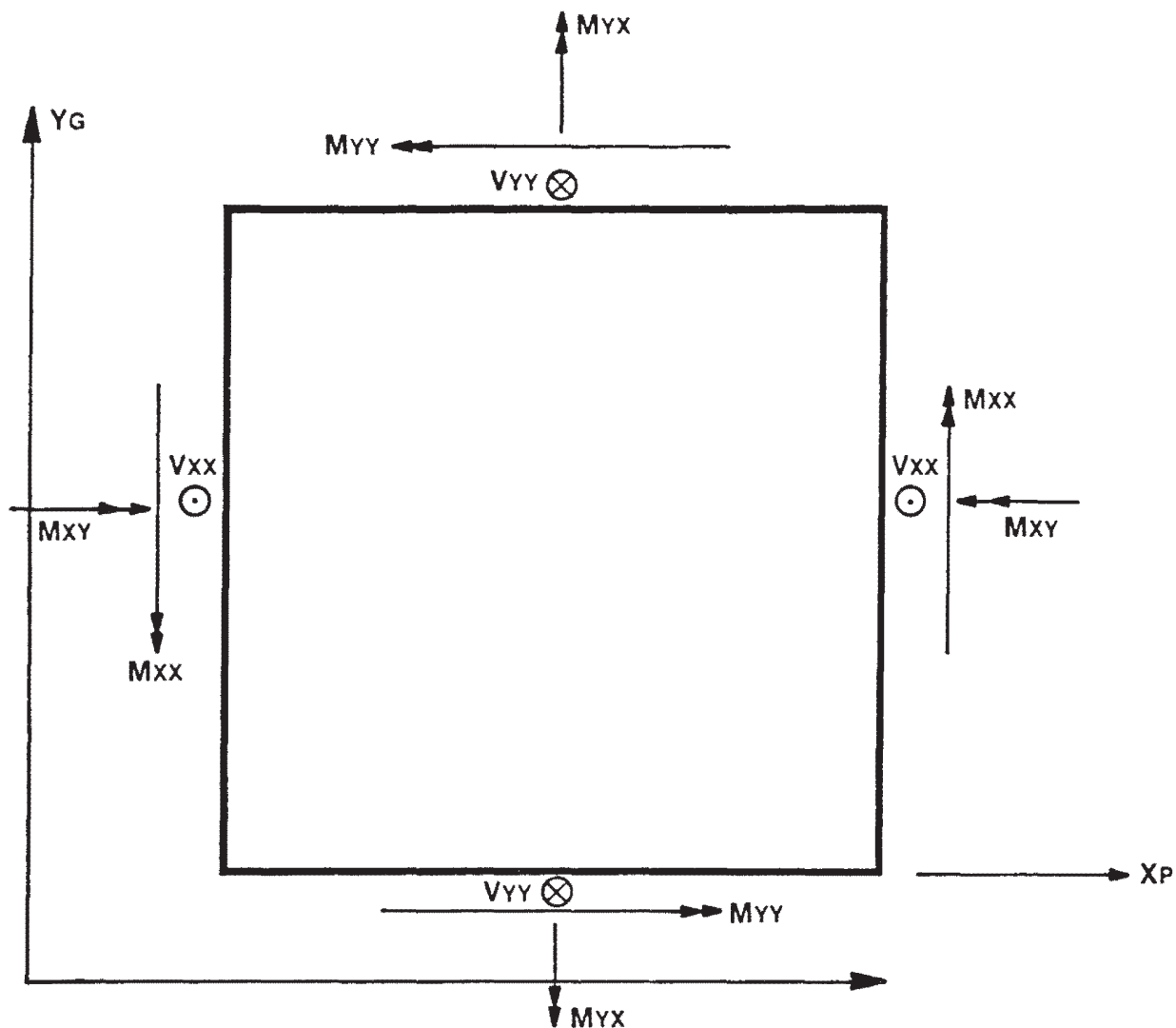


AMENDMENT 61
DECEMBER 19, 1986

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

FINITE ELEMENT MODEL OF THE
FOUNDATION MAT FOR A PORTION OF
THE OFF-GAS BUILDING

FIGURE 3B.13-1



NOTES:

M_{xx} , M_{yy} , M_{xy} , THE MOMENT RESULTANTS, ARE OUTPUT AT THE AVAILABLE LOCATIONS ON THE ELEMENTS.

V_{xx} , V_{yy} ARE ALSO OUTPUT FOR THE TRANSVERSE SHEAR RESULTANTS

⊙ POSITIVE DIRECTION COMING OUT OF PAPER

⊗ POSITIVE DIRECTION GOING INTO THE PAPER

X_P , Y_P — PLANER COORDINATE SYSTEM

X_G , Y_G — GLOBAL COORDINATE SYSTEM

X_P IS PARALLEL TO X_G

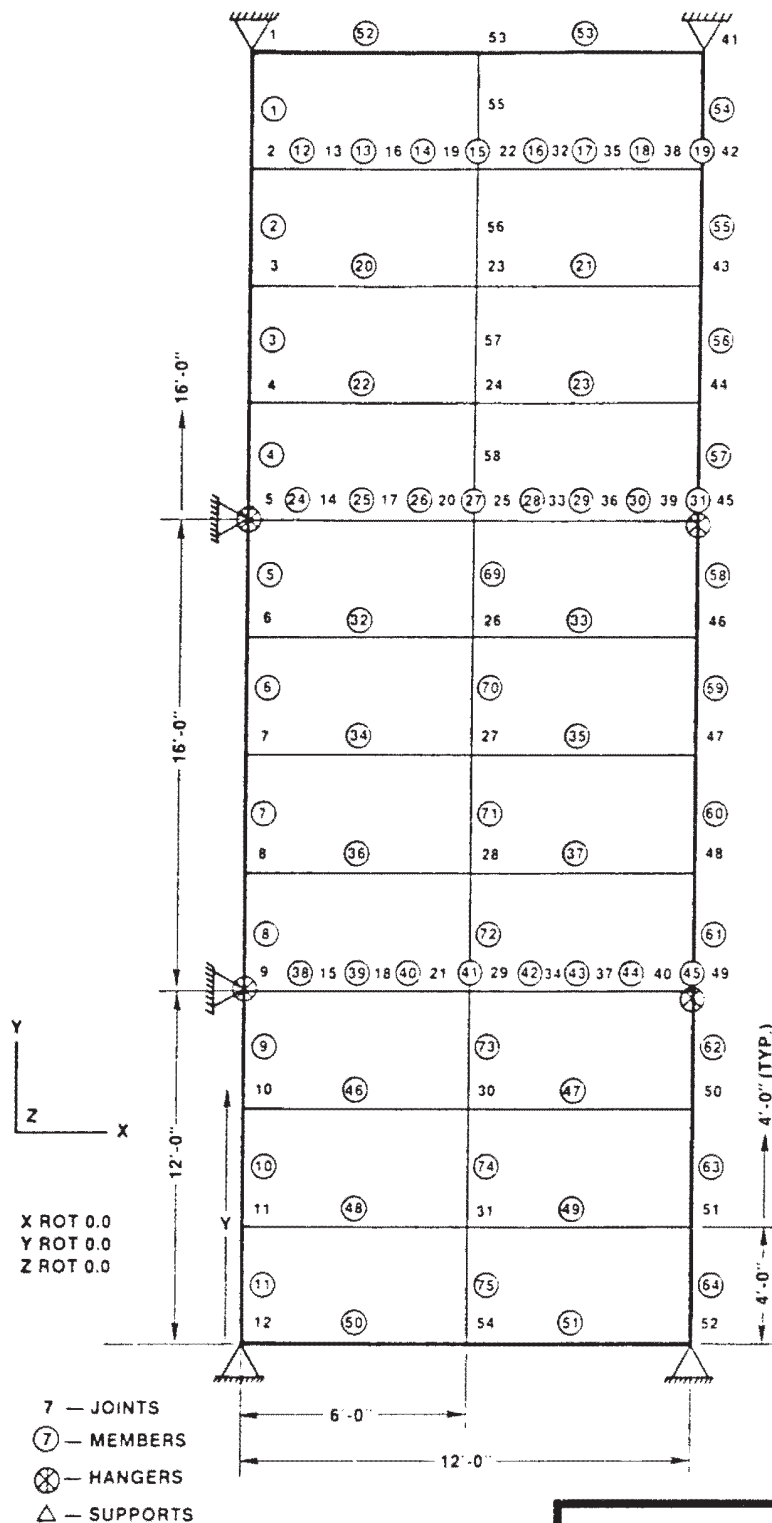
Y_P IS PARALLEL TO Y_G

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DECEMBER 19, 1986

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UNITS 1 and 2

POSITIVE SIGN CONVENTION FOR
RESULTS OF PLATE BENDING
ELEMENT

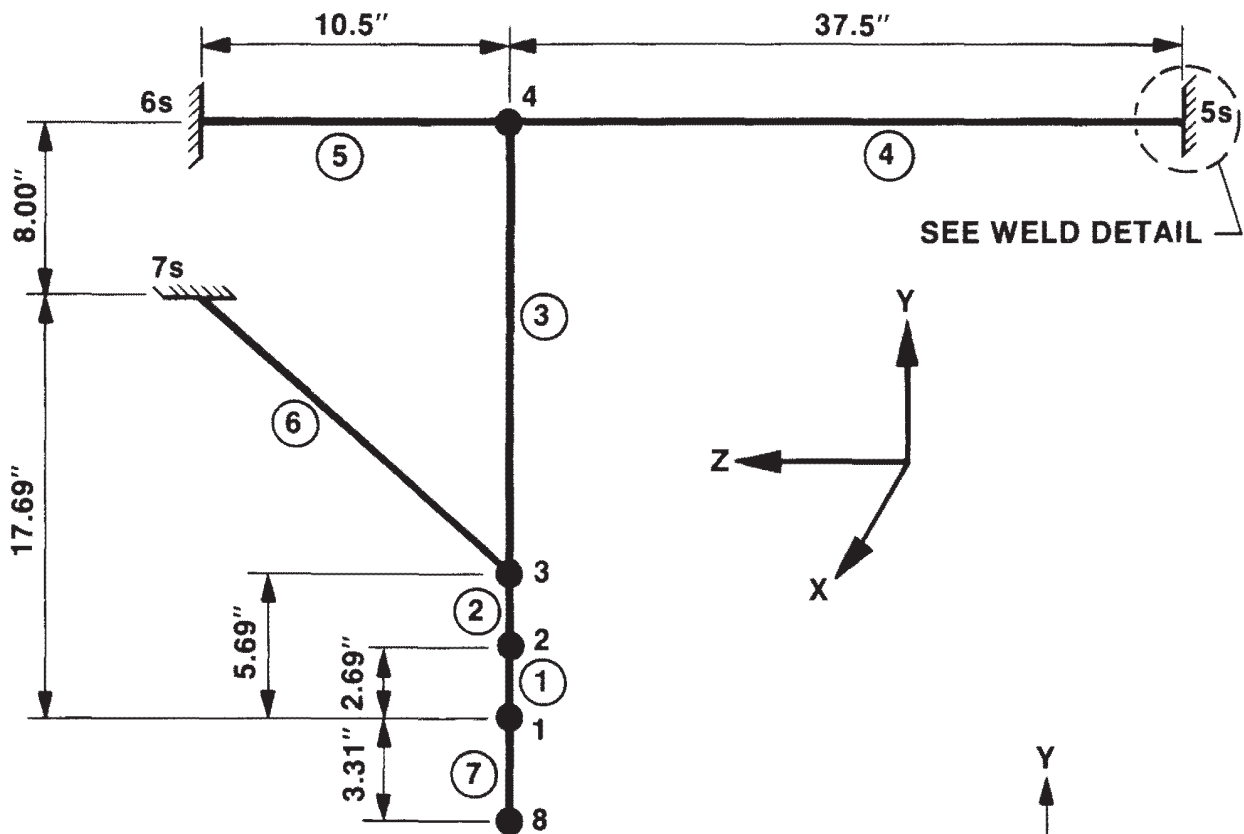
FIGURE 3B.13-2



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 UNITS 1 and 2

MODEL - SUSPENDED CEILING

FIGURE 3B.13-3

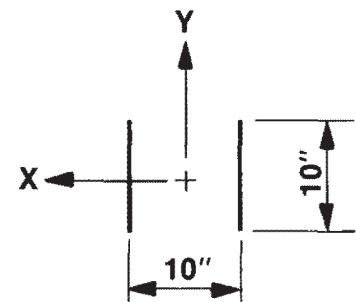


NOTES:

1. MEMBERS 1 & 6-6" SCH 160 PIPE
2. MEMBERS 2 & 3-8" SCH 160 PIPE
3. MEMBERS 4 & 5-TS 10" X 10" X 1/2"
4. MEMBER 7 IS A FICTITIOUS MEMBER FROM THE CENTERLINE TO THE OUTER SURFACE OF THE SUPPORTED PIPE

5. LEGEND:

- 2 INDICATES JOINT
- ② INDICATES MEMBER
- s INDICATES STRUCTURAL ATTACHMENT POINT



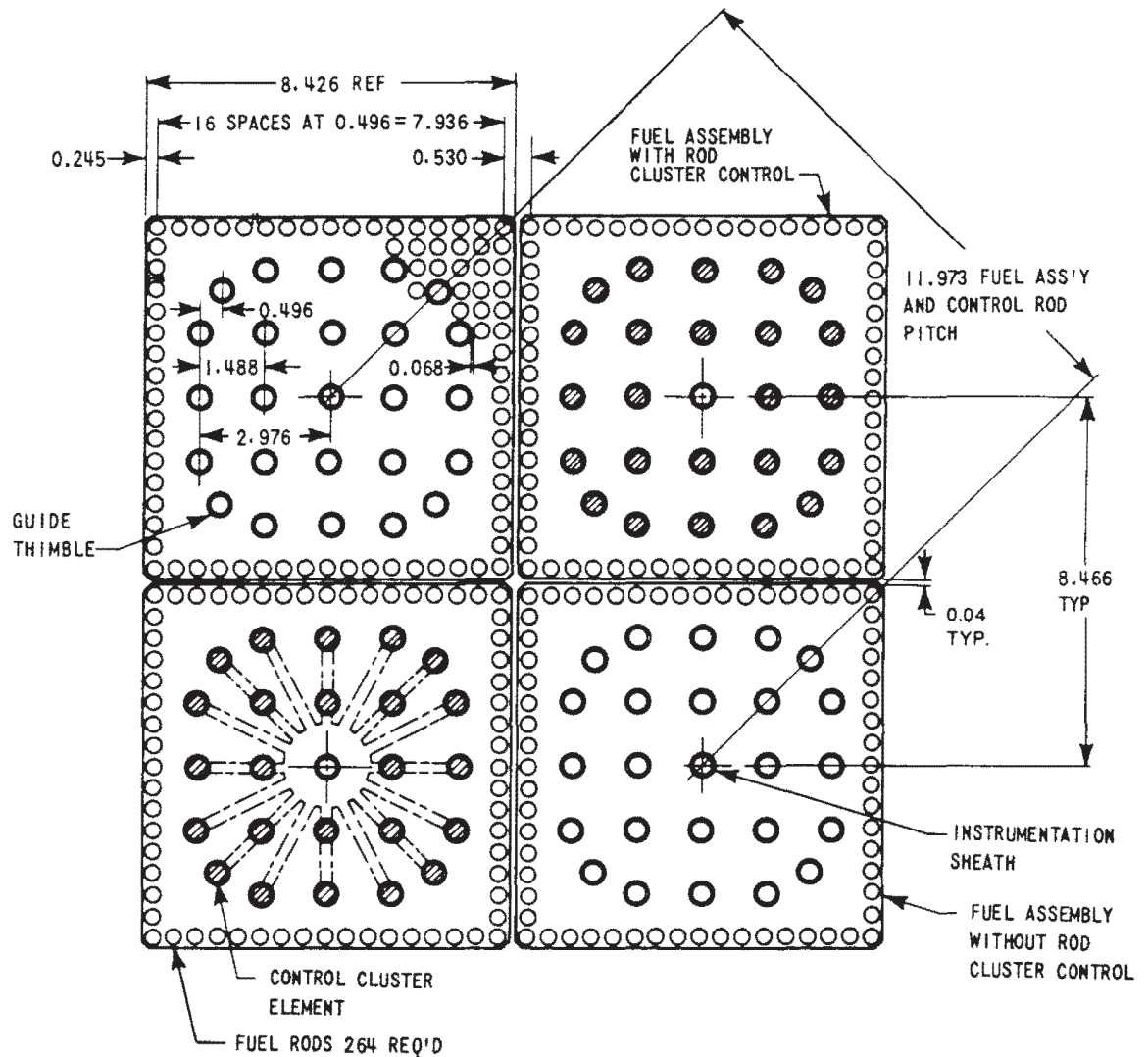
WELD AT JOINT 5s

AMENDMENT 61
DECEMBER 19, 1986

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

STRU DL INPUT ASME ANCHOR

FIGURE 3B.14-1

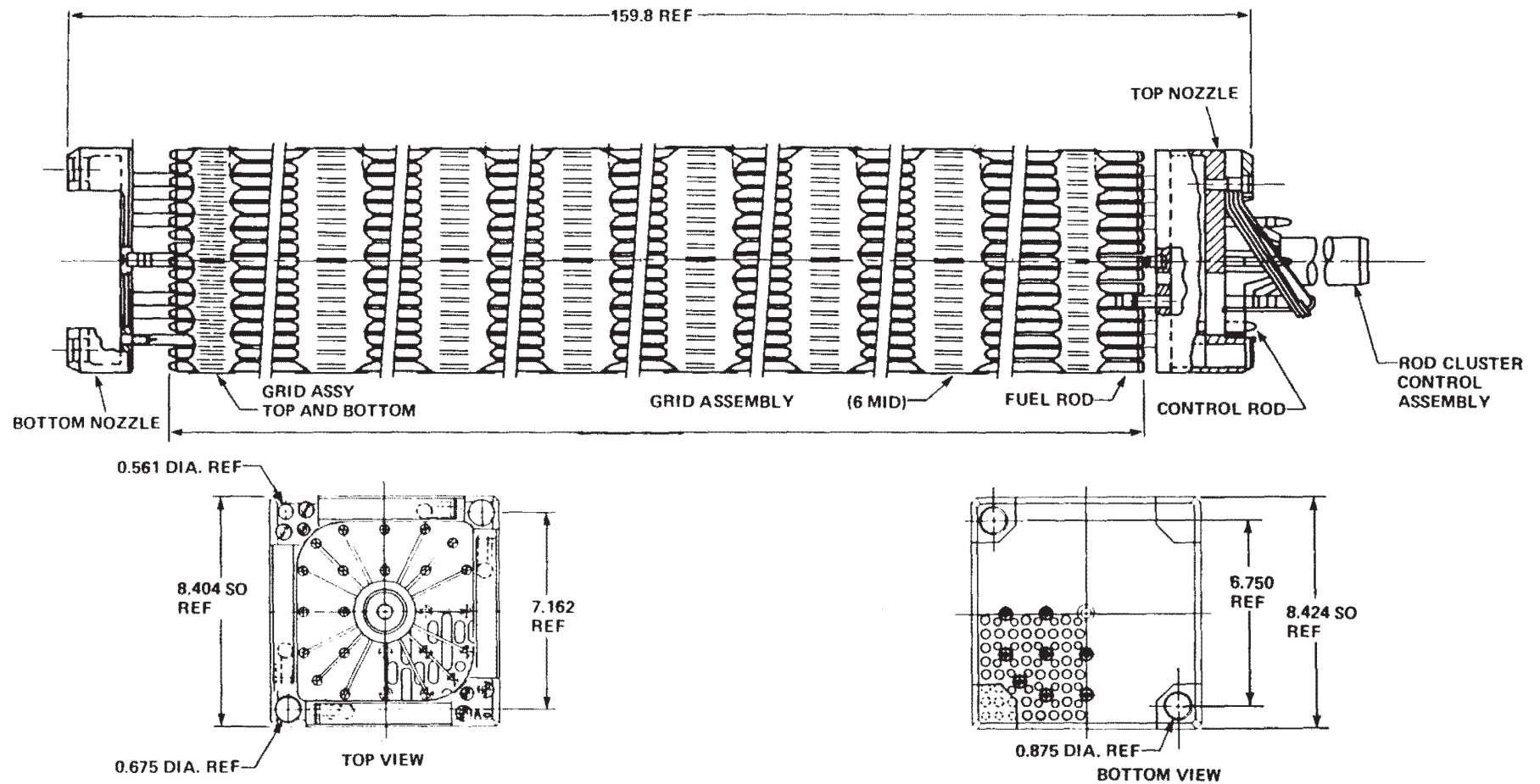


AMENDMENT 92
AUGUST 31, 1994

**COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
Typical**

Fuel Assembly Cross Section 17X17

FIGURE 4.2-1

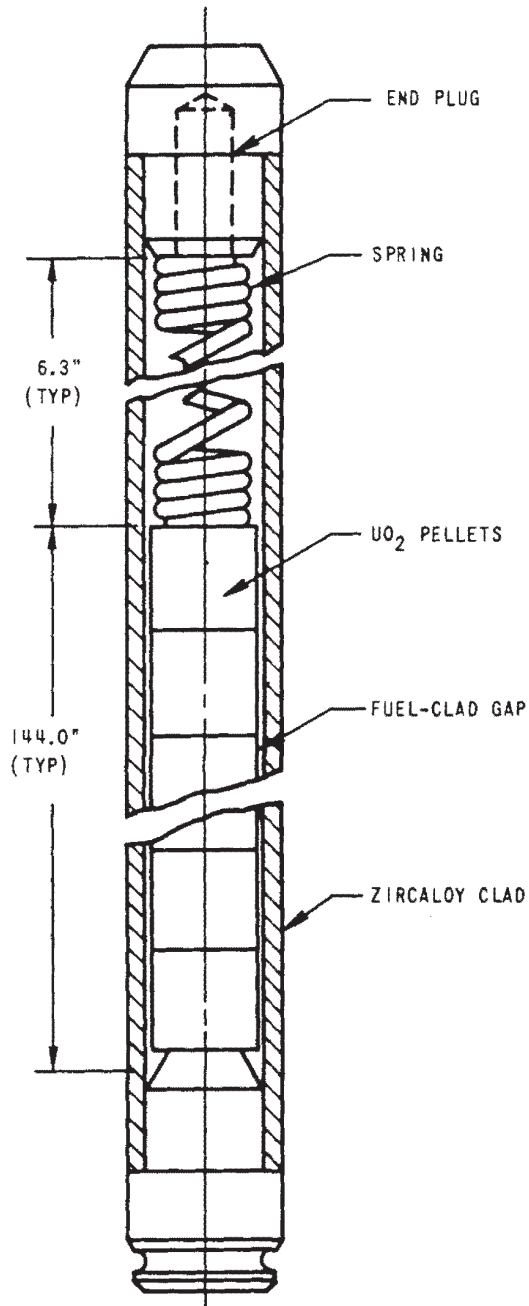


AMENDMENT 92
AUGUST 31, 1994

**COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT**

**Typical 17X17 Fuel Assembly
Outline**

FIGURE 4.2-2



SPECIFIC DIMENSIONS DEPEND ON DESIGN VARIABLES SUCH AS
PRE-PRESSURIZATION, POWER HISTORY, AND DISCHARGE BURNUP

AMENDMENT 92
AUGUST 31, 1994

**COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
Typical**

Fuel Rod Schematic

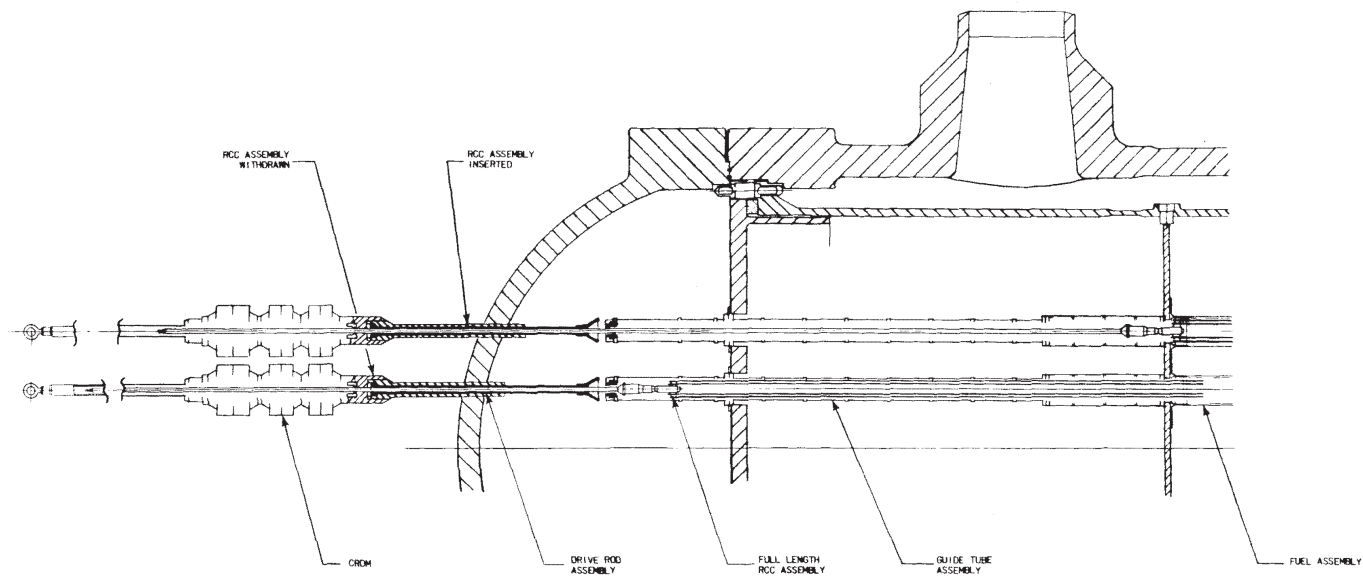
FIGURE 4.2-3

Figures 4.2-4A,B thru 4.2-7A,B have been deleted | 92

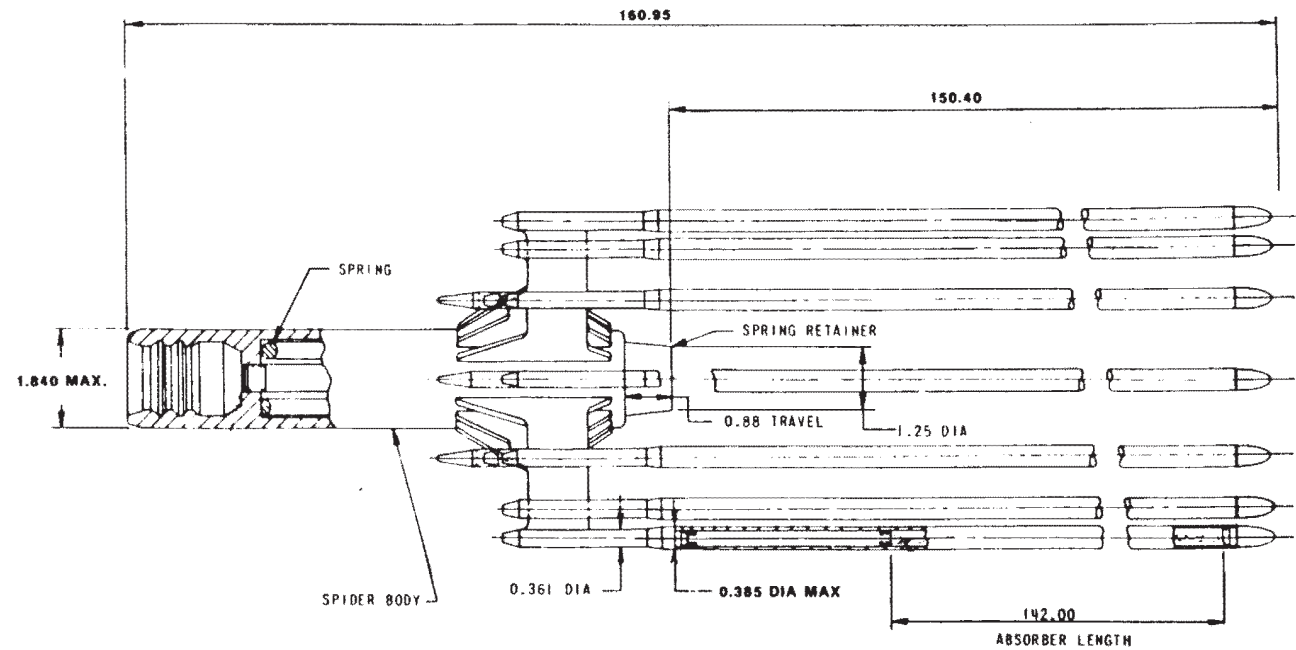
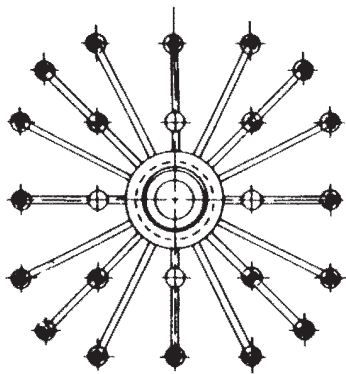
Figures 4.2-4A,B thru 4.2-7A,B have been deleted | 92

Figures 4.2-4A,B thru 4.2-7A,B have been deleted | 92

Figures 4.2-4A,B thru 4.2-7A,B have been deleted | 92



<p>COMANCHE PEAK S.E.S. FINAL SAFETY ANALYSIS REPORT UNITS 1 and 2</p>
<p>Full Length RCC and Drive Rod Assembly With Interfacing Components</p>
<p>FIGURE 4.2-8</p>

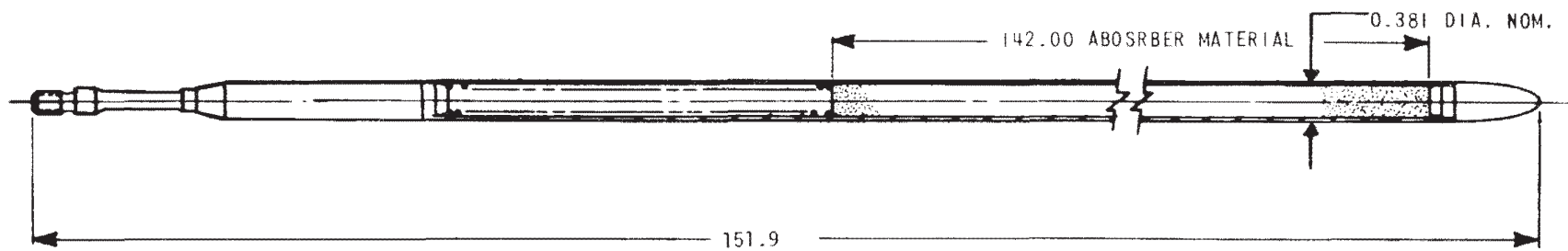


AMENDMENT 92
AUGUST 31, 1994

**COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
Typical**

Rod Cluster Control
Assembly Outline

FIGURE 4.2-9



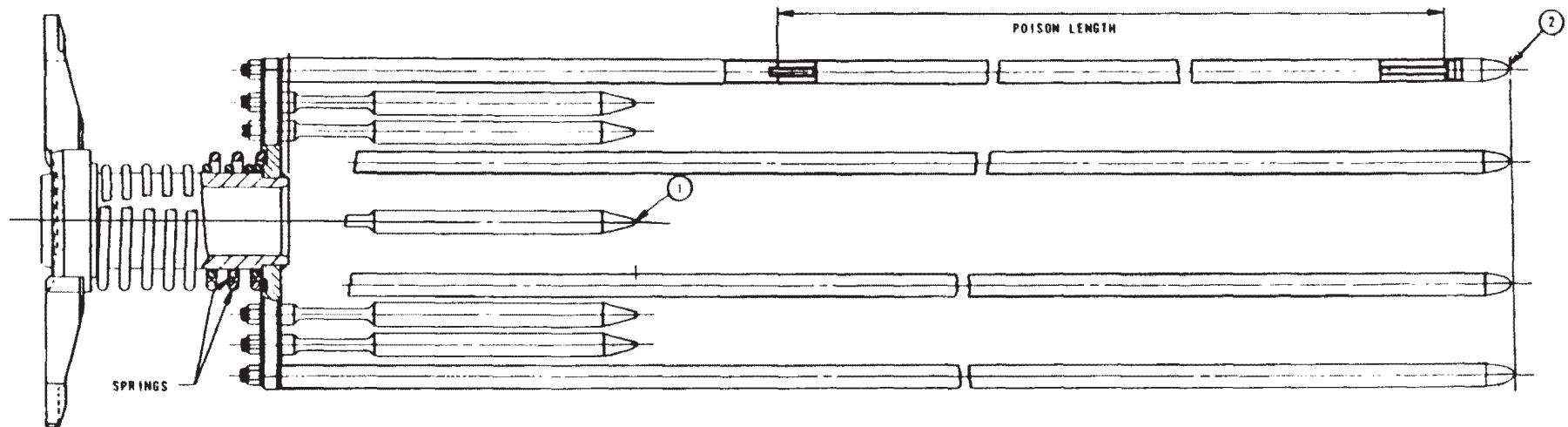
AMENDMENT 84
FEBRUARY 28, 1992

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

**Full Length Absorber Rod
All Ag-In-Cd Design**

FIGURE 4.2-10

Figure 4.2-11
Has Been Deleted

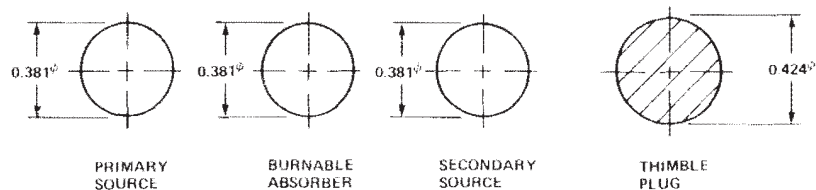
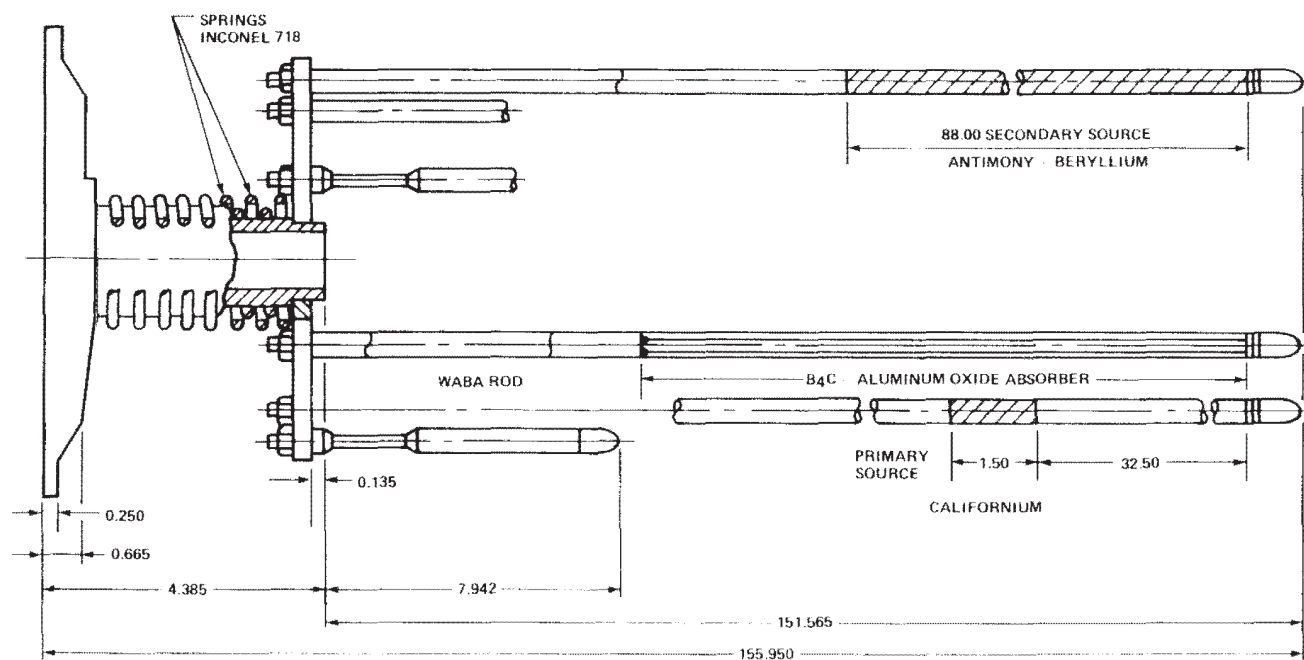
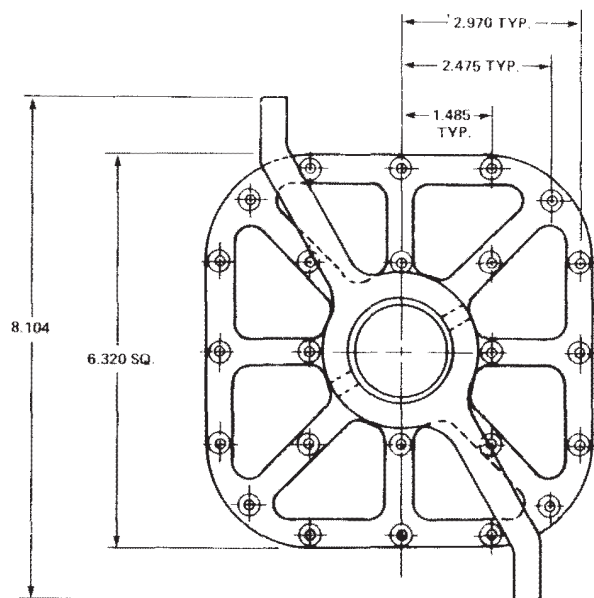


AMENDMENT 92
AUGUST 31, 1994

**COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
Typical**

Burnable Poison Assembly

FIGURE 4.2-12



X = 151.565 - 143.107
 = 8.458
 Y = X + END PLUG LENGTH
 = 9.583

AMENDMENT 84
 FEBRUARY 28, 1992

**COMANCHE PEAK S.E.S.
 FINAL SAFETY ANALYSIS REPORT
 UNIT 2**

Composite Core Component
 Rods and Assembly Outline

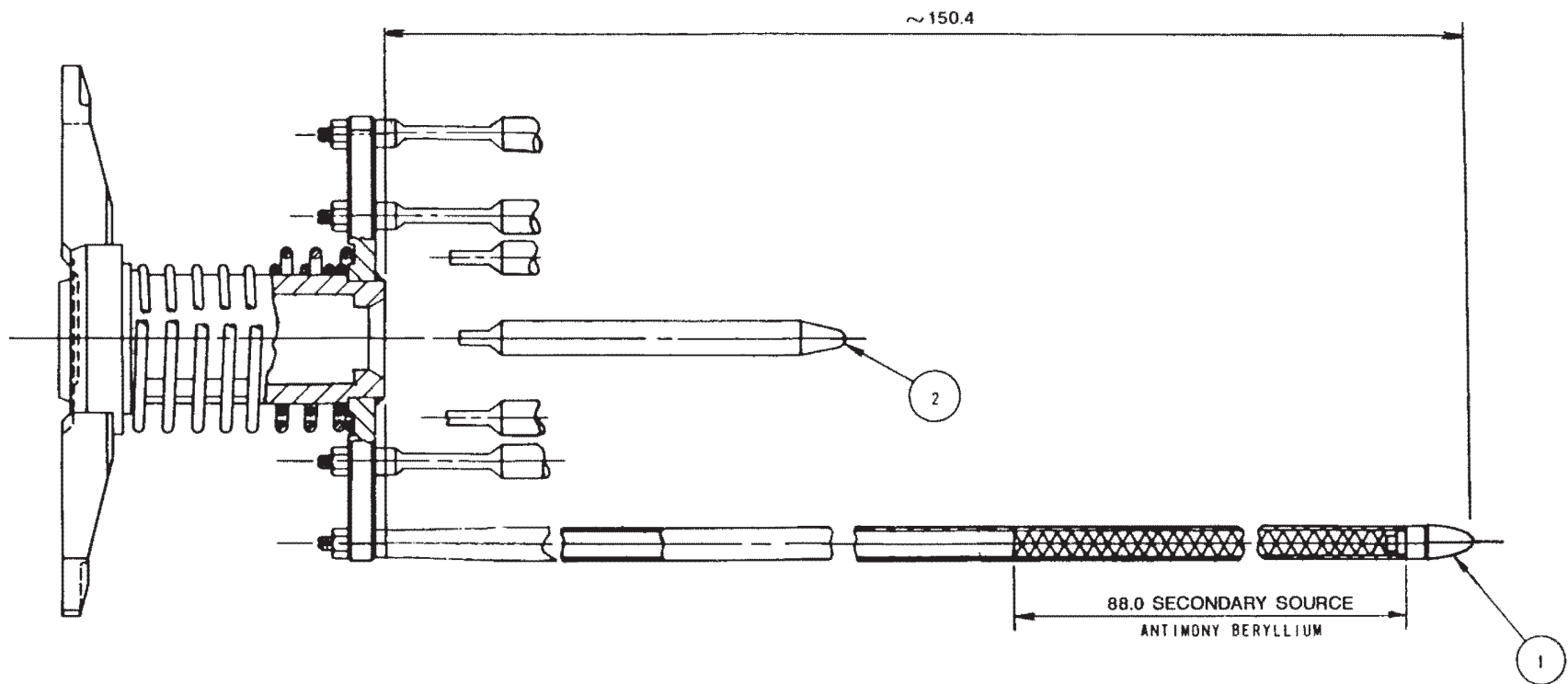
FIGURE 4.2-12B

Figures 4.2-13A,B and 4.2-14 have been deleted

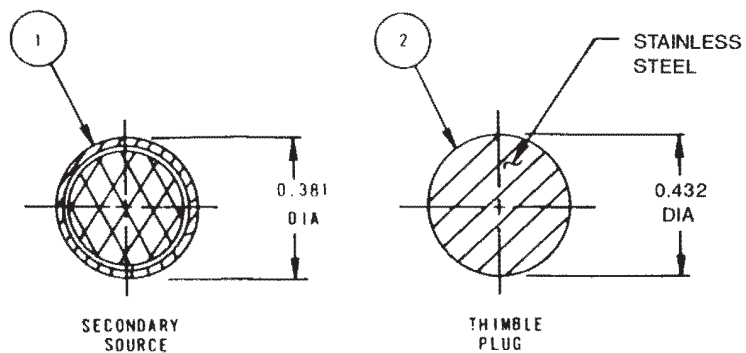
| 92

Figures 4.2-13A,B and 4.2-14 have been deleted

| 92



NOTE: ALL DIMENSIONS ARE IN INCHES

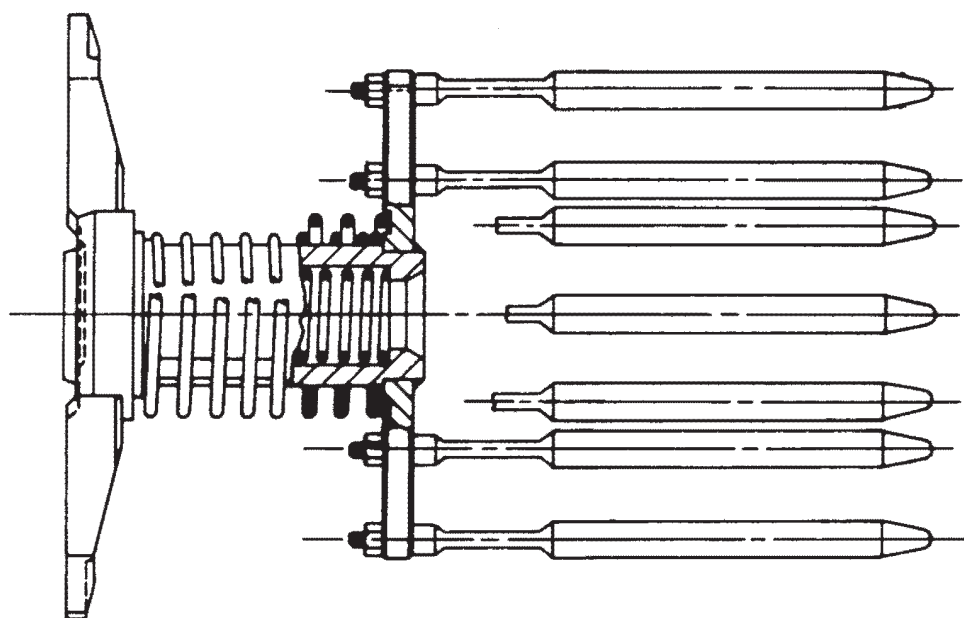


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
Typical

Secondary Source Assembly

FIGURE 4.2-15



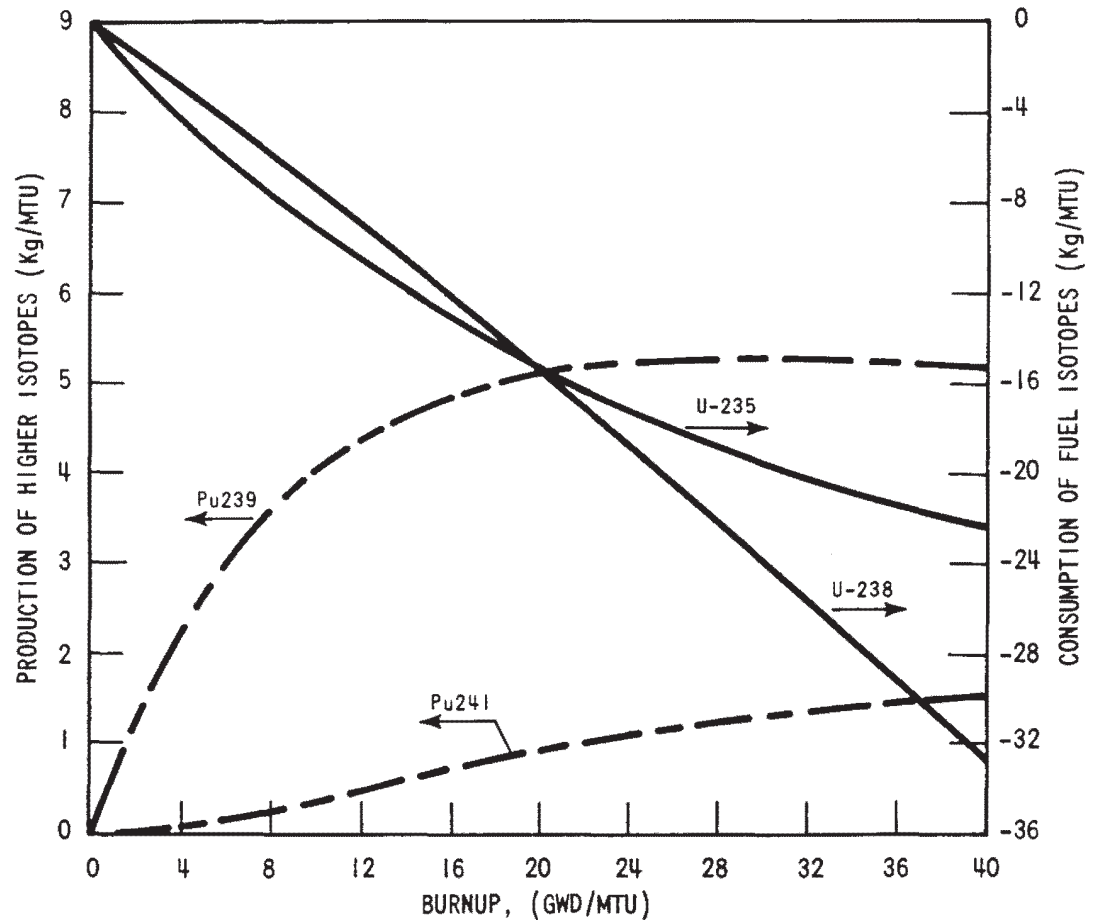
AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
Typical

Thimble Plug Assembly

FIGURE 4.2-16

Figure 4.3-1 has been deleted.

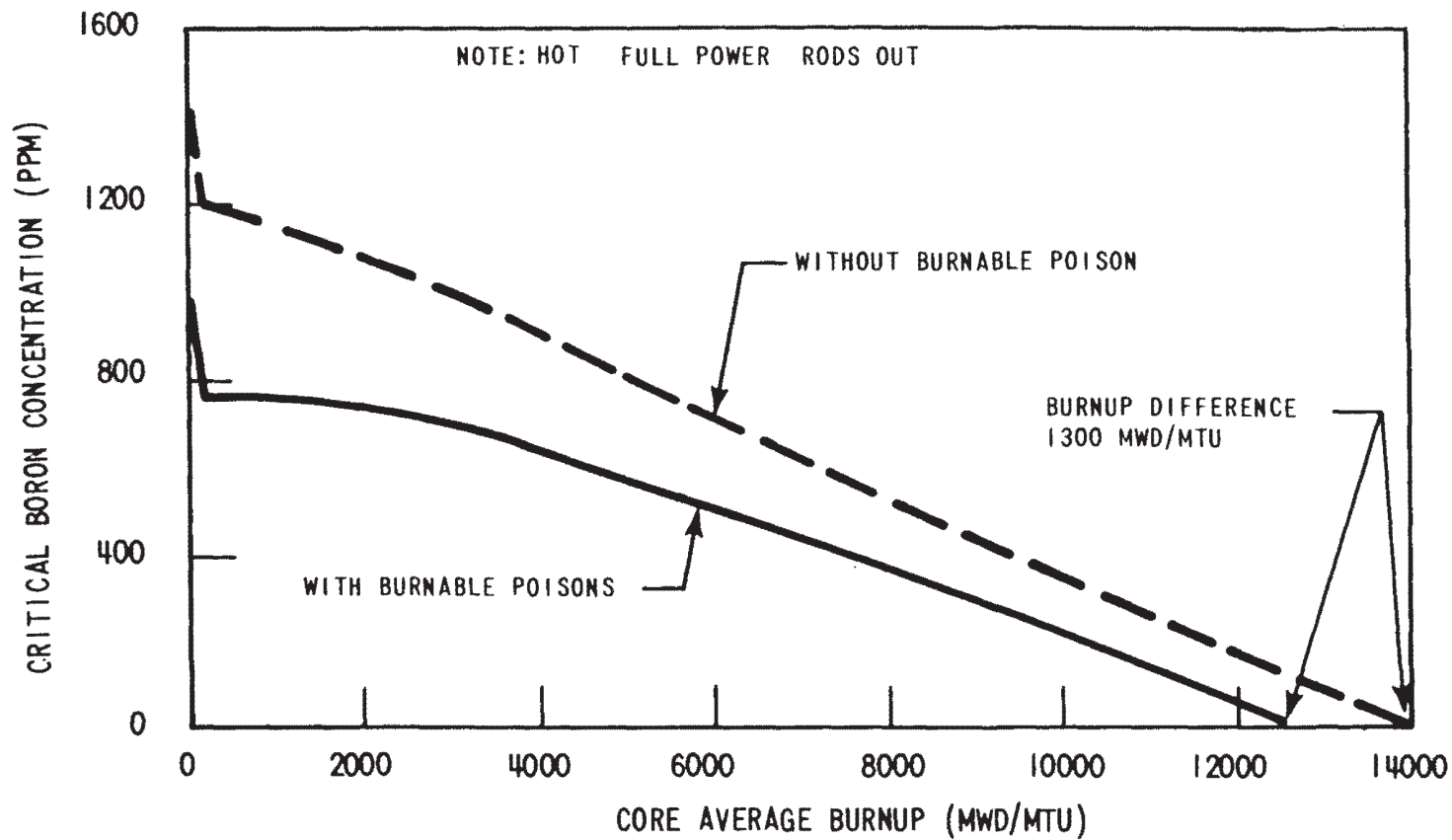


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Production and Consumption
of Higher Isotopes
(Typical)

FIGURE 4.3-2

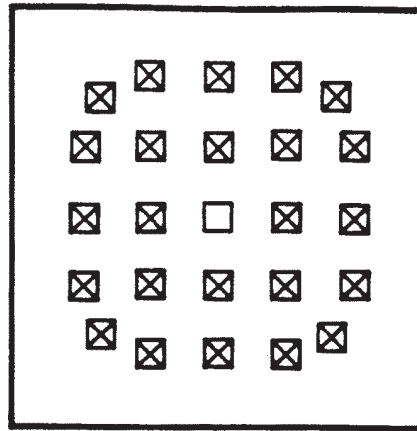


AMENDMENT 92
AUGUST 31, 1994

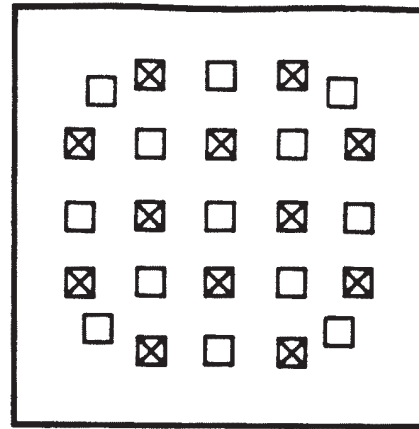
COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Boron Concentration vs First Cycle
Burnup With and Without Burnable
Absorber Rods (Typical)

FIGURE 4.3-3

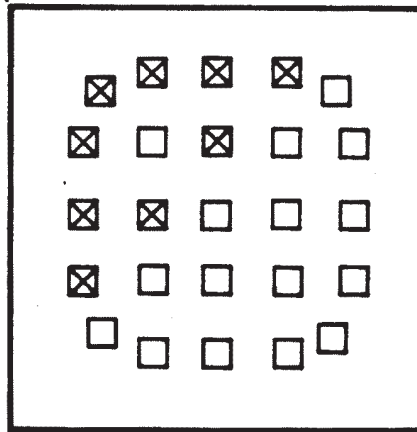


24 BP'S

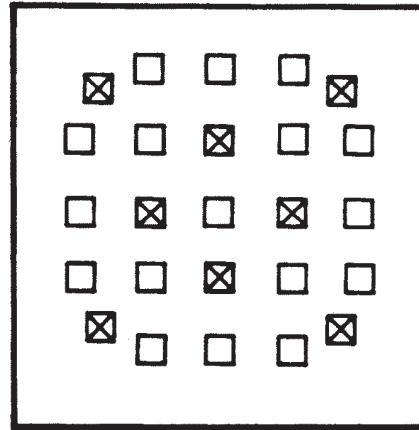


12 BP'S

← CORE CENTER



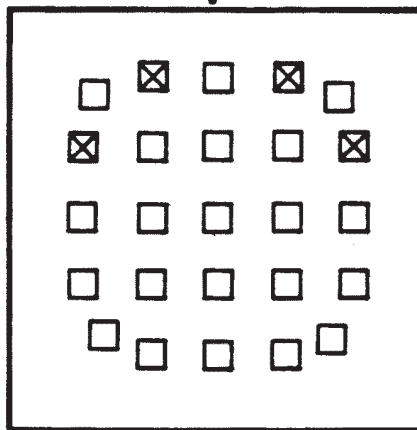
9 BP'S



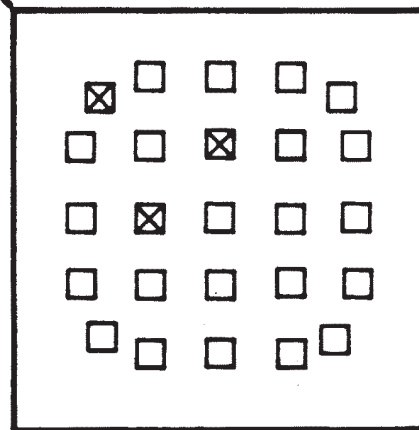
8 BP'S

CORE CENTER
↑

CORE CENTER
←



4 BP'S



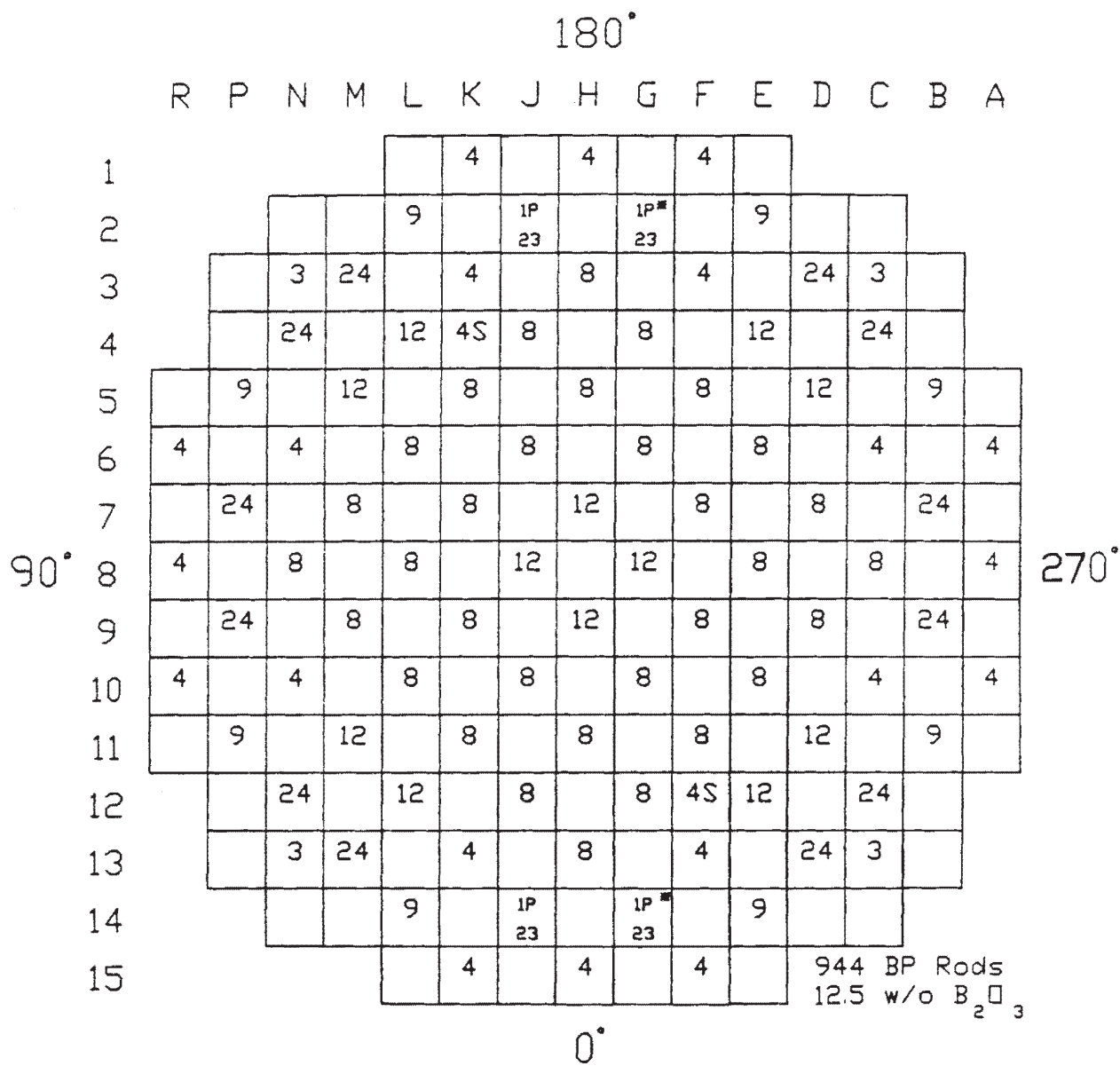
3 BP'S

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AUGUST 31, 1994

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FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Burnable Absorber Arrangement
Within an Assembly (Typical)

FIGURE 4.3-4



NUMBER INDICATES NUMBER OF BURNABLE POISON RODS

'S' INDICATES SECONDARY SOURCE ROD

'P' INDICATES PRIMARY SOURCE ROD

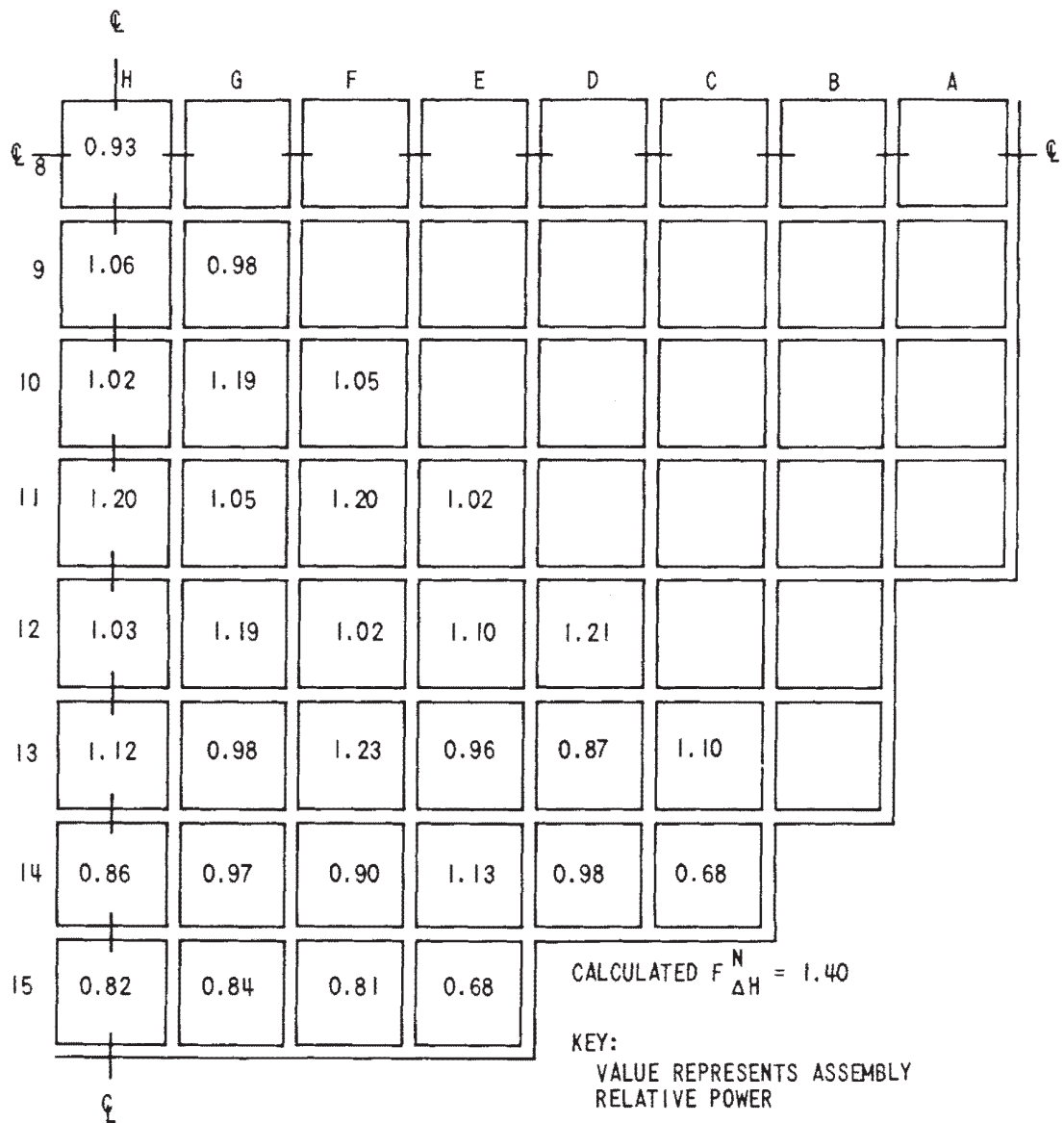
'*' INDICATES DEPLETED PRIMARY SOURCE ROD

AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
Typical

Burnable Absorber
Loading Pattern

FIGURE 4.3-5

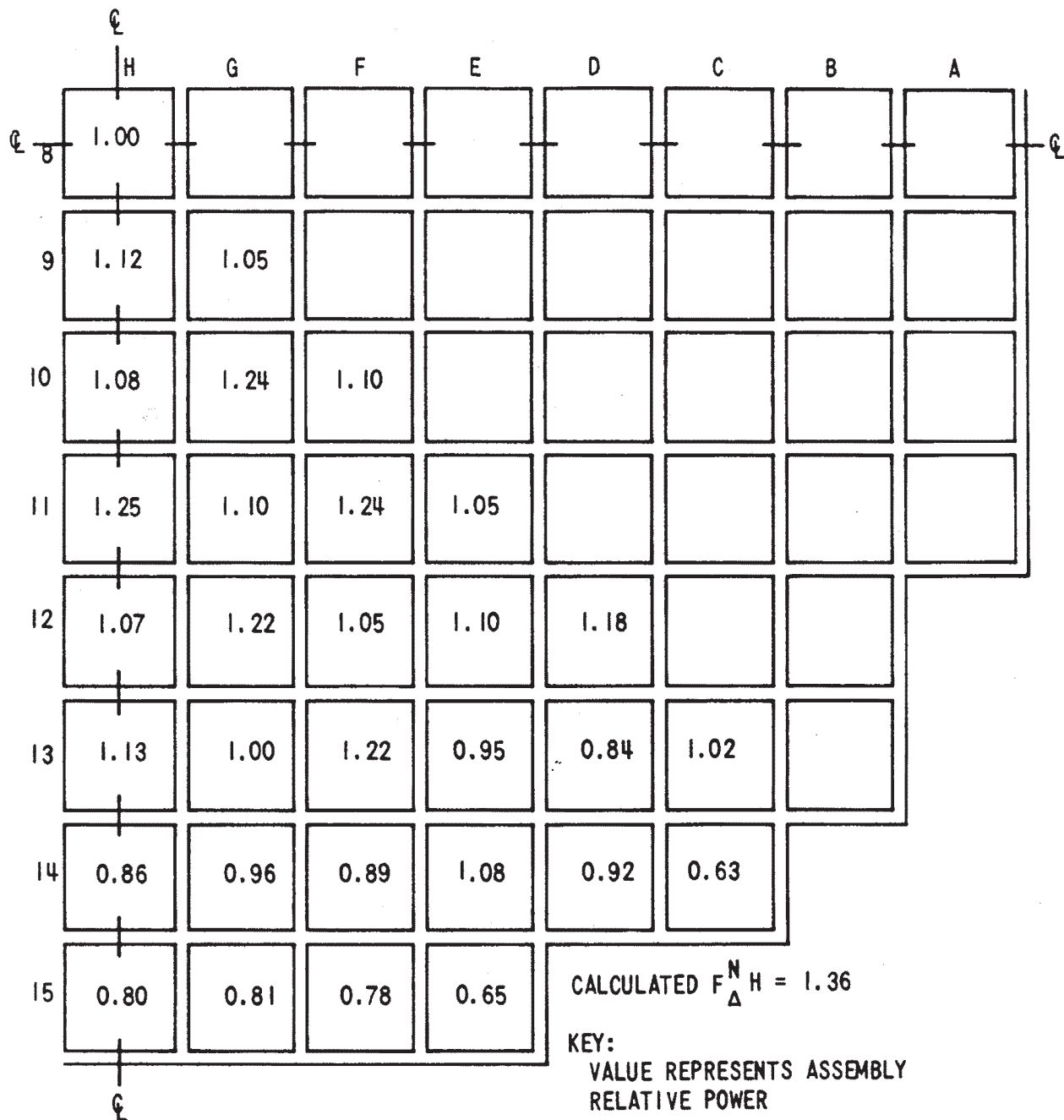


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Normalized Power Density Distribution
Near BOL, Unrodded Core, HFP,
No Xenon (Typical)

FIGURE 4.3-6

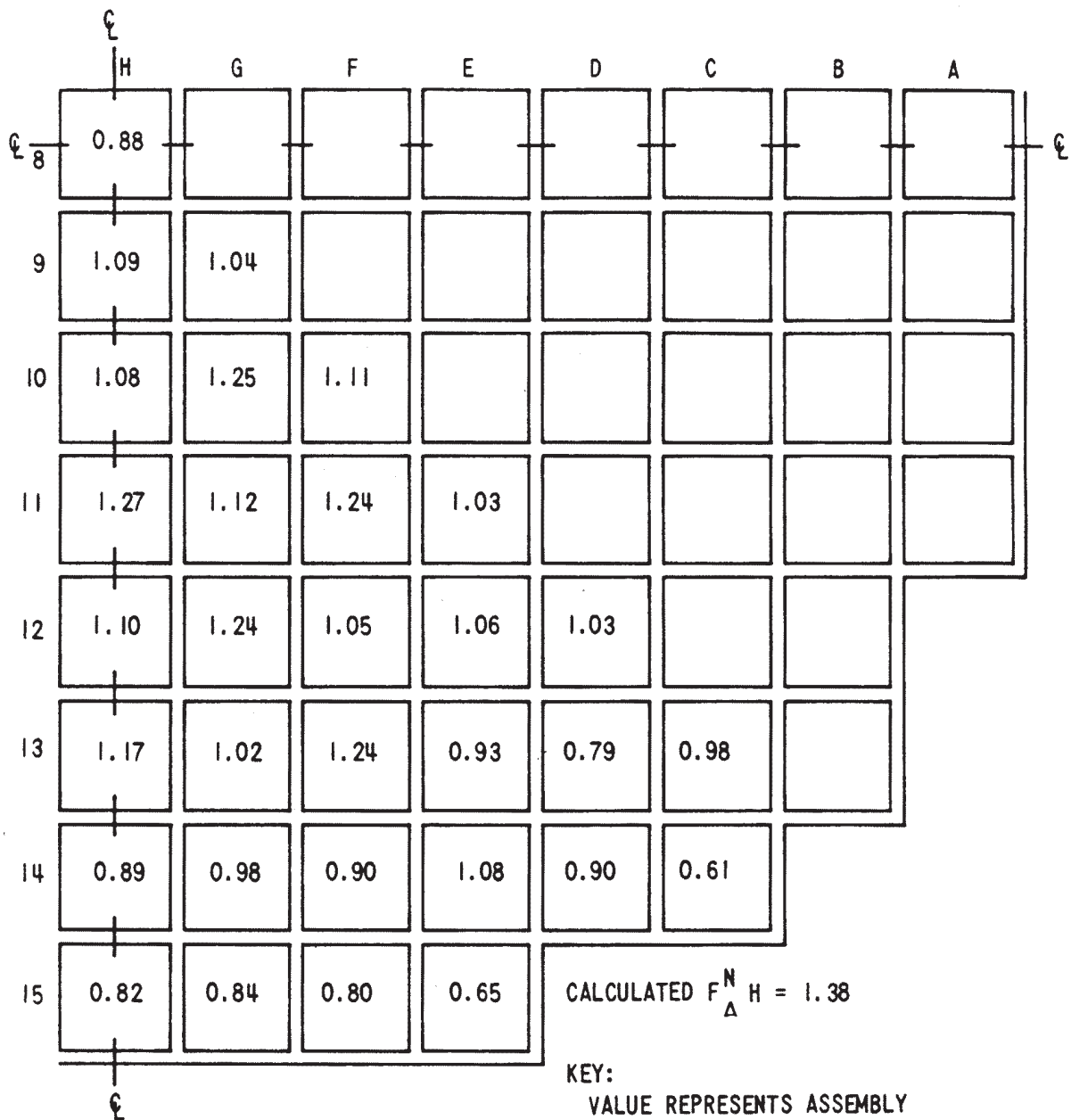


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Normalized Power Density Dist.
Near BOL, Unrodded Core, HFP,
Equilibrium Xenon (Typical)

FIGURE 4.3-7

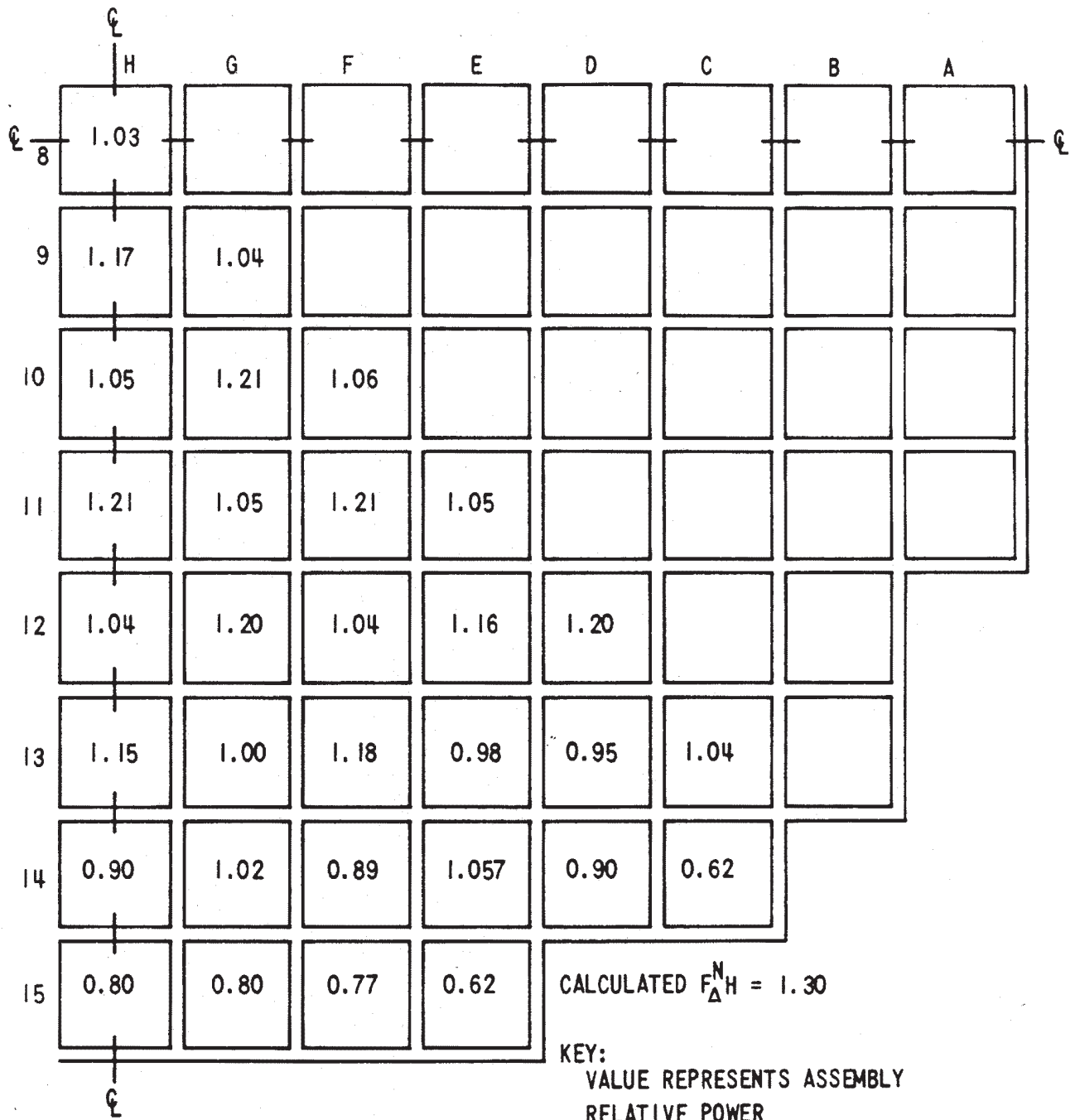


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Normalized Power Density Distribution
Near BOL, Group D 35%, HFP,
Equilibrium Xenon (Typical)

FIGURE 4.3-8

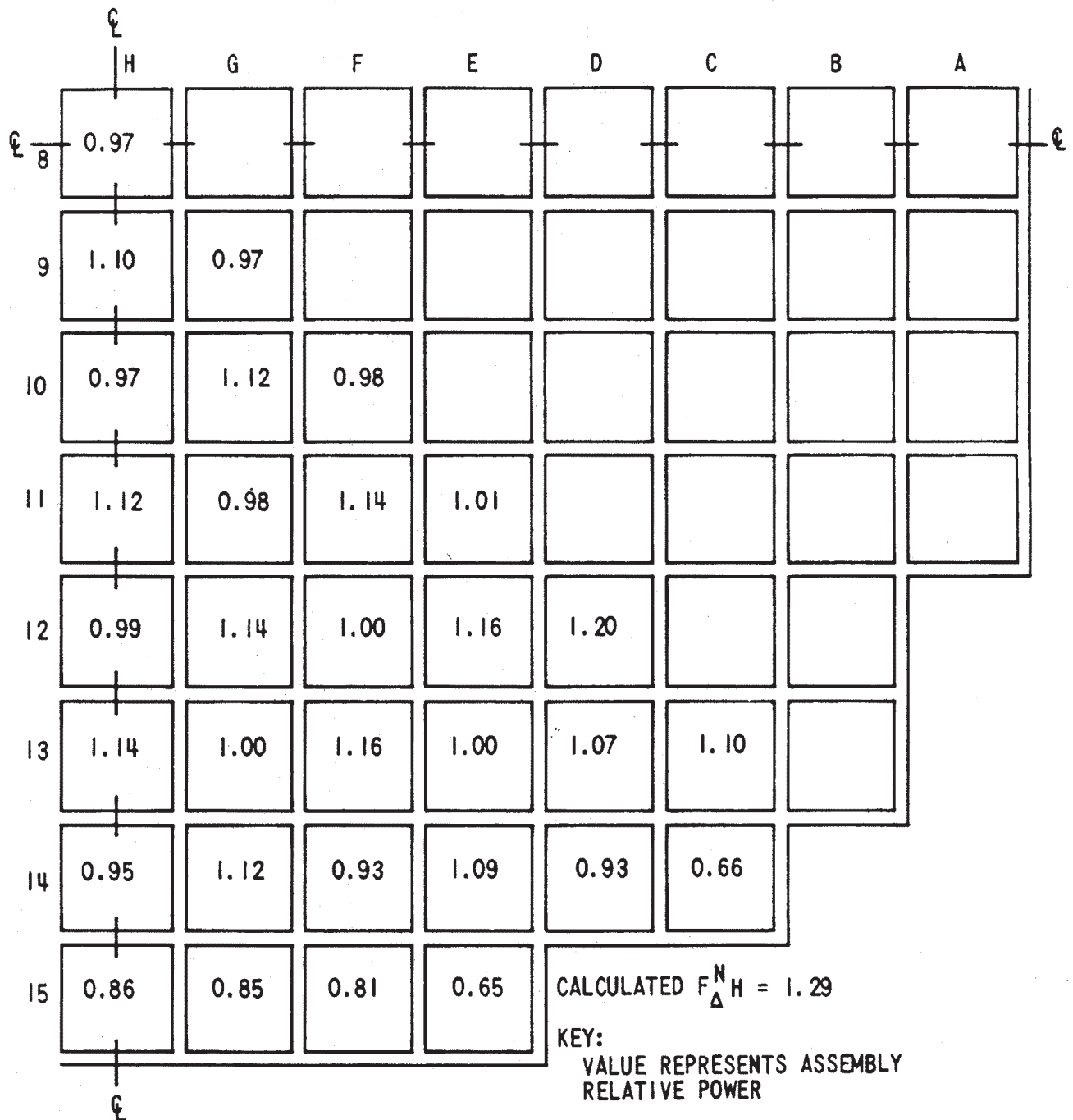


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Normalized Power Density Distribution
Near MOL Unrodded Core, HFP,
Equilibrium Xenon (Typical)

FIGURE 4.3-9

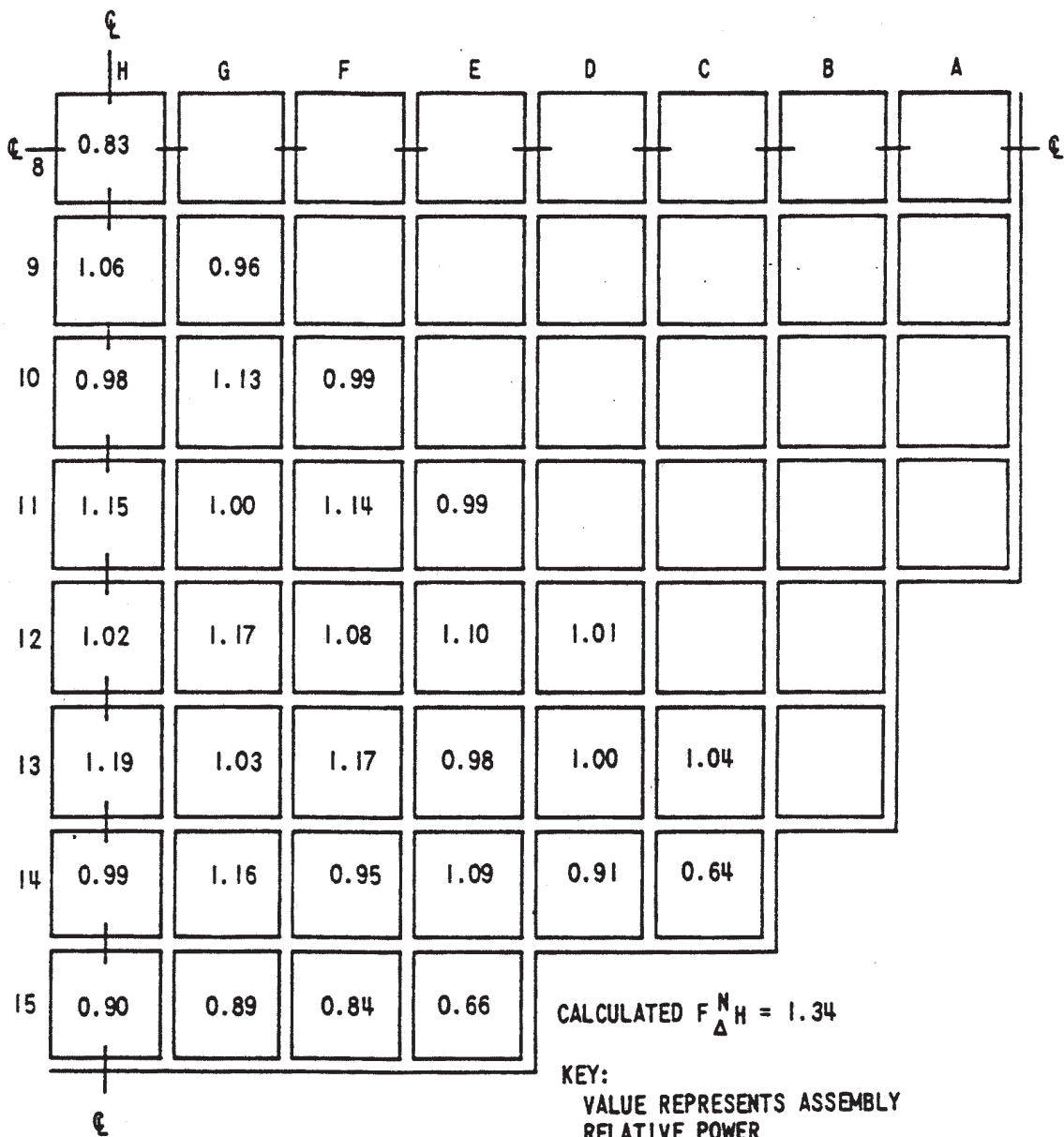


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Normalized Power Density Distribution
Near EOL, Unrodded Core, HFP,
Equilibrium Xenon (Typical)

FIGURE 4.3-10

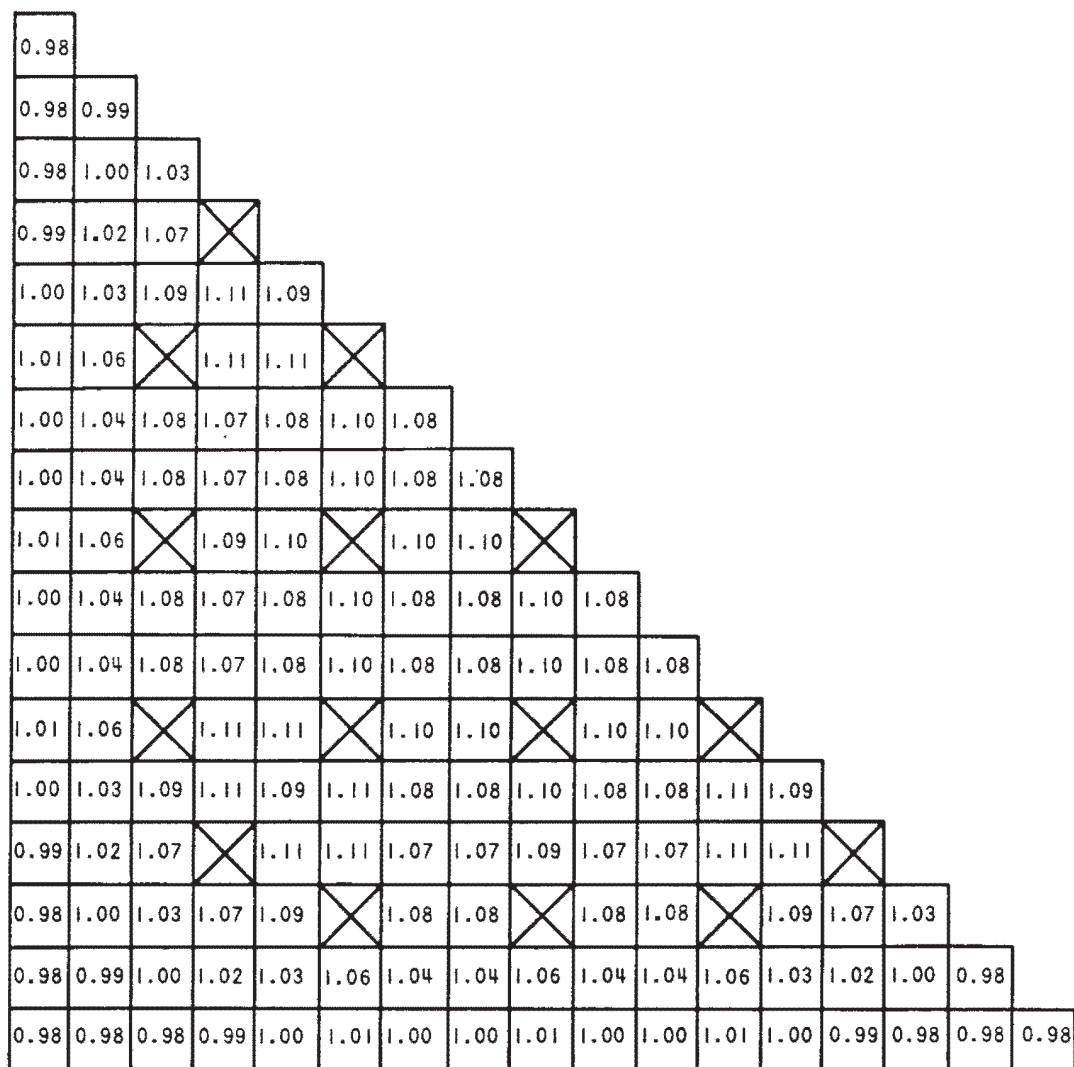


Amendment 95
February 2, 1998

COMANCHE PEAK S.E.S
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Normalized Power Density Distribution
Near EOL, Group D @ 35%, HFP,
Equilibrium Xenon (Typical)

FIGURE 4.3-11

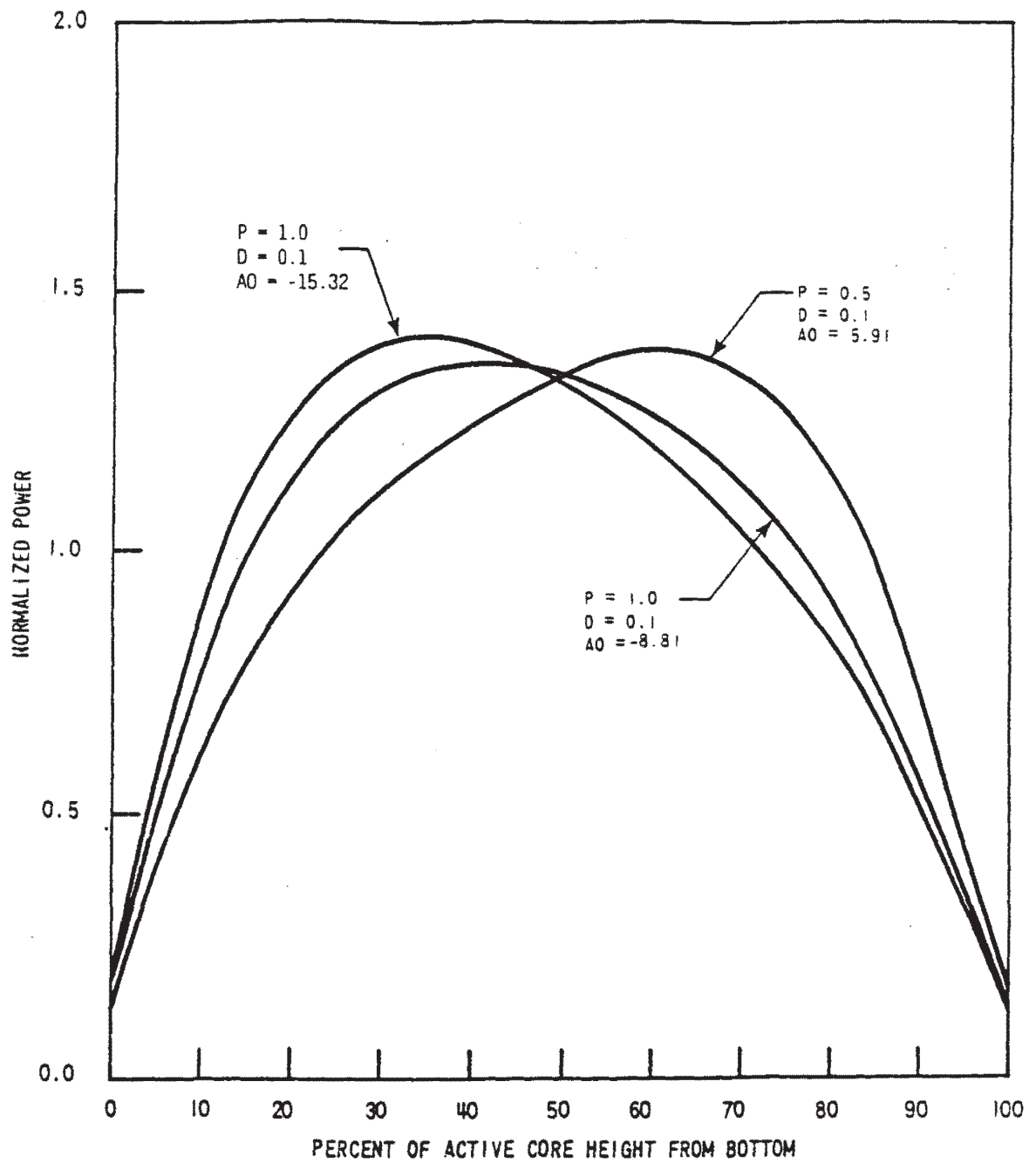


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Rodwise Power Distribution in a
Typical Assembly Near EOL, HFP,
Equilibrium Xenon, Unrodded Core

FIGURE 4.3-13

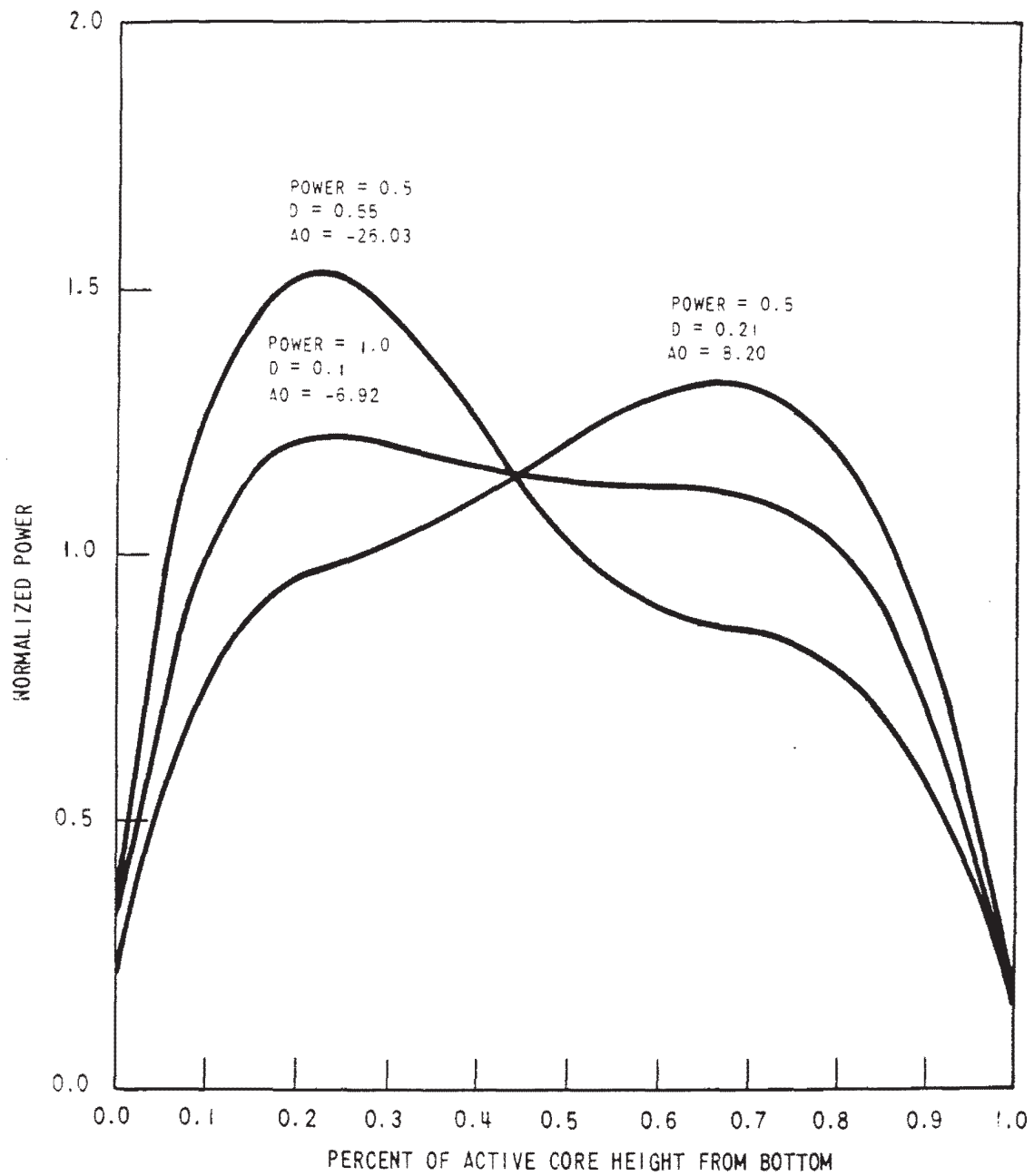


Amendment 95
February 2, 1998

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Axial Power
Shapes Occurring at BOL

FIGURE 4.3-14

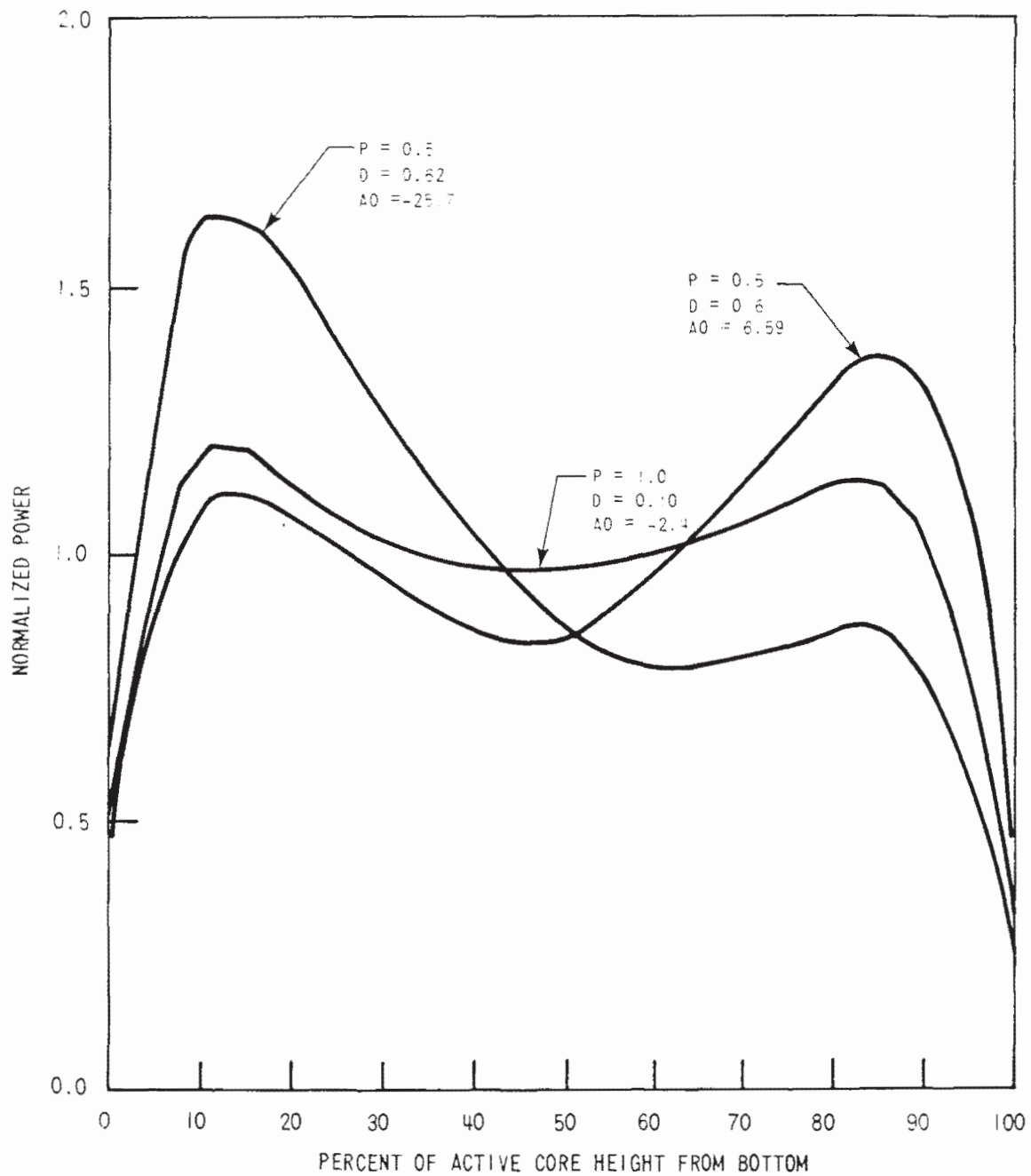


AMENDMENT 92
AUGUST 31, 1994

**COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT**

Typical Axial Power
Shapes Occurring at MOL

FIGURE 4.3-15



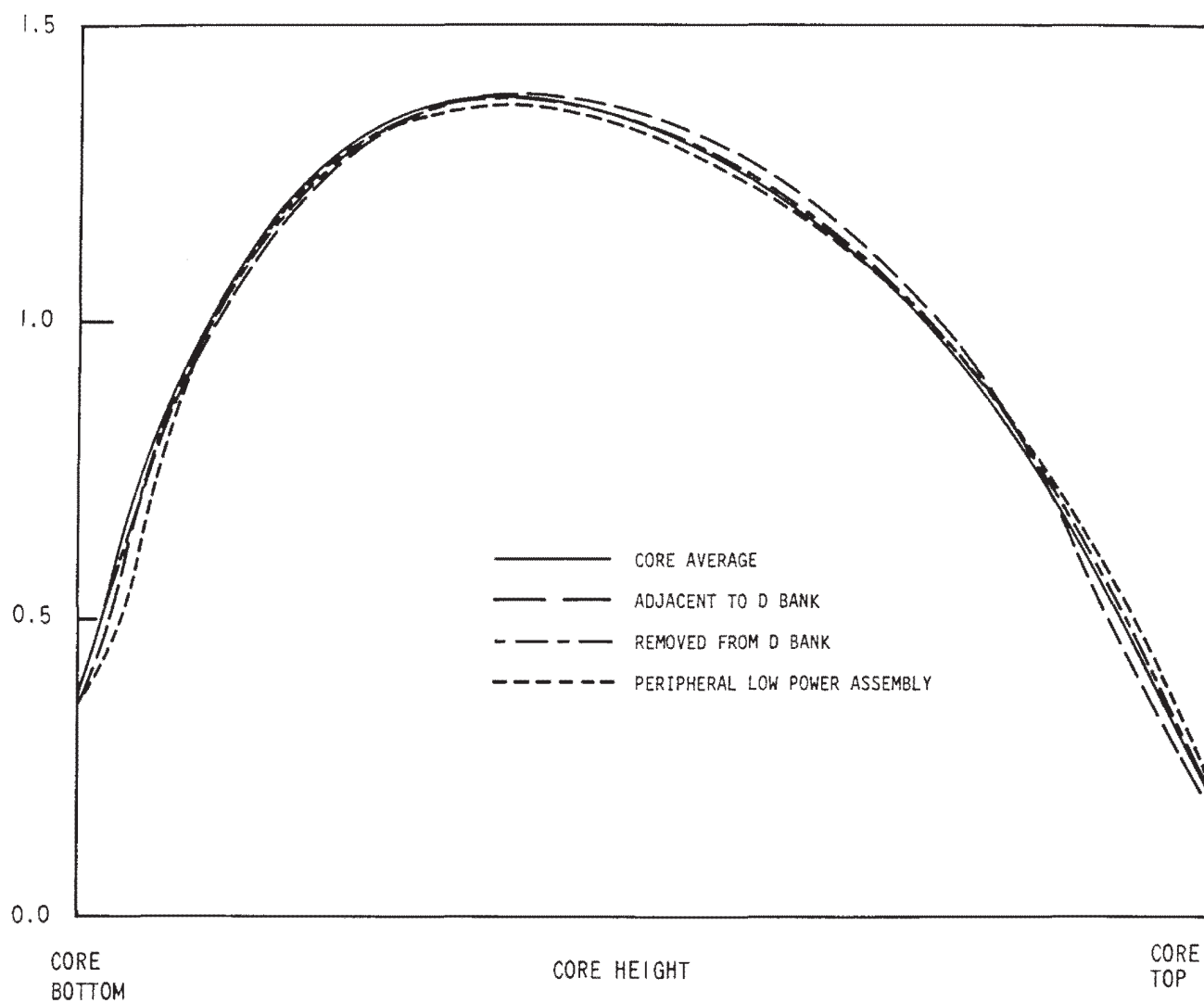
AMENDMENT 92
AUGUST 31, 1994

**COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT**

Typical Axial Power
Shapes Occurring at EOL

FIGURE 4.3-16

Axial Relative Power



AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Comp of Assembly Axial Power
Dist. with Core Average Axial
Dist. D. Bank Slightly Inserted

FIGURE 4.3-17

Figures 4.3-18 thru 4.3-23A,B have been deleted | 92

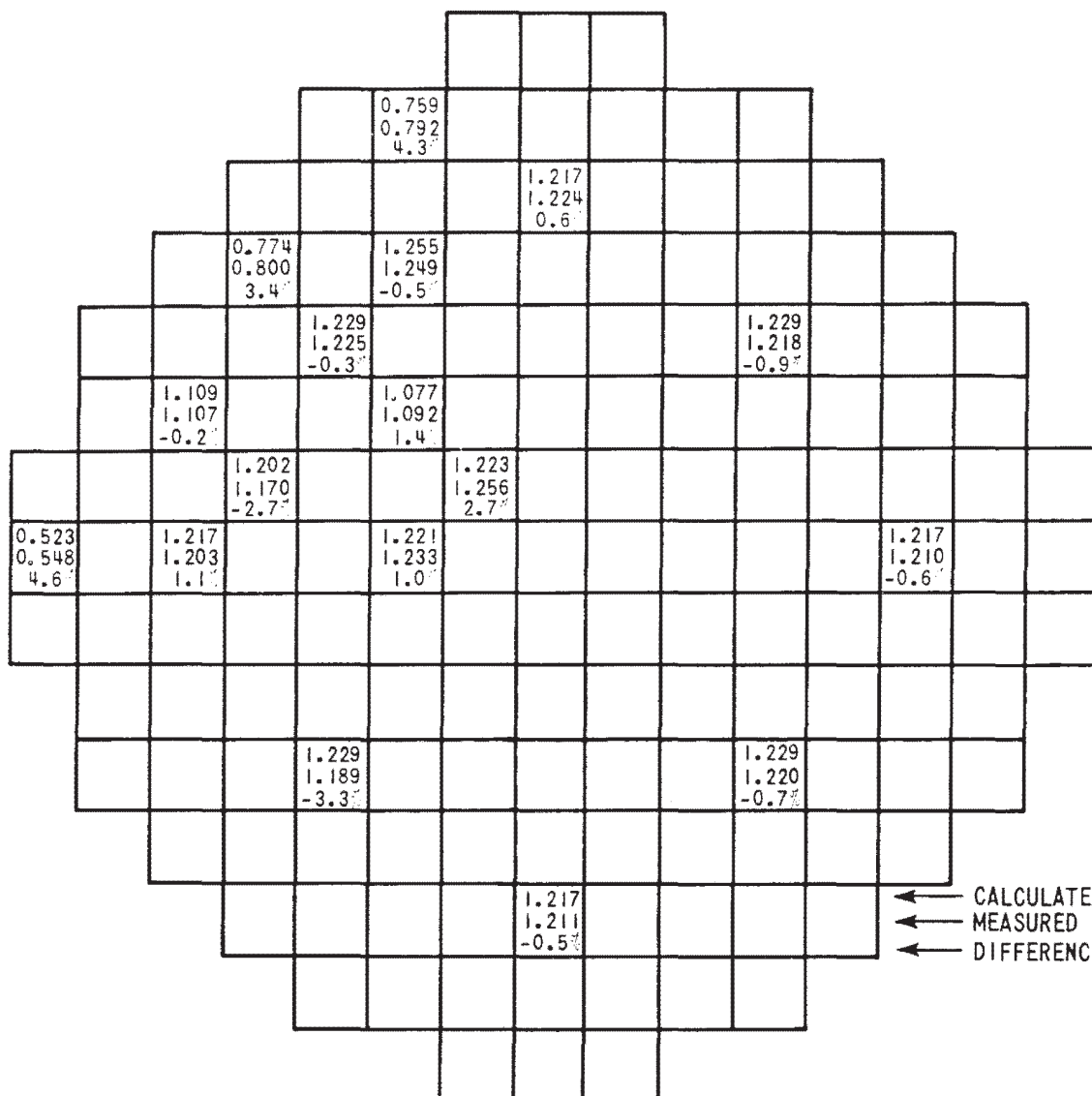
Figures 4.3-18 thru 4.3-23A,B have been deleted | 92

Figures 4.3-18 thru 4.3-23A,B have been deleted | 92

Figures 4.3-18 thru 4.3-23A,B have been deleted | 92

Figures 4.3-18 thru 4.3-23A,B have been deleted | 92

Figures 4.3-18 thru 4.3-23A,B have been deleted | 92



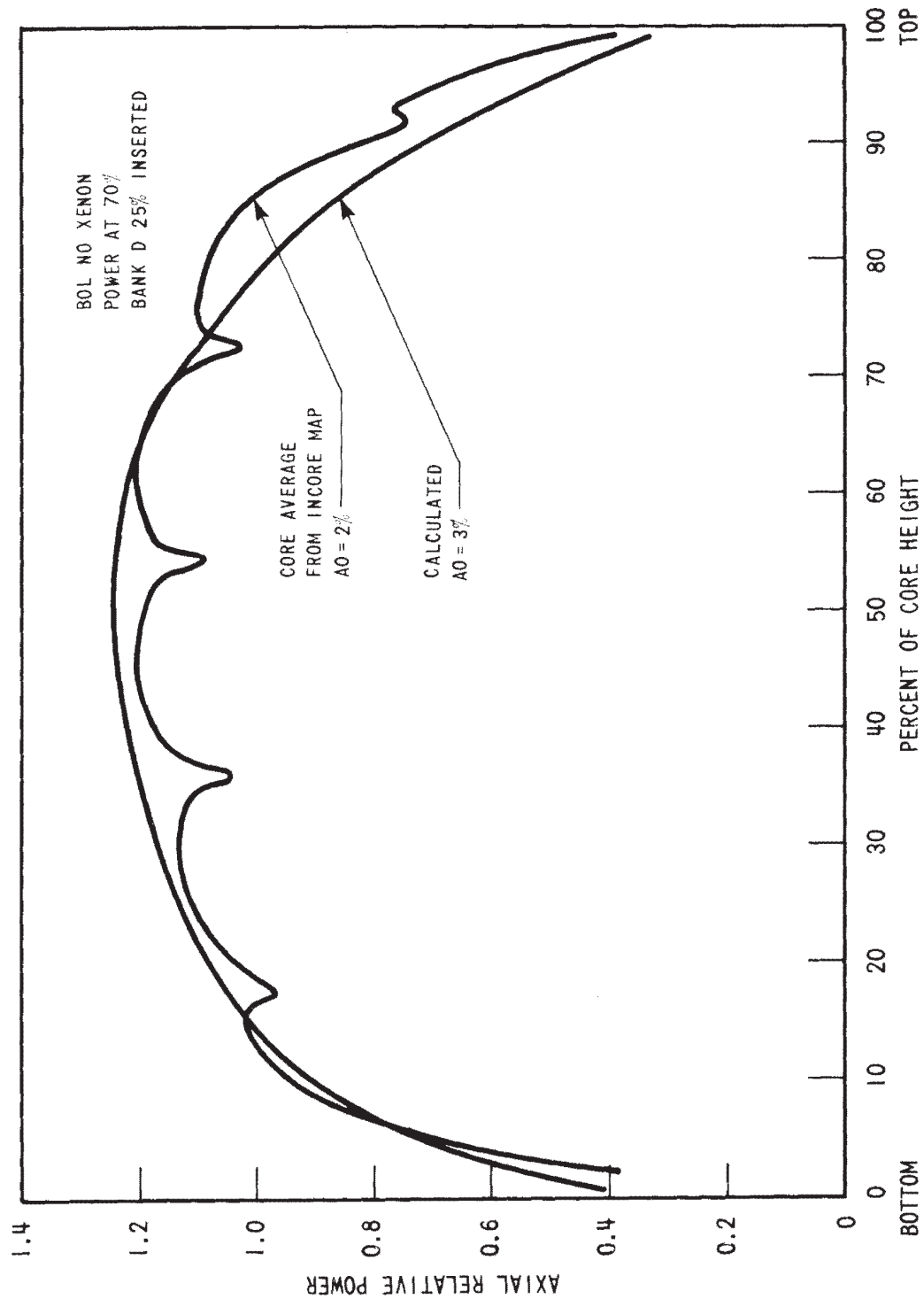
PEAKING FACTORS
 $\bar{F}_z = 1.5$
 $F_{\Delta H}^N = 1.357$
 $F_Q^N = 2.07$ LOCATED AT
 M-8 SOUTH

AMENDMENT 92
 AUGUST 31, 1994

COMANCHE PEAK S.E.S. FINAL SAFETY ANALYSIS REPORT

Comparison Between Calculated
 and Measured Relative Fuel
 Assembly Power Distribution

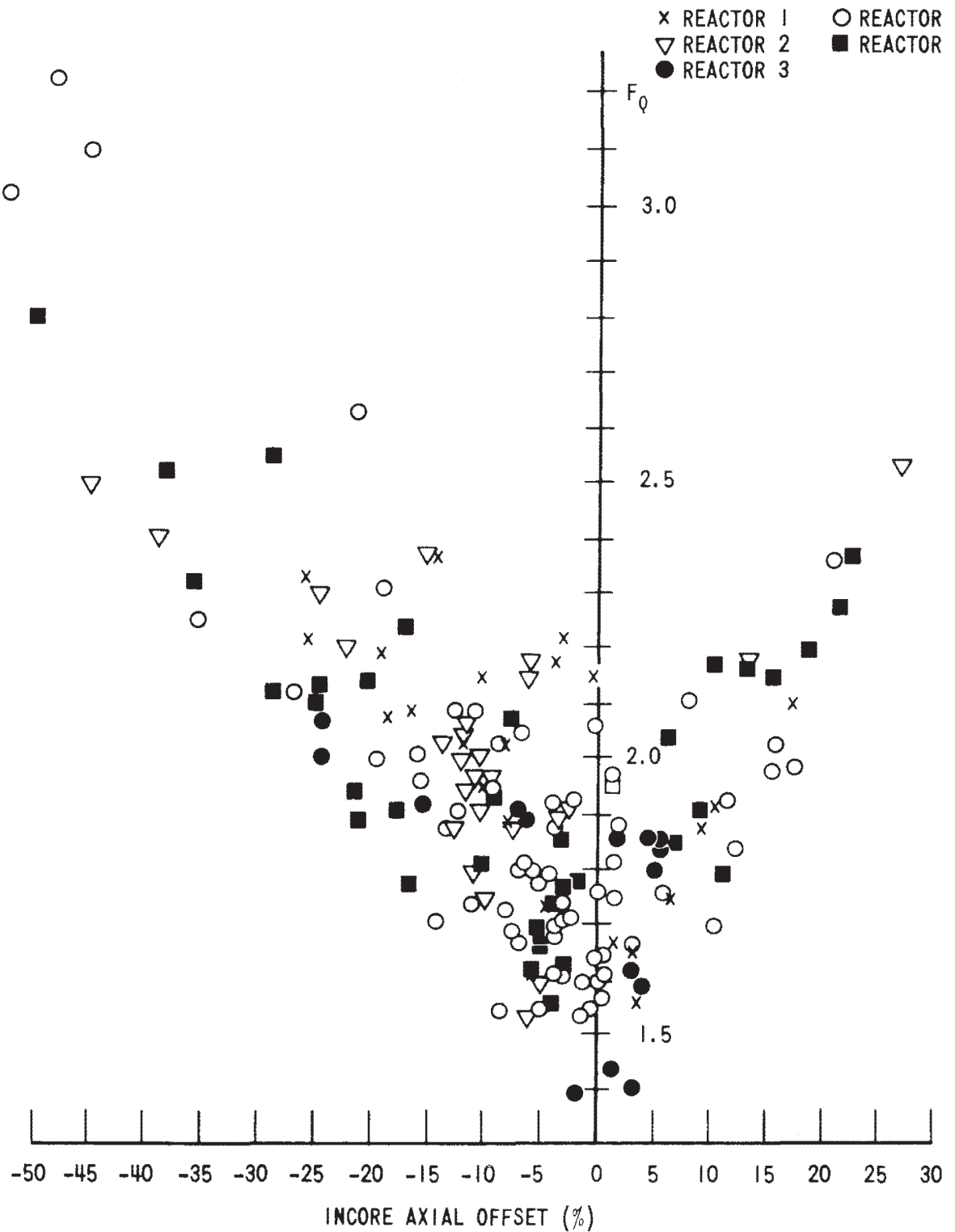
FIGURE 4.3-24



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Comparison of Calculated
and Measured Axial Shape

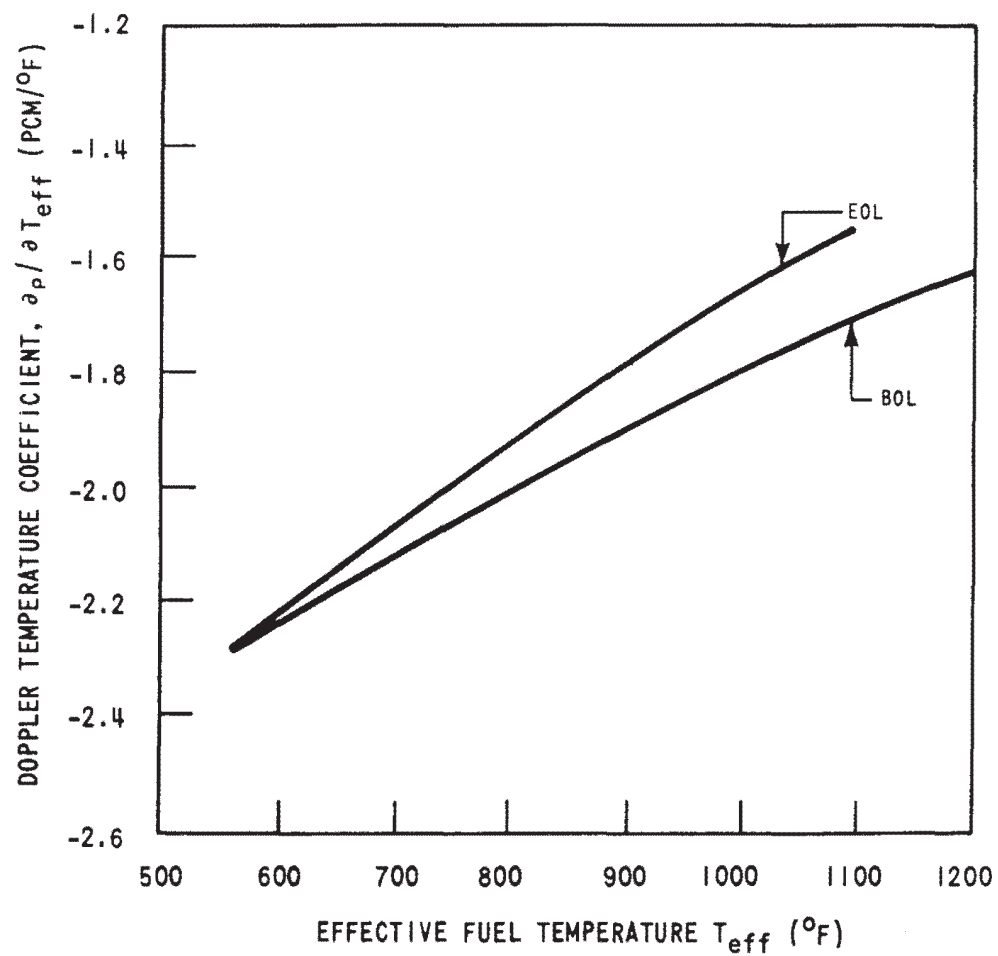
FIGURE 4.3-25



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Measured Values of F_0 for
Full Power Rod Configurations

FIGURE 4.3-26

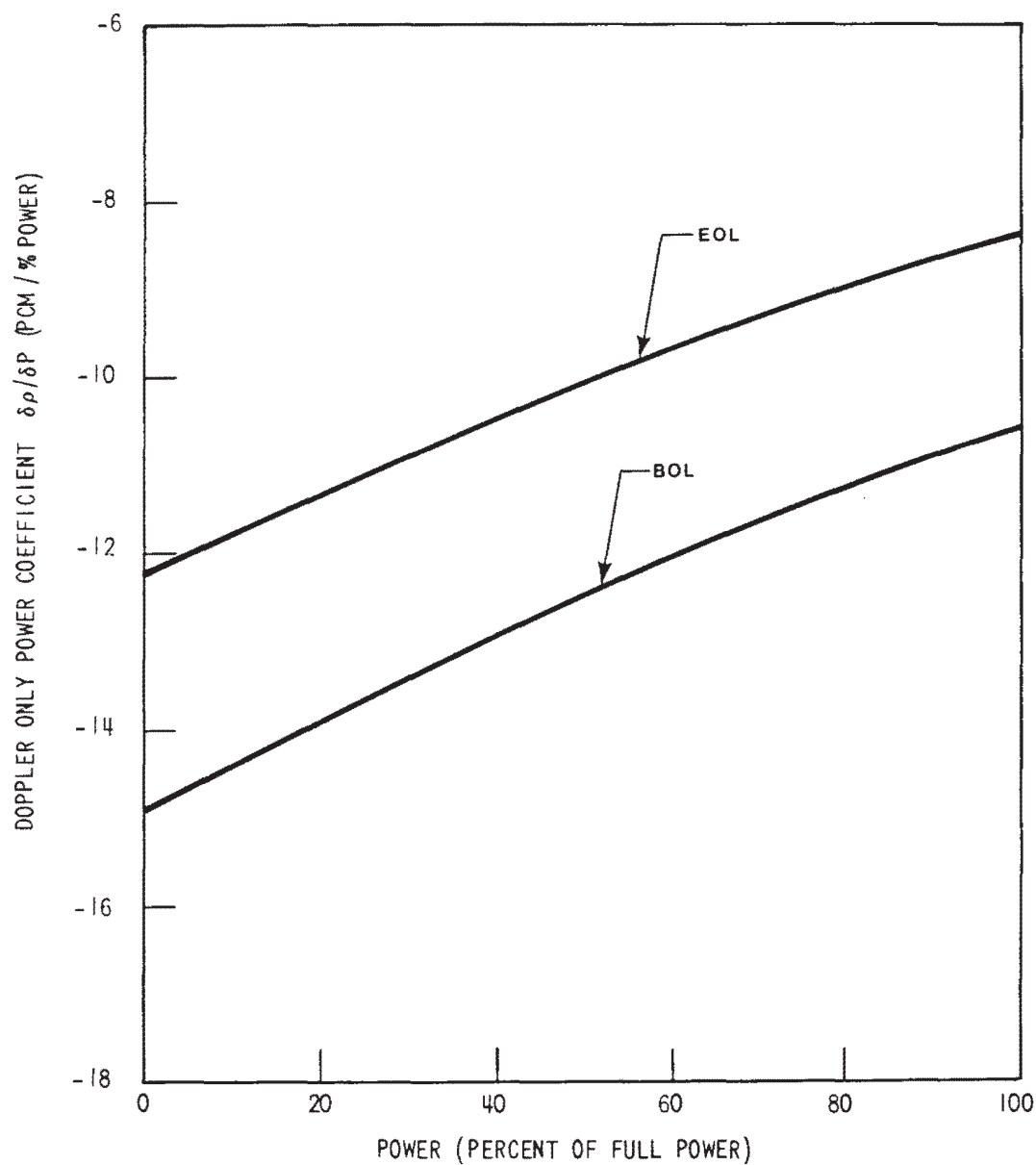


AMENDMENT 92
AUGUST 31, 1994

**COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
Typical**

Doppler Temperature Coefficient at
BOL and EOL Cycle 1

FIGURE 4.3-27

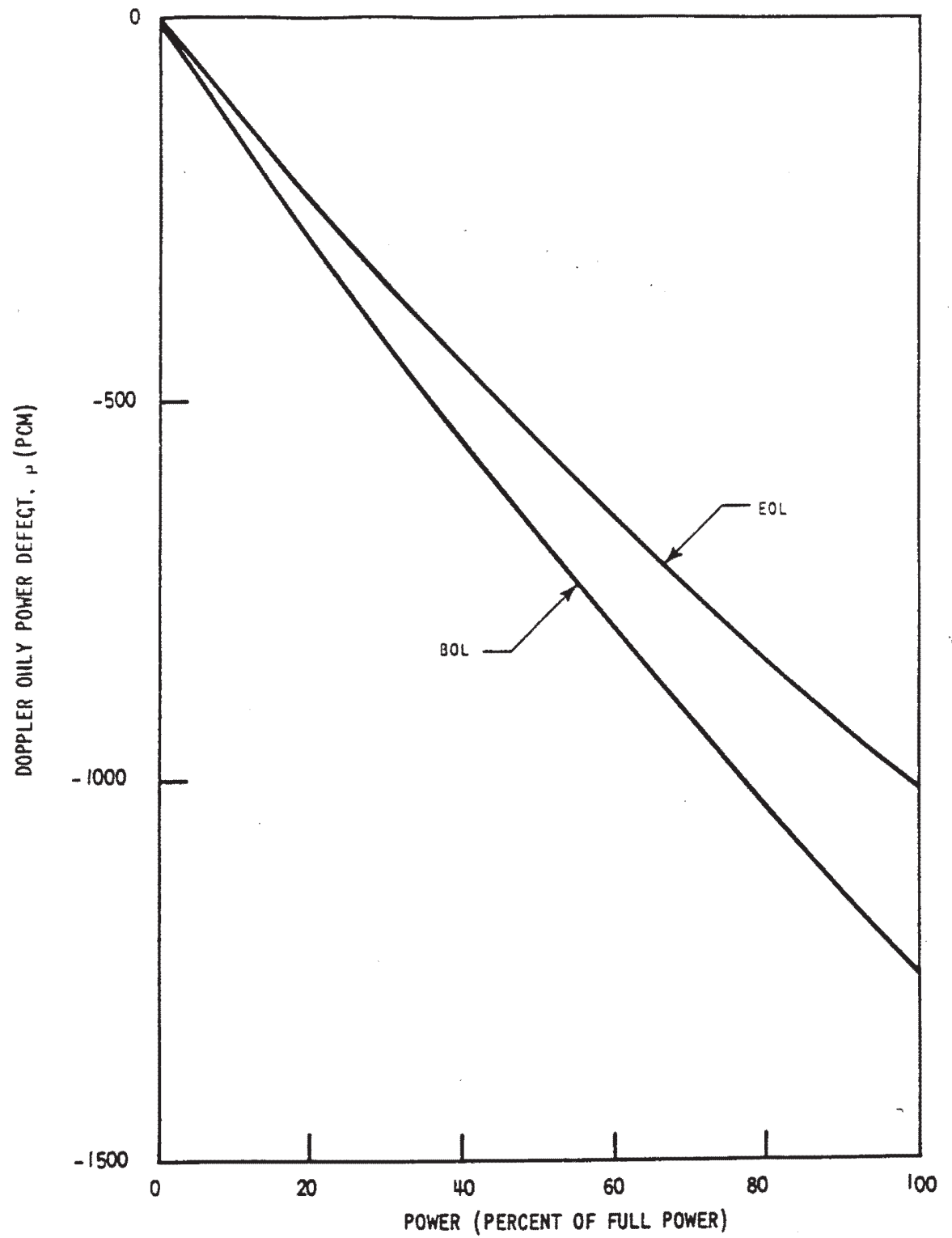


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

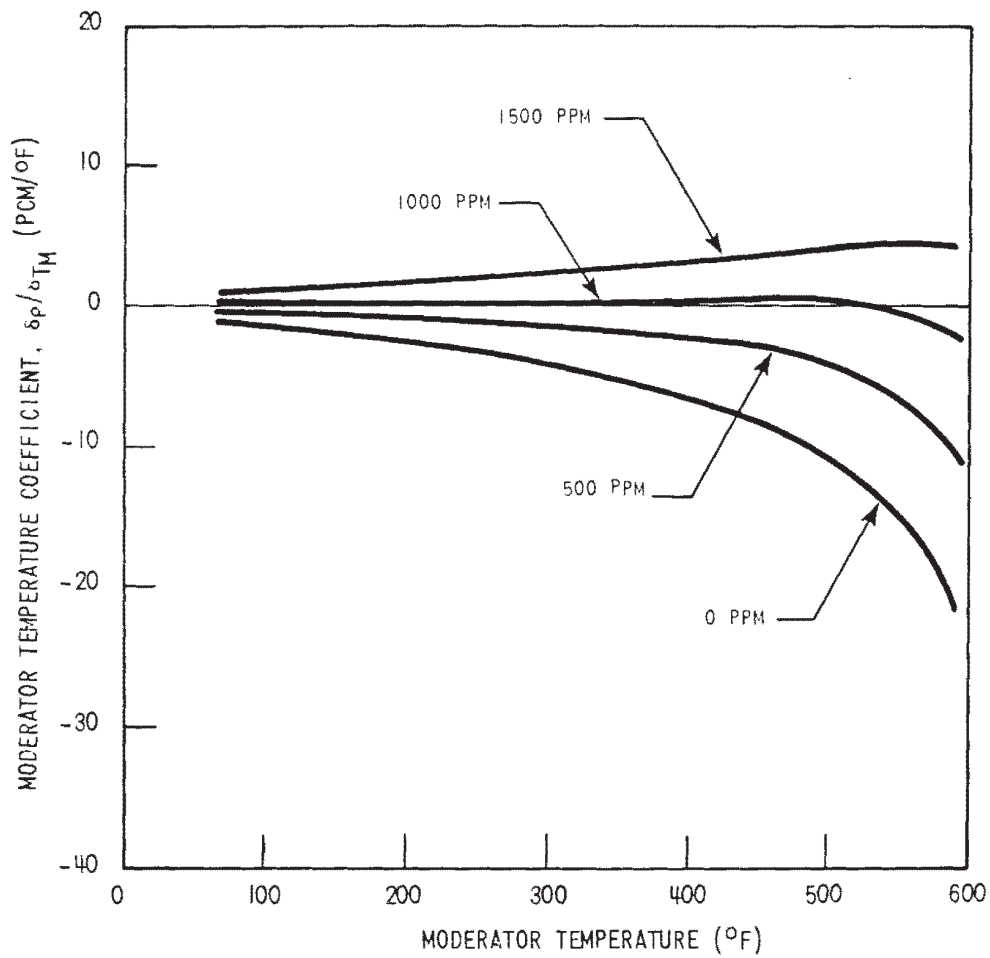
Typical Doppler-Only Power
Coefficient - BOL, EOL

FIGURE 4.3-28



Amendment 95
February 2, 1998

COMANCHE PEAK S.E.S FINAL SAFETY ANALYSIS REPORT
Typical Doppler-Only Power Defect - BOL, EOL
FIGURE 4.3-29

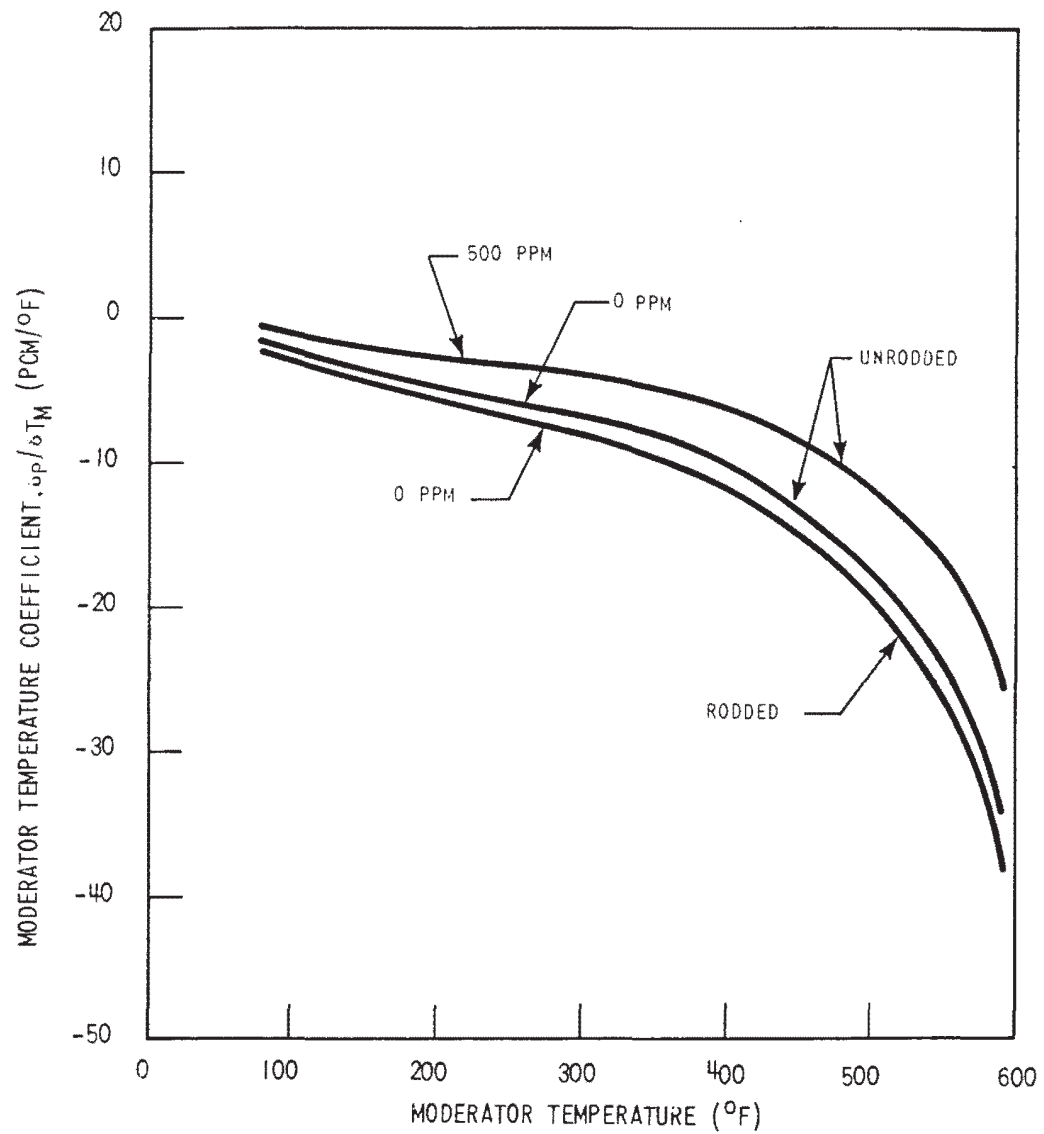


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Moderator Temperature Coefficient
- BOL, No Rods (Typical)

FIGURE 4.3-30

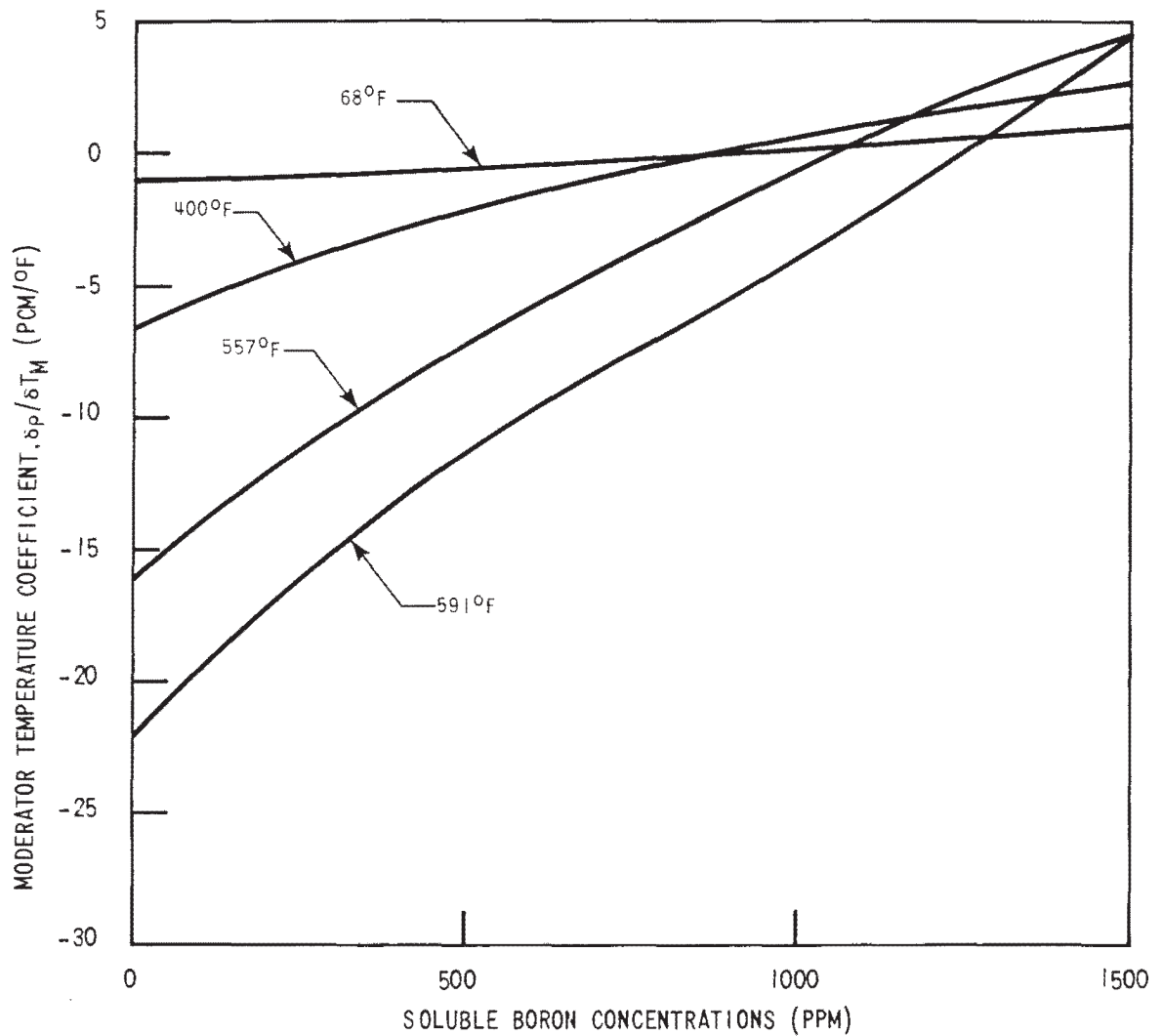


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Moderator Temperature
Coefficient, EOL

FIGURE 4.3-31

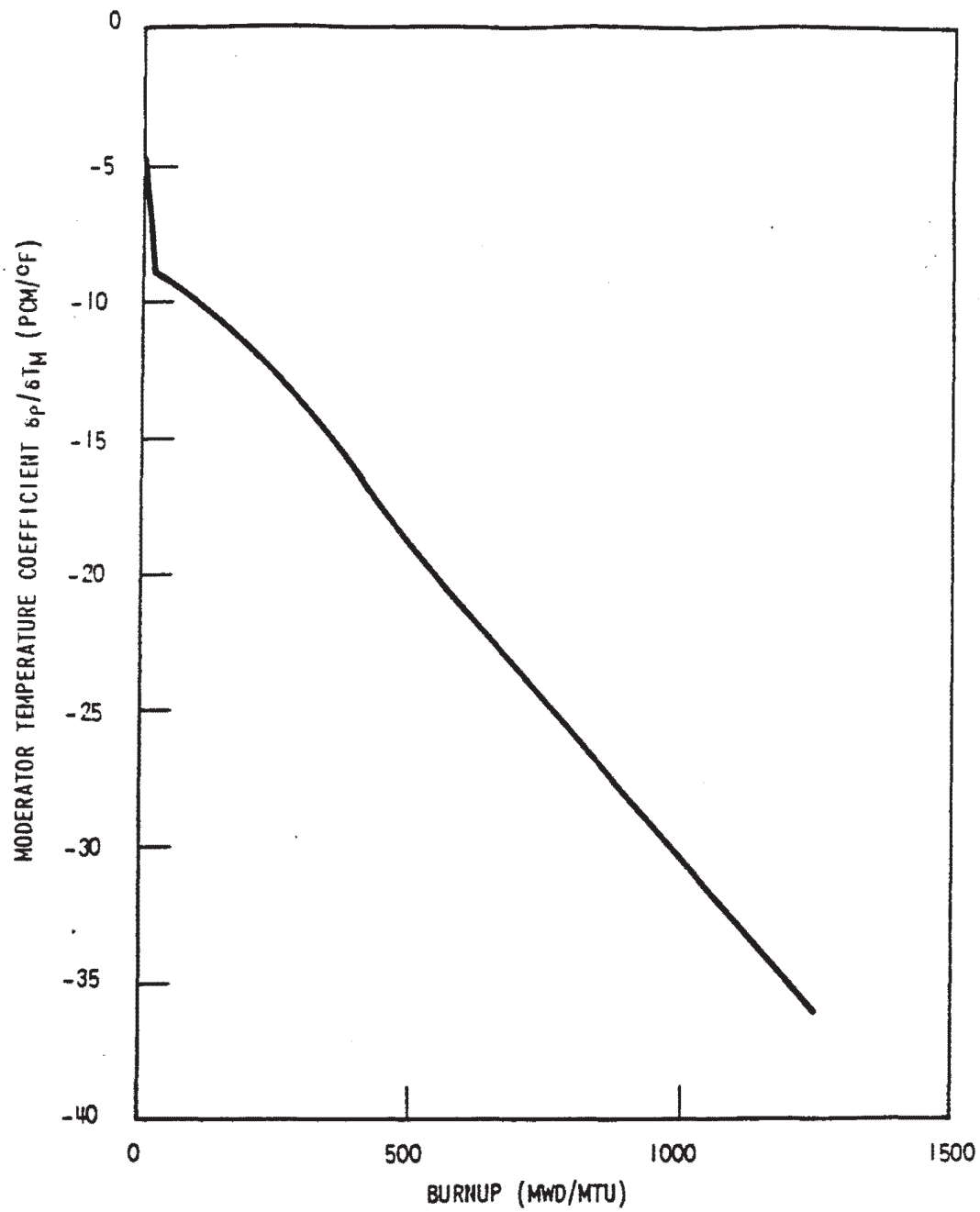


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

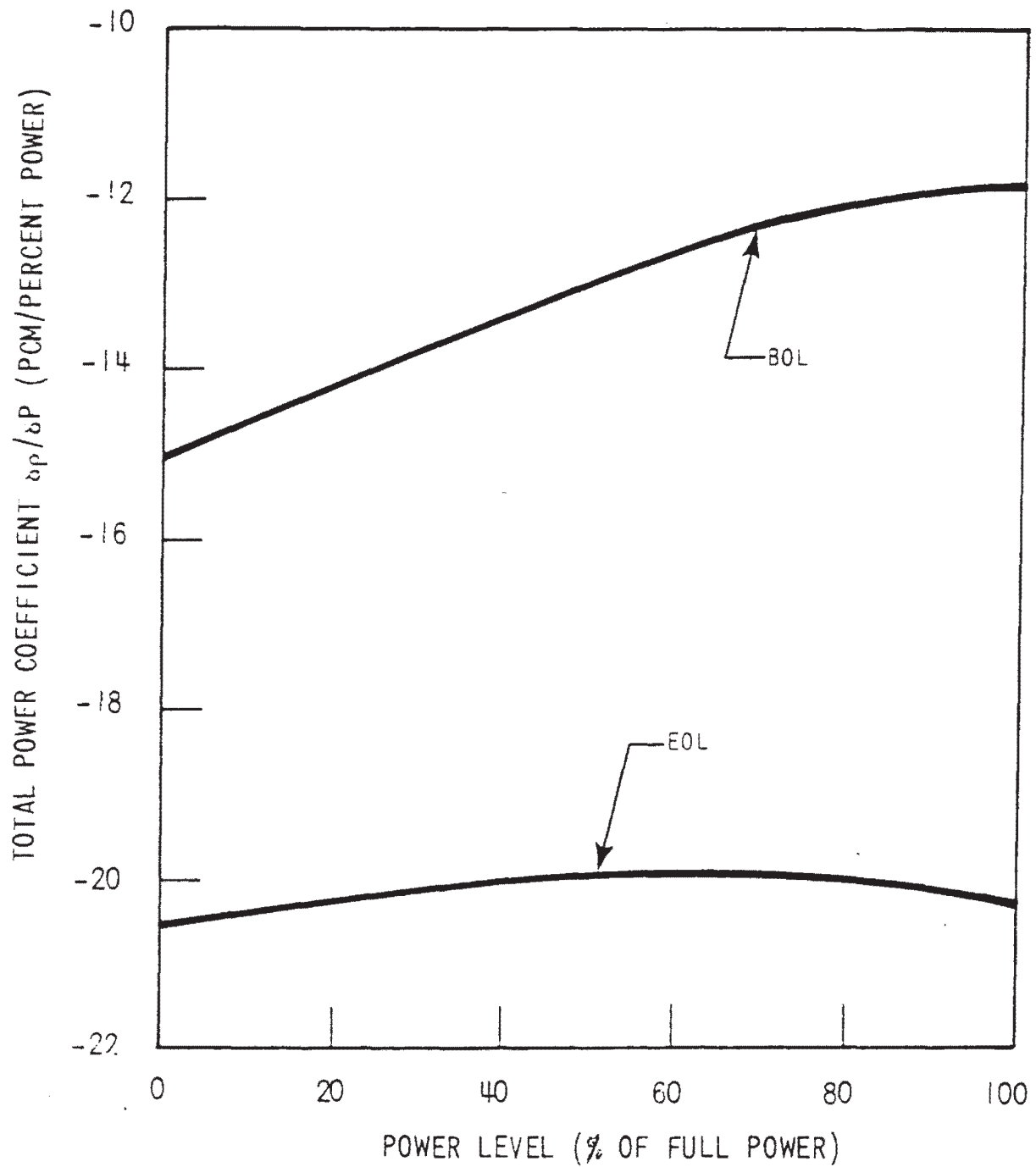
Moderator Temperature Coefficient
as a Function of Boron Concentration
- BOL, No Rods (Typical)

FIGURE 4.3-32



Amendment 95
February 2, 1998

COMANCHE PEAK S.E.S FINAL SAFETY ANALYSIS REPORT UNITS 1 and 2
HFP Temperature Coefficient for the Critical Boron Concentration (Typical)
FIGURE 4.3-33

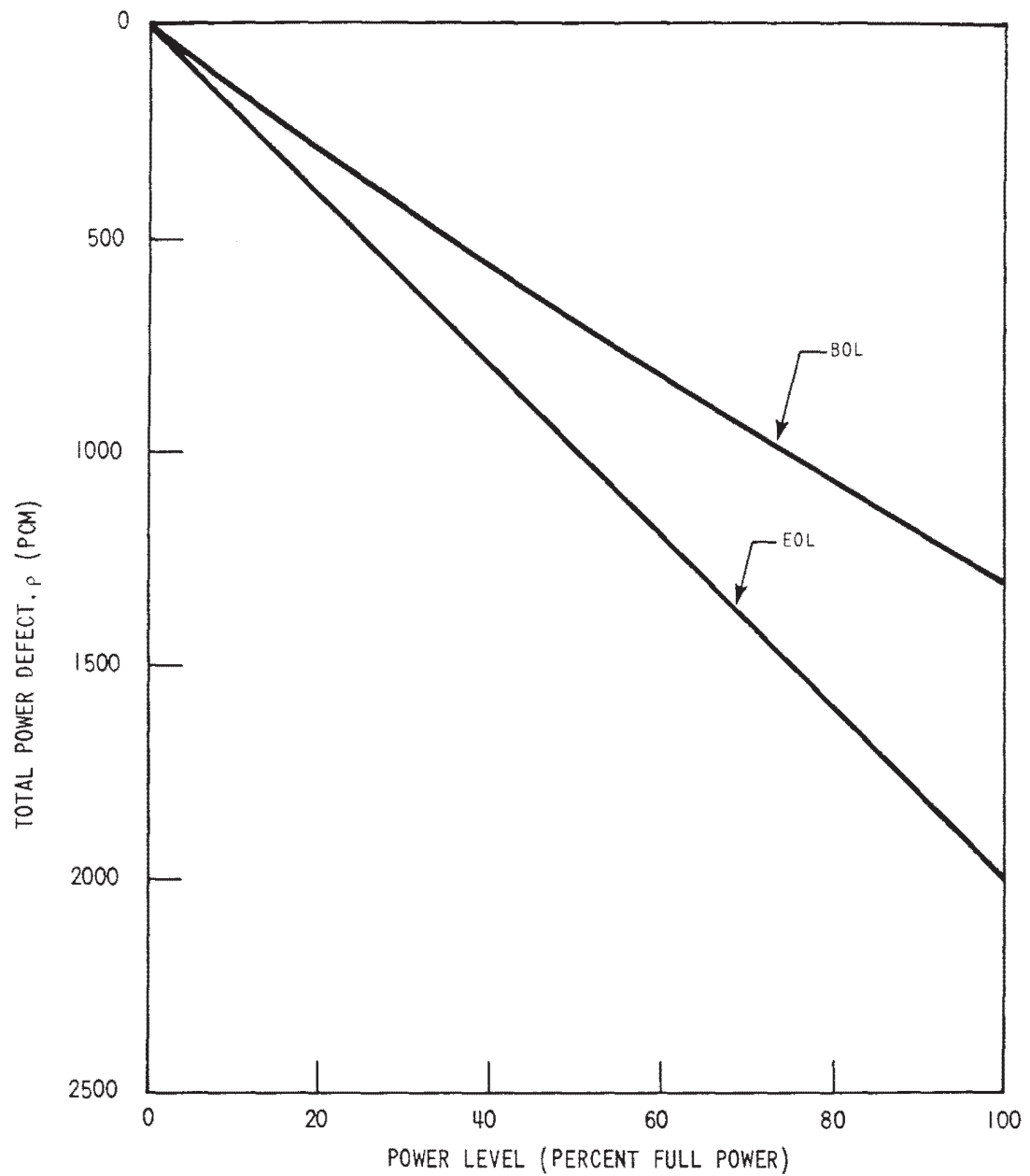


COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Total Power Coefficient -
BOL, EOL

FIGURE 4.3-34

Amendment 96
August 2, 1999

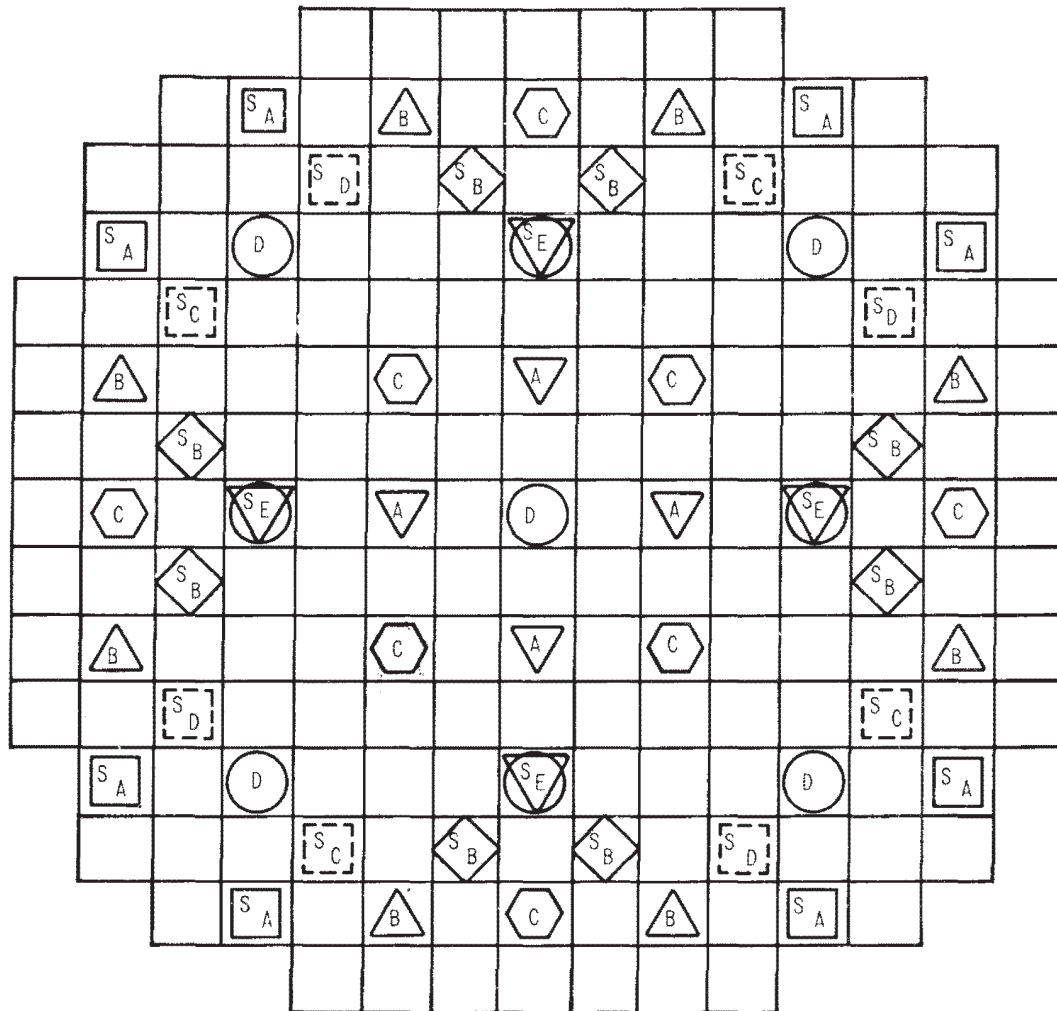


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Total Power Defect -
BOL, EOL

FIGURE 4.3-35

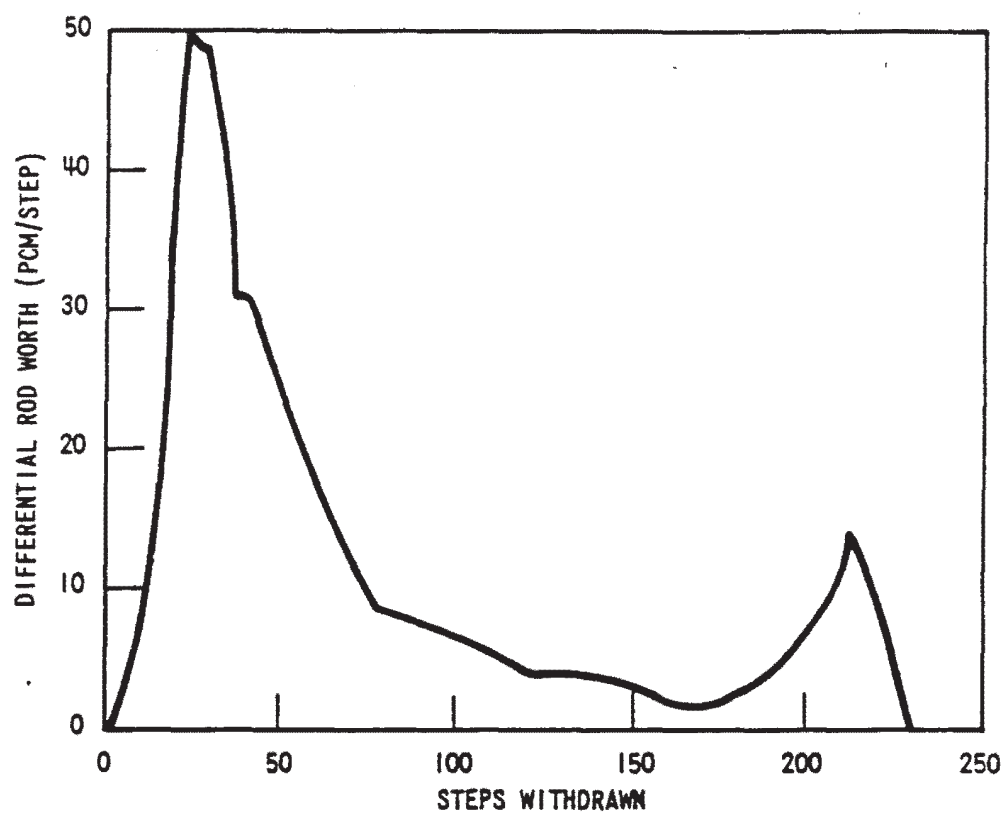


SHUTDOWN BANK	S _A	8
SHUTDOWN BANK	S _B	8
SHUTDOWN BANK	S _C & S _D	4 & 4
SHUTDOWN BANK	S _E	4
CONTROL BANK	A	4
CONTROL BANK	B	8
CONTROL BANK	C	8
CONTROL BANK	D	5

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Rod Cluster Control
Assembly Pattern

FIGURE 4.3-36

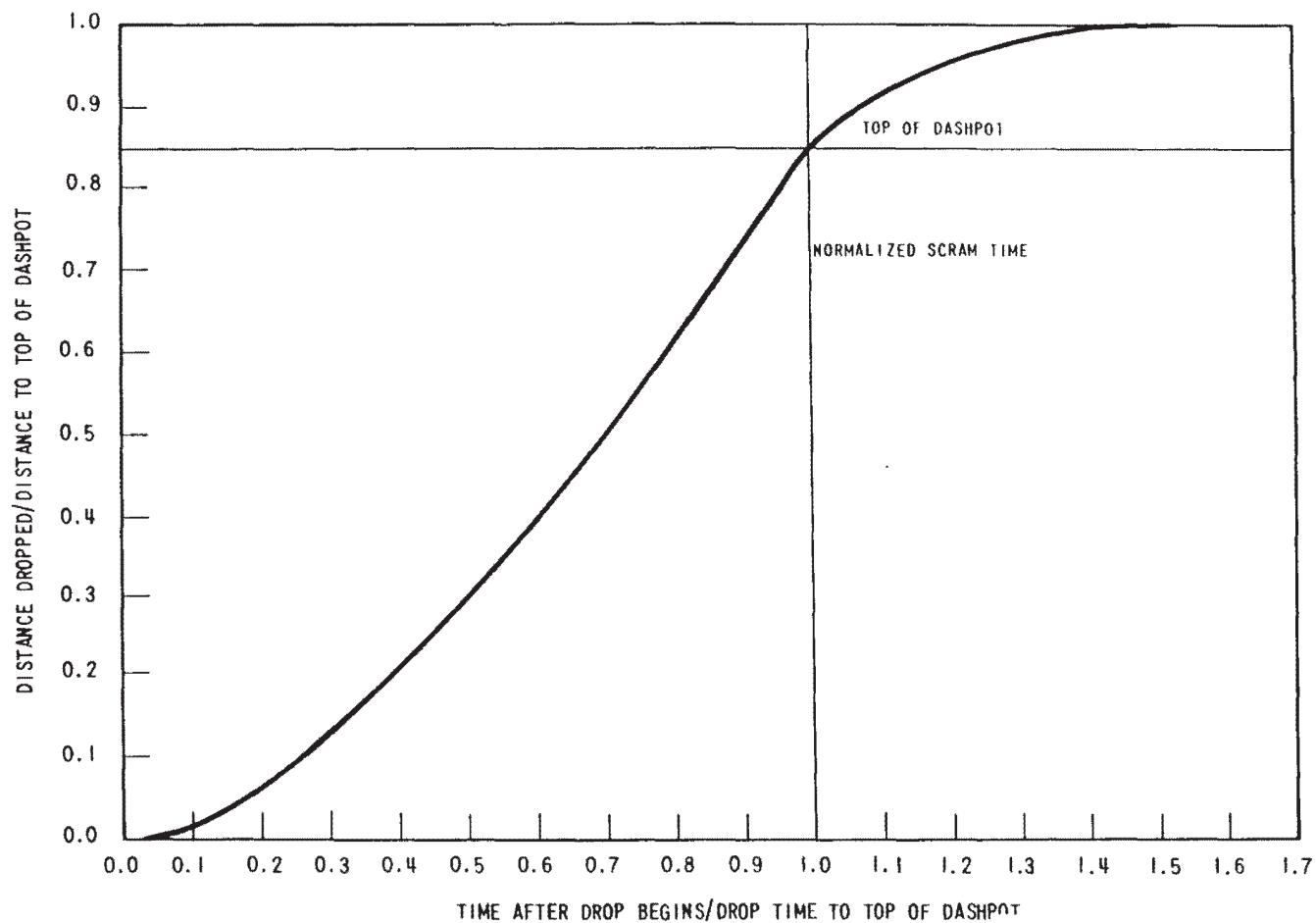


Amendment 95
February 2, 1998

COMANCHE PEAK S.E.S
FINAL SAFETY ANALYSIS REPORT

Accidental Simultaneous Withdrawal of 2
Control Banks EOL, HZP Banks C and B
Moving in Same Plane (Typical)

FIGURE 4.3-37

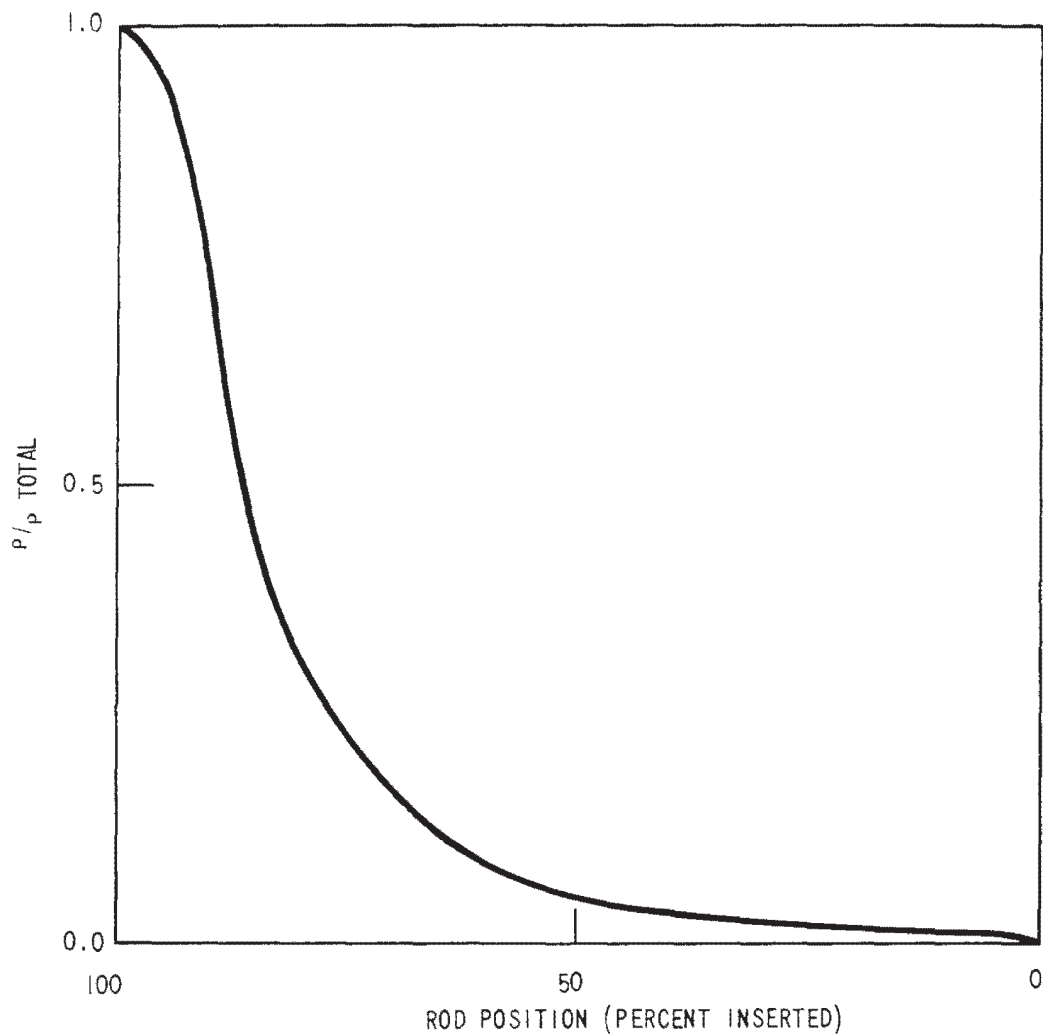


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Trip Curve

FIGURE 4.3-38

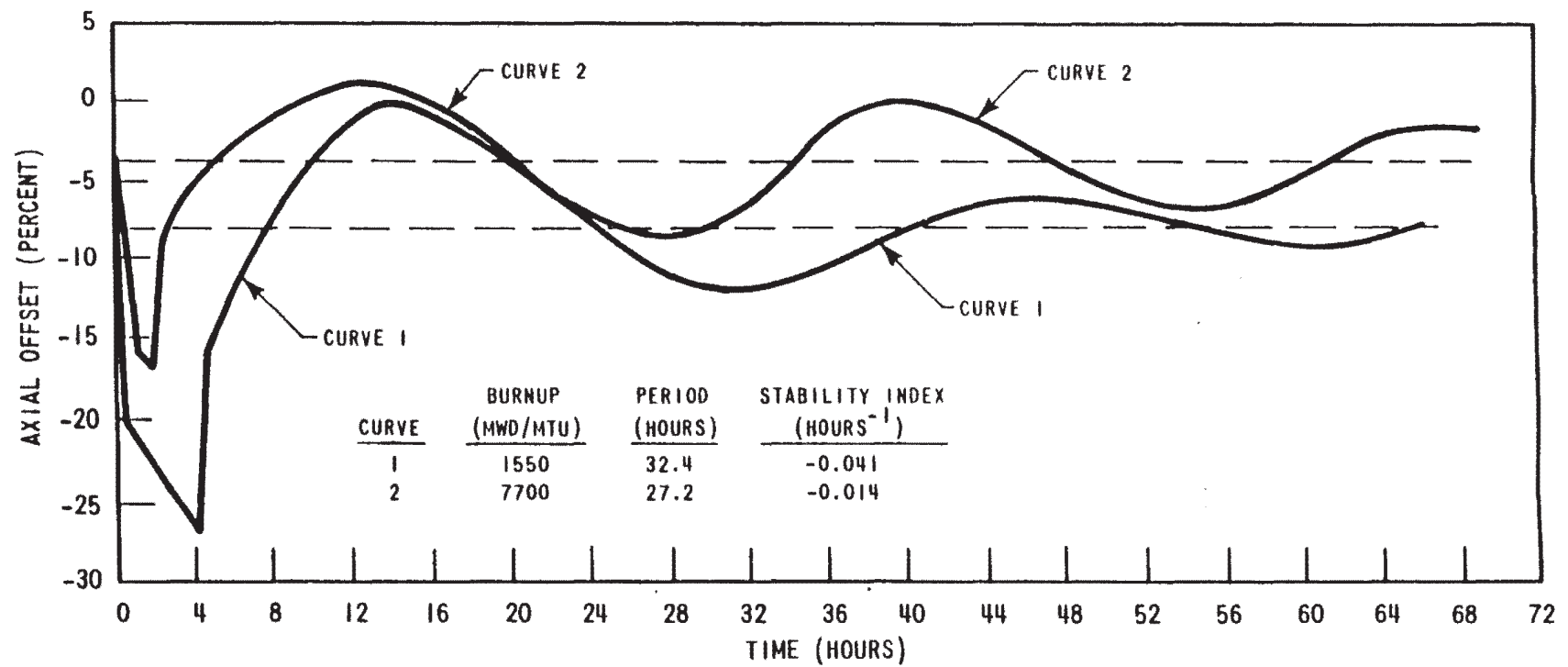


AMENDMENT 92
AUGUST 31, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

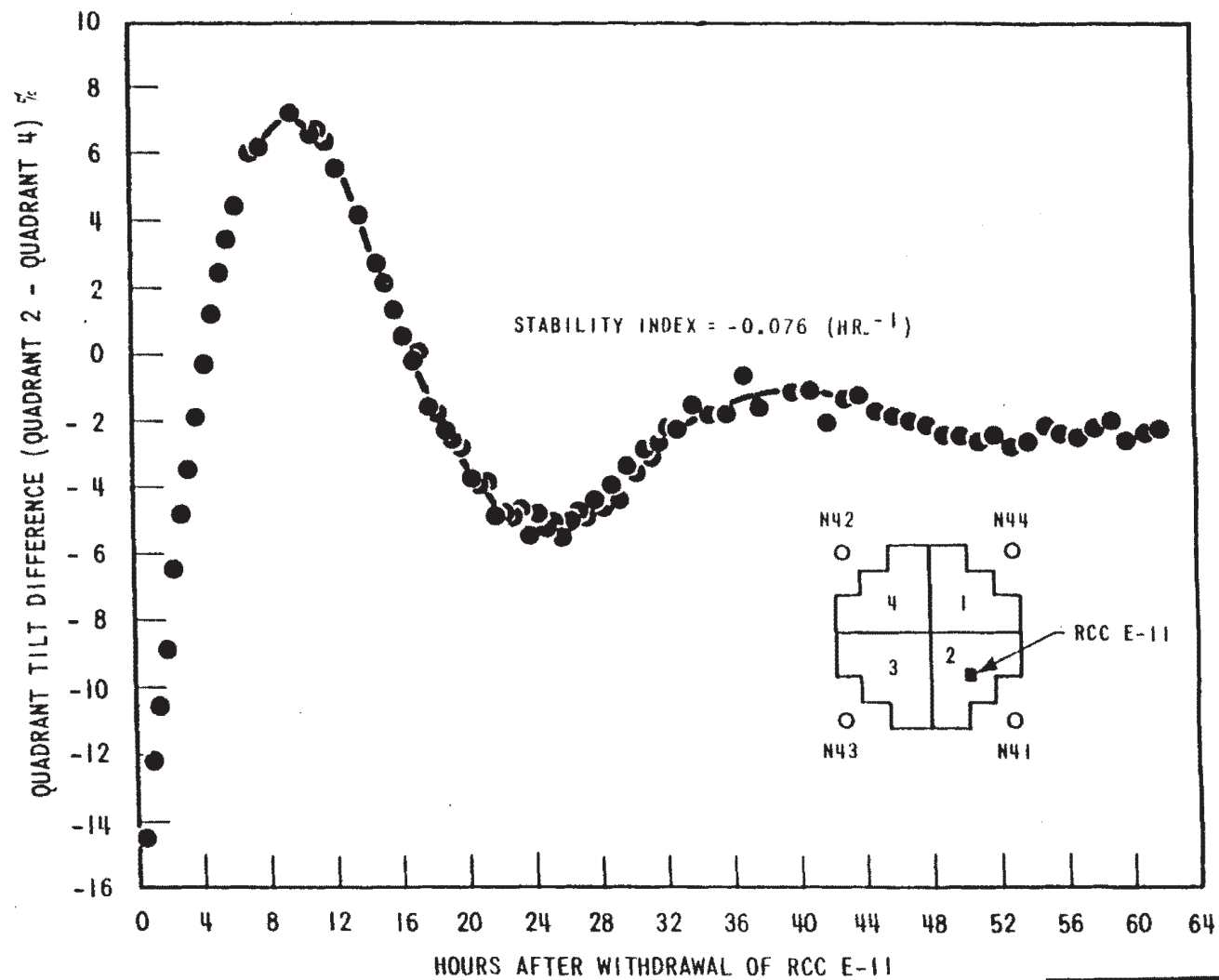
Normalized Rod Worth Vs
Percent Insertion -
All Rods But One (Typical)

FIGURE 4.3-39



Amendment 95
February 2, 1998

COMANCHE PEAK S.E.S
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2
Axial Offset Vs. Time
PWR Core with a 12-Ft Height
and 121 Assemblies
FIGURE 4.3-40



Amendment 95
February 2, 1998

COMANCHE PEAK S.E.S FINAL SAFETY ANALYSIS REPORT UNITS 1 and 2
XY Xenon Test Thermocouple Response Quadrant Tilt Difference Vs. Time
FIGURE 4.3-41

Figures 4.3-42 thru 4.3-45 have been deleted

|92

Figures 4.3-42 thru 4.3-45 have been deleted

|92

Figures 4.3-42 thru 4.3-45 have been deleted

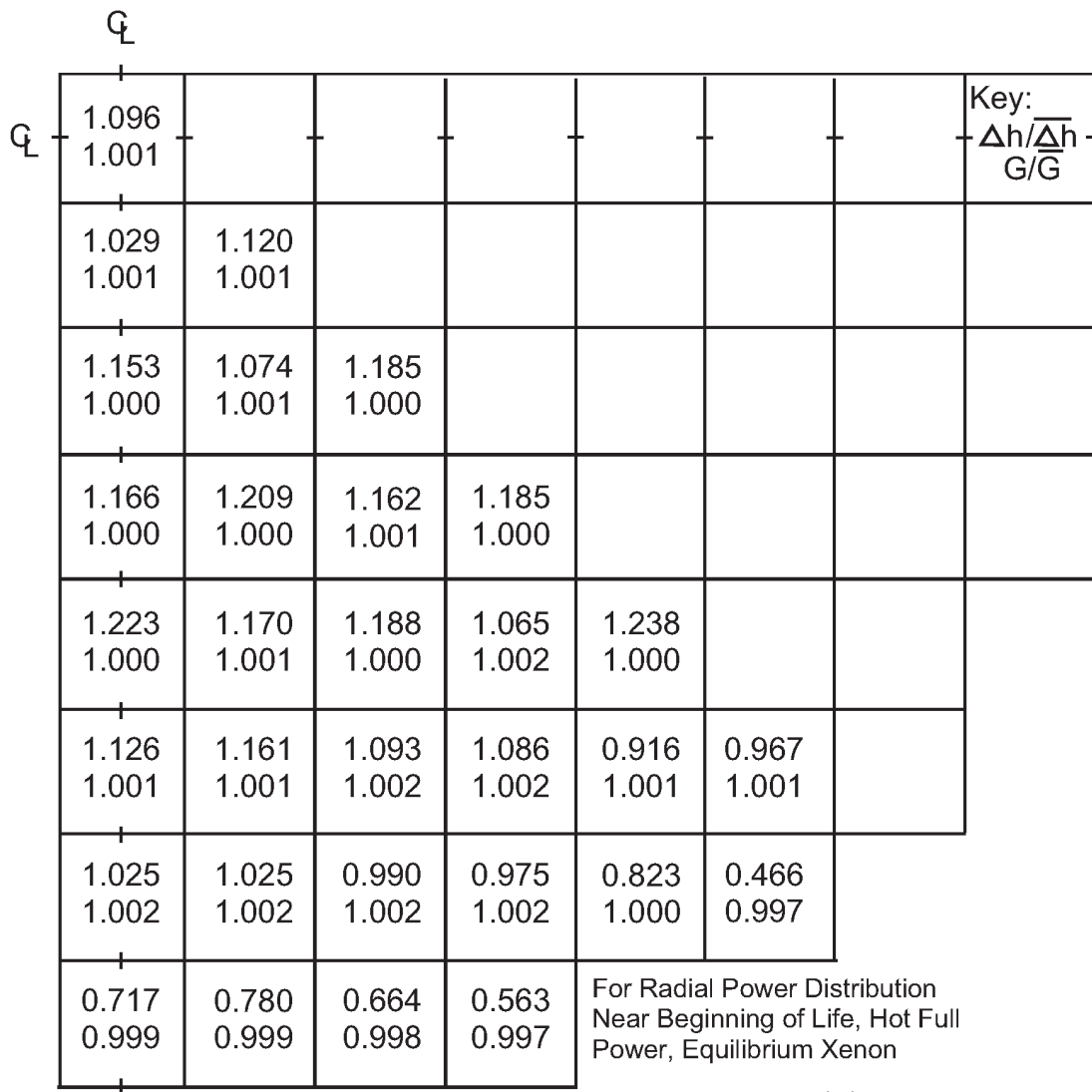
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Figures 4.3-42 thru 4.3-45 have been deleted

|92

Figures 4.4-1 thru 4.4-19 have been deleted

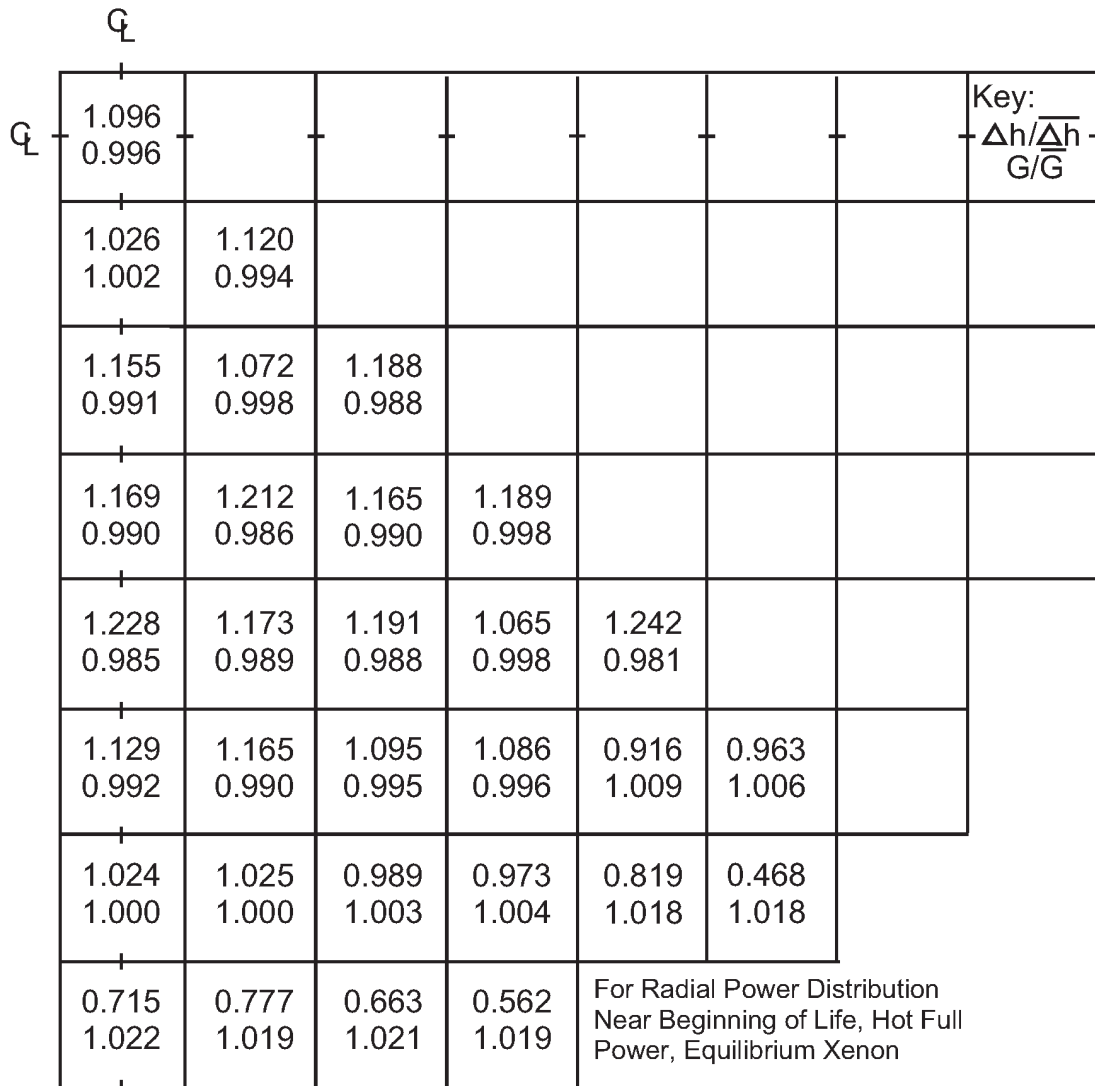
| 92



Calculated $F N = 1.34$
 ΔH

COMANCHE PEAK S.E.S FINAL SAFETY ANALYSIS REPORT UNITS 1 and 2
Normalized Radial Flow and Enthalpy Distribution at 4-Ft Elevation Typical of Cycle 1
Figure 4.4-2

Amendment No. 103



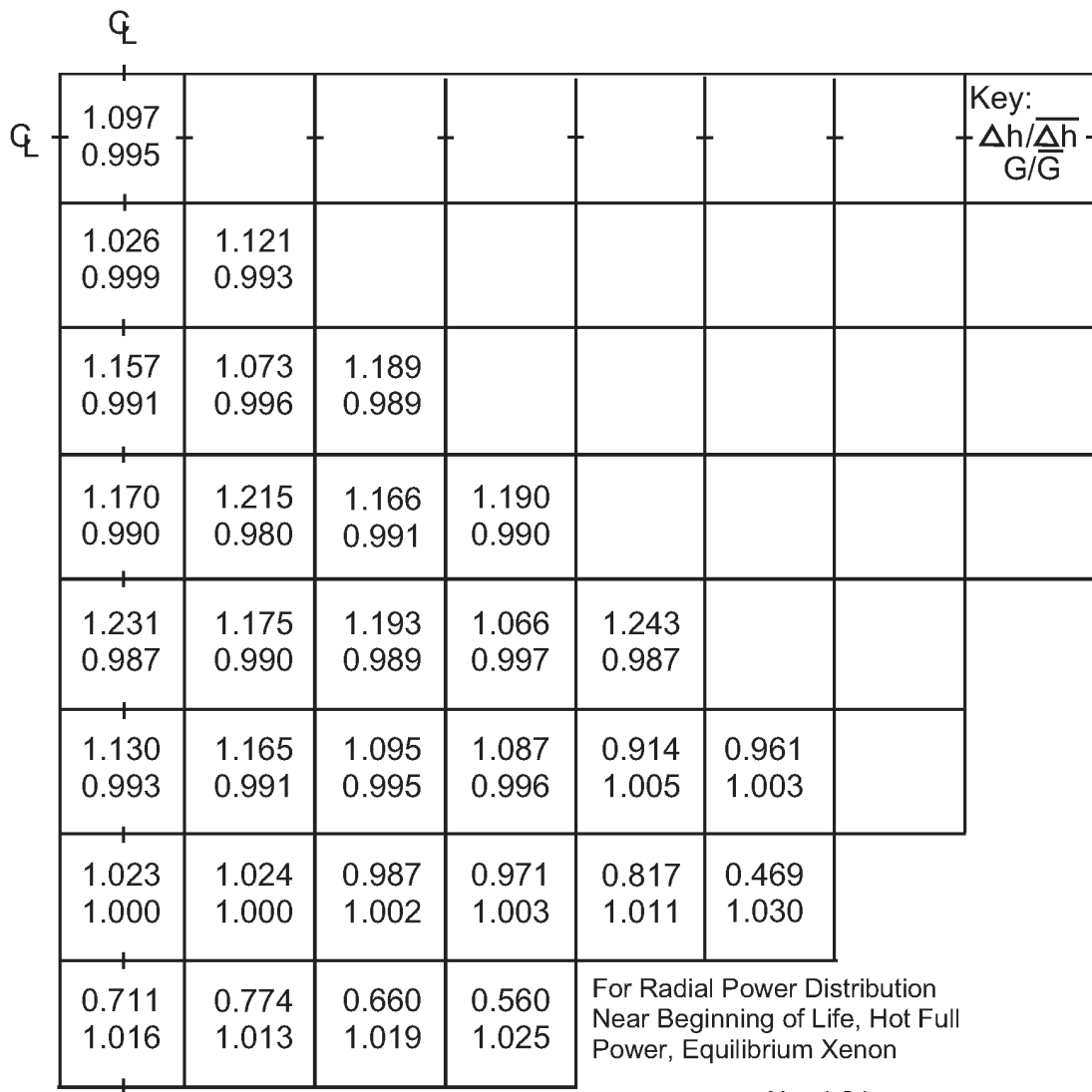
Calculated $F_N = 1.34$
 ΔH

COMANCHE PEAK S.E.S
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Normalized Radial Flow and
Enthalpy Distribution at
8-Ft Elevation Typical of Cycle 1

Figure 4.4-3

Amendment No. 103



Calculated $F_N = 1.34$
 ΔH

COMANCHE PEAK S.E.S FINAL SAFETY ANALYSIS REPORT UNITS 1 and 2
Normalized Radial Flow and Enthalpy Distribution at 12-Ft Elevation Typical of Cycle 1
Figure 4.4-4

Figures 4.4-1 thru 4.4-19 have been deleted

| 92

Figures 4.4-1 thru 4.4-19 have been deleted

| 92

Figures 4.4-1 thru 4.4-19 have been deleted

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Figures 4.4-1 thru 4.4-19 have been deleted

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Figures 4.4-1 thru 4.4-19 have been deleted

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Figures 4.4-1 thru 4.4-19 have been deleted

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Figures 4.4-1 thru 4.4-19 have been deleted

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Figures 4.4-1 thru 4.4-19 have been deleted

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Figures 4.4-1 thru 4.4-19 have been deleted

| 92

Figures 4.4-1 thru 4.4-19 have been deleted

| 92

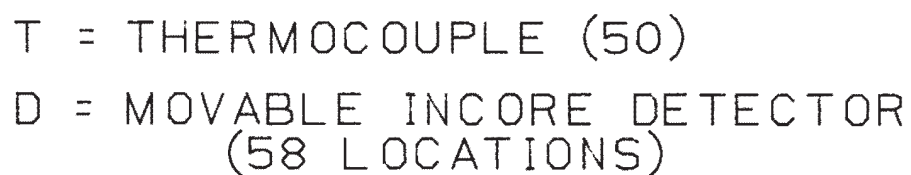
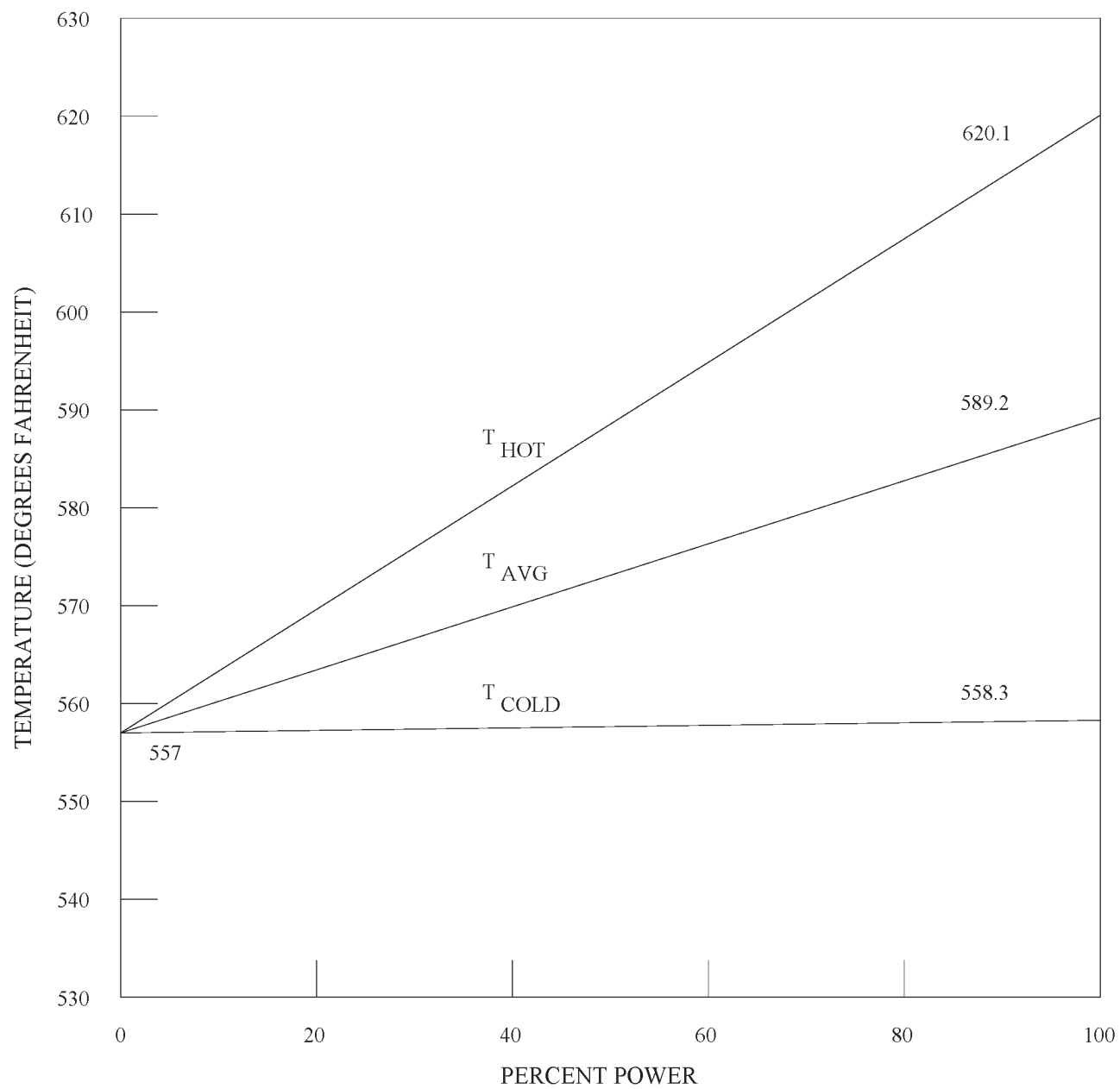


FIGURE 4.4-20

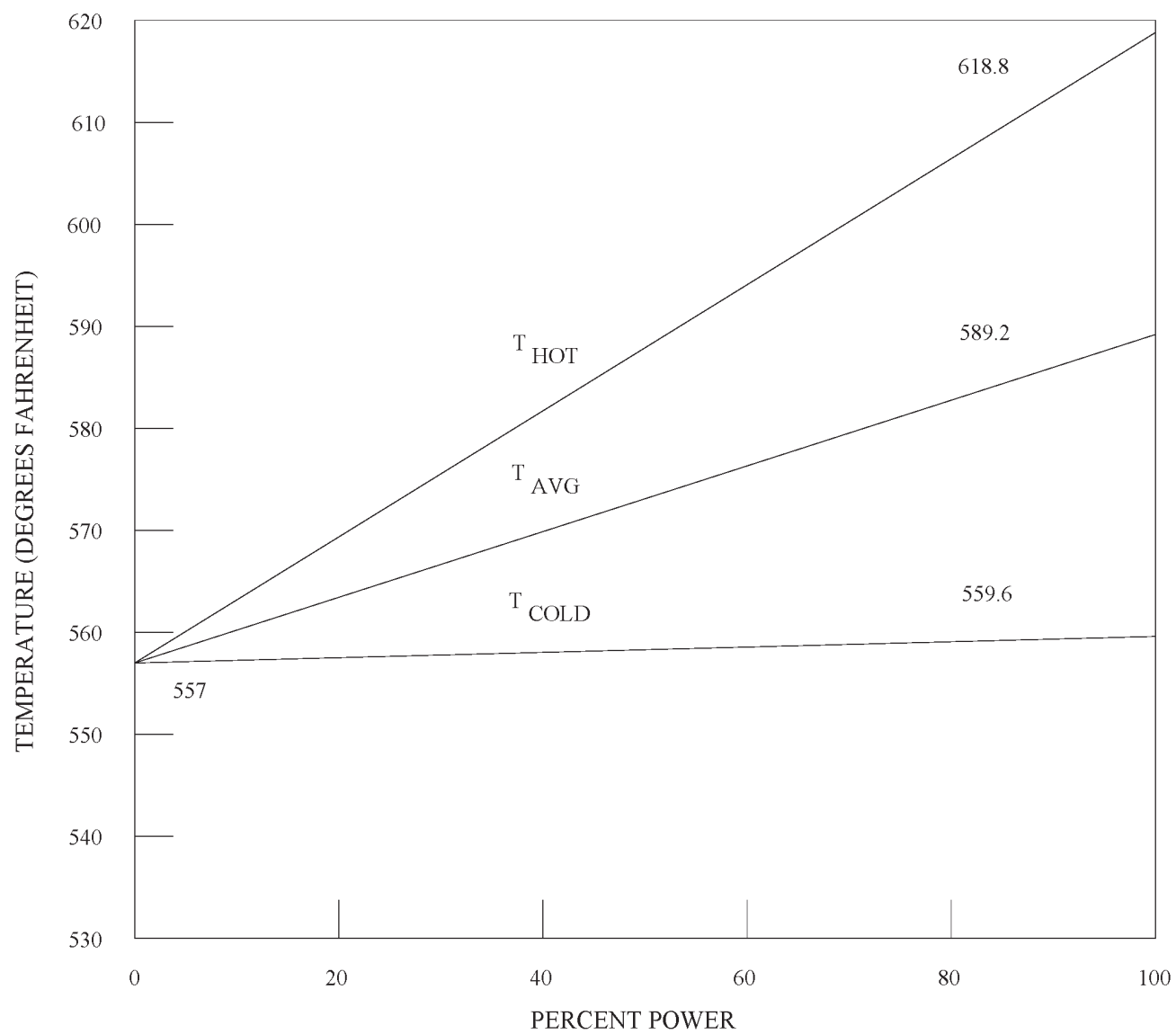


Amendment 102

COMANCHE PEAK S E S
FINAL SAFETY ANALYSIS REPORT
UNIT 1

REACTOR COOLANT SYSTEM
TEMPERATURE PERCENT POWER MAP

FIGURE 4.4-21A



Amendment 102

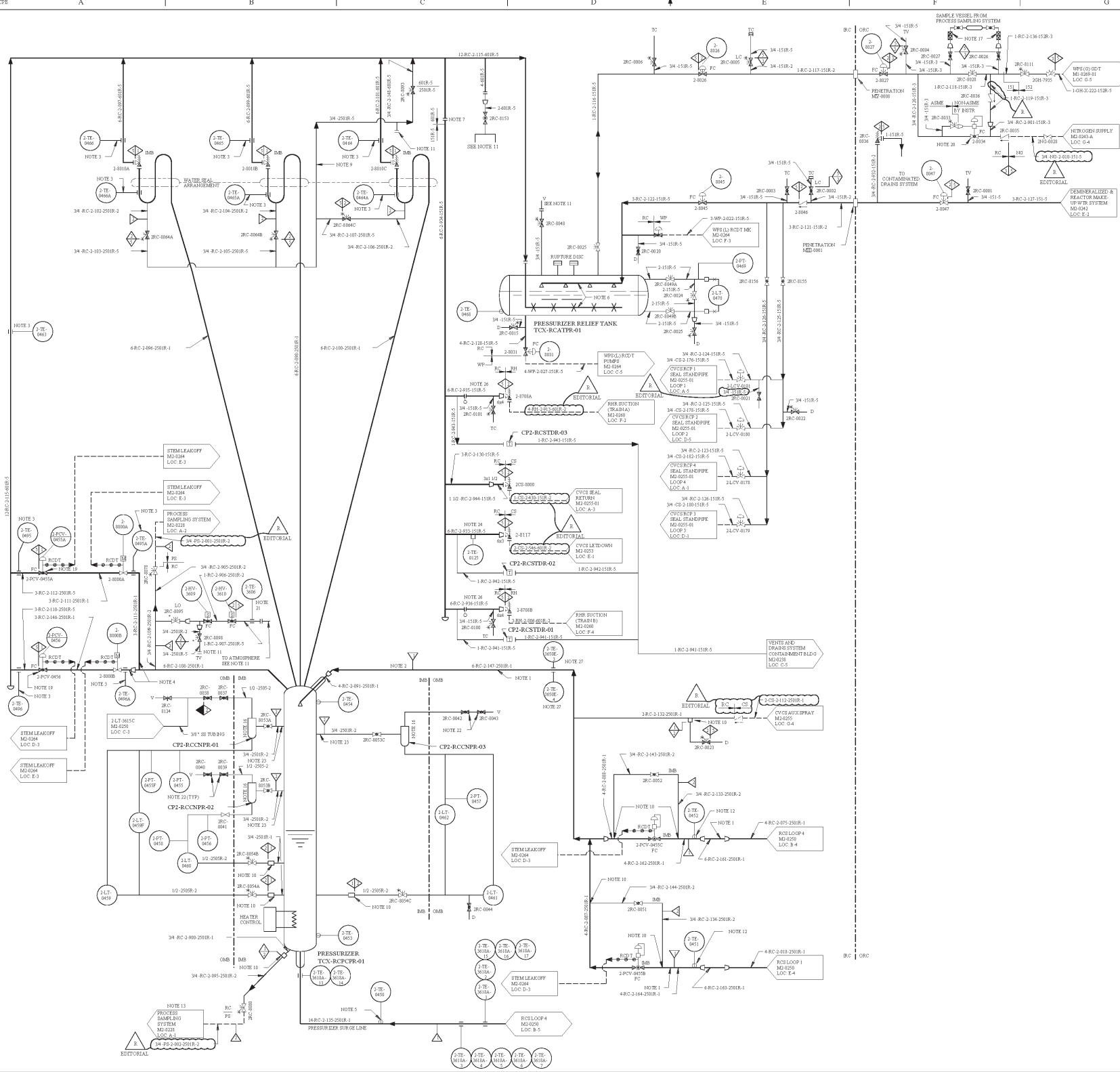
COMANCHE PEAK S E S
FINAL SAFETY ANALYSIS REPORT
UNIT 2

REACTOR COOLANT SYSTEM
TEMPERATURE PERCENT POWER MAP

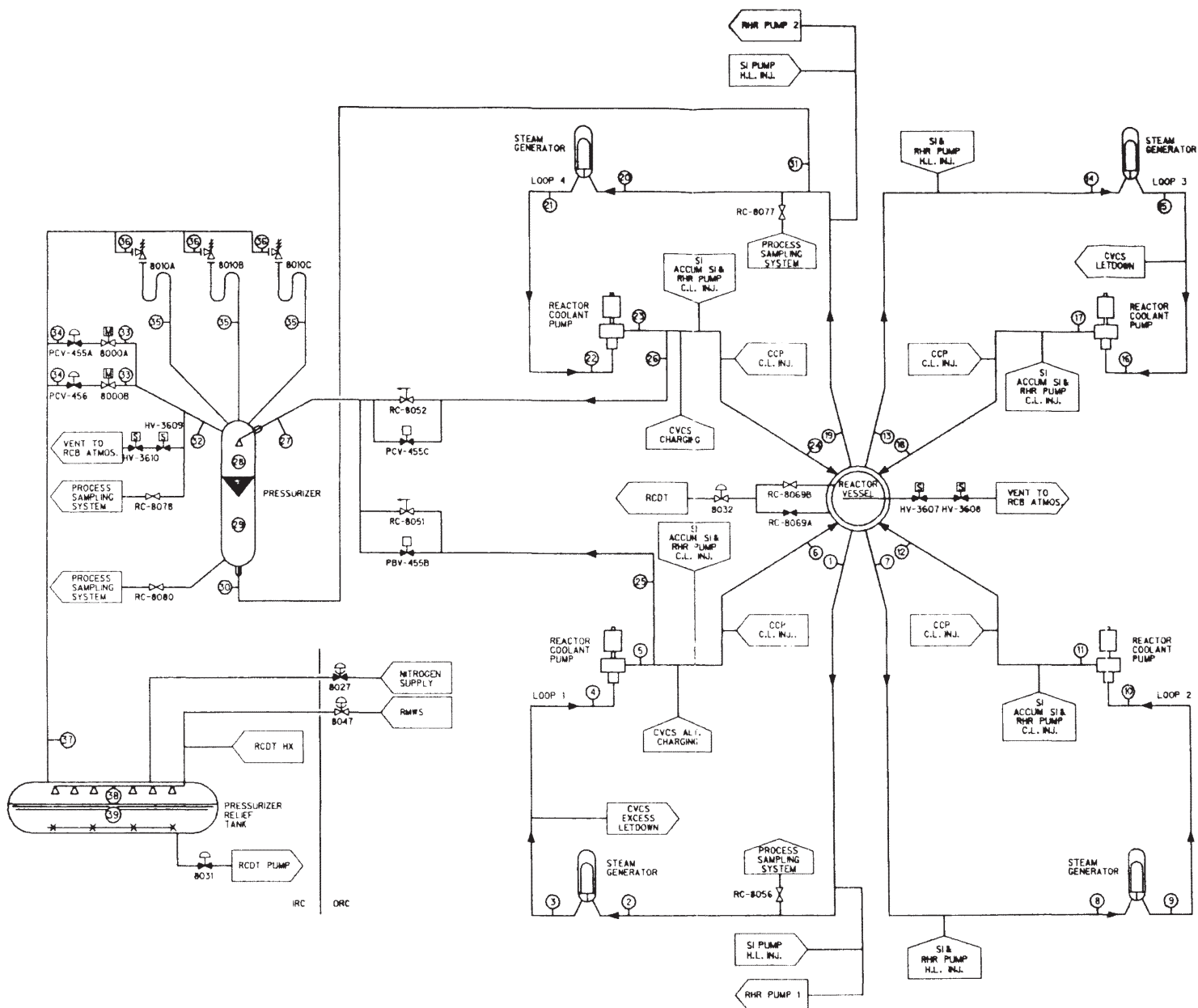
FIGURE 4.4-21B



THIS DRAWING CREATED ELECTRONICALLY



REV		DESCRIPTION/CHANGES	REMARKS						
P-20	100 101 102 103 104 105		THIS DRAWING REVISED TO INCORPORATE DESIGN CHANGE PER 20-00000001-01 REV 10-01-2024 01:00 INITIAL CHARGE AT NOTE						
NOTES:									
1. PRESSURIZER SPRAY LINES FROM REACTOR COOLANT LOOPS TO PRESSURIZER ARE RUN USING LARGE RADIIUS BENDS TO COMPLY WITH MAXIMUM ALLOWABLE PRESSURE DROP PER WESTINGHOUSE DOCUMENT PFD-40-305.4									
2. SPRAY PIPE SLOPED TO PROVIDE WATER SEAL BETWEEN PRESSURIZER AND SPRAY VALVES									
3. STRAP ON SURFACE MOUNTED RTG IS LOCATED AT BOTTOM OF PIPE									
4. PIPE SLOPED DOWNWARD TO PROVIDE WATER SEAL BETWEEN PRESSURIZER AND MOTOR OPERATED VALVES									
5. LOCATED APPROXIMATELY MIDWAY BETWEEN LOCAL AND PRESSURIZER									
6. SPRAYER AND SPRAY HEATER SUPPLIED WITH PRESSURIZER HEAT TANK VENT HOLE PROVIDED IN SPRAYER LINE									
7. 60R1 ANTI FLASHER									
8. DELETED									
9. GRAVITY LINE SLOPED DOWN FROM LOCAL REALS TO CONNECT WITH PRT HEADER LINE									
10. 38 INCH ID FLOW RESTRICTOR WITH PFR#0 FOR CLASS I AND CLASS 2 TRANSITION AT PRESSURIZER LIQUID SPACE LEVEL INDICENT AND SAMPLE NOZZLES AND OTHER LOCATIONS AS SHOWN SIMILAR TO ARRANGEMENT SHOWN ON MECHANICAL SYMBOLS AND NOTES DRAWING NUMBER M1-0208, NOTE 15									
11. TYPING HOLE TO BE INSTALLED AT THESE CONNECTIONS TO VENT PRESSURIZER DURING DRAINING AND FILLING									
12. LOCATED CLOSE TO PRESSURIZER SPRAY VALVES IN THE WATER SEAL									
13. DONTAL PRESSURE INDICATOR LOCATED ON THIS LINE DOWNSTREAM OF SAMPLE HEAT EXCHANGER									
14. DELETED									
15. DELETED									
16. SEE REFERENCE 5 ON MECHANICAL SYMBOLS AND NOTES DRAWING NUMBER M1-0208									
17. ALL QUICK CONNECT COUPLINGS SHALL BE SWAGelok SS-QC# 3-400 AND SS-QC# 3-400 FURNISHED WITH SAMPLE VESSEL									
18. DELETED									
19. INERTED GAS SUPPLY REQUIRED FOR COLD OVERPRESSURE PROTECTION									
20. LOCATED ABOVE THE PRESSURIZER RELIEF TANK PIPING MUST BE SLOPED CONTINUOUSLY DOWNWARD FROM THE REGULATOR TO THE PRT TO AVOID WATER TRAPS									
21. TEMPERATURE ELEMENT IS STRAP ON RTG									
22. RT INSTRUMENTATION									
23. 143 INCH FLOW RESTRICTIONS IN PRESSURIZER STEAM SPACE LEVEL INSTRUMENT NOZZLES PROVIDE THE CLASS 1 TO CLASS 2 TRANSITION									
24. FACILITY PIPE SUPPORT DESIGN, PIPE IS UPGRADDED TO SCHEDULE 160S									
25. DELETED									
26. TO FACILITY PIPE SUPPORT DESIGN, PIPE IS UPGRADDED TO SCHEDULE 80S									
27. THE FACILITY PIPE IS IDENTIFIED ON THE FOLLOWING TABLE ARE USED TO MONITOR THERMAL CYCLING AND STRATIFICATION IN THEIR RESPECTIVE PIPES. THE DETAILS OF THE COVERED LOOPS WILL BE SHOWN ON EITHER THE TOP OR BOTTOM OF THE PIPE									
<table><tr><td>TOP</td><td>BOTTOM</td></tr><tr><td>2-TE-3050E-3</td><td>2-TE-3050E-4</td></tr></table>				TOP	BOTTOM	2-TE-3050E-3	2-TE-3050E-4		
TOP	BOTTOM								
2-TE-3050E-3	2-TE-3050E-4								
REFERENCE NOTES:									
THIS FLOW DIAGRAM HAS BEEN PREPARED FROM WESTINGHOUSE DRAWING NUMBER 110801-201 OF FIG 9 WITH EXCEPTIONS AS FOLLOWS:									
a. VALVE AND LINE NUMBERS HAVE BEEN ADDED									
b. CONTROL LOOPS HAVE BEEN DELETED EXCEPT FOR THE PRIMARY AND FINAL ELEMENTS. THE DETAILS OF THE COVERED LOOPS WILL BE SHOWN ON INSTRUMENTATION AND CONTROL DIAGRAMS									
CLASS I (NUCLEAR SAFETY RELATED)									
<table><tr><td>SAFETY CLASS 1</td><td>STEAM CATEGORY 1</td></tr><tr><td>SAFETY CLASS 1</td><td>CLASS 1B</td></tr><tr><td>SAFETY CLASS 1</td><td>ASSOCIATED CIRCUITS</td></tr></table>				SAFETY CLASS 1	STEAM CATEGORY 1	SAFETY CLASS 1	CLASS 1B	SAFETY CLASS 1	ASSOCIATED CIRCUITS
SAFETY CLASS 1	STEAM CATEGORY 1								
SAFETY CLASS 1	CLASS 1B								
SAFETY CLASS 1	ASSOCIATED CIRCUITS								
LUMINANT CPNPP GLEN ROSE, TEXAS									
FLOW DIAGRAM REACTOR COOLANT SYSTEM									
DWG NO. M2-0251	REV NO. REV	CP-21							



Amendment 67
February 5, 1988

COMANCHE PEAK S E S
FINAL SAFETY ANALYSIS REPORT
UNITS 1 AND 2
PROCESS FLOW DIAGRAM
REACTOR COOLANT SYSTEM
FIGURE B.1-2

CPSES/FSAR
NOTES TO FIGURE 5.1-2

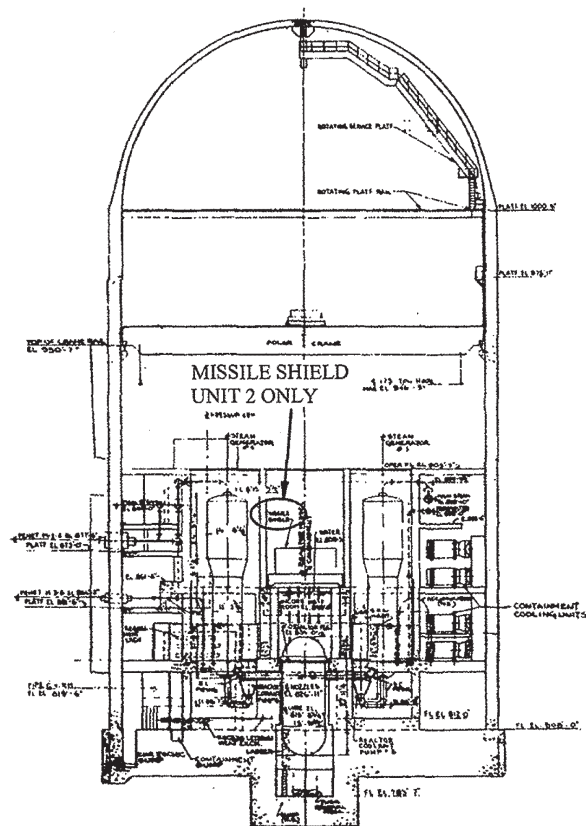
RCS AT STEADY STATE FULL POWER OPERATION

ITEM	FLUID	PRESSURE (psig)	TEMP (°F)	FLOW ^a		VOLUME (cu.ft.)	
				(gpm) ^b	(lb/hr) ^c		
1	RC	2235.0	618.8	110,250	36.7125	---	68
2	RC	2233.1	618.8	110,250	36.7125	---	68
3	RC	2195.9	559.3	99,839	36.7125	---	68
4	RC	2192.4	559.3	99,839	36.7125	---	68
5	RC	2285.1	559.6	98,900	36.7125	---	68
6	RC	2283.2	559.6	98,900	36.7125	---	68
7-12	See Loop 1 Specifications (1-6)						68
13-18	See Loop 1 Specifications (1-6)						68
19-24	See Loop 1 Specifications (1-6)						68
25	RC	2285.1	559.6	1.0	0.0004	---	68
26	RC	2285.1	559.6	1.0	0.0004	---	68
27	RC	2235.0	559.6	2.0	0.0008	---	68
28	Steam	2235.0	652.7	---	---	720	68
29	RC	2235.0	652.7	---	---	1080	68
30	RC	2235.0	652.7	2.5	0.0008	---	68
31	RC	2235.0	652.7	0	0	---	68
32	Steam	2235.0	652.7	0	0	---	68
33	RC	2235.0	<652.7	0	0	Minimize	68
34	Nitrogen	3.0	120	0	0	---	68
35	RC	2235.0	<652.7	0	0	Minimize	68
36	Nitrogen	3.0	120	0	0	---	68
37	Nitrogen	3.0	120	0	0	---	68
38	Nitrogen	3.0	120	---	---	456	68
39	PRT Water	3.0	120	---	---	1350	68

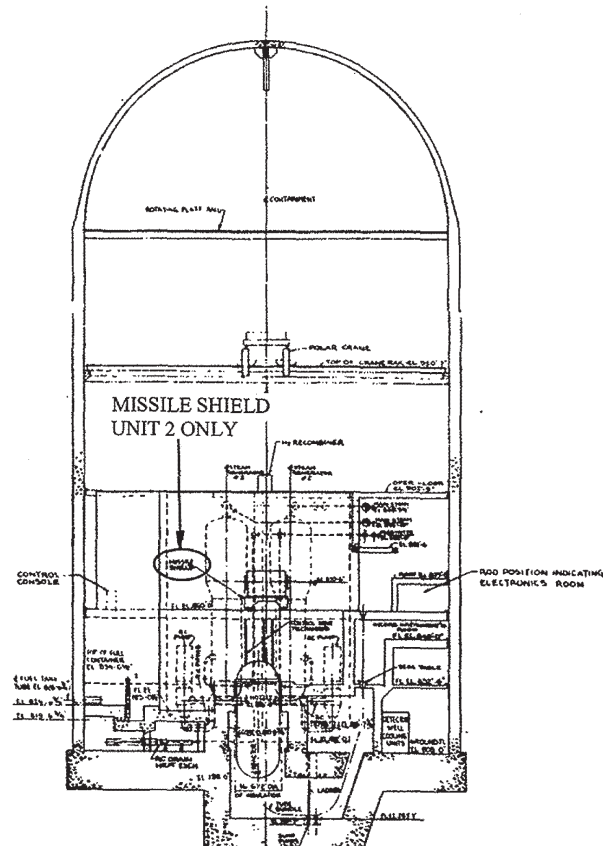
a) Flow measured at 130°F and 2300 psig; charging and letdown not included | 68

b) At the conditions specified | 68

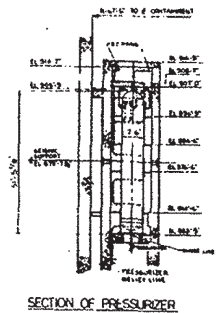
c) x 10⁶ | 68



SECTION LOOKING NORTH



SECTION LOOKING EAST



COMANCHE PEAK S.E.S.
NUCLEAR PLANT
UNITS 1 and 2

REACTOR COOLANT
SYSTEM ELEVATIONS

Figure 5.1-3

THIS FIGURE HAS BEEN DELETED.

COMANCHE PEAK S.E.S. FINAL SAFETY ANALYSIS REPORT UNITS 1 and 2
Vessel Inservice Inspection Tool
Figure 5.2-1

Amendment 102

Amendment 102

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNIT 1

RCS Heatup Limitations

Figure 5.2-2 Sht. 1

Amendment 101b

Amendment 102

Amendment 102

COMANCHE PEAK S.E.S. FINAL SAFETY ANALYSIS REPORT
UNIT 2
RCS Heatup Limitations
Figure 5.2-2. Sht. 2

THIS FIGURE HAS BEEN DELETED.

Amendment 102

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT

UNIT 1

RCS Cooldown Limitations

Figure 5.2-3. Sht. 1

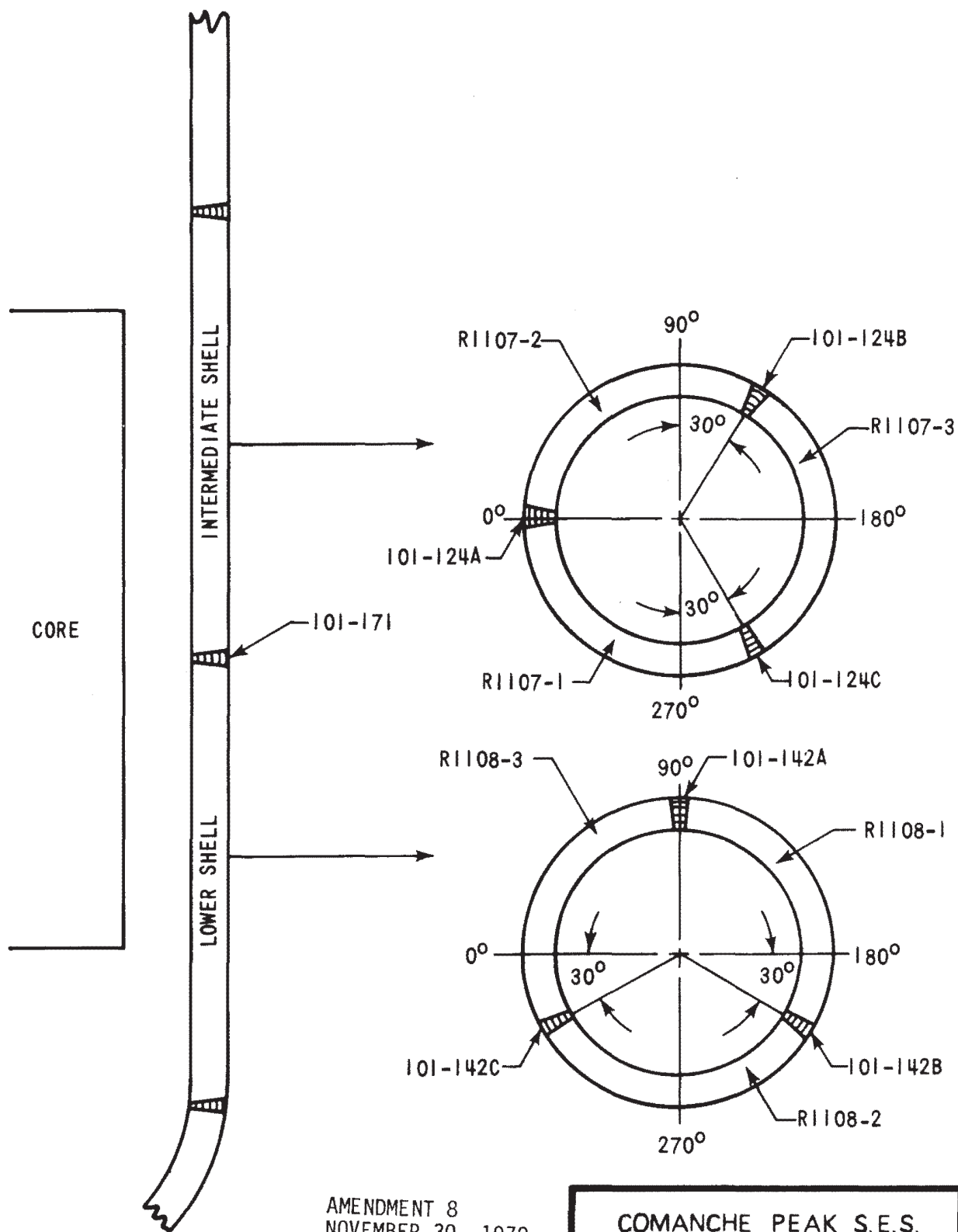
Amendment 102

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNIT 2

RCS Cooldown Limitations

Figure 5.2-3. Sht. 2

Amendment 101b

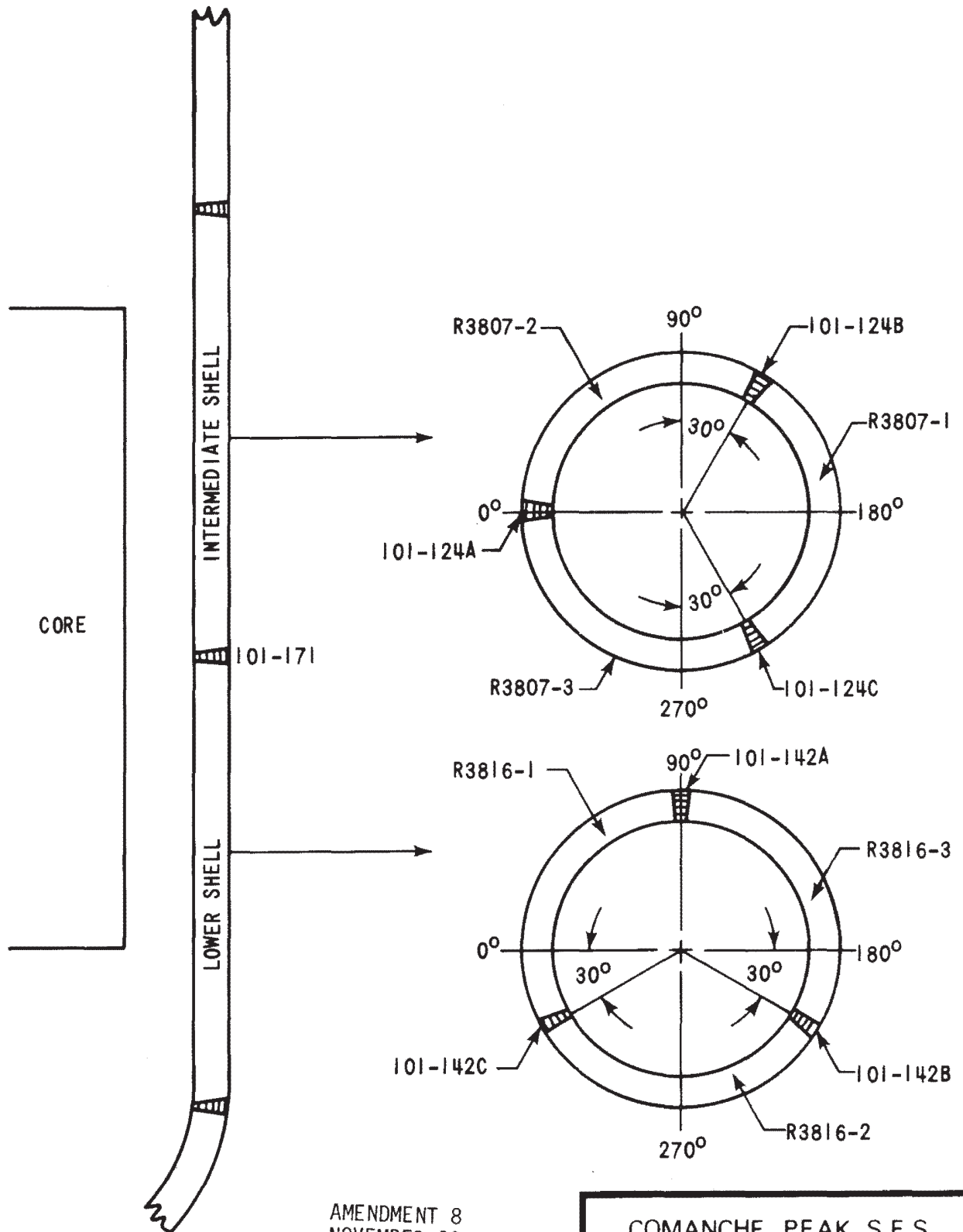


AMENDMENT 8
NOVEMBER 30, 1979

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Unit No. 1 Reactor Vessel Beltline
Region Material Identification

FIGURE 5.3-1A

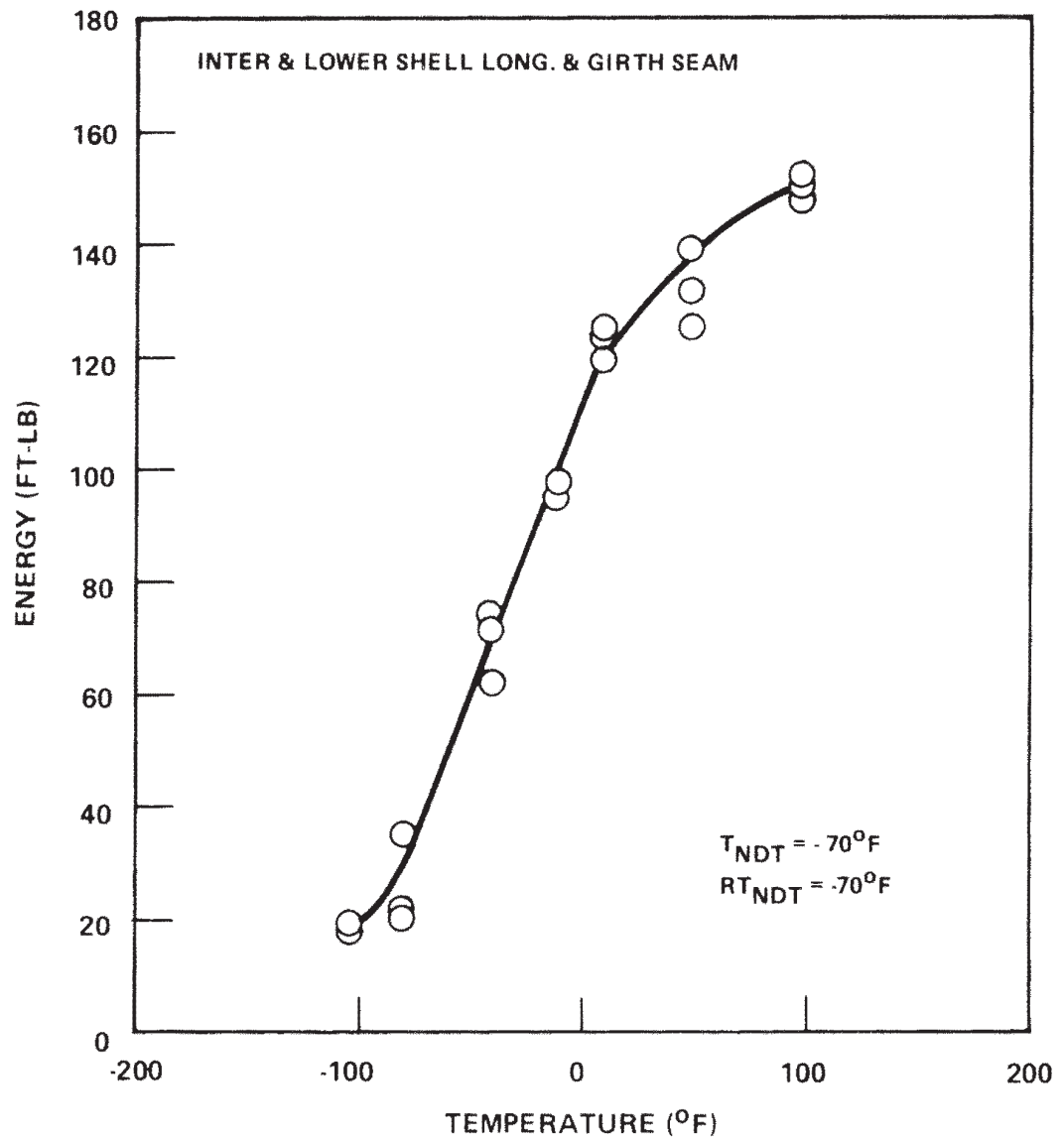


AMENDMENT 8
NOVEMBER 30, 1979

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Unit No. 2 Reactor Vessel Beltline
Region Material Identification

FIGURE 5.3-1B



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Comanche Peak Unit 1 Beltline Region
Weld Metal Charpy V-Notch Impact Data
Weld Code No. G1.67

FIGURE 5.3-2A

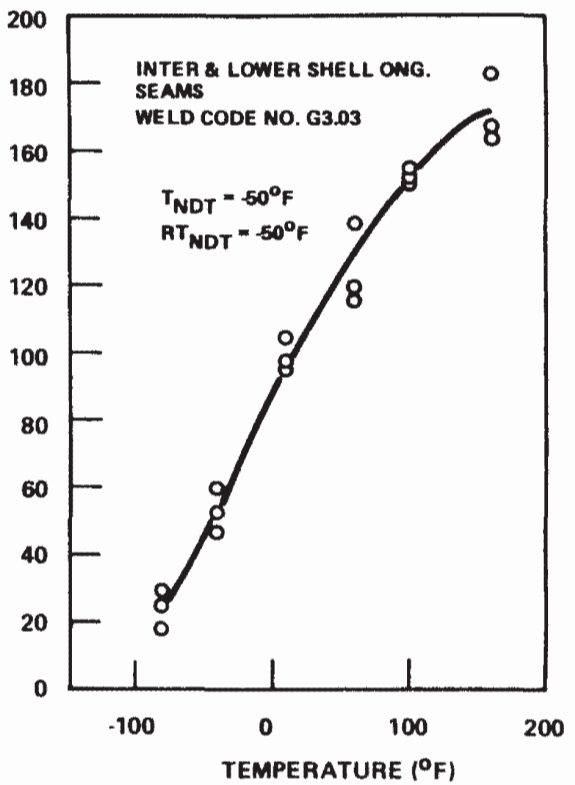
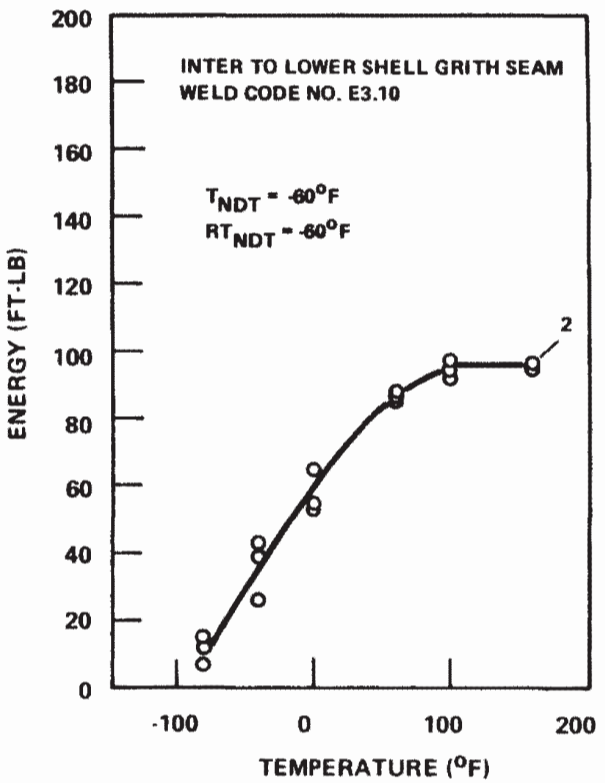
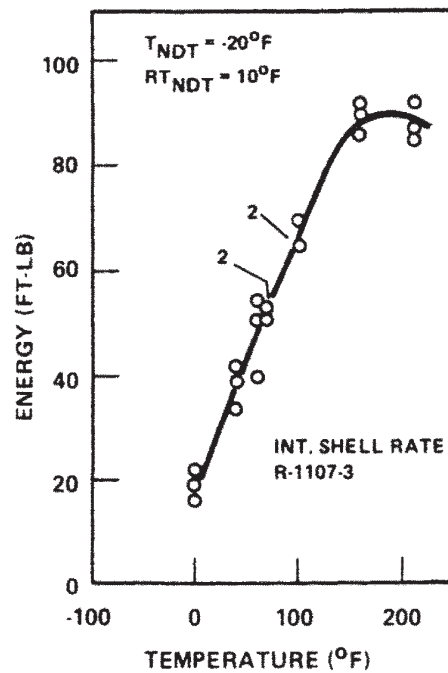
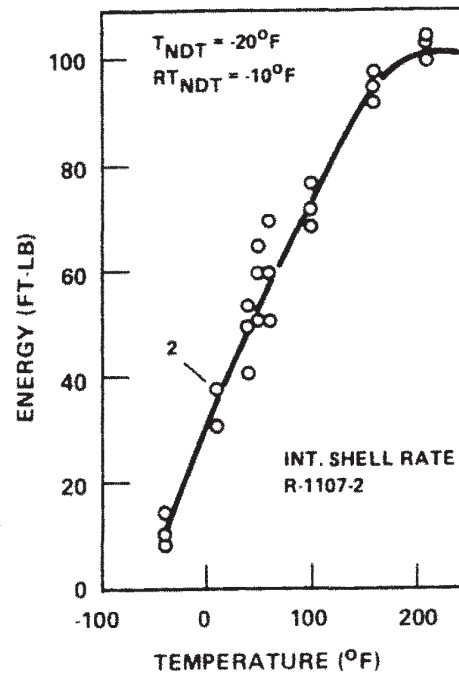
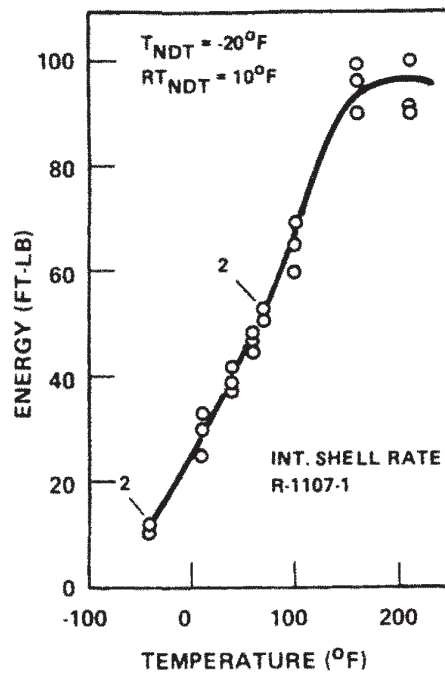


FIGURE 5.3-2B

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

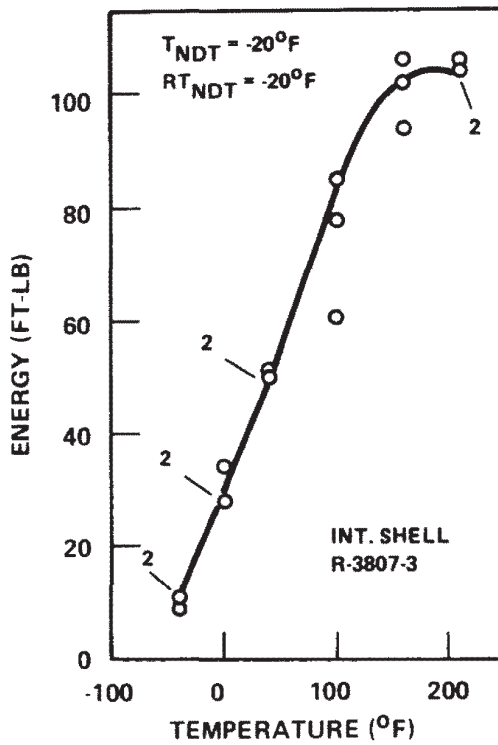
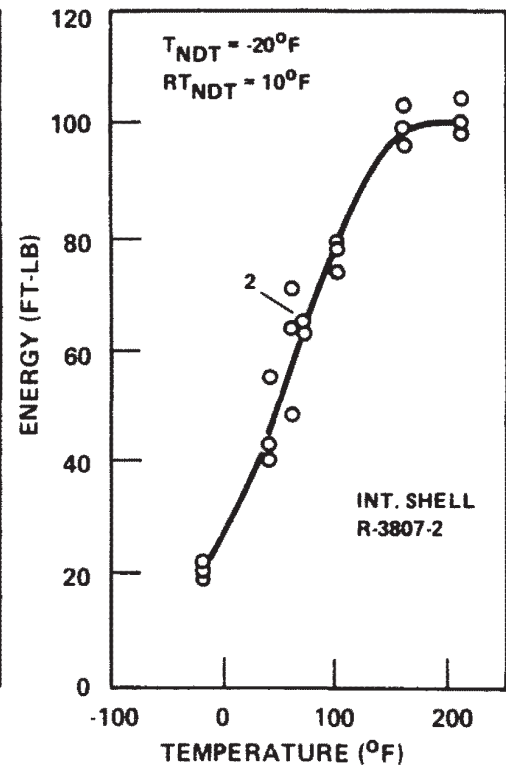
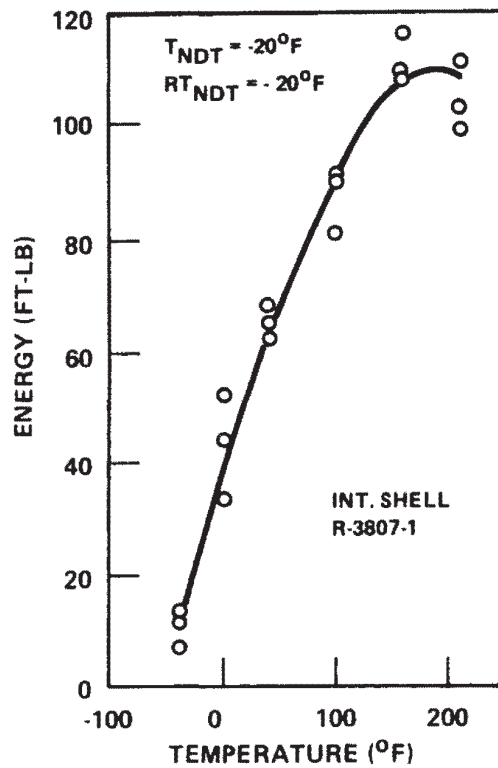
Comanche Peak Unit 2
Bellline Region Weld Metal Charpy
V-Notch Impact Data



COMANCHE PEAK S.E.S.
 FINAL SAFETY ANALYSIS REPORT
 UNITS 1 and 2

Comanche Peak Unit 1
 Charpy V-Notch Impact Data for
 Intermediate Shell Plates R-1107-1, R1107-2
 and R-1107-3, Transverse Orientation

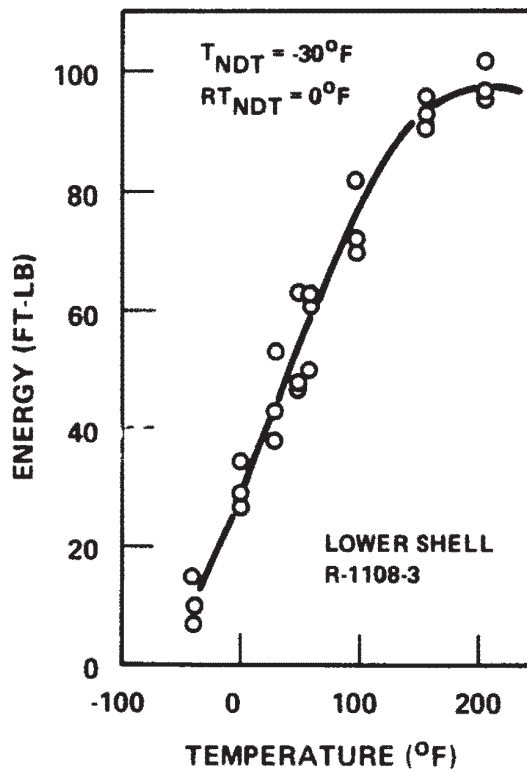
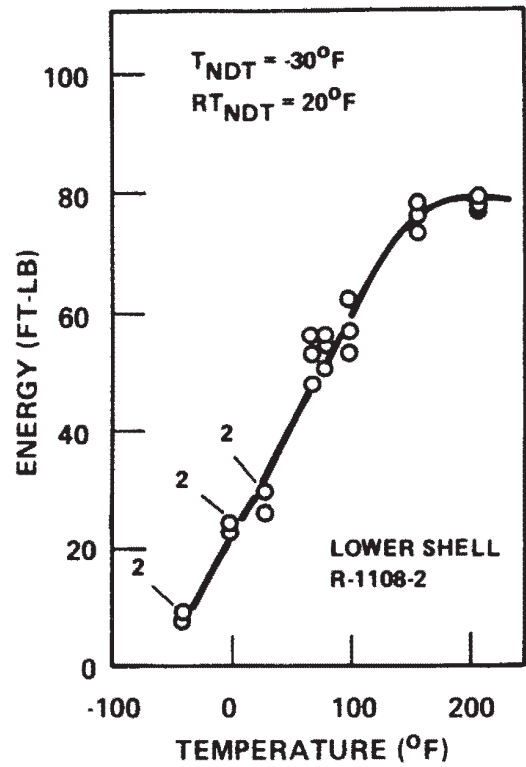
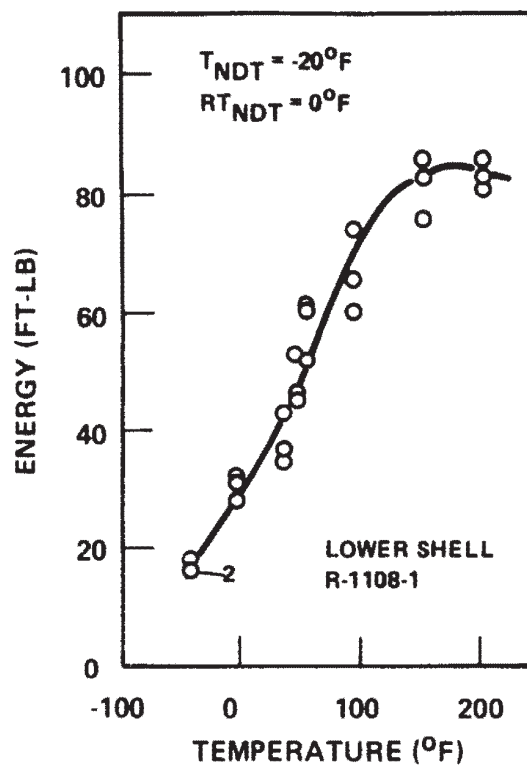
FIGURE 5.3-3A



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Comanche Peak Unit 2
Charpy V-Notch Impact Data for
Intermediate Shell Plates R-3807-1, R3807-2
and R-3807-3 Transverse Orientation

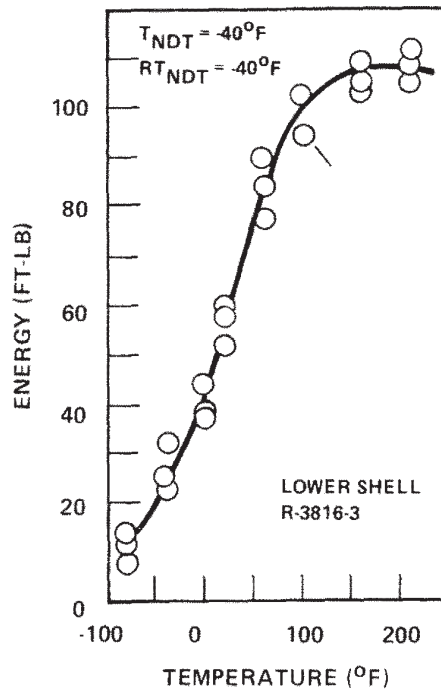
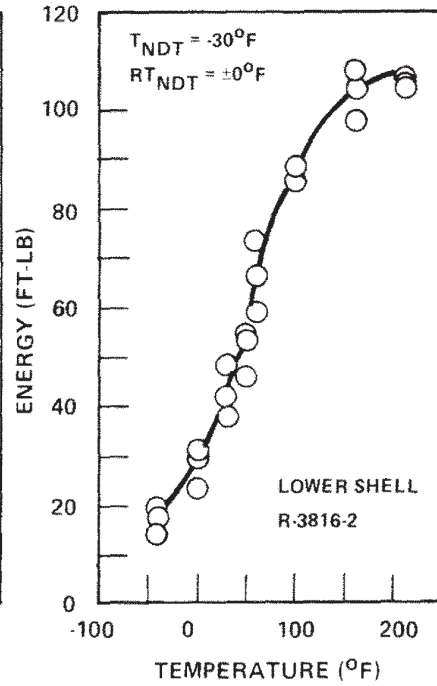
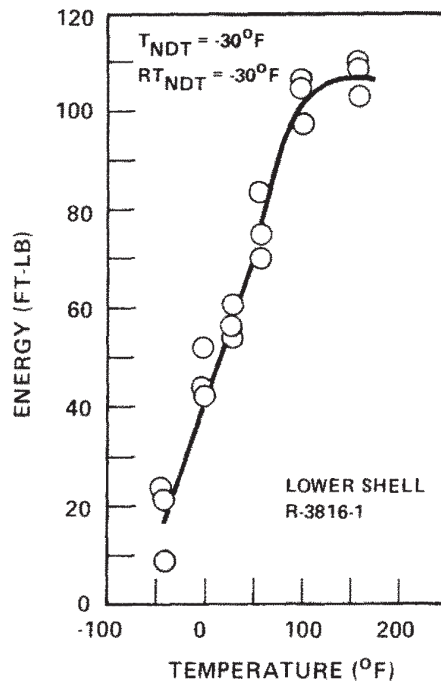
FIGURE 5.3-3B



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Comanche Peak Unit 1
Charpy V-Notch Impact Data for Lower
Shell Plates R-1108-1, R-1108-2 and R-1108-3,
Transverse Orientation

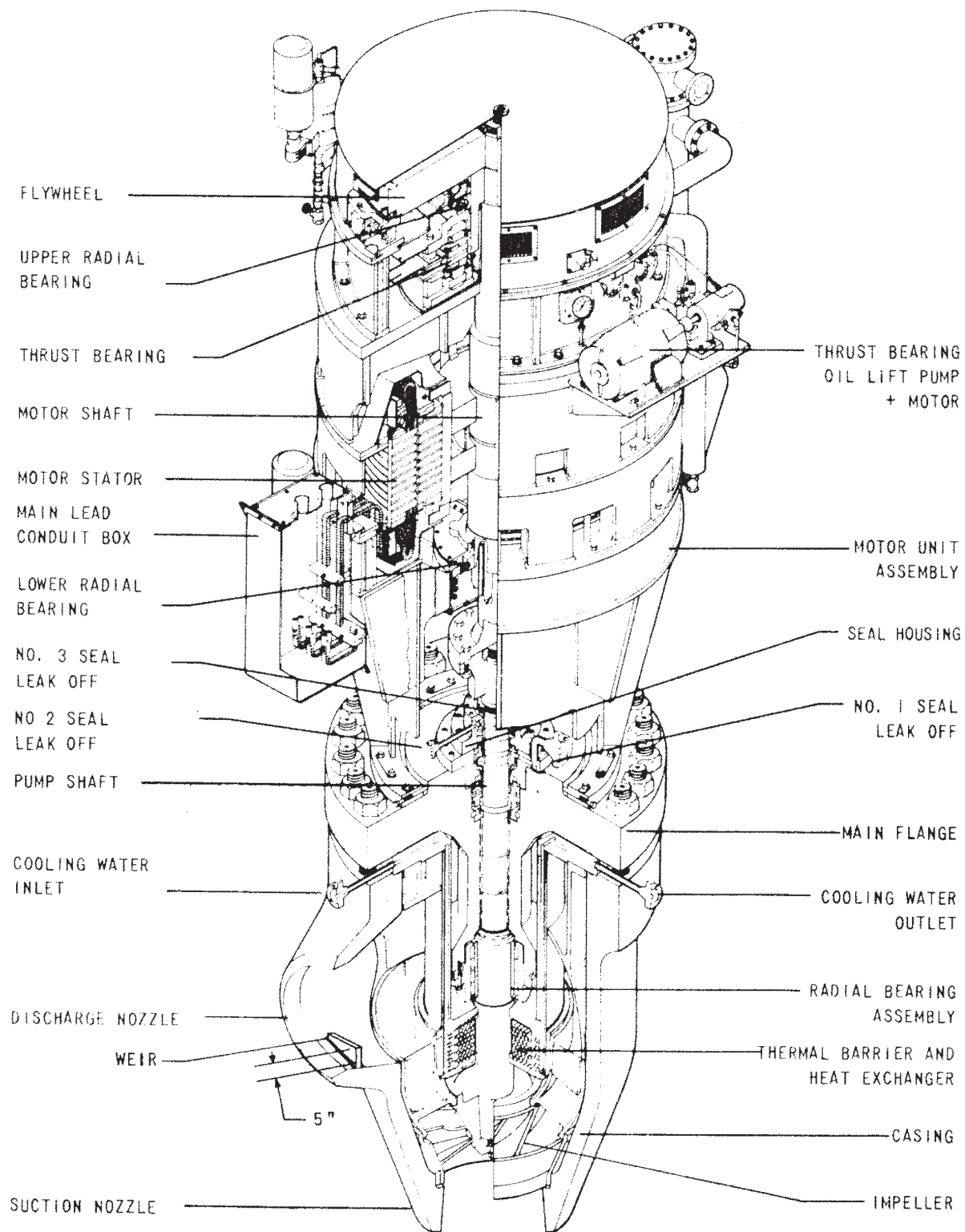
FIGURE 5.3-4A



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Comanche Peak Unit 2
Charpy V-Notch Impact Data for Lower
Shell Plates R-3816-1, R-3816-2 and R-3816-3
Transverse Orientation

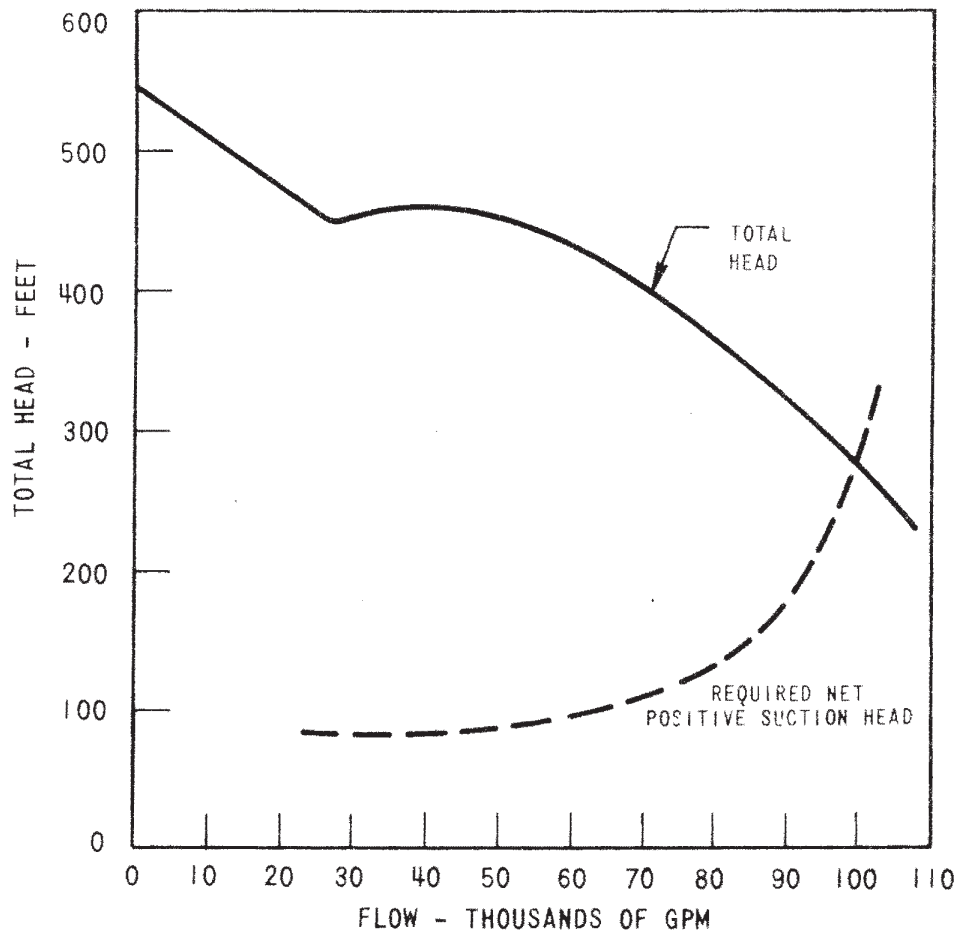
FIGURE 5.3-4B



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Reactor Coolant
Controlled Leakage Pump

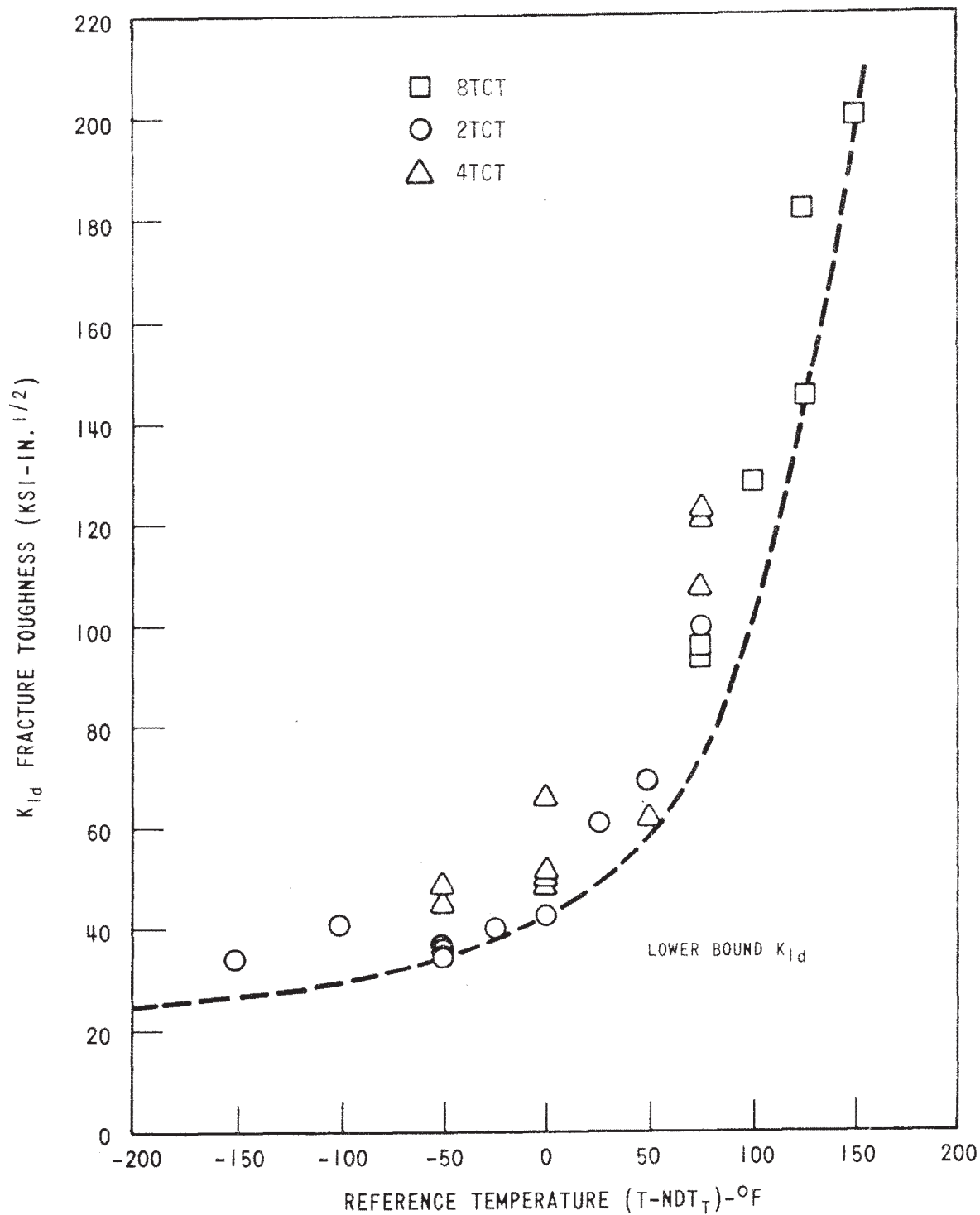
FIGURE 5.4-1



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Reactor Coolant Pump
Estimated
Performance Characteristic

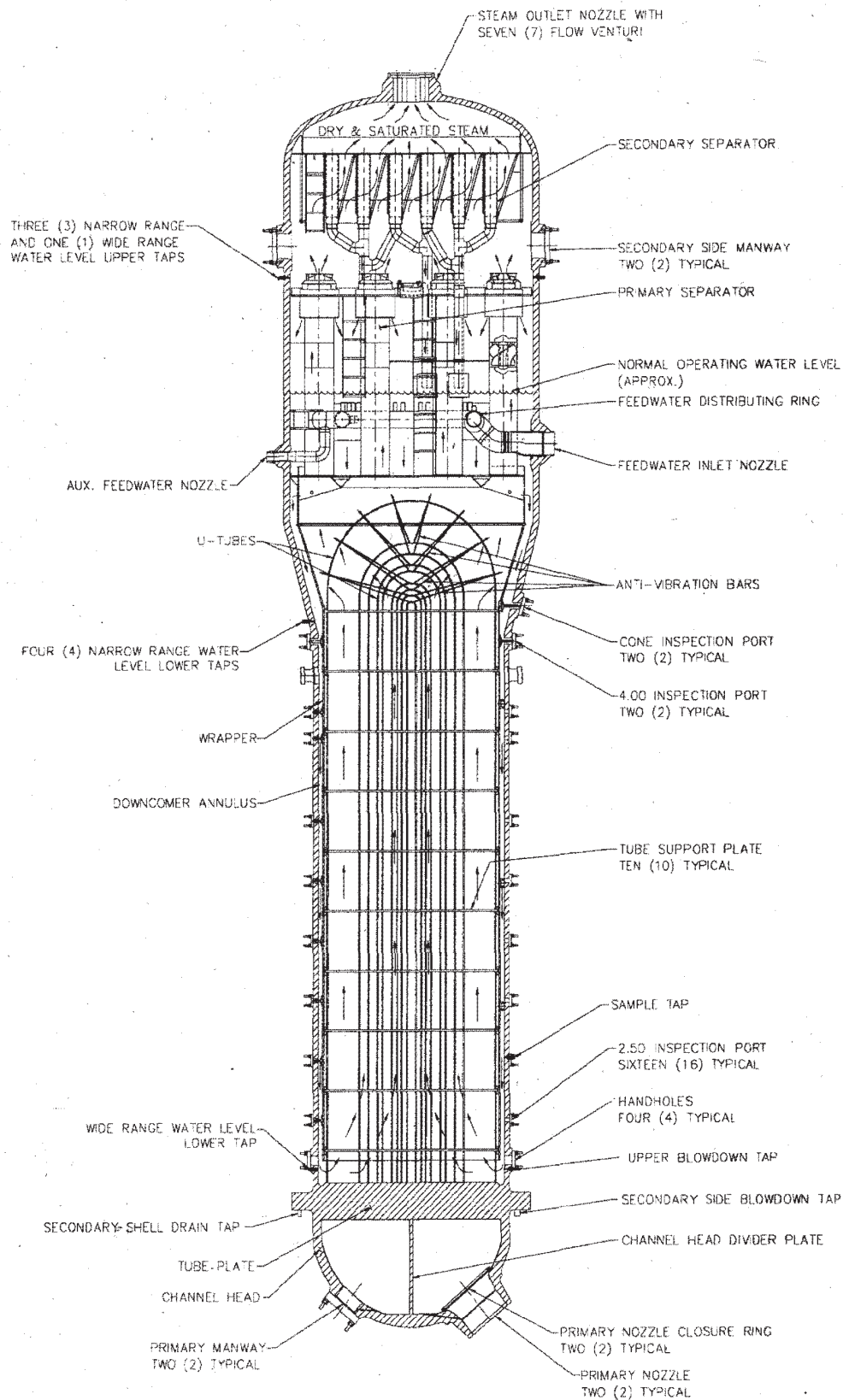
FIGURE 5.4-2



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

K_{Id} Lower Bound Fracture Toughness
SA-533, Grade B, Class 1
(Reference [2])

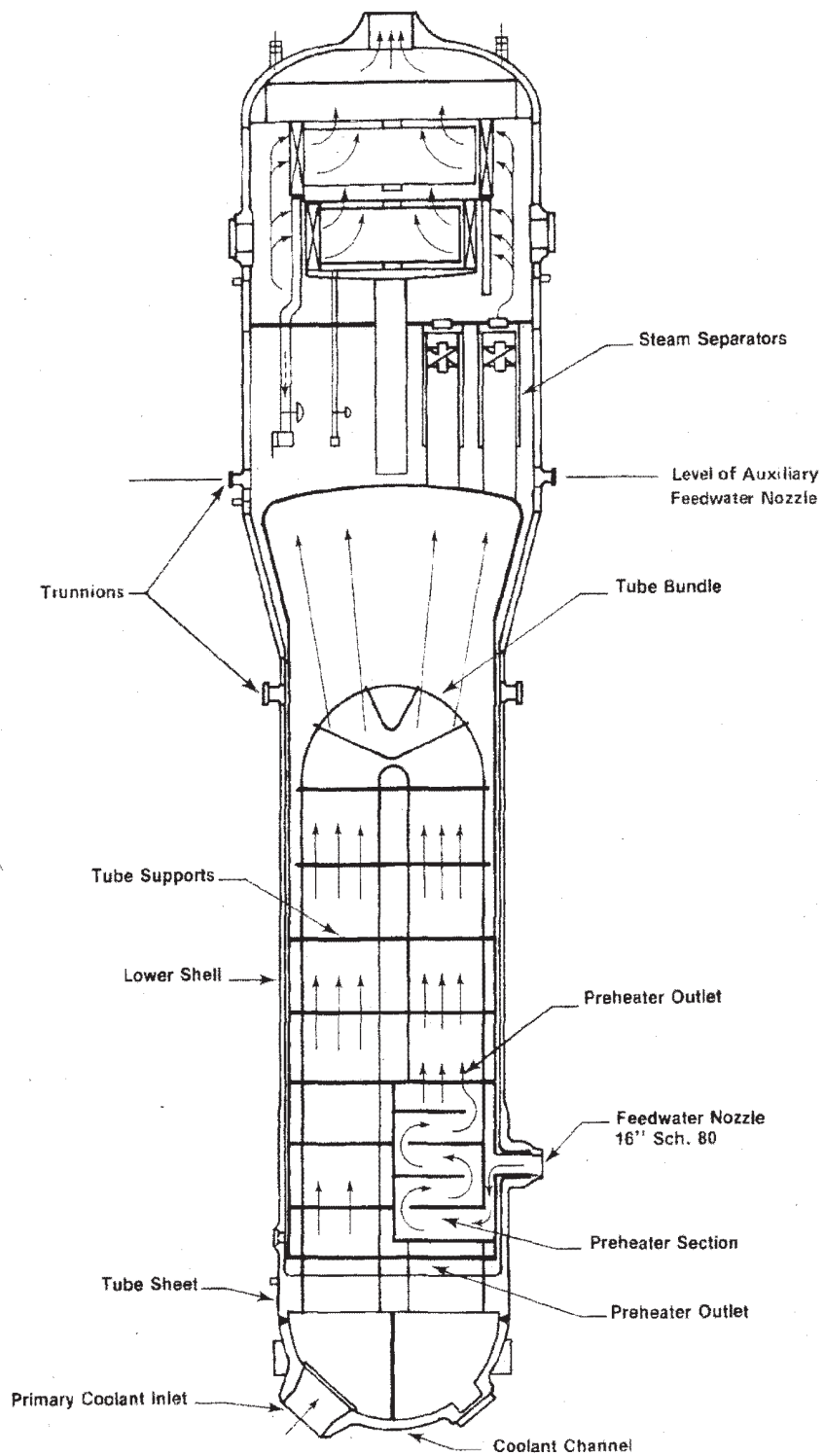
FIGURE 5.4-3



COMANCHE PEAK S E S
FINAL SAFETY ANALYSIS REPORT
UNIT 1

LONGITUDINAL SECTION OF
FEEDRING STEAM GENERATOR

FIGURE 5.4-4A

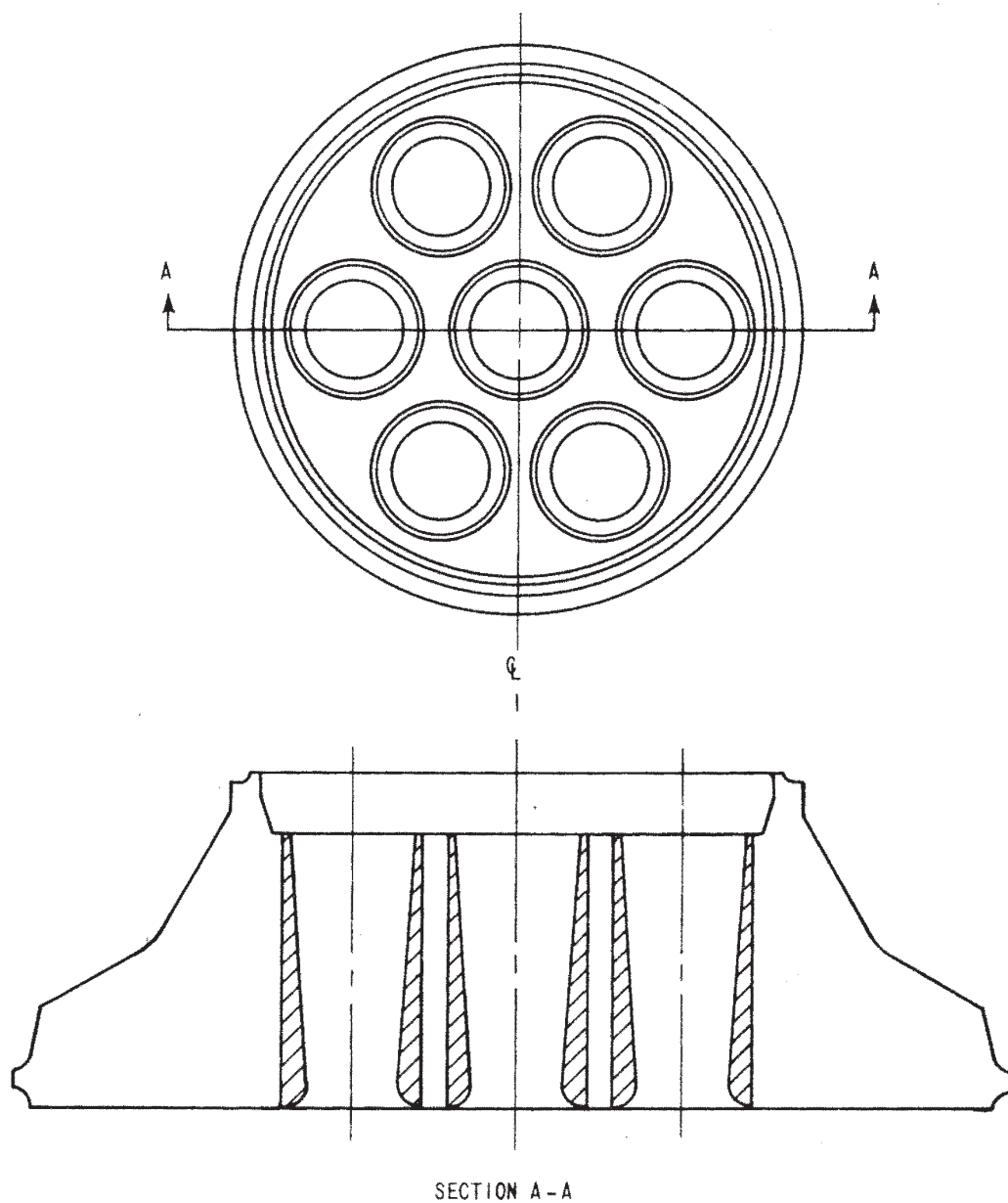


COMANCHE PEAK S E S
FINAL SAFETY ANALYSIS REPORT
UNIT 2

LONGITUDINAL SECTION OF
PREHEAT STEAM GENERATOR

FIGURE 5.4-4B

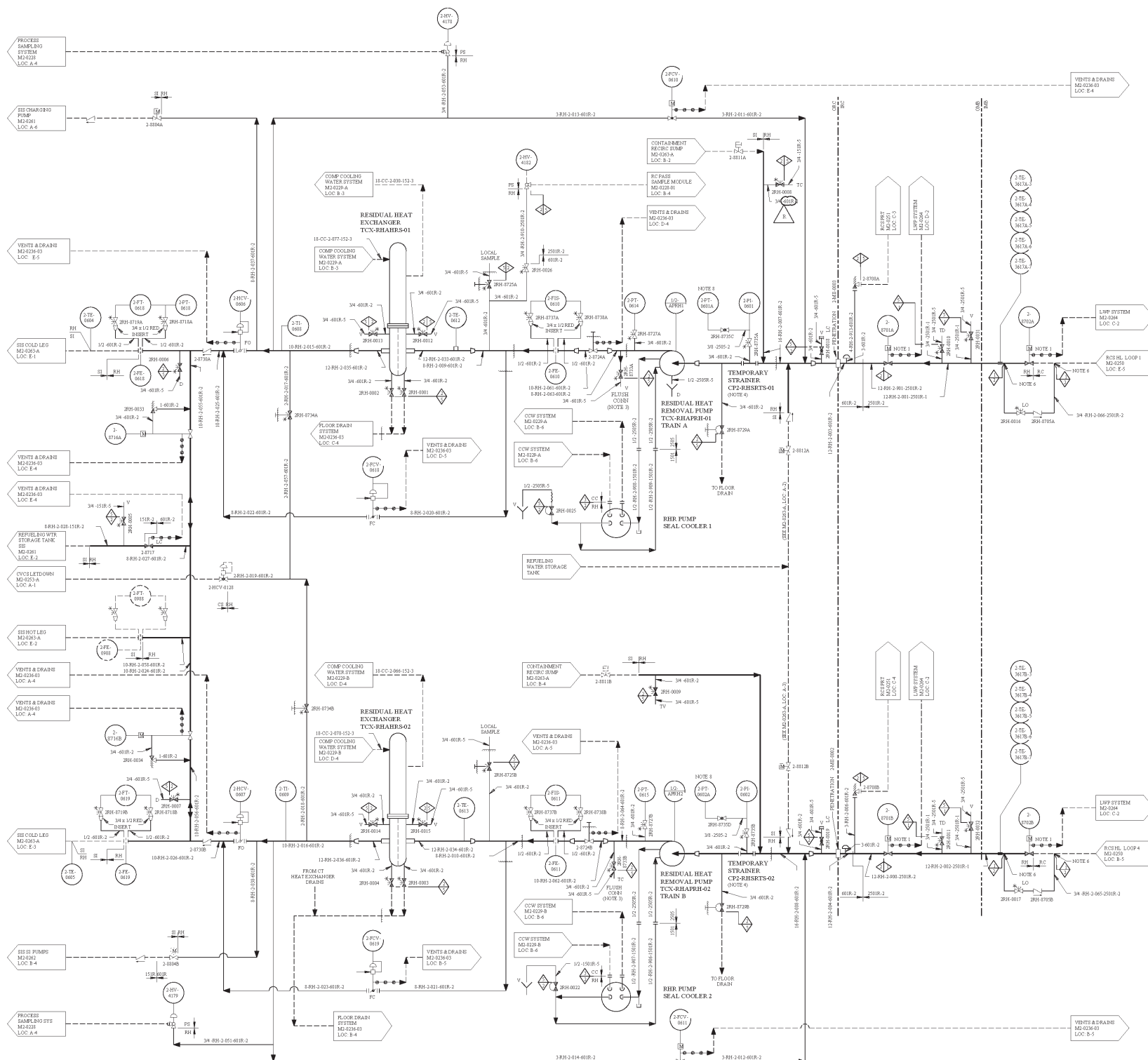
Amendment 102



COMANCHE PEAK S.E.S.
 FINAL SAFETY ANALYSIS REPORT
 UNITS 1 and 2

Steam Line Flow Restrictor

FIGURE 5.4-5



REV

DATE

DESCRIPTION

REMARKS

CP-21

1 JUL 2008

100
200

THIS DRAWING REVISED TO INCORPORATE DESIGN CHANGE FOR 2008-0046 TO (1) PER 1 E-0001 (2) 0001 TO (1) (1)

NOTES:

1. VALVE INTERLOCKED WITH REACTOR COOLANT SYSTEM PRESSURE SIGNAL

2. DELETED

3. VALVE LOCATED OUTSIDE RESIDUAL HEAT REMOVAL PUMP SHIELDING

4. TEMPORARY STRAINER(1) CP-21-0011(1) (1) ARE PLACED IN INCVL FLOW CROSSING INITIAL PUMPED OPERATIONS. STRAINER MUST BE REMOVED BEFORE PLANT START-UP.

5. FOR MECHANICAL SYMBOLS AND NOTES SEE DRAWING M1-0206

6. 303" FLOW RESTRICTOR WITH PP90 FOR CLASS 1 AND CLASS 2 TRANSITION

7. DELETED

8. INSTRUMENT VALVES 2PH-8735C AND 2PH-8735D ARE REQUIRED TO BE OPEN IN MODES 1, 2 AND 3

REFERENCE NOTE:

THIS FLOW DIAGRAM HAS BEEN REDRAWN FROM WESTINGHOUSE DRAWING 113587 REV 6 WITH EXCEPTIONS AS FOLLOWS

a. VALVES AND LINE NUMBERS HAVE BEEN ADDED

b. CONTROL LOOPS HAVE BEEN IDENTIFIED EXCEPT FOR THE PRIMARY AND THE FINAL ELEMENTS. THE DETAILS OF THE CONTROL LOOPS WILL BE SHOWN ON INSTRUMENTATION AND CONTROL DIAGRAM

FSAR FIGURE 5.4-6

THIS DRAWING CREATED ELECTRONICALLY

CLASS I

(NUCLEAR SAFETY RELATED)

SAFETY CLASS 1SRM-CAT/DROXYI

SAFETY CLASS 2CLASS 2A

SAFETY CLASS 3ASSOCIATED CIRCUITS

LUMINANT

CPNPP

GLEN ROSE, TEXAS

FLOW DIAGRAM

RESIDUAL HEAT

REMOVAL SYSTEM

DWG NO.

M2-0260

SR NO.

-

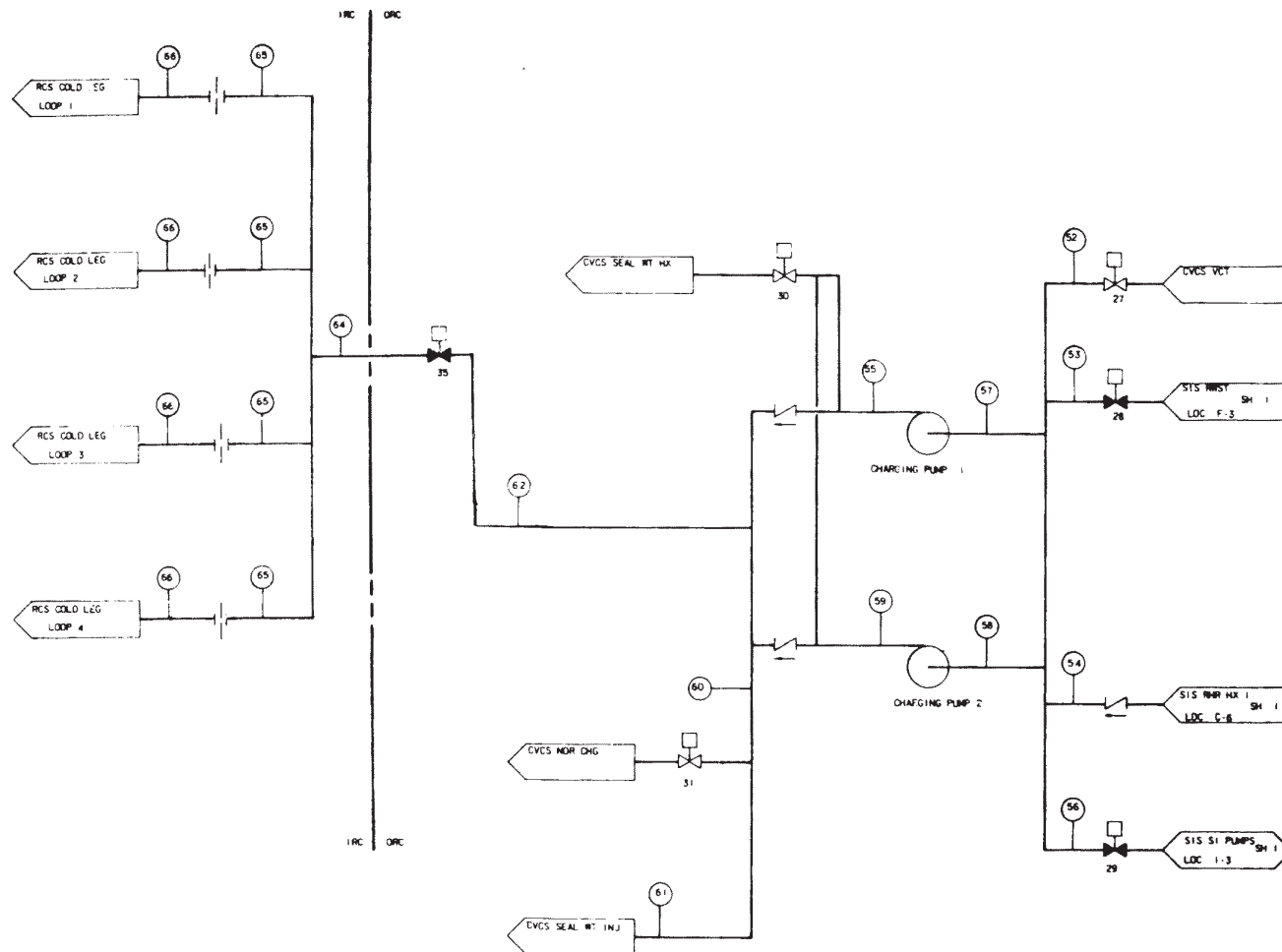
REV.

CP-21



Residual Heat Removal System Process Flow Diagram

FIGURE 5.4-7, Sheet 1



AMENDMENT 17
APRIL 7, 1981

NOTE:

1. THIS DIAGRAM IS A SIMPLIFICATION OF THE SYSTEM INTENDED TO FACILITATE THE UNDERSTANDING OF THE PROCESS. FOR DETAILS OF THE PIPING, VALVES, INSTRUMENTATION, ETC. REFER TO THE ENGINEERING FLOW DIAGRAM. REFER TO PROCESS FLOW DIAGRAM TABLES FOR THE CONDITIONS AT EACH POINT.

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Residual Heat Removal System
Process Flow Diagram

FIGURE 5.4-7, Sheet 2

NOTES TO FIGURE 5.4-7
(Sheet 1 of 4)

MODES OF OPERATION

Q212.63

Mode A - Initiation of RHR Operation

When the reactor coolant temperature and pressure are reduced to RHRS operational conditions, approximately 4 hours after reactor shutdown, the second phase of plant cooldown starts with the RHR being placed in operation. Before starting the pumps, Component Cooling Water is established through the heat exchanger. Upon initial startup of the RHR pump, the miniflow valves automatically position open to protect the pump and RHR boration requirements are established. Once boration is completed, power is restored and the RHR to Hot Leg Recirculation Isolation Valves are opened.

96

Startup of the RHRS includes a warm-up period during which time reactor coolant flow through the heat exchangers is limited to minimize thermal shock on the RCS. The rate of heat removal from the reactor coolant is controlled manually, not to exceed 100°F per hour. Cooldown rate is based on equipment stress and a maximum Component Cooling water temperature of 122°F through the RHR heat exchanger. A constant flow is regulated automatically by control valves in the heat exchanger bypass line.

96

Mode B - End Conditions of a Normal Cooldown

This situation characterizes most of the RHRS operation. As the reactor coolant temperature decreases, the flow through the residual heat exchanger is increased until all of the flow is directed through the heat exchanger to obtain maximum cooling.

Note: For the safeguards functions performed by the RHRS refer to Section 6.3.

NOTES TO FIGURE 5.4-7
(Sheet 2 of 4)

VALVE ALIGNMENT CHART

<u>Valve No.</u>	<u>Operational Mode</u>	
	<u>A</u>	<u>B</u>
2	C	C
3	C	C
10	O	O
11	O	O
12	C	C
13	C	C
14	C	C
15	C	C
16	P	C
17	P	C
18	P	P
19	P	P
20	C	C
21	C	C
22	O	O
23	O	O
24	O	O
26	O	O

O = Open.

C = Closed.

P = Partially Open.

February 15, 1988

NOTES TO FIGURE 5.4-7
(Sheet 3 of 4)

MODE A - INITIATION OF RHR OPERATION

		Pressure	Temperature	Flow		
<u>Location</u>		<u>(psig)</u>	<u>(°F)</u>	<u>(gpm)^a</u>	<u>(lb/hr)</u>	
		Reactor				
93	24	Coolant	400	350	3800	1.69 × 10 ⁶
	25	"	407	350	3800	1.69 × 10 ⁶
	26	"	542	350	3800	1.69 × 10 ⁶
	27	"	541	350	992	0.44 × 10 ⁶
	31	"	539	142	992	0.44 × 10 ⁶
	29	"	496	350	2808	1.25 × 10 ⁶
	32	"	496	296	3800	1.69 × 10 ⁶
	28	"	480	296	3690	1.64 × 10 ⁶
	19 Loop 4	"	404	296	1992	0.885 × 10 ⁶
19 Loop 3	"	419	296	1698	0.755 × 10 ⁶	
18	34	"	400	350	3800	1.69 × 10 ⁶
	35	"	407	350	3800	1.69 × 10 ⁶
	36	"	542	350	3800	1.69 × 10 ⁶
93	37	"	541	350	992	0.44 × 10 ⁶
	41	"	539	142	992	0.44 × 10 ⁶
	39	"	496	350	2808	1.25 × 10 ⁶
	42	"	496	296	3800	1.69 × 10 ⁶
	38	"	479	296	3910	1.74 × 10 ⁶
	20 Loop 1	"	404	296	1955	0.87 × 10 ⁶
	20 Loop 2	"	404	296	1955	0.87 × 10 ⁶

^a At reference conditions 350°F and 400 psig.

NOTES TO FIGURE 5.4-7

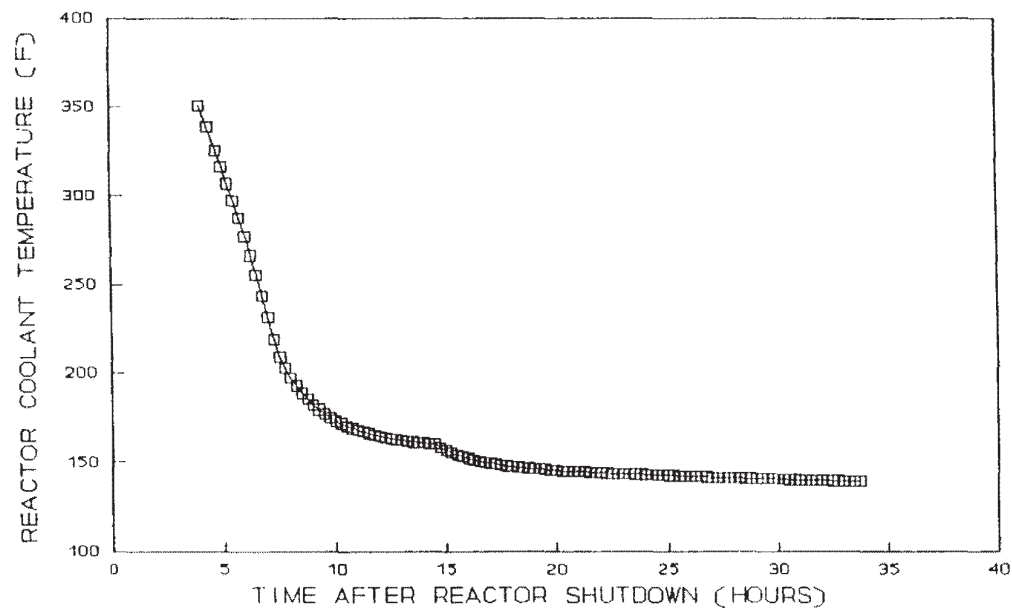
(Sheet 4 of 4)

MODE B - END CONDITIONS OF A NORMAL COOLDOWN

<u>Location</u>		<u>Fluid</u>	<u>Pressure</u> <u>(psig)</u>	<u>Temperature</u> <u>(°F)</u>	<u>Flow</u> <u>(gpm)^a (lb/hr)</u>	
		Reactor				
18	24	Coolant	0	140	3800	1.87×10^6
	25	"	7	140	3800	1.87×10^6
	26	"	156	140	3800	1.87×10^6
	27	"	149	140	3800	1.87×10^6
	31	"	129	120	3800	1.87×10^6
	29	"	93	120	0	0
	32	"	93	120	3800	1.87×10^6
	28	"	75	120	3800	1.87×10^6
	19	"	2	120	1900	0.935×10^6
18	34	"	0	140	3800	1.87×10^6
	35	"	7	140	3800	1.87×10^6
	36	"	156	140	3800	1.87×10^6
	37	"	149	140	3800	1.87×10^6
93	41	"	129	122	3800	1.87×10^6
	39	"	93	122	0	0
	42	"	93	122	3800	1.87×10^6
	38	"	75	122	3800	1.87×10^6
	20	"	2	122	1900	0.935×10^6

^a At reference conditions 140°F and 0 psig.

NORMAL RHR COOLDOWN



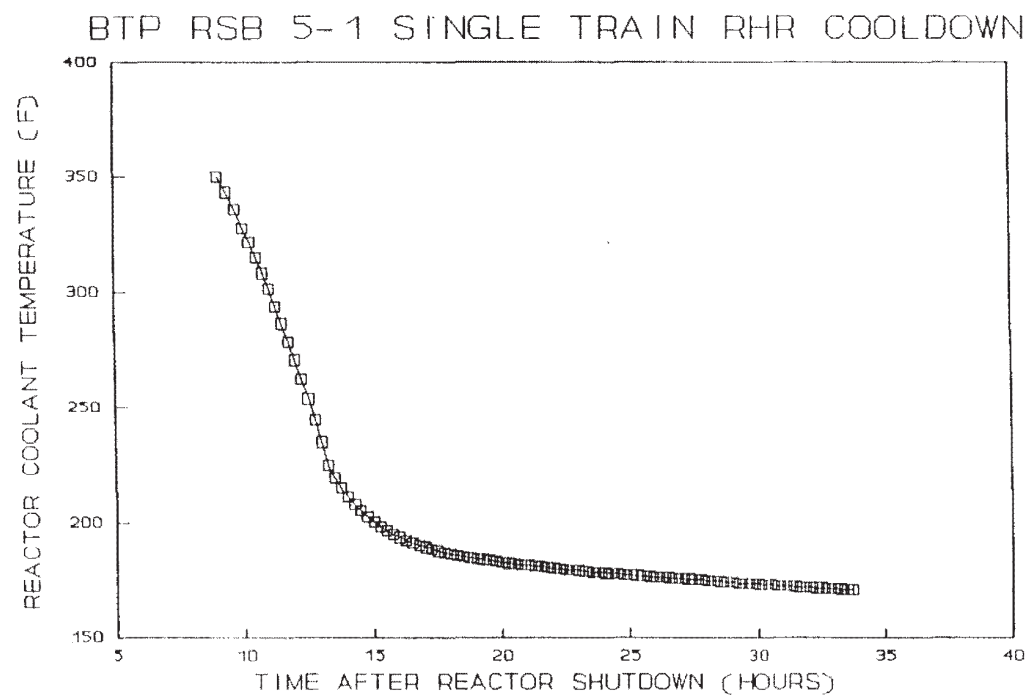
212 F AT T=7.5 HOURS
200 F AT T=8.0 HOURS

Amendment 93
February 1, 1995

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Normal RHR Cooldown

FIGURE 5.4-8



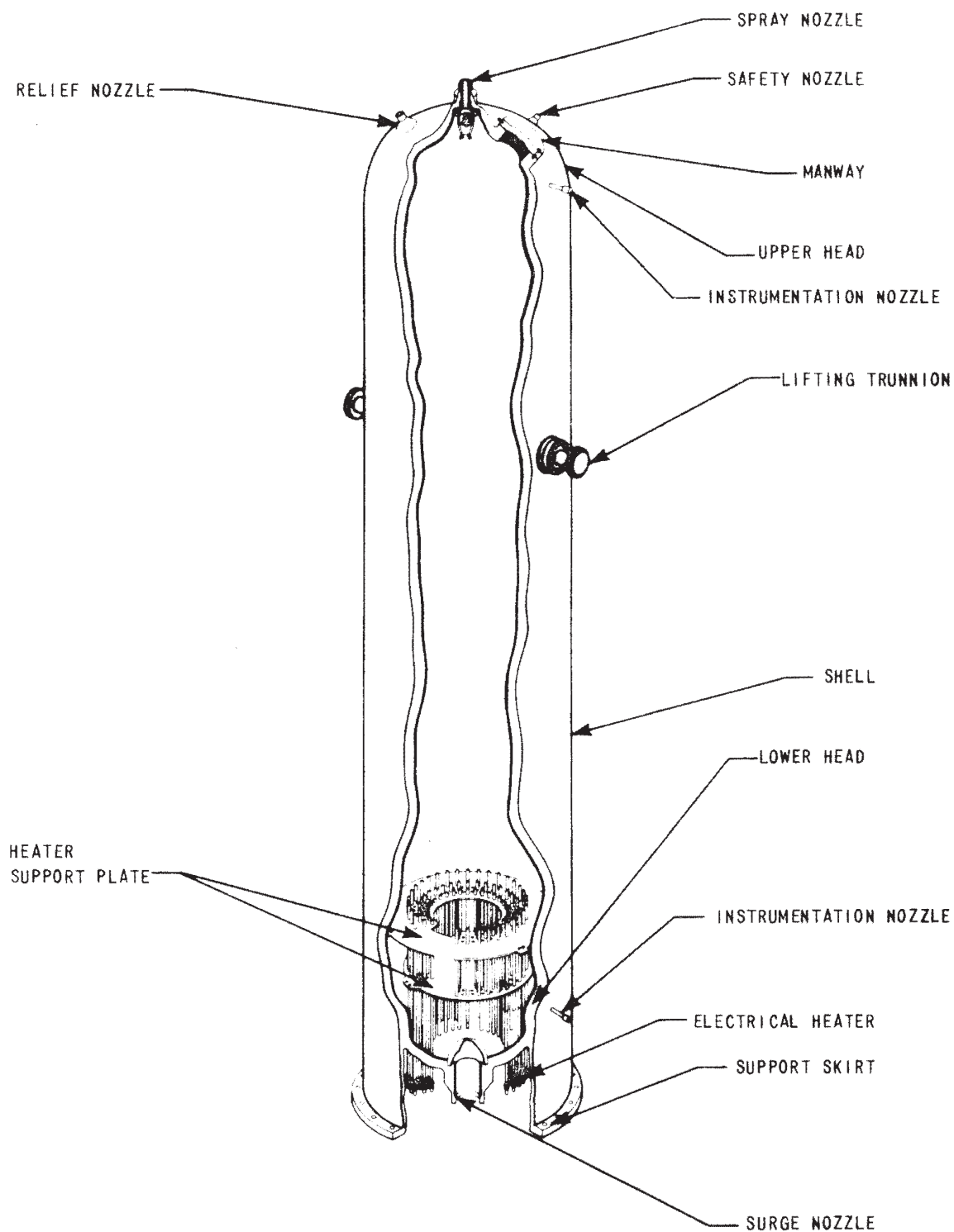
212 F AT T=14 HOURS
200 F AT T=15.25 HOURS

Amendment 93
February 1, 1995

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 AND 2

SINGLE TRAIN RHR COOLDOWN

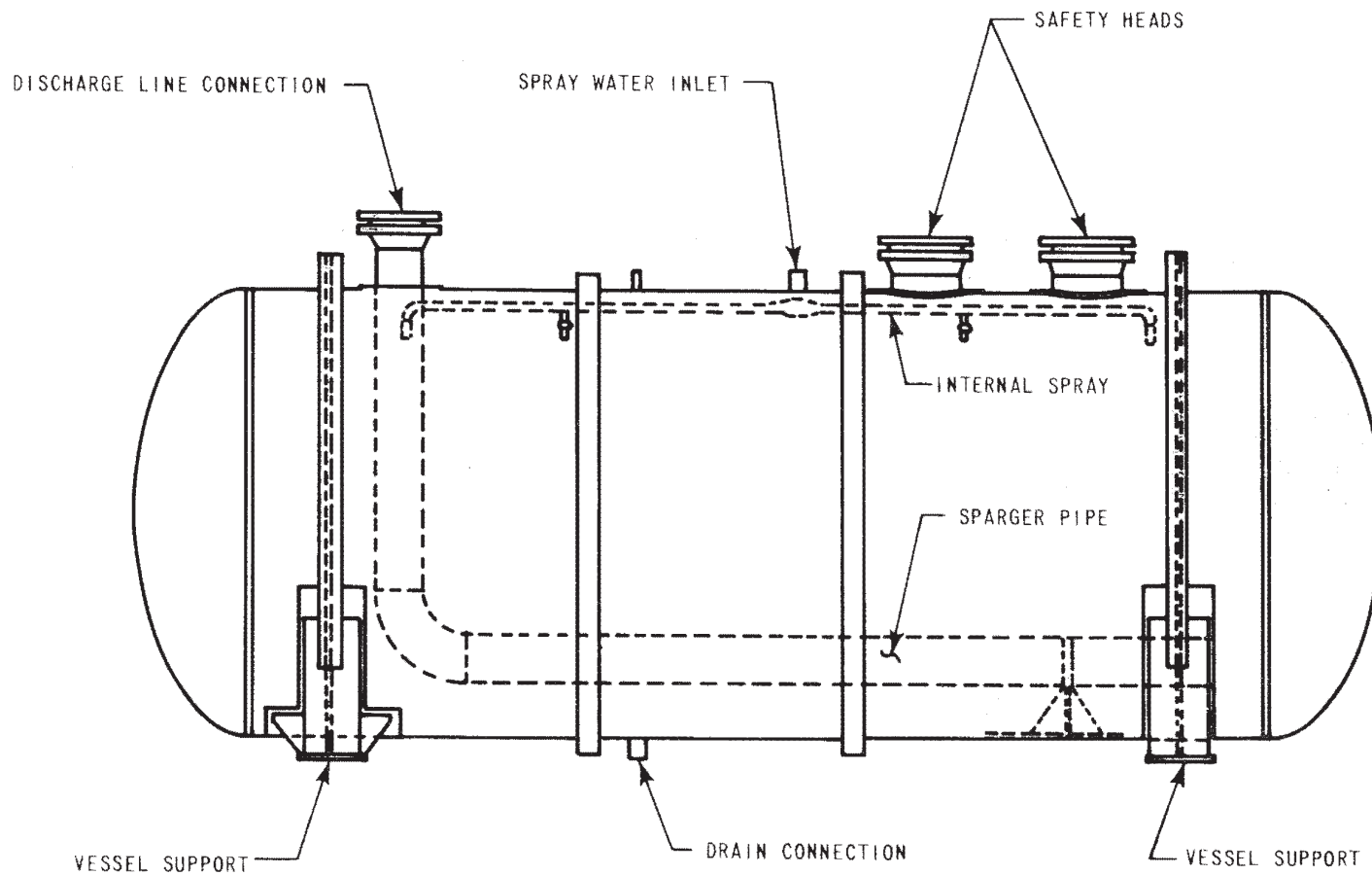
FIGURE 5.4-9



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Pressurizer

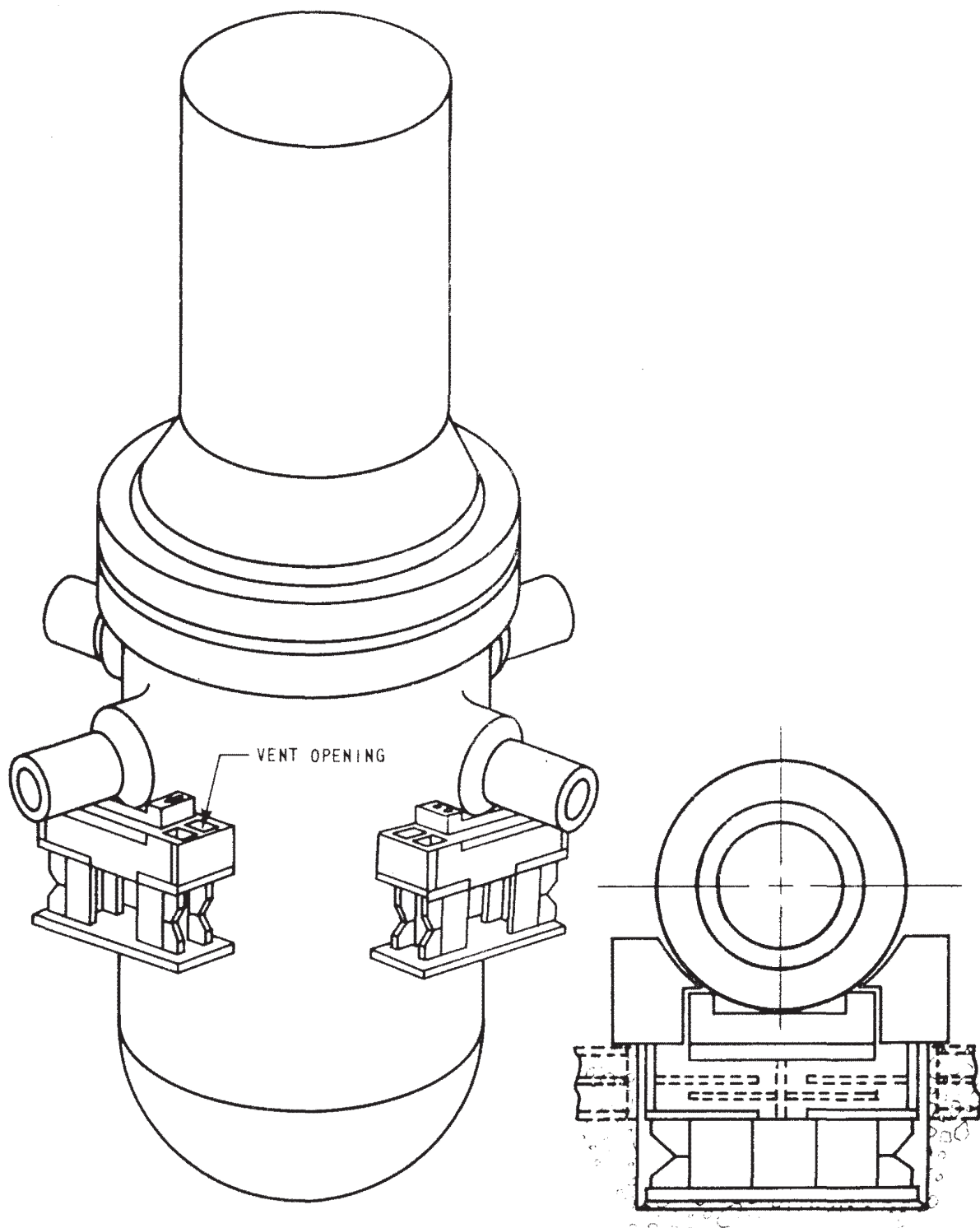
FIGURE 5.4-10



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Pressurizer Relief Tank

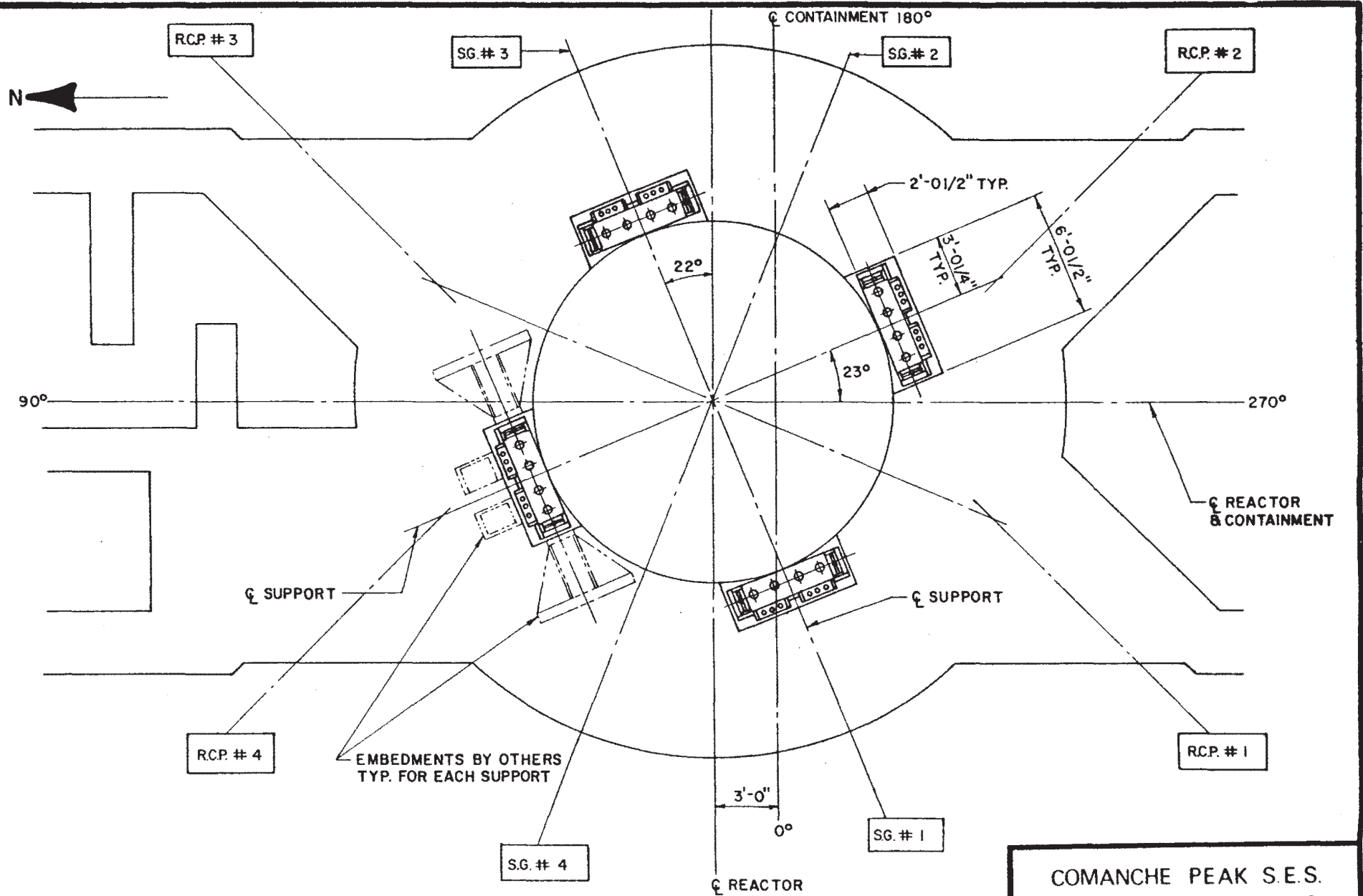
FIGURE 5.4-11



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Reactor Vessel
Supports

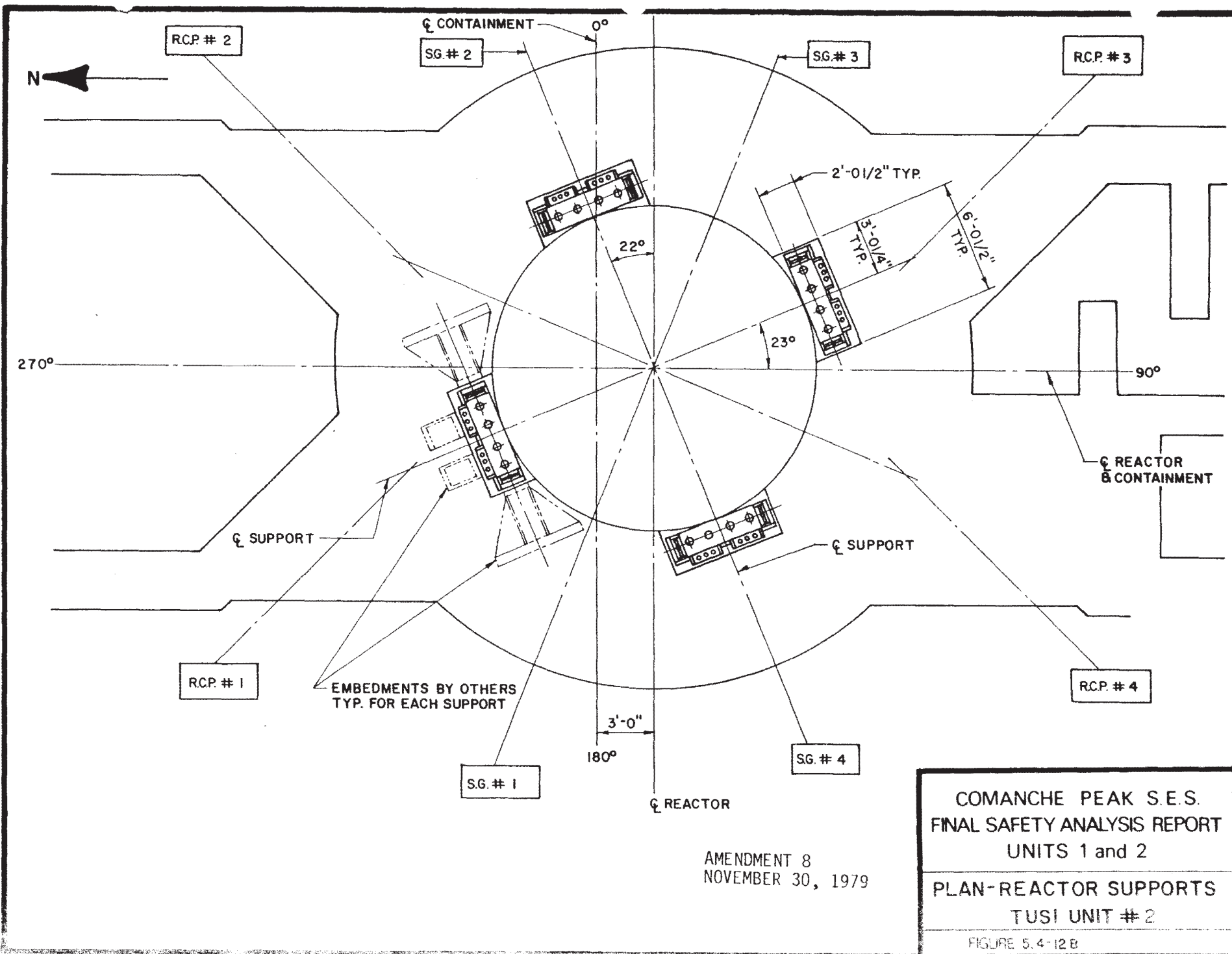
FIGURE 5.4-12

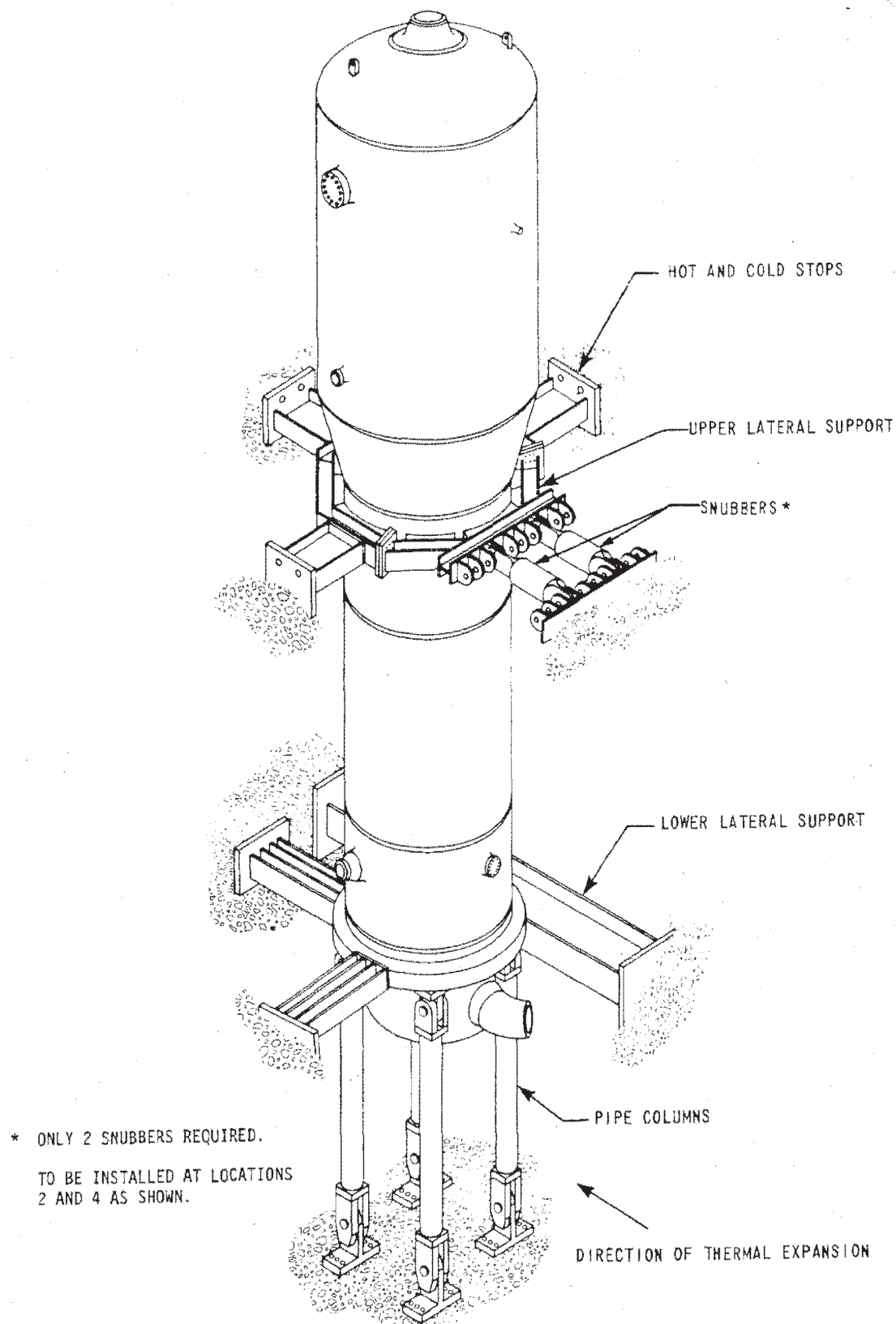


AMENDMENT 8
NOVEMBER 30, 1979

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2
PLAN-REACTOR SUPPORTS
TUSI UNIT # 1

FIGURE 5.4-12 A





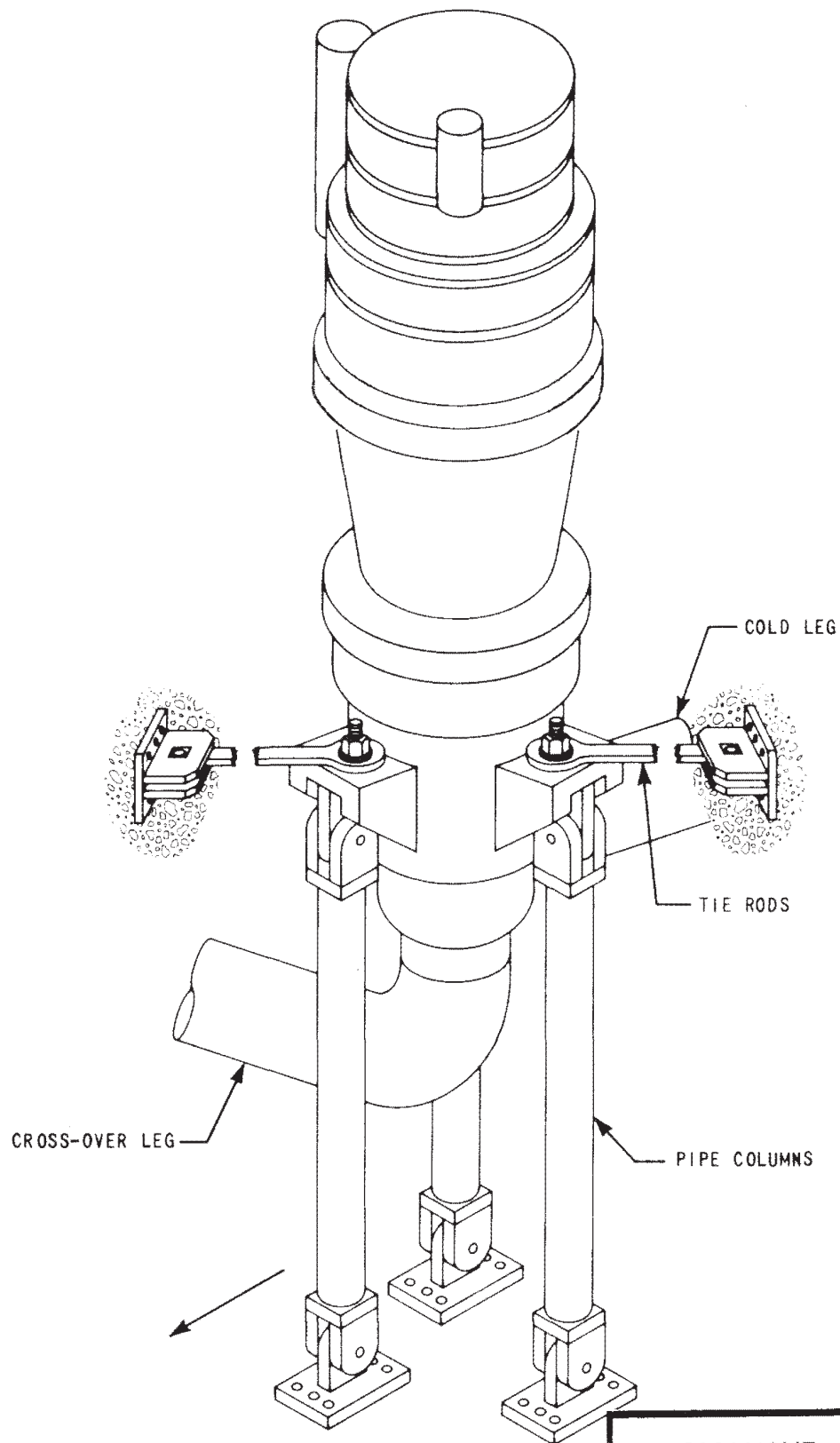
NOTE:
THE SNUBBERS EXIST ONLY ON UNIT 2.
THEY HAVE BEEN REMOVED FROM UNIT 1.

Amendment 102

COMANCHE PEAK S E S
FINAL SAFETY ANALYSIS REPORT
UNITS 1 AND 2

TYPICAL STEAM GENERATOR
SUPPORTS

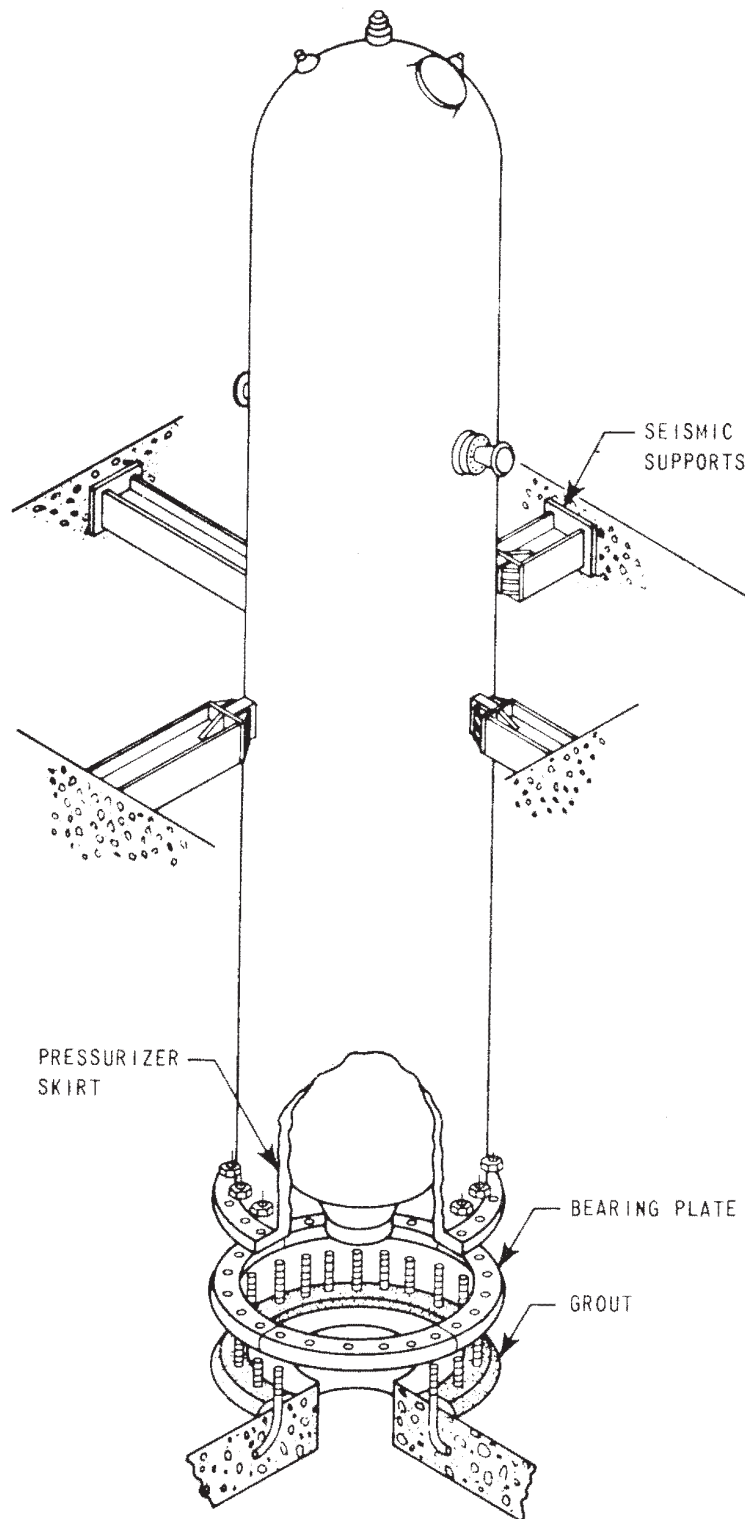
FIGURE 5.4-13



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Reactor Coolant
Pump Supports

FIGURE 5.4-14



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Pressurizer Supports

FIGURE 5.4-15

THIS FIGURE HAS BEEN DELETED.

Amendment 66
January 15, 1988

COMANCHE PEAK S.E.S. FINAL SAFETY ANALYSIS REPORT UNITS 1 and 2
Typical Crossover Leg Restraint
FIGURE 5.4-16

THIS FIGURE HAS BEEN DELETED.

Amendment 66
January 15, 1988

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Crossover Leg
Vertical Run Restraint

FIGURE 5.4-17

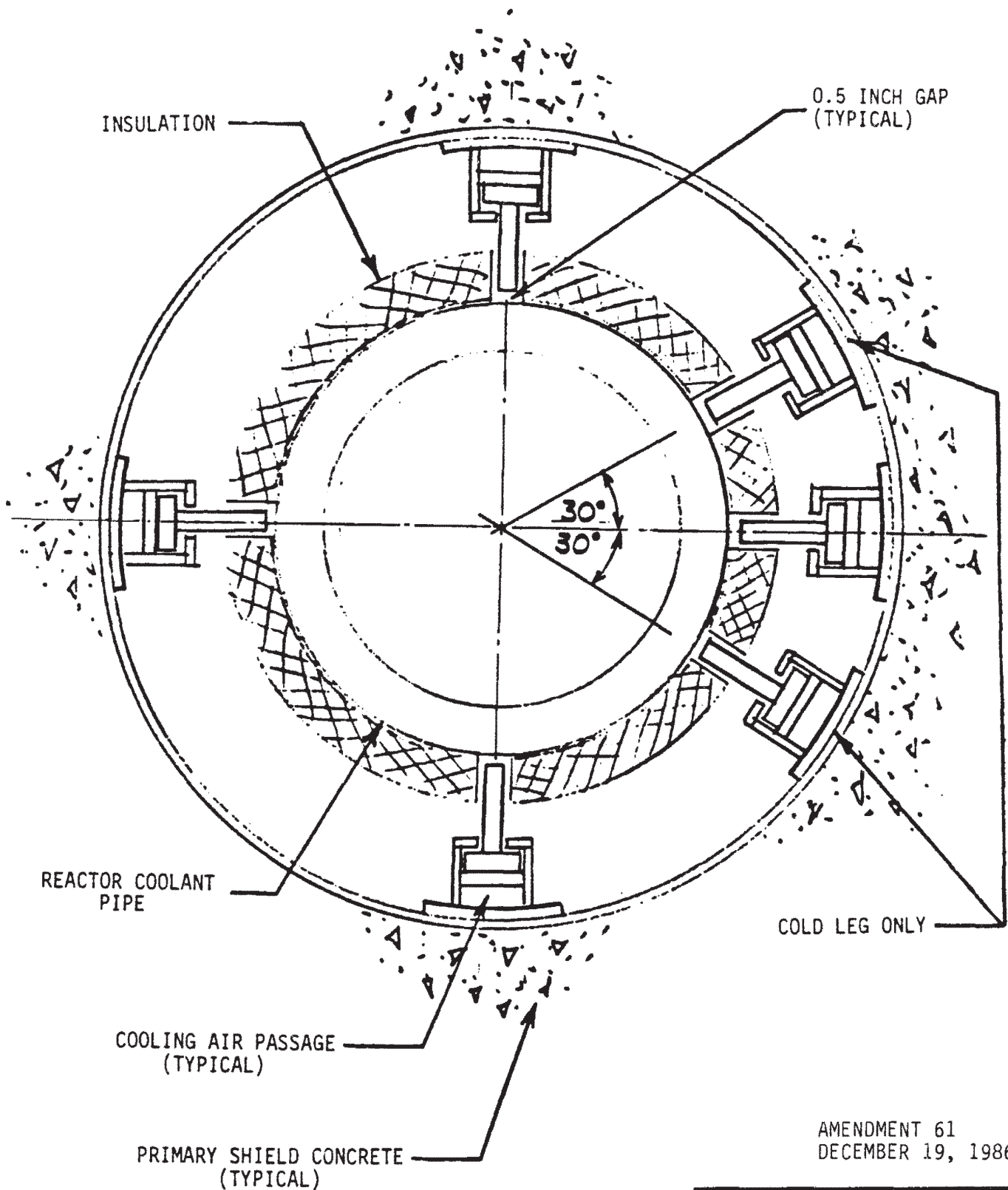
THIS FIGURE HAS BEEN DELETED.

Amendment 66
January 15, 1988

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

Typical Hot Leg Pipe
Whip Restraint

FIGURE 5.4-18



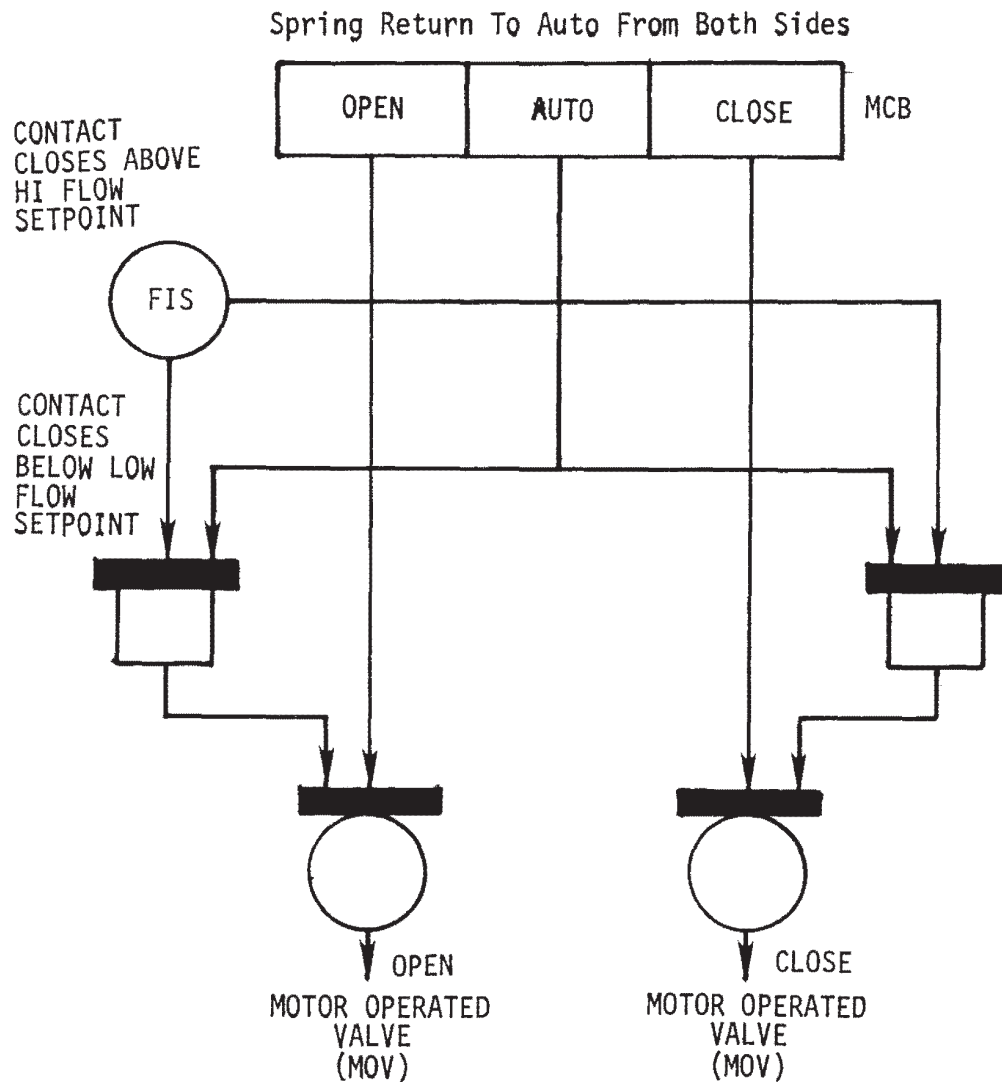
NOTE: Hot and Cold Leg Restraint may be eliminated
(See Section 5.4.14.2.5)

AMENDMENT 61
DECEMBER 19, 1986

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

TYPICAL
LATERAL RESTRAINTS

FIGURE 5.4-19



TRAIN	FLOW SW INSTRUMENT NO	MOV NO
A	FIS-610	FCV -610
B	FIS-611	FCV-611

Amendment 91
April 15, 1994

COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

RHR PUMP MINI-FLOW
VALVE INTERLOCK

FIGURE 5.4-20