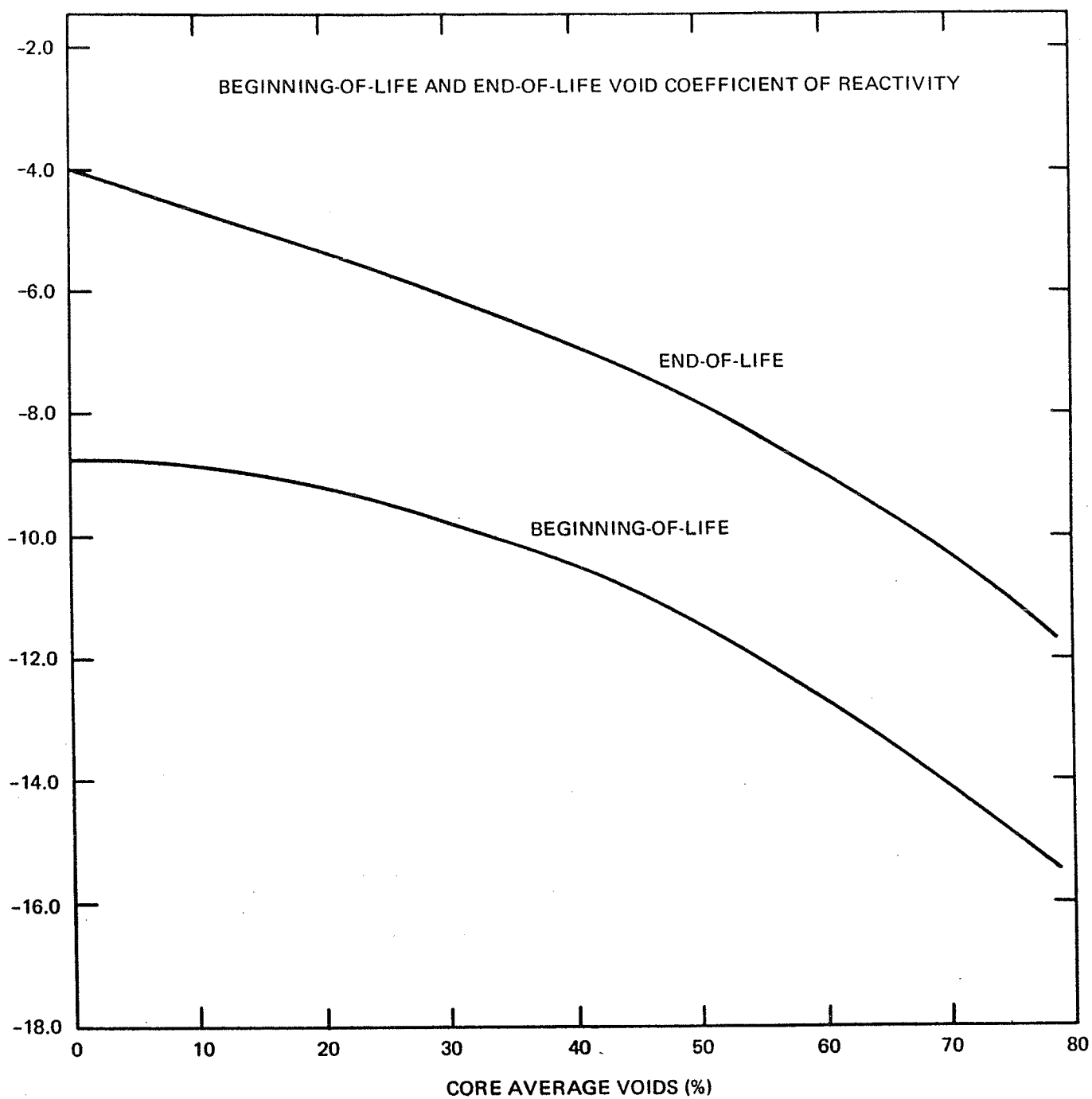
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UPDATED SAFETY ANALYSIS REPORT (USAR)

Generic Figure  
Core Average Doppler Defect  
Versus Core Power Level  
Figure III-6-7 03/08/00



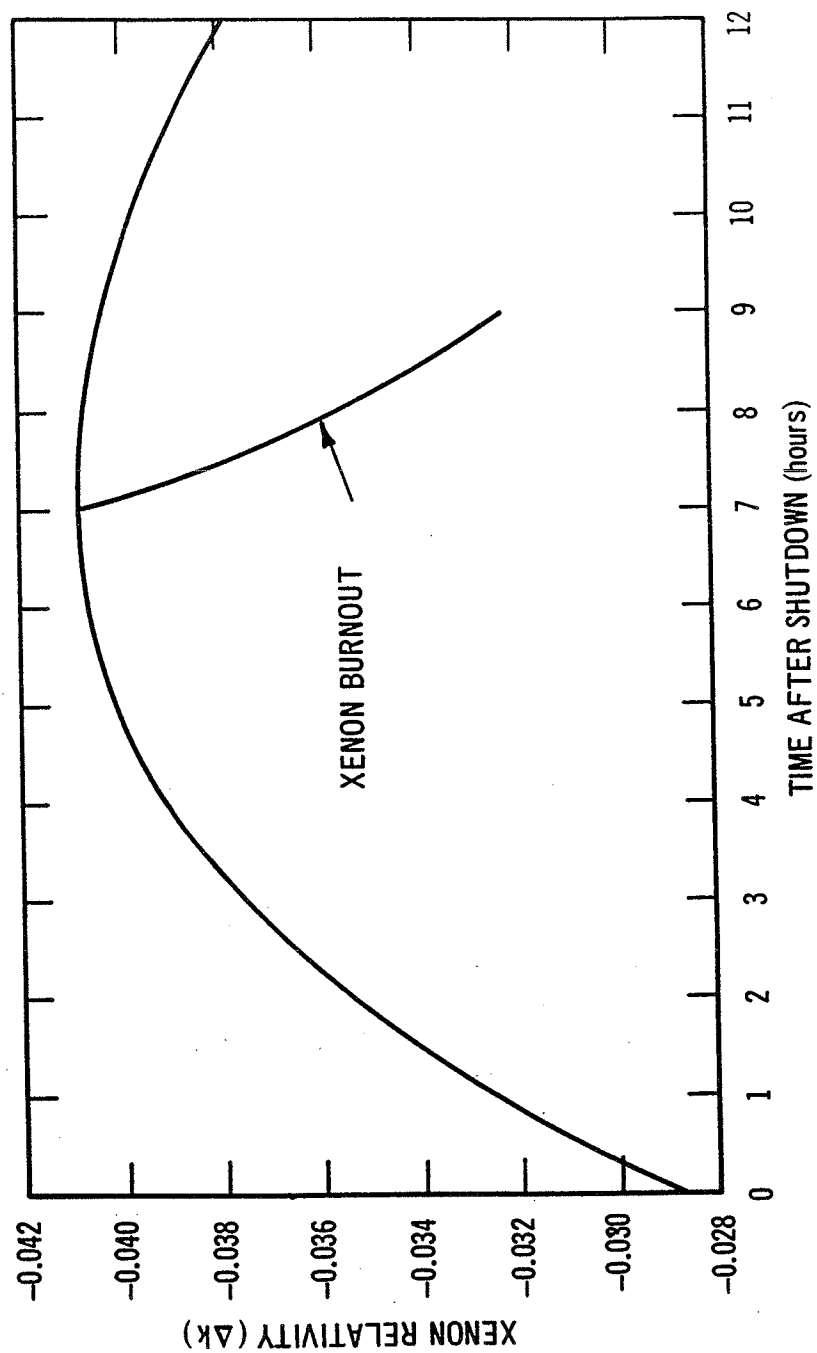
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Generic Figure  
Doppler Defect  
Versus Fuel Temperature  
Figure III-6-8 03/08/00



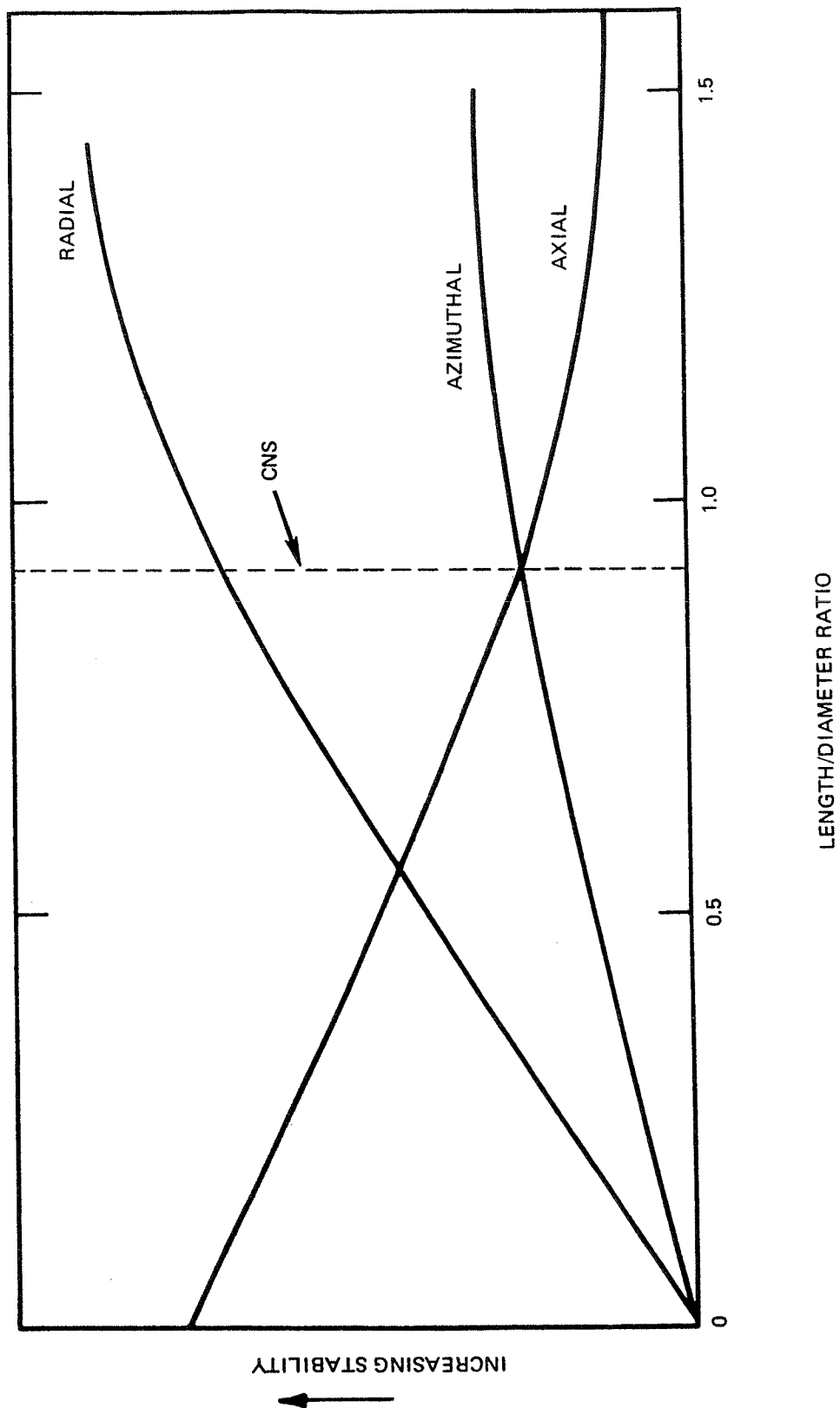
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Generic Figure  
Moderator Void Coefficient  
of Reactivity  
Figure III-6-9 03/08/00



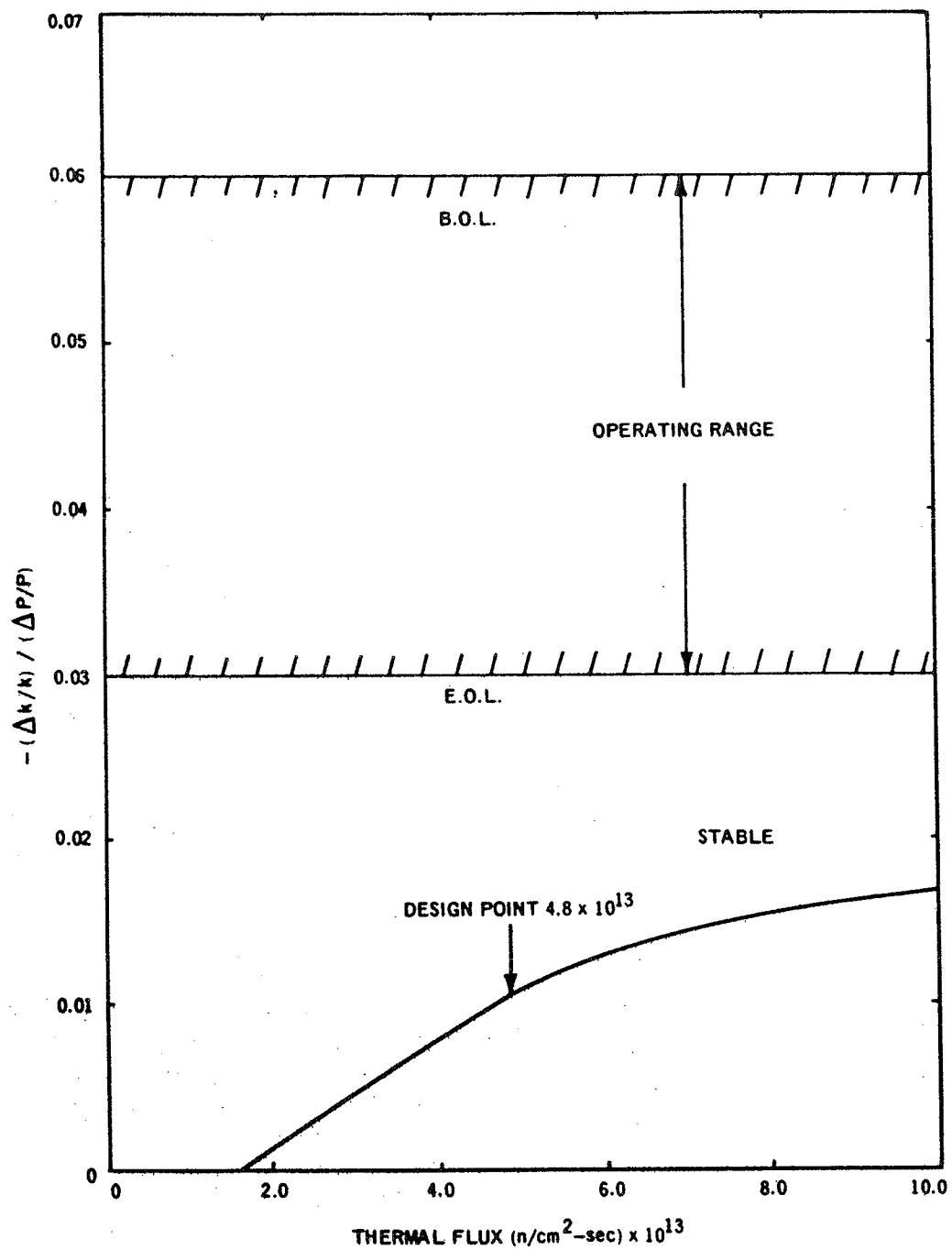
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Generic Figure  
 Xenon Reactivity Buildup After Shutdown -  
 Beginning of Life  
 Figure III-6-10 03/08/00



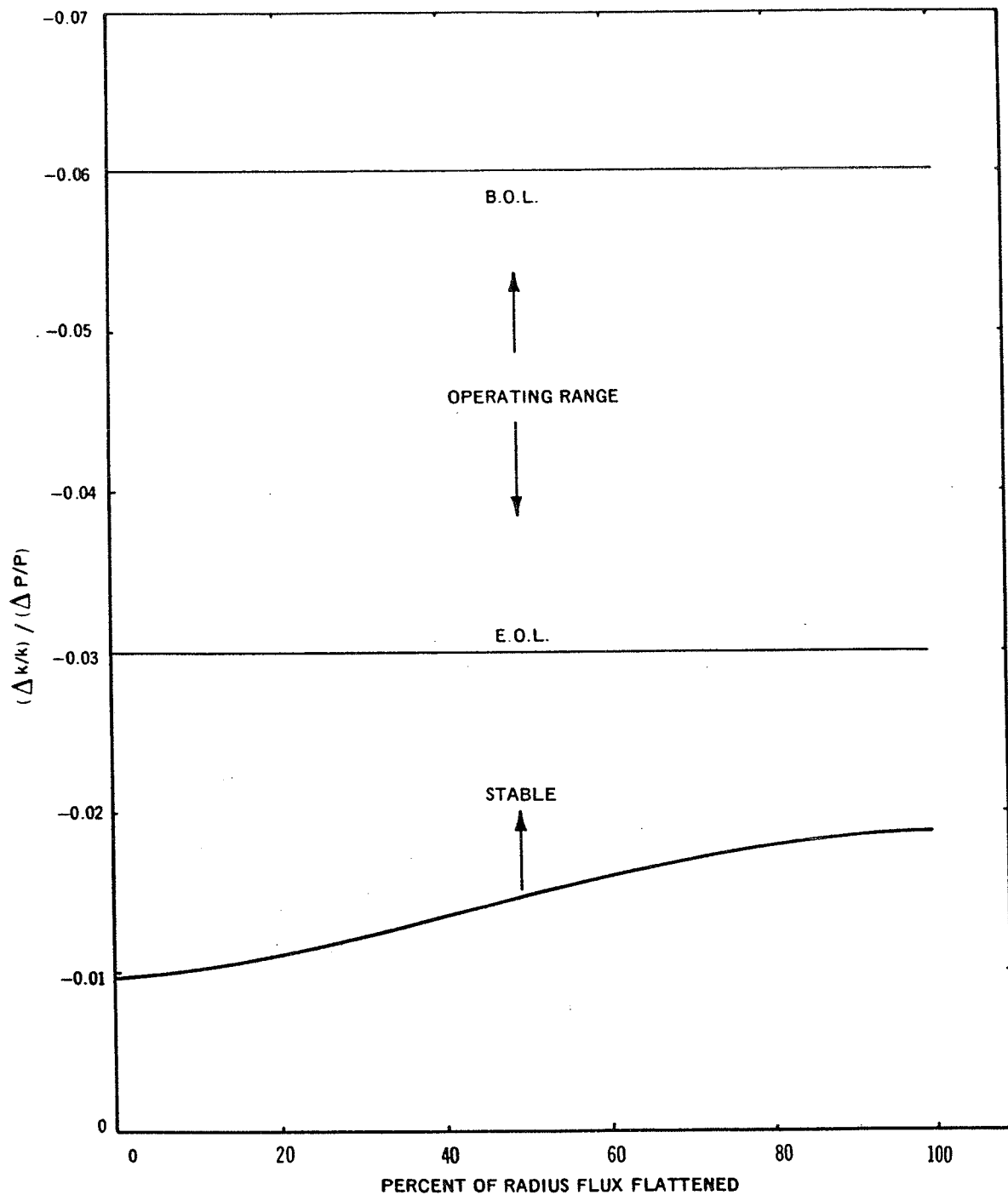
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Generic Figure  
Relative Xenon Stability with  
No Flux Flattening  
Figure III-6-11 03/08/00



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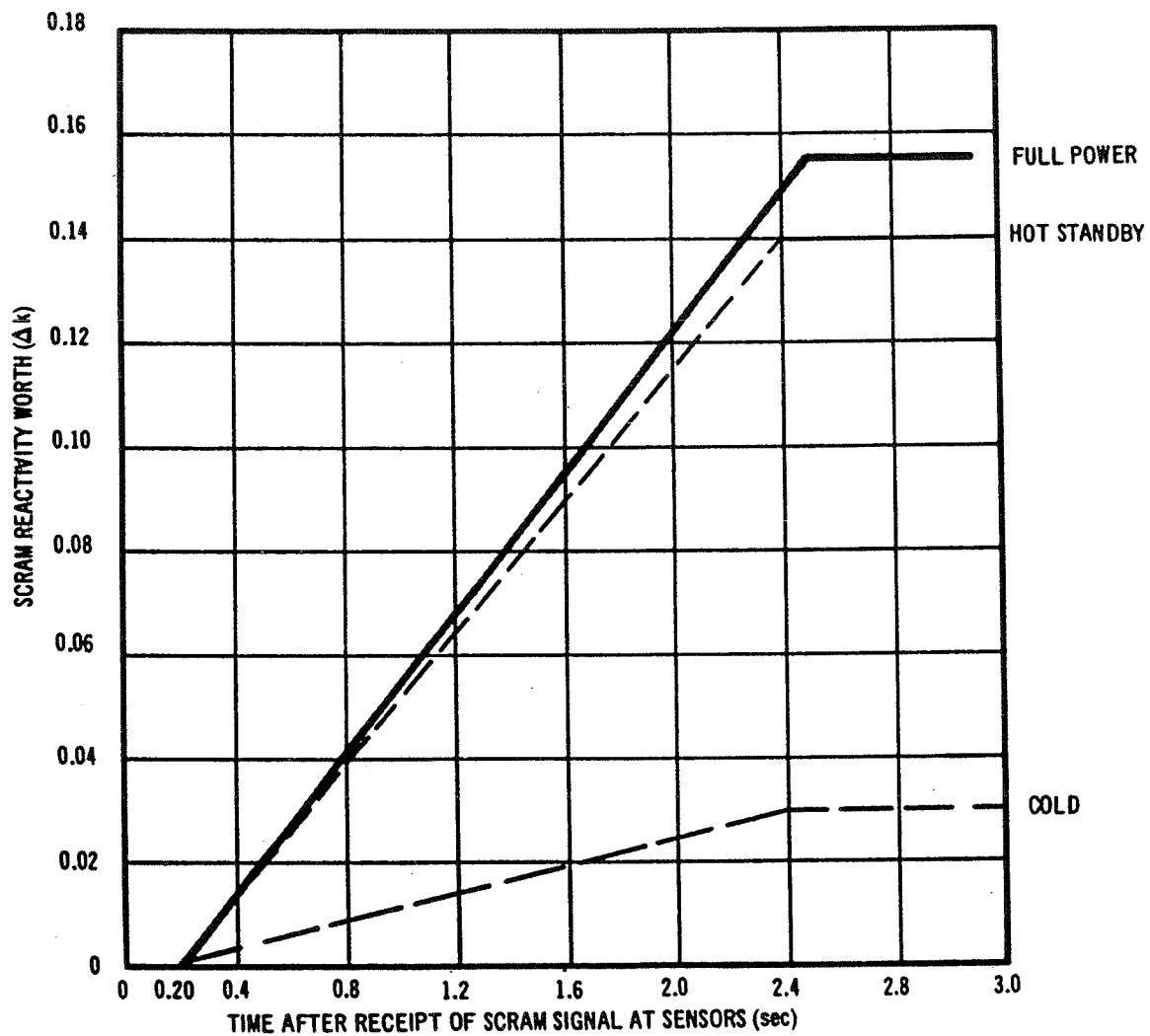
Generic Figure  
Effect of Power Density on Axial Xenon  
Stability Including Void Transport  
Figure III-6-12 03/08/00



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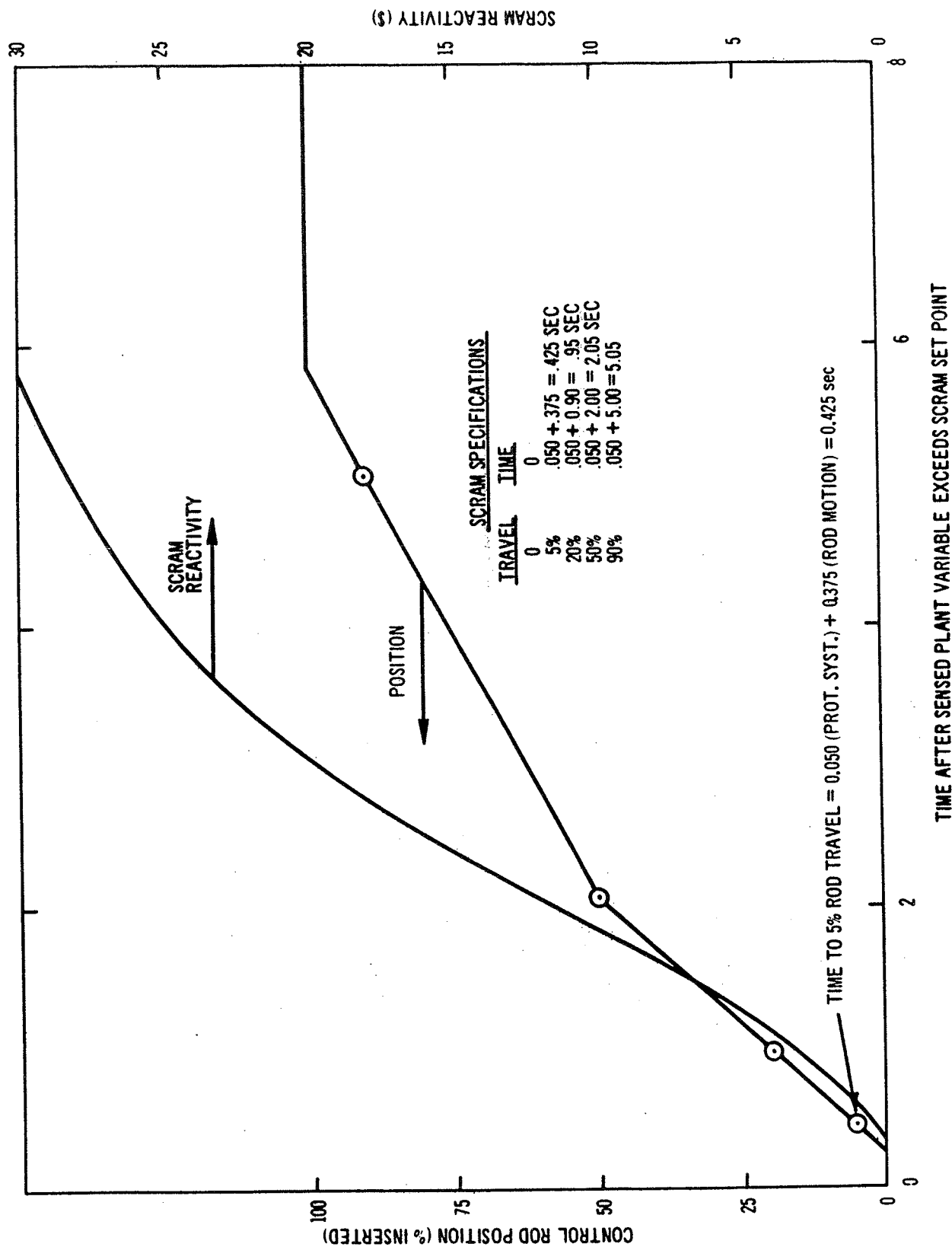
Generic Figure  
Azimuthal Xenon Stability  
Figure III-6-13 03/08/00





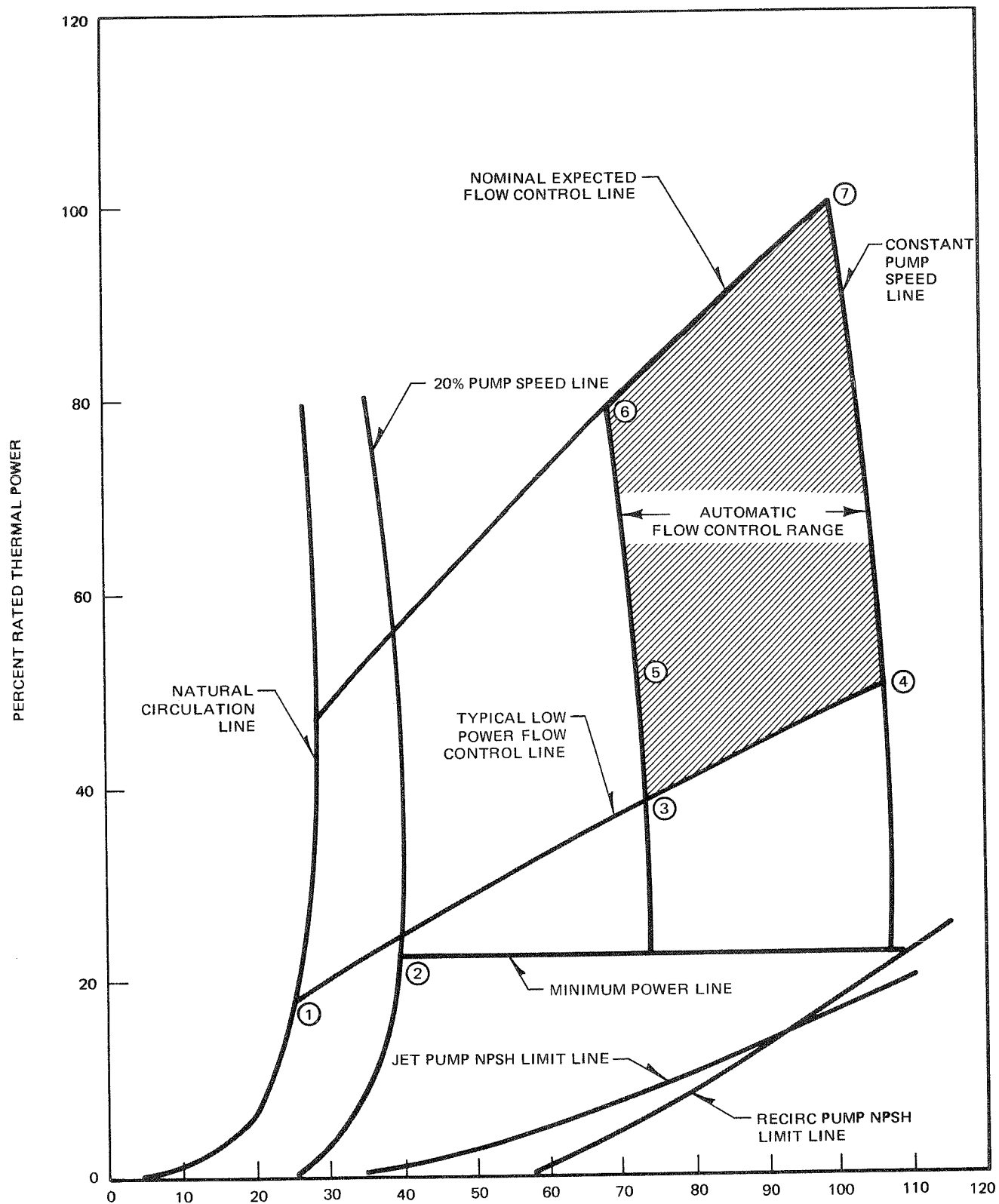
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Generic Figure  
 Control Rod Scram Reactivity  
 Characteristics Excursion Analysis  
 Figure III-6-14 03/08/00



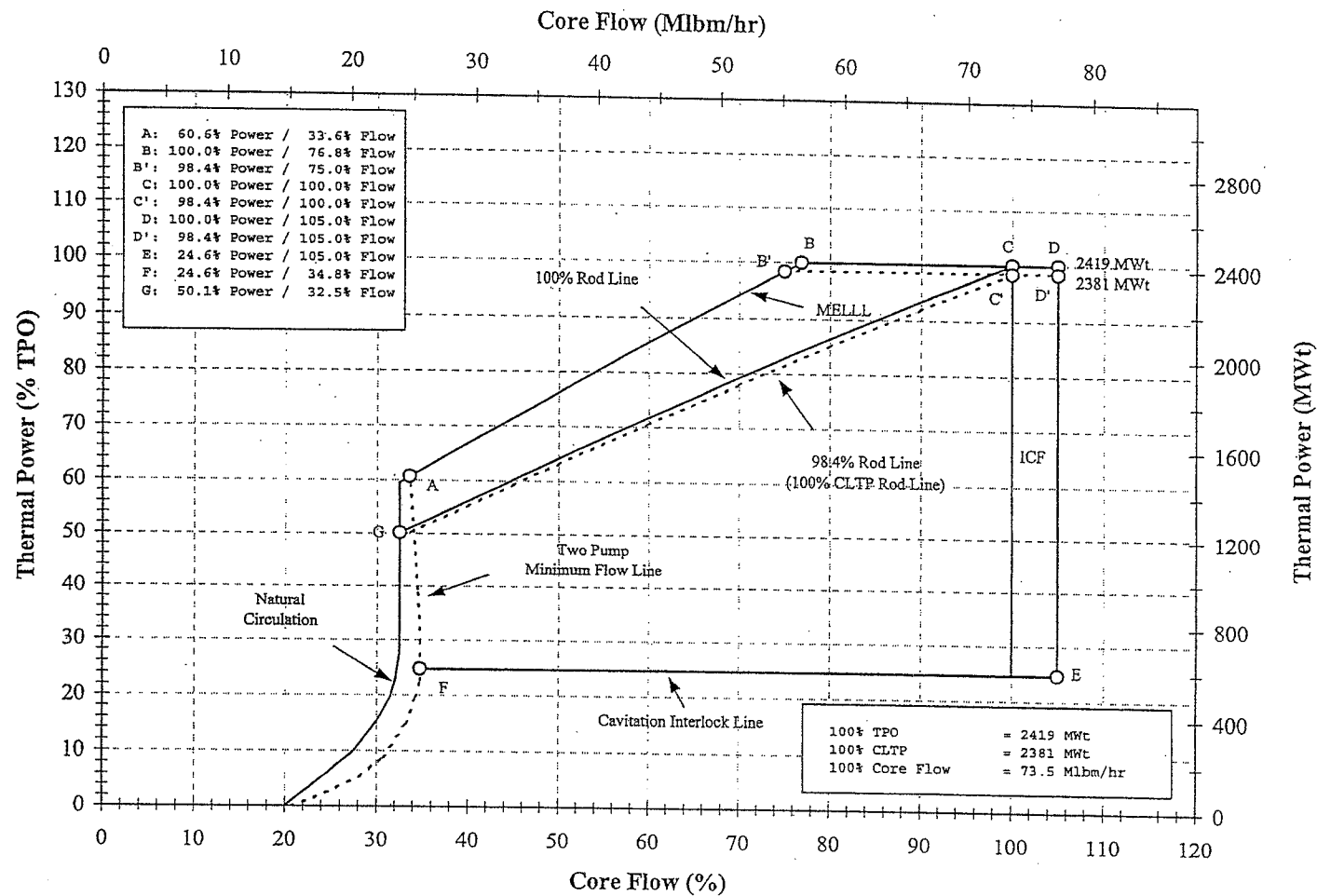
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Generic Figure  
Scram Characteristics Assumed  
for Transient Analysis  
Figure III-6-15 03/08/00



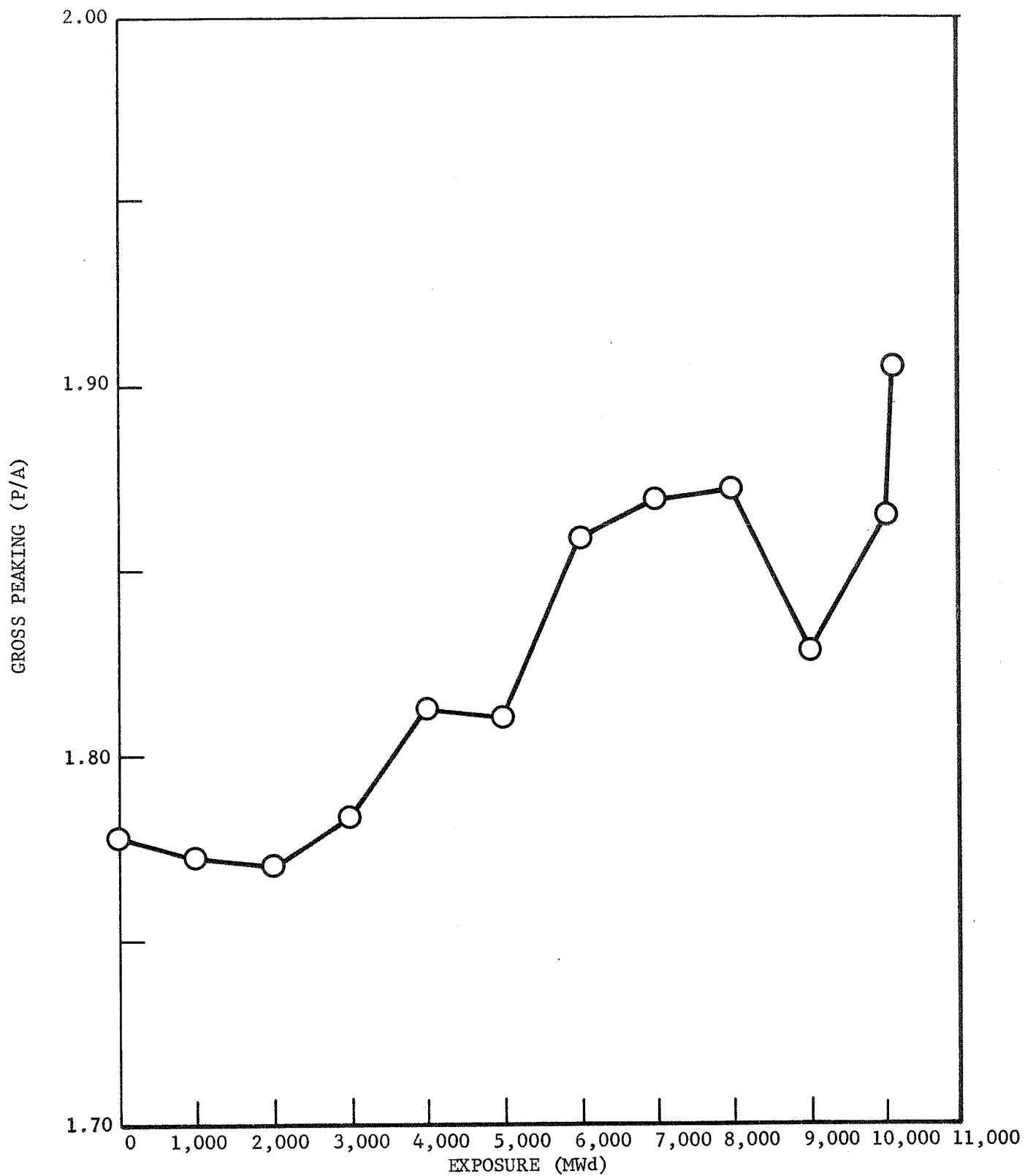
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Operating Map  
Figure III-7-1a



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Power/Flow Map  
MELLL and ICF  
Figure III-7-1b 08/07/08

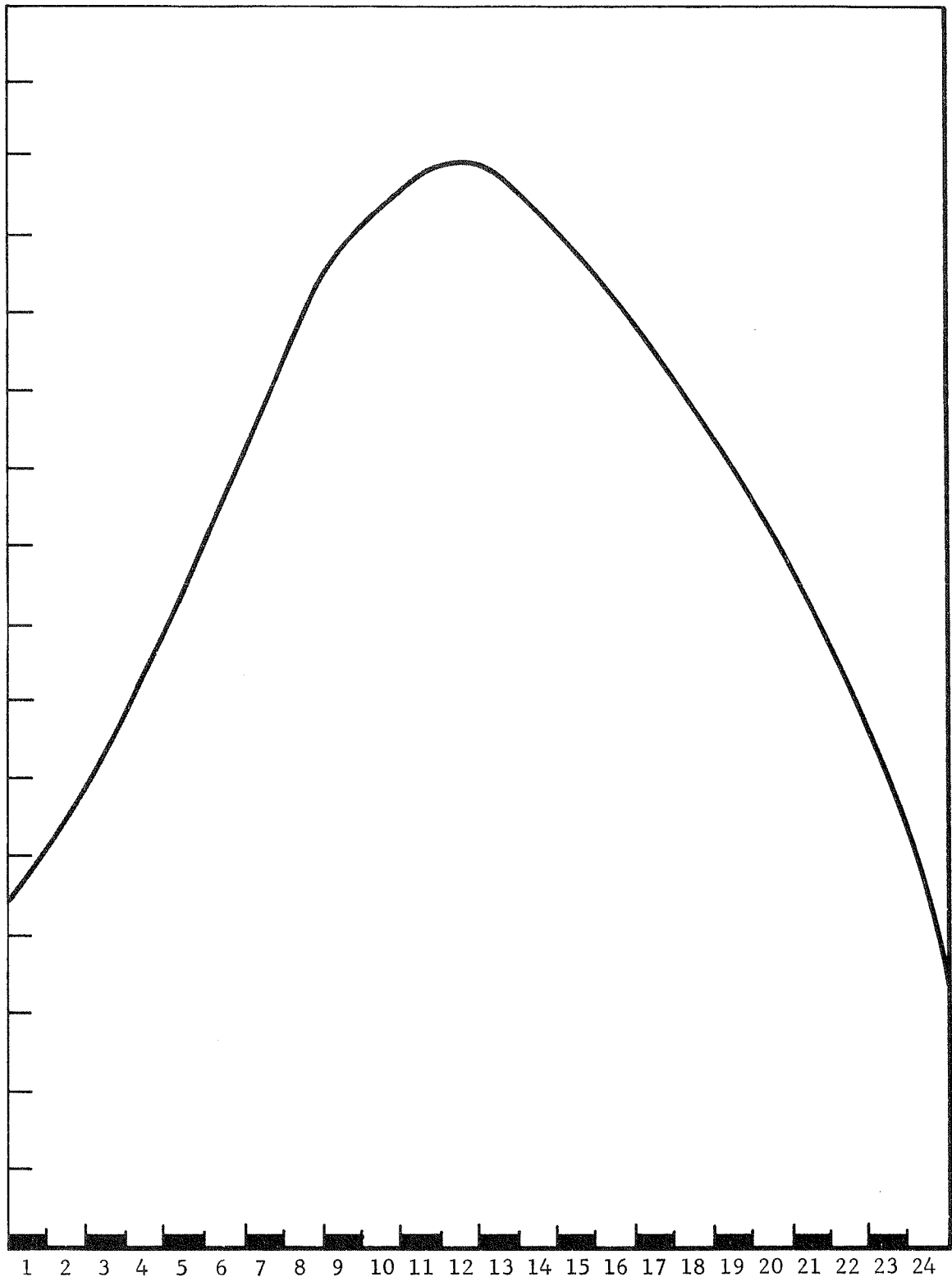


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Gross Power Peaking  
versus Exposure  
Figure III-7-3

RELATIVE AXIAL POWER

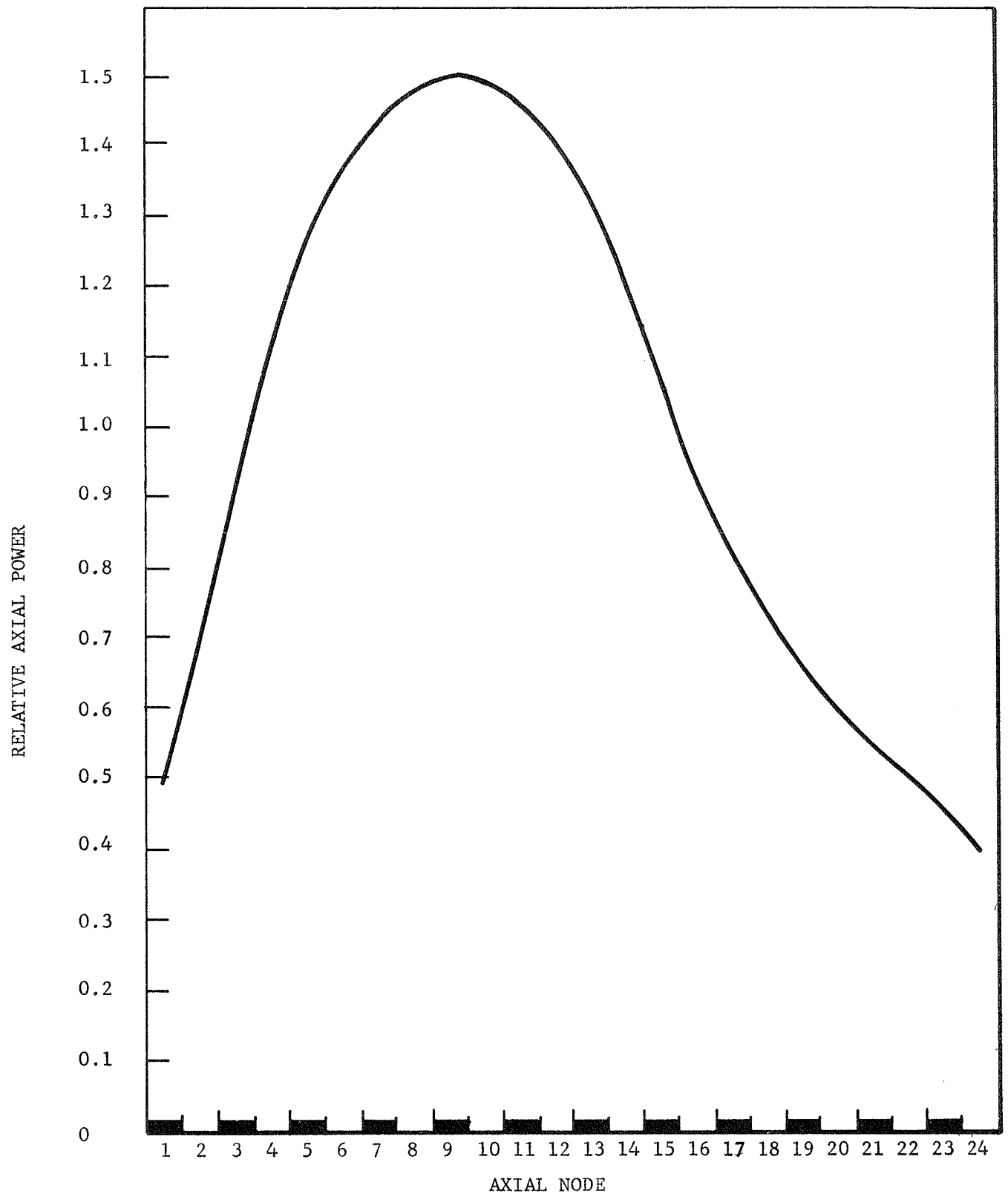
1.5  
1.4  
1.3  
1.2  
1.1  
1.0  
0.9  
0.8  
0.7  
0.6  
0.5  
0.4  
0.3  
0.2  
0.1  
0



AXIAL NODE

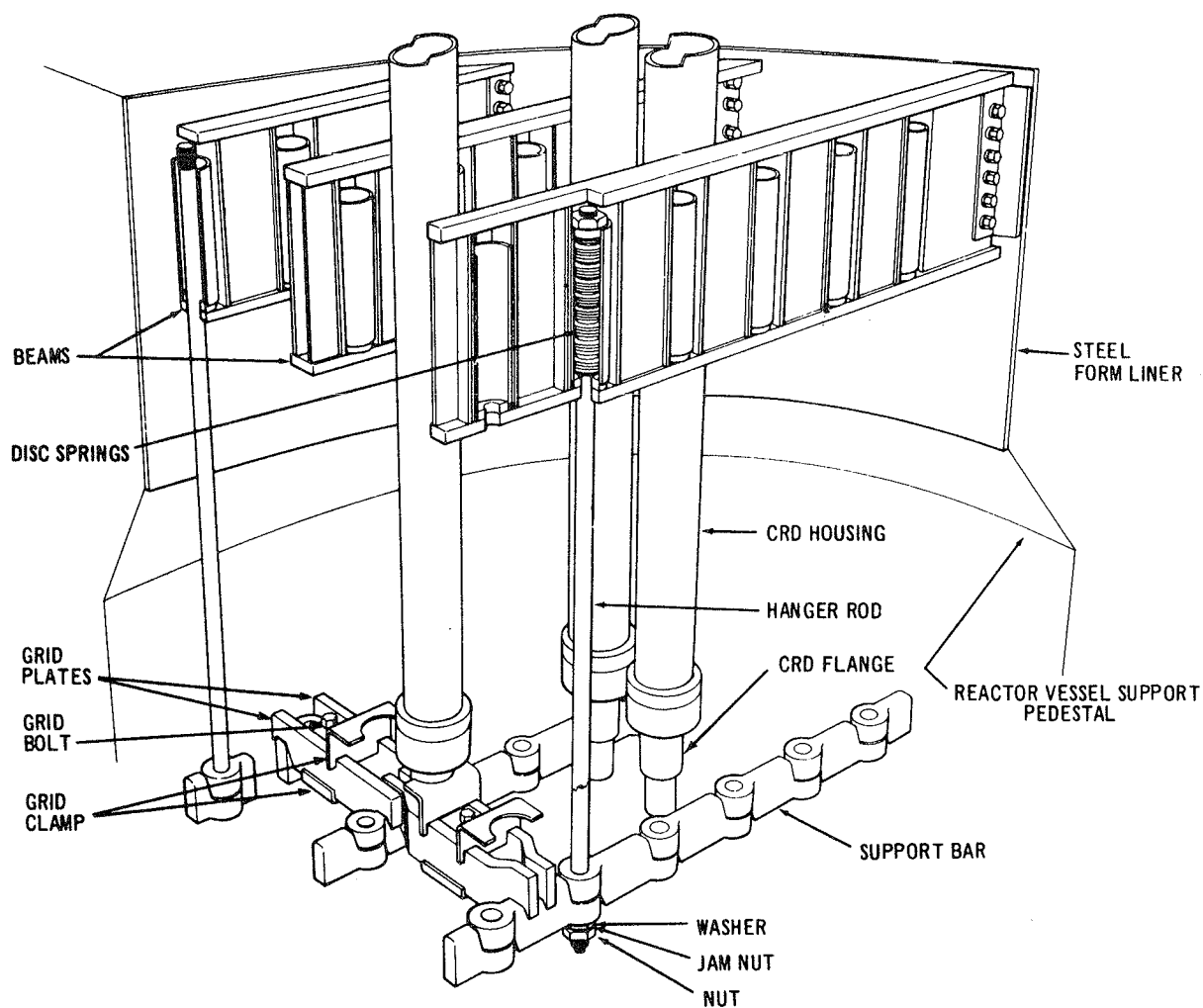
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Axial Power Distribution  
(Case 1)  
Figure III-7-4a



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Axial Power Distribution  
(Case 2)  
Figure III-7-4b

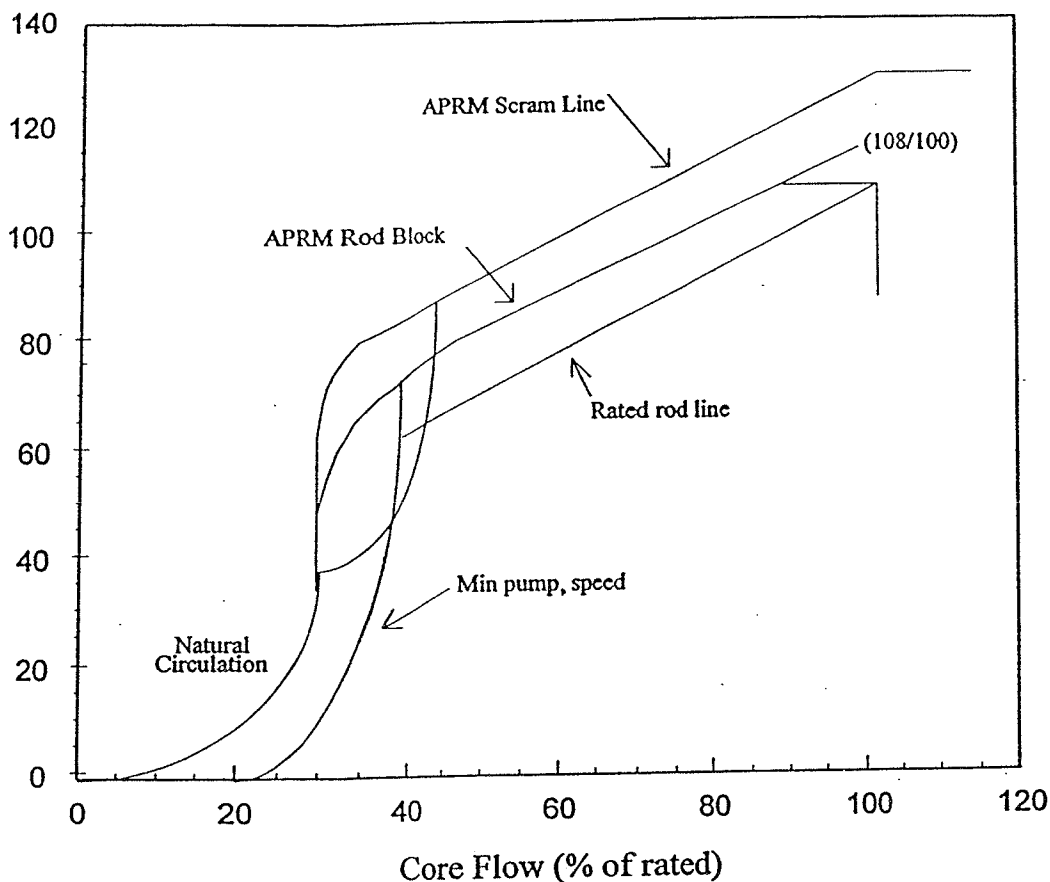


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Control Rod Drive Housing Support  
Figure III-8-1



Figure 10.1



$$P = P_B \left( \frac{P_A}{P_B} \right)^{\frac{1}{2} \left[ \frac{W - W_B}{W_A - W_B} + \left( \frac{W - W_B}{W_A - W_B} \right)^2 \right]}$$

where,

$P$  = a core thermal power value on the Exclusion Region boundary (% of rated),

$W$  = the core flow rate corresponding to power,  $P$ , on the Exclusion Region boundary (% of rated),

$P_A$  = core thermal power at State Point A (% of rated),

$P_B$  = core thermal power at State Point B (% of rated),

$W_A$  = core flow rate at State Point A (% of rated),

$W_B$  = core flow rate at State Point B (% of rated),

Coordinates of Exclusion Region Boundary

Point #	Power (%)	Flow (%)
A	75.4	43.8
B	36.3	30.0

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Power to Flow Operating Map  
Figure III-10-1  
08/15/98