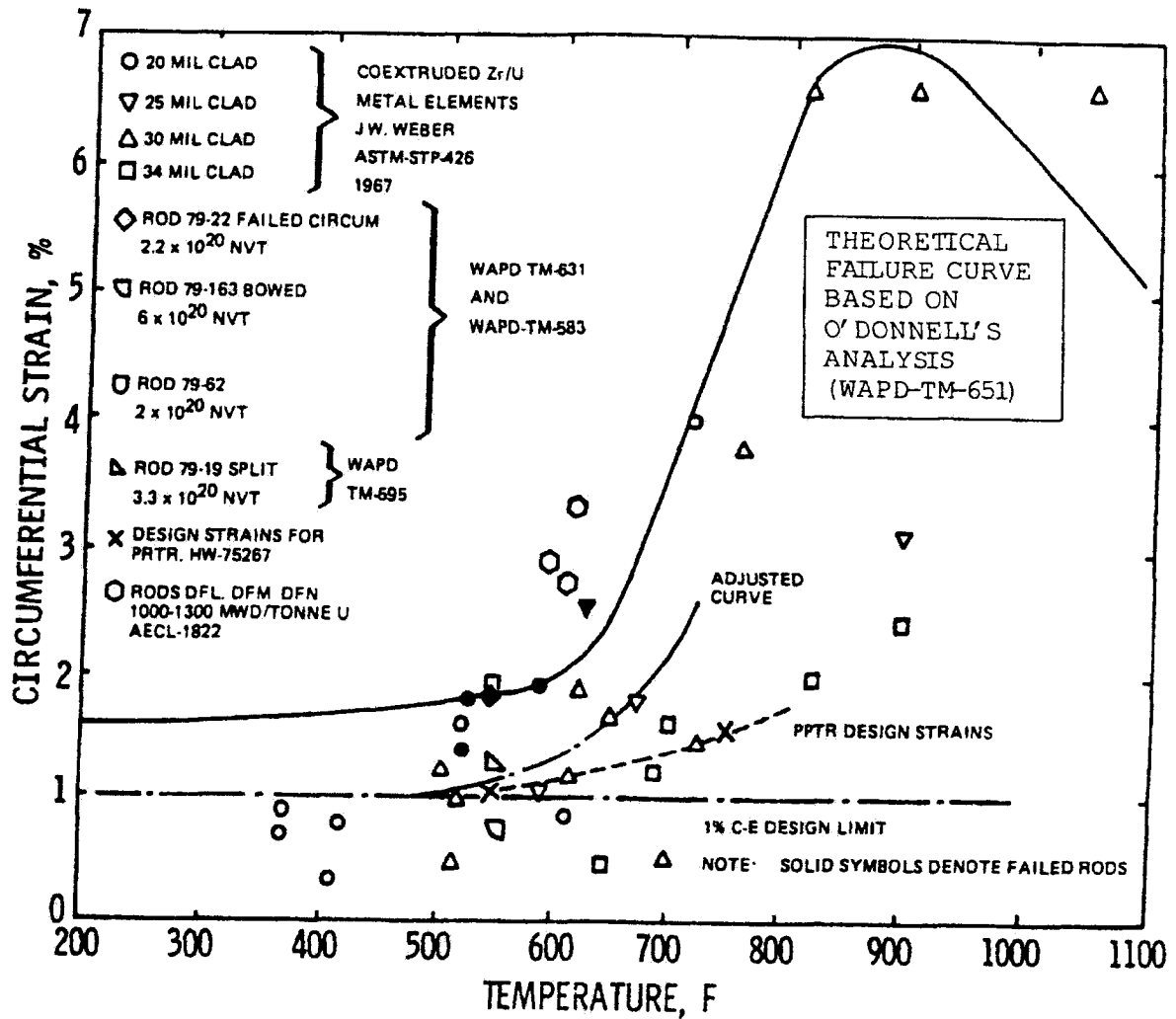


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REACTOR VERTICAL ARRANGEMENT  
FIGURE 4.1-1

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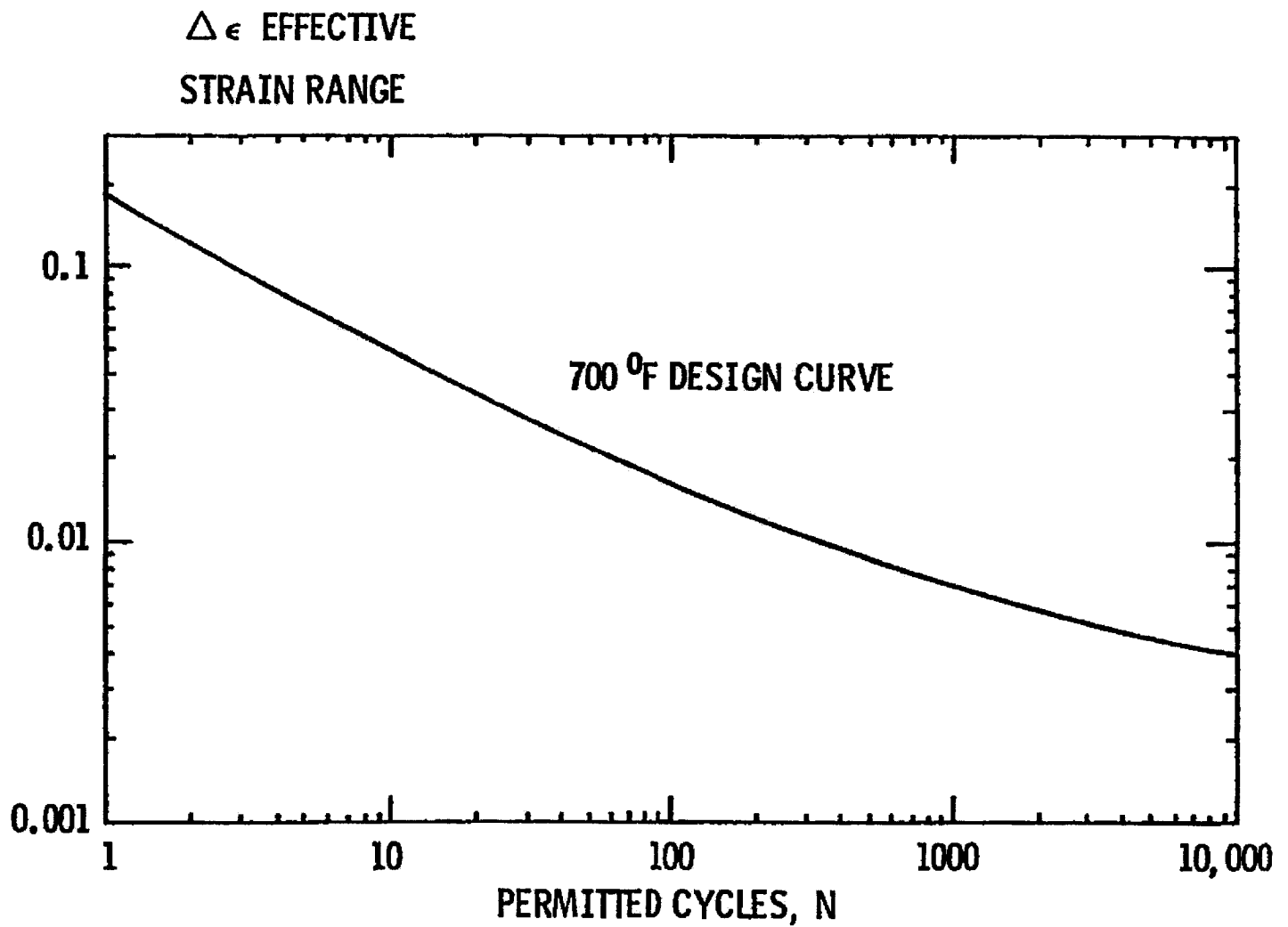


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CIRCUMFERENTIAL STRAIN VS TEMPERATURE  
FIGURE 4.2-1

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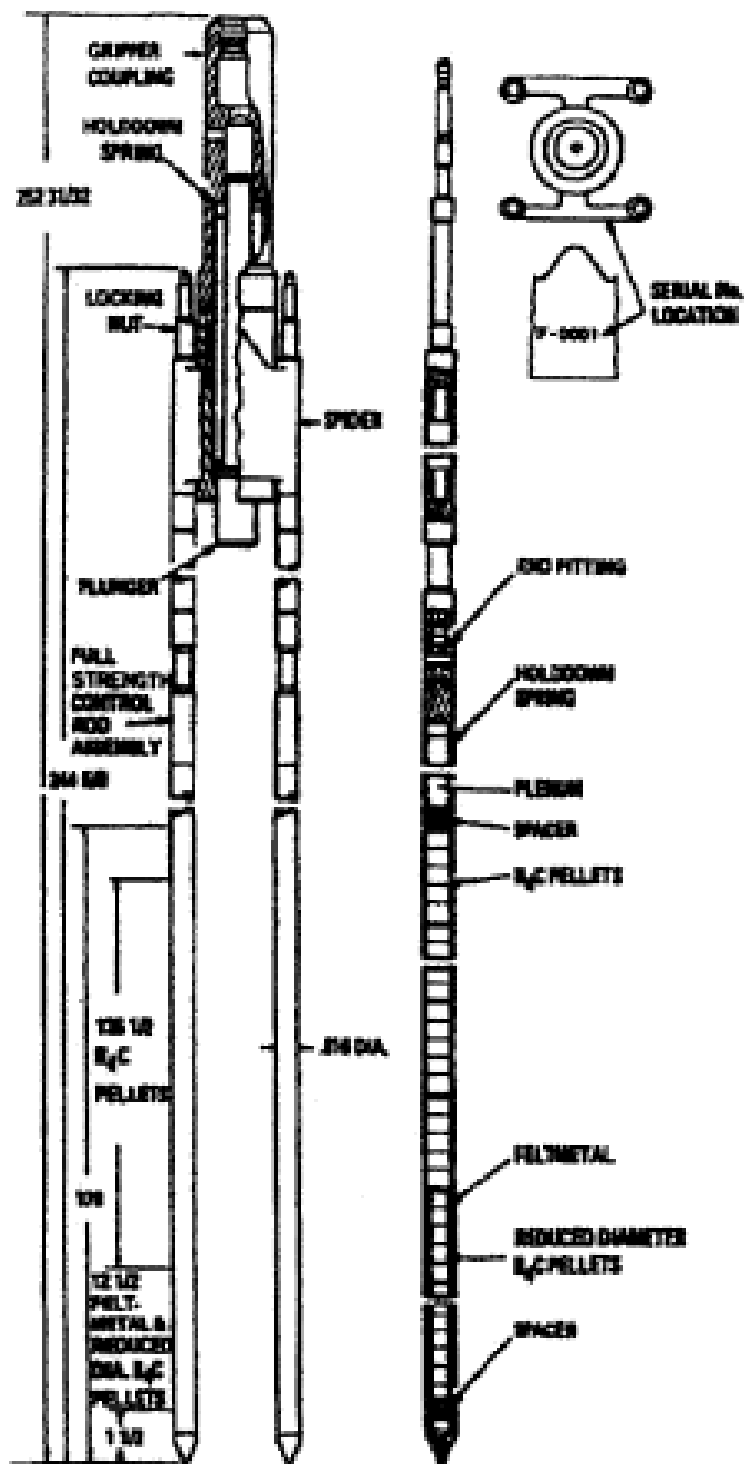


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

DESIGN CURVE FOR CYCLIC STRAIN USAGE  
OF ZIRCALOY-4 AND ZERLO AT 700F  
FIGURE 4.2-2

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#### NOTES:

1. ALL DIMENSIONS TYPICAL AND REPRESENTATIVE OF DESIGN.
2. PLANT ID NUMBERS WERE STAMPED ON THE ORIGINAL CEAS, BUT ARE NOT REQUIRED ON REPLACEMENT CEAS.

### 4-FINGER FULL STRENGTH CEA (FSCEA)

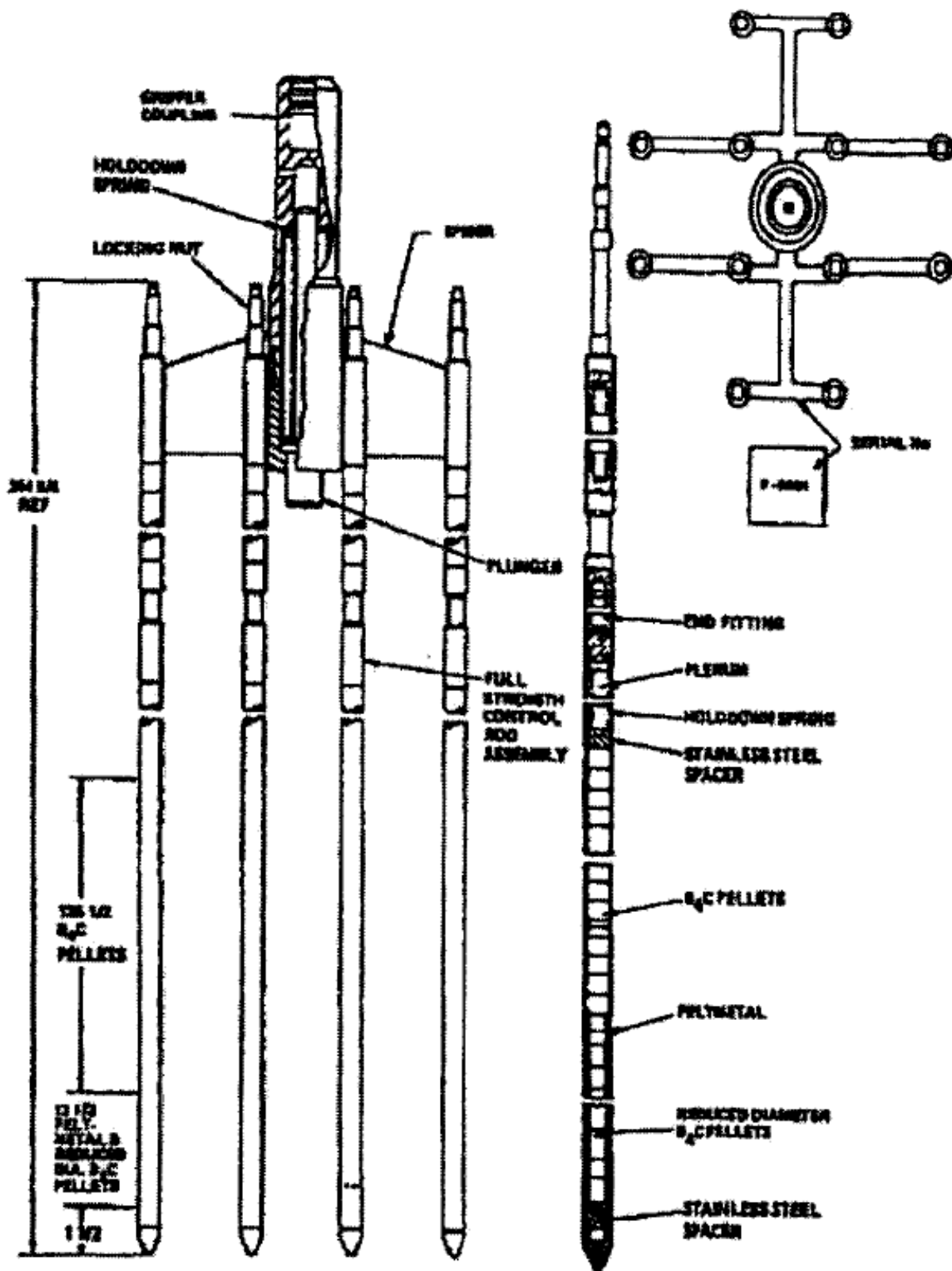
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

FULL-STRENGTH CONTROL ELEMENT ASSEMBLY  
(4-ELEMENT)  
FIGURE 4.2-3

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12-FINGER FULL STRENGTH CEA (FSCEA)

**NOTES:**

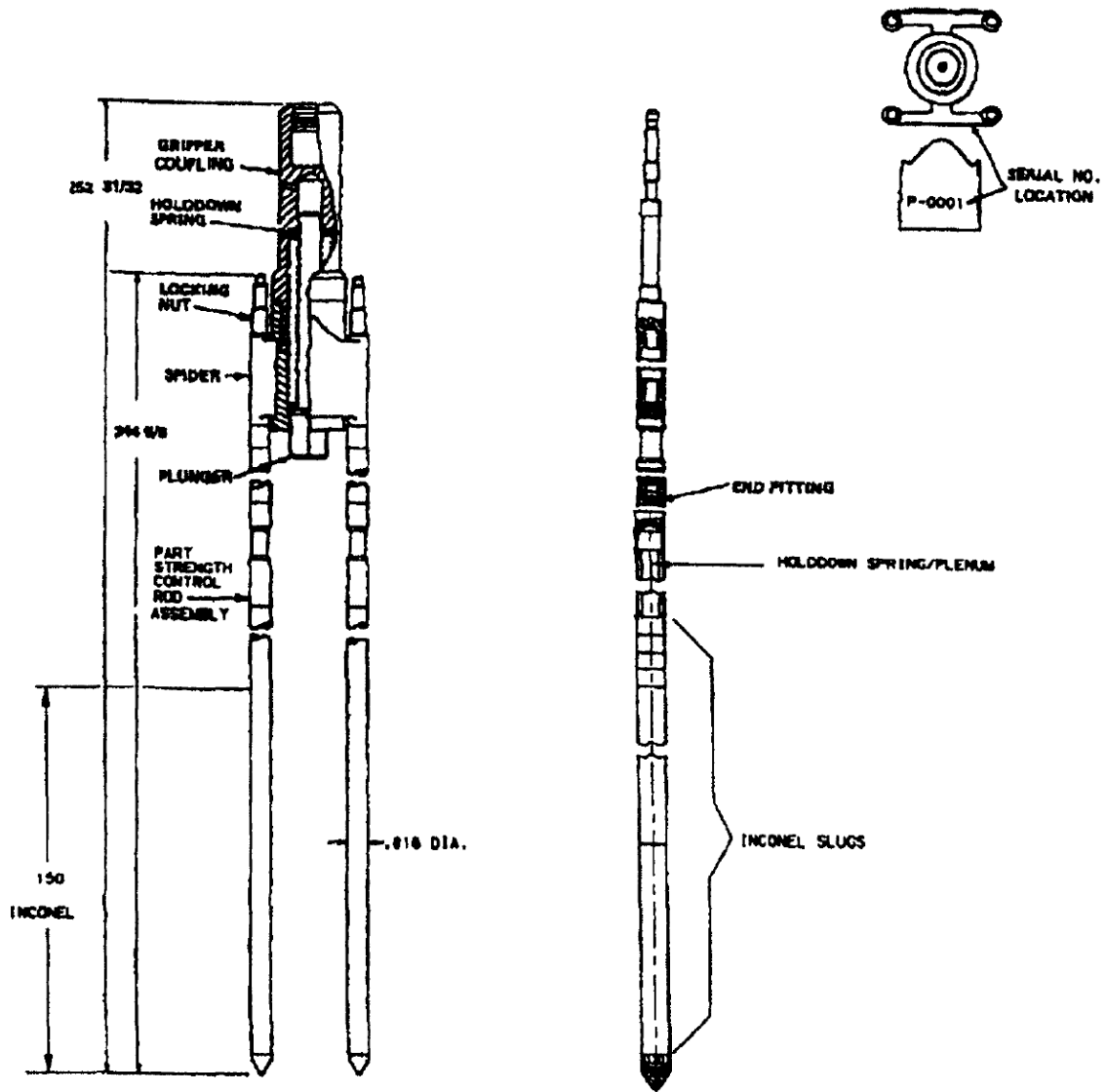
1. ALL DIMENSIONS TYPICAL AND REPRESENTATIVE OF DESIGN.
2. PLANT ID NUMBERS WERE STAMPED ON THE ORIGINAL CEAS, BUT ARE NOT REQUIRED ON REPLACEMENT CEAS.

PALO VERDE NUCLEAR GENERATING STATION  
FULL-STRENGTH CONTROL ELEMENT ASSEMBLY  
(12-ELEMENT)

FIGURE 4.2-4

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PART STRENGTH CEA (PSCEA)

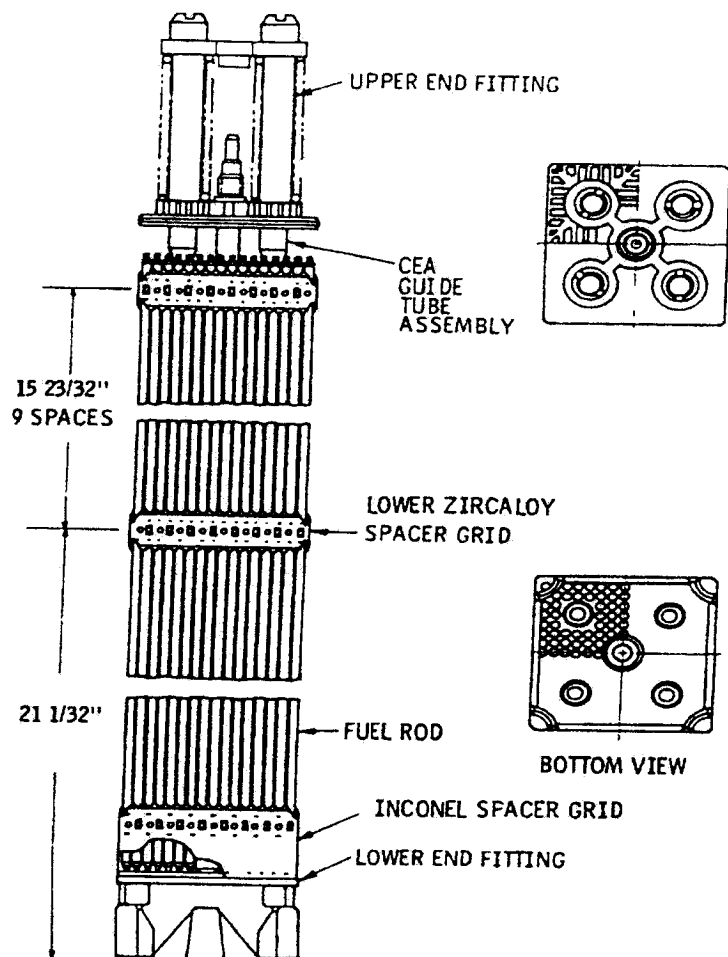
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PART-STRENGTH CONTROL ELEMENT ASSEMBLY

FIGURE 4.2-5

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**NOTE -**

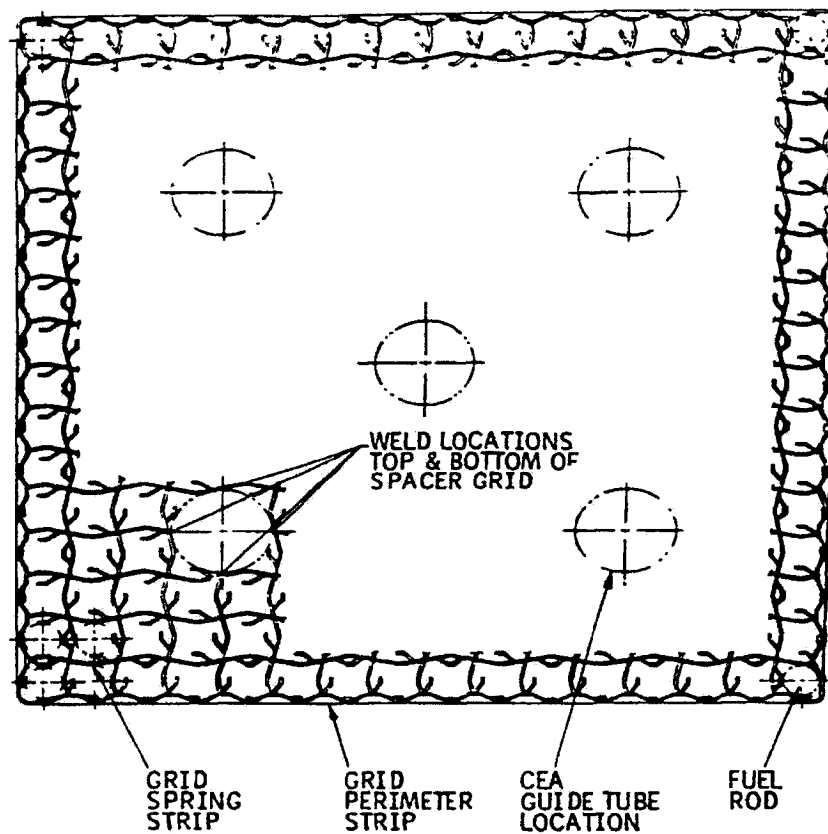
1. All dimensions typical, not for design purposes
2. Proprietary Guardian <sup>TM</sup> grids may replace the lower Inconel grids on reload assemblies

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

FUEL ASSEMBLY  
FIGURE 4.2-6

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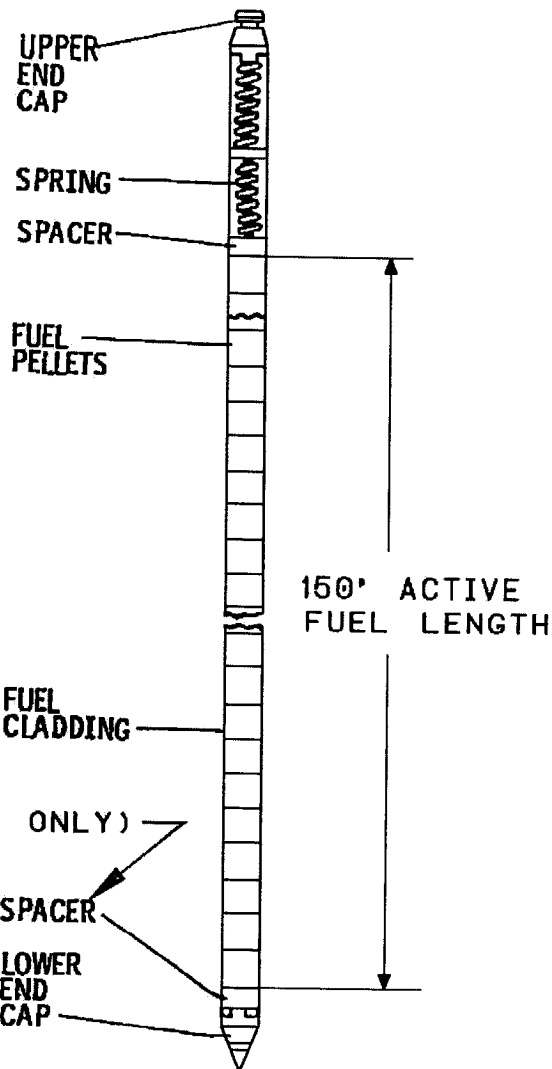
NOTE - Proprietary Guardian <sup>TM</sup> grids may replace the lower Inconel grids on reload assemblies

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

FUEL SPACER GRID  
FIGURE 4.2-7

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**NOTES:**

Reload assemblies may incorporate one or more design improvements, including:

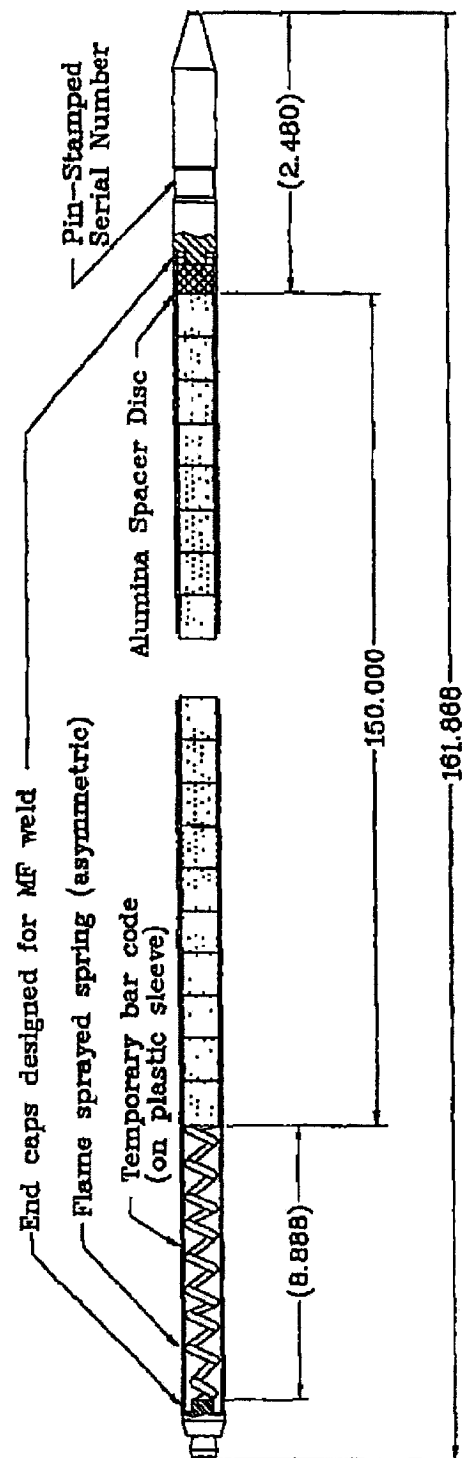
1. Removal of upper spacer disc.
2. Longer lower end caps for use with Guardian™ grids
3. Minor changes in fuel pellet dimensions (diameter, dishes, chamfers)
4. Use of  $UO_2$ - $ER_2O_3$  fuel - poison pellets, in lieu of the  $A1_2O_3$ - $B_4C$  poison rod shown in Figure 4.2-9.

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

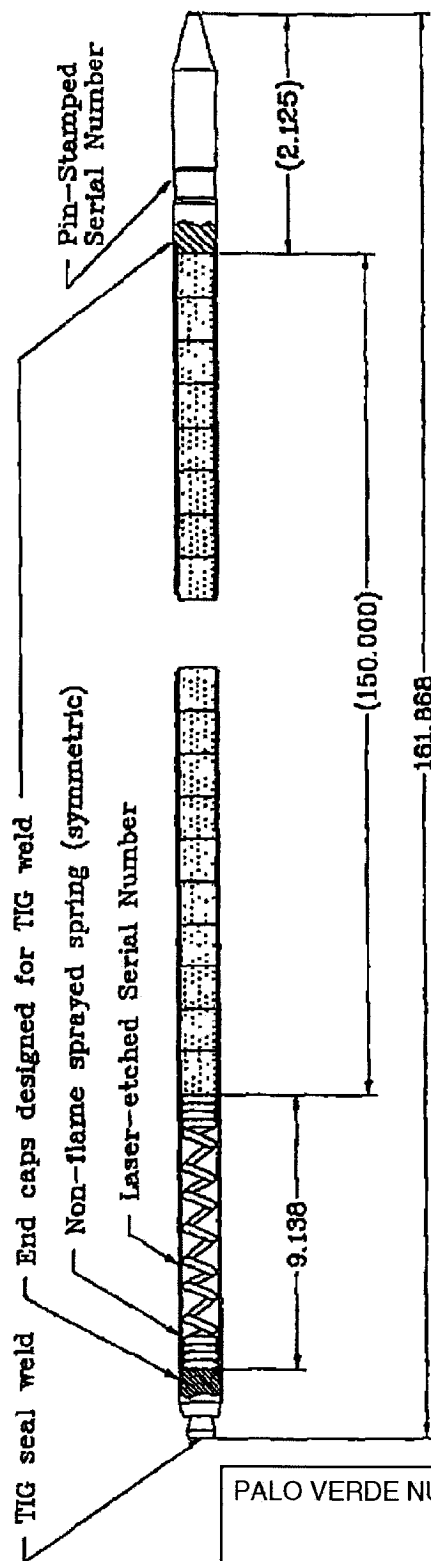
FUEL ROD  
FIGURE 4.2-8

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Batch 3M Rod Assembly with MF Welds (Hematite Production)



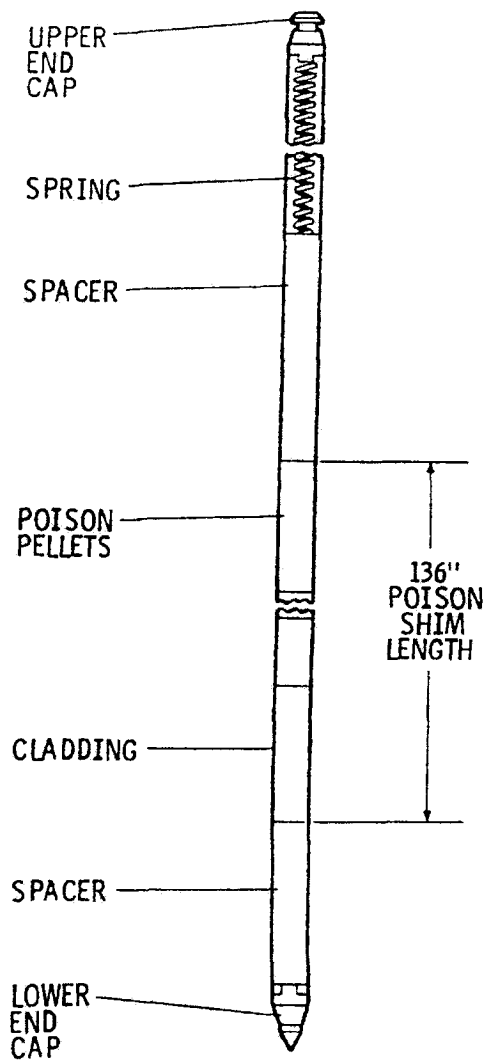
Batch 2N Rod Assembly with TIG Welds (Columbia Production)

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

COMPARISON OF URANIA ROD  
ASSEMBLY FEATURES  
FIGURE 4.2-8A

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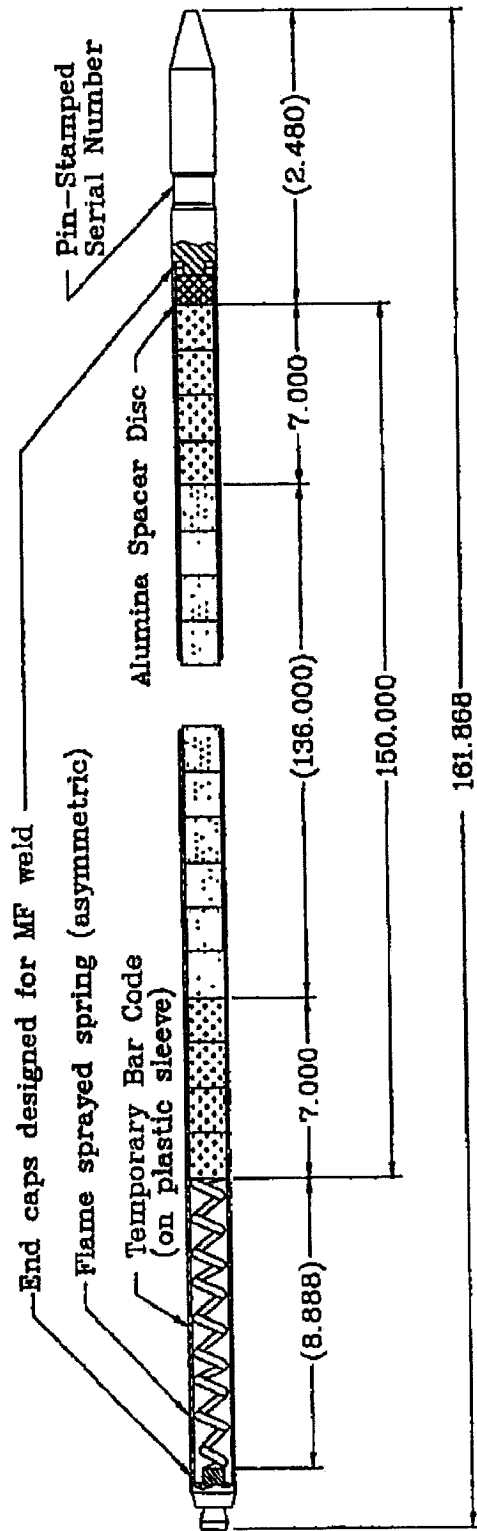
NOTE. Reload designs may utilize  $\text{UO}_2$  -  $\text{ER}_2\text{O}_3$  fuel - poison rods, in lieu of the  $\text{A1}_2\text{O}_3$  -  $\text{B}_4\text{C}$  rods, in lieu of the  $\text{A1}_2\text{O}_3$  -  $\text{B}_4\text{C}$  rods that were incorporated into the original design of system 80 fuel for PVNGS. See Figure 4.2- 8

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

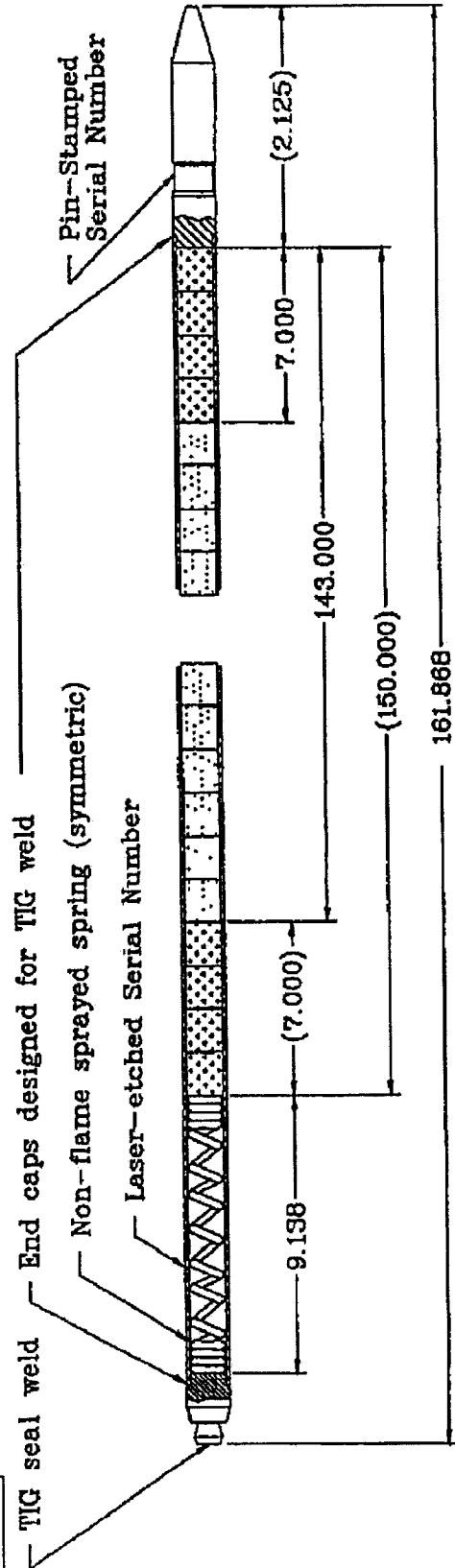
BURNABLE POISON ROD  
FIGURE 4.2-9

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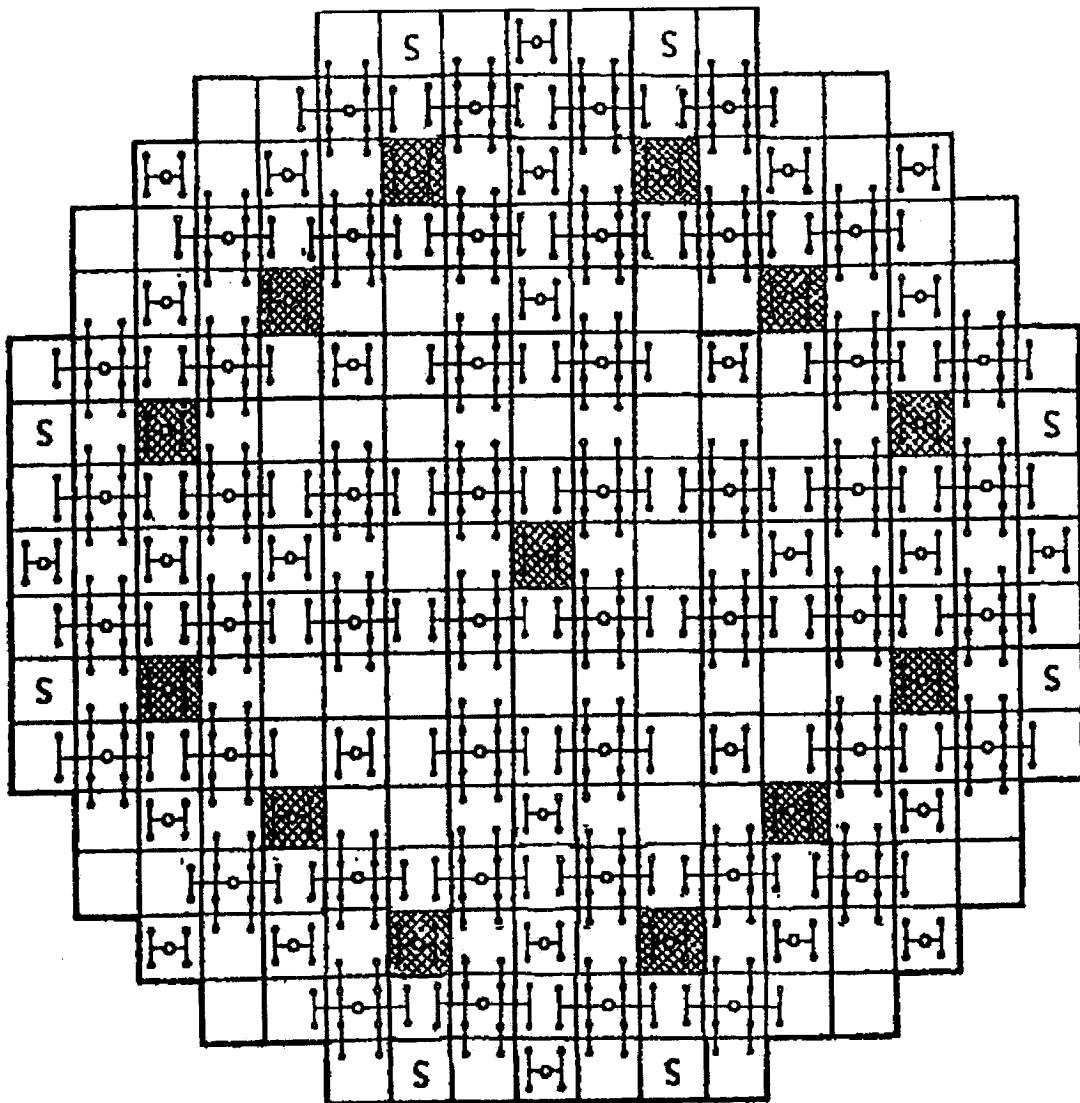


Batch 3M Rod Assembly with MF Welds (Hematite Production)



Batch 2N Rod Assembly with TIG Welds (Columbia Production)





	12 ELEMENT FULL LENGTH CEA's	48
	4 ELEMENT FULL LENGTH CEA's	28
	4 ELEMENT PART LENGTH CEA's	13
TOTAL		89 CEA's

S DENOTES SPARE CEA LOCATIONS 8

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

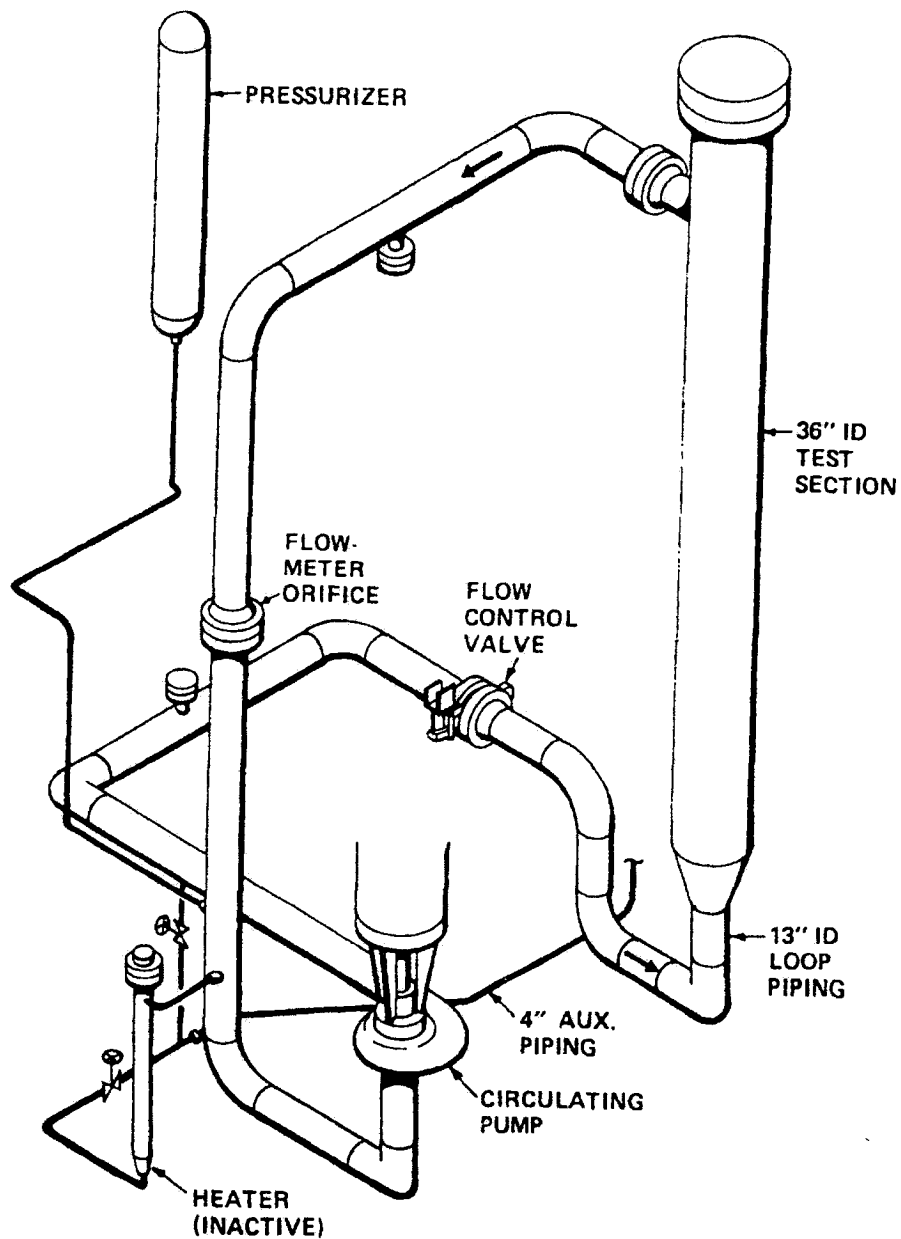
CONTROL ELEMENT ASSEMBLY LOCATIONS

FIGURE 4.2-10

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FIGURE 4.2-10  
REV. 12

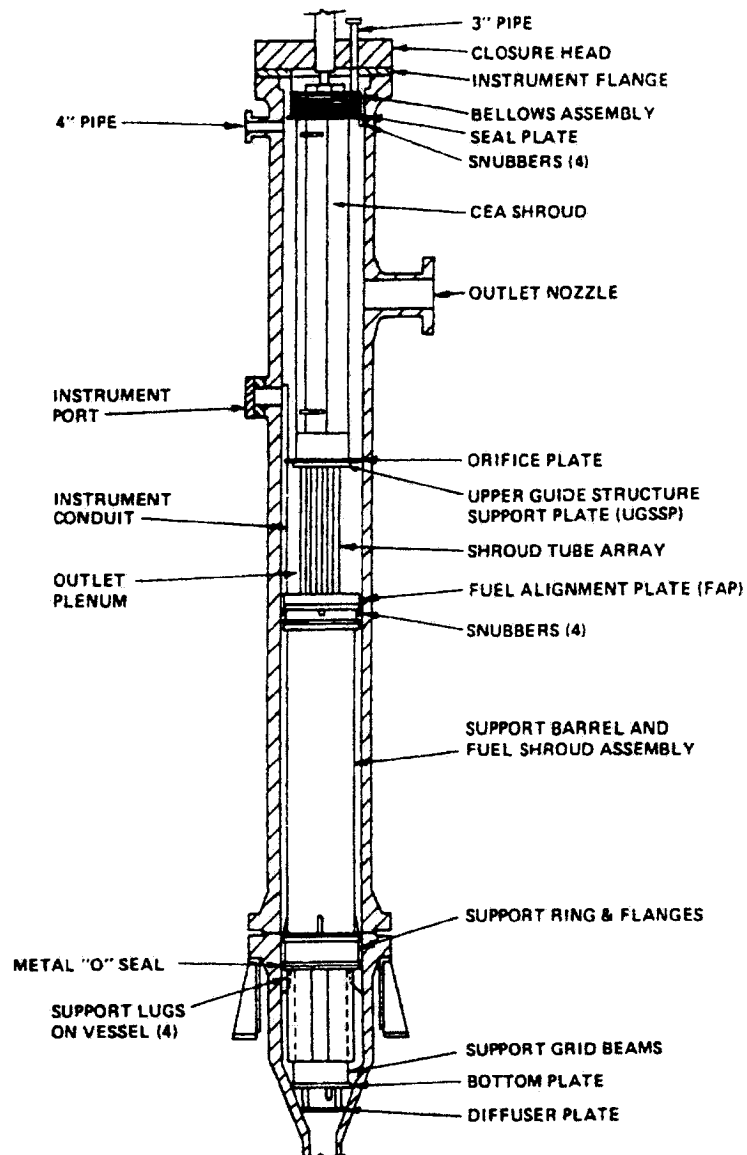


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

C-E TF - 2 HOT LOOP PIPING ISOMETRIC  
FIGURE 4.2-11

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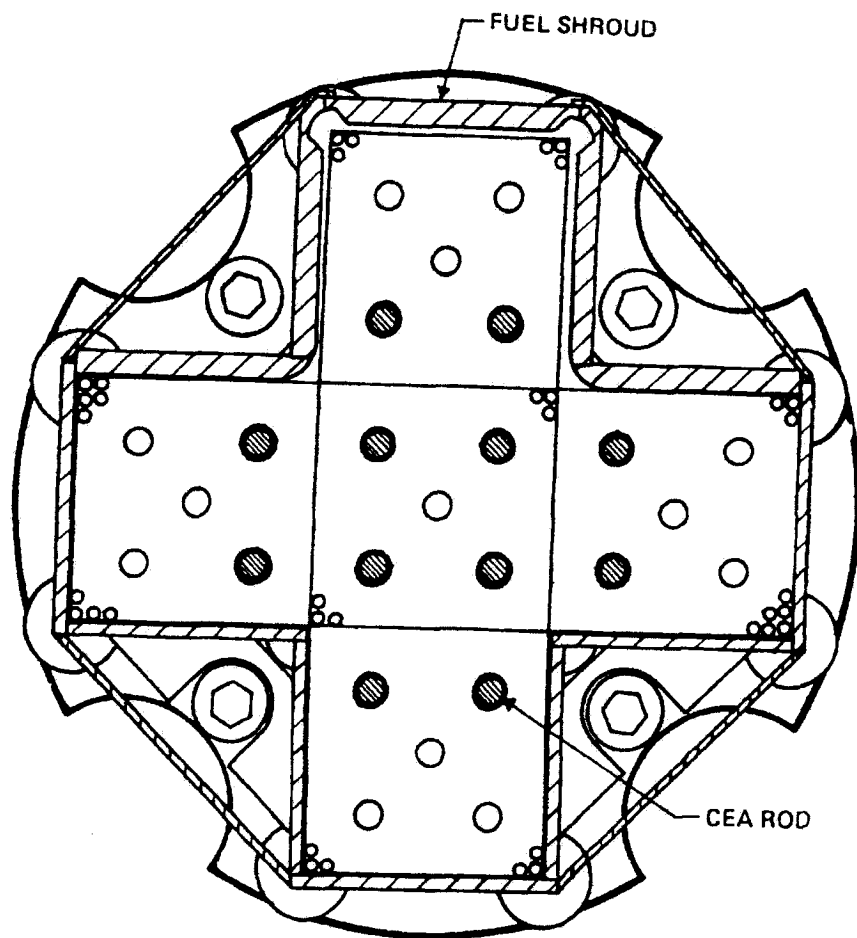


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SYSTEM 80 FUEL HOT LOOP TESTS,  
COMPONENT STACKUP IN TF - 2  
FIGURE 4.2-12

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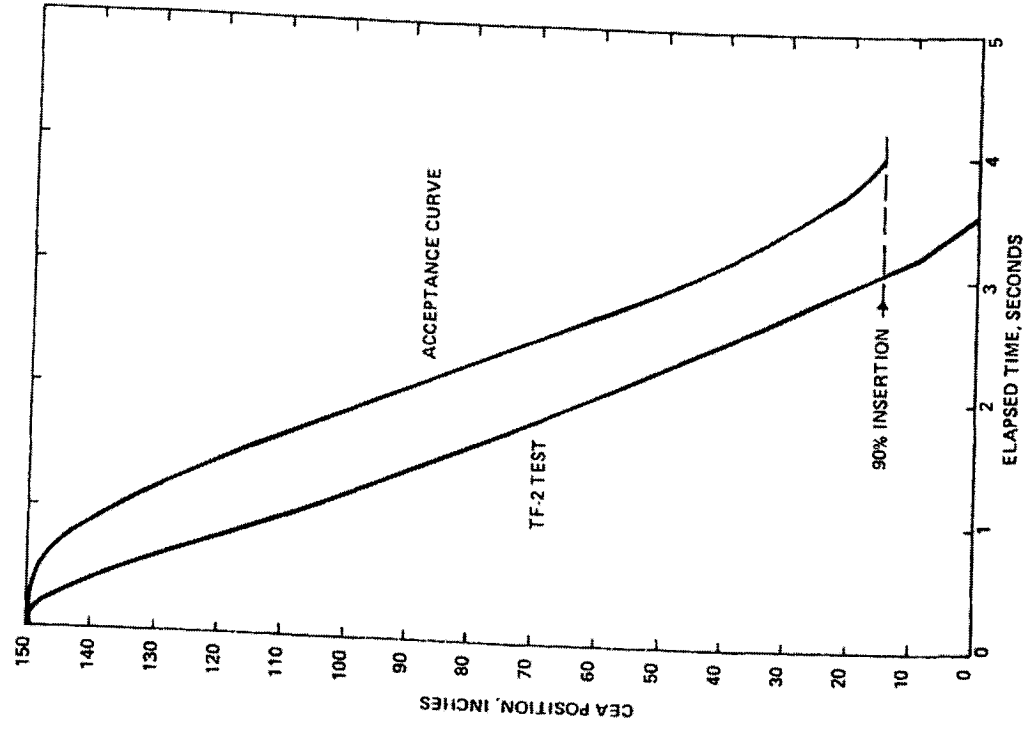


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CROSS SECTION THROUGH FUEL SHROUD AND  
FUEL ARRAY TF-2 TESTS  
FIGURE 4.2-13

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TEST SCRAM VS ACCEPTANCE CURVE,  
525°F FOUR PUMP FLOW SETTING IN TF - 2

FIGURE 4.2-14

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					1 Old	2 Old	3 Old	4 New
		5 Old	6 Old	7 New	8 Old	9 New	10 Old	
	11 Old	12 Old	13 New	14 Old	15 New	16 Old	17 New	
18 Old	19 Old	20 New	21 Old	22 New	23 Old	24 New	25 Old	
26 Old	27 New	28 Old	29 New	30 Old	31 New	32 Old	33 Old	
34 Old	35 New	36 Old	37 New	38 Old	39 Old	40 Old	41 New	42 Old
43 Old	44 Old	45 New	46 Old	47 New	48 Old	49 New	50 Old	51 New
52 Old	53 New	54 Old	55 New	56 Old	57 New	58 Old	59 Old	60 Old
61 New	62 Old	63 New	64 Old	65 Old	66 Old	67 New	68 Old	69 Old

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TYPICAL FUEL MANAGEMENT

FIGURE 4.3-1

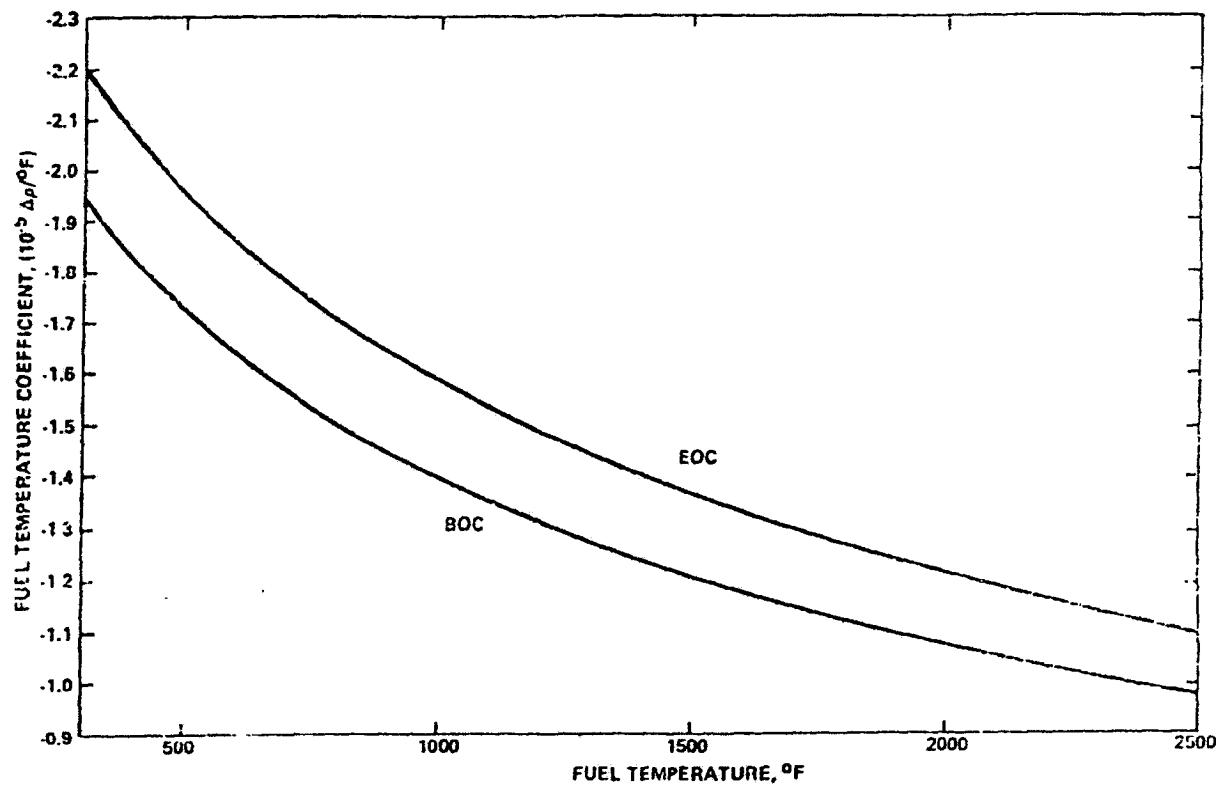
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NORMALIZED POWER DISTRIBUTION OF  
UNSHIMMED ASSEMBLY USED IN SAMPLE DNB ANALYSIS  
--IN PARAGRAPH 4.4.2.2

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0.933										
0.933	0.950									
0.942	0.968	1.003								
0.950	0.989	1.039								
0.950	0.987	1.045								
0.945	0.979	1.021	1.063	1.076	1.060					
0.945	0.972	0.999	1.024	1.039	1.048	1.068				
0.947	0.968	0.990	1.009	1.027	1.049	1.094				



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

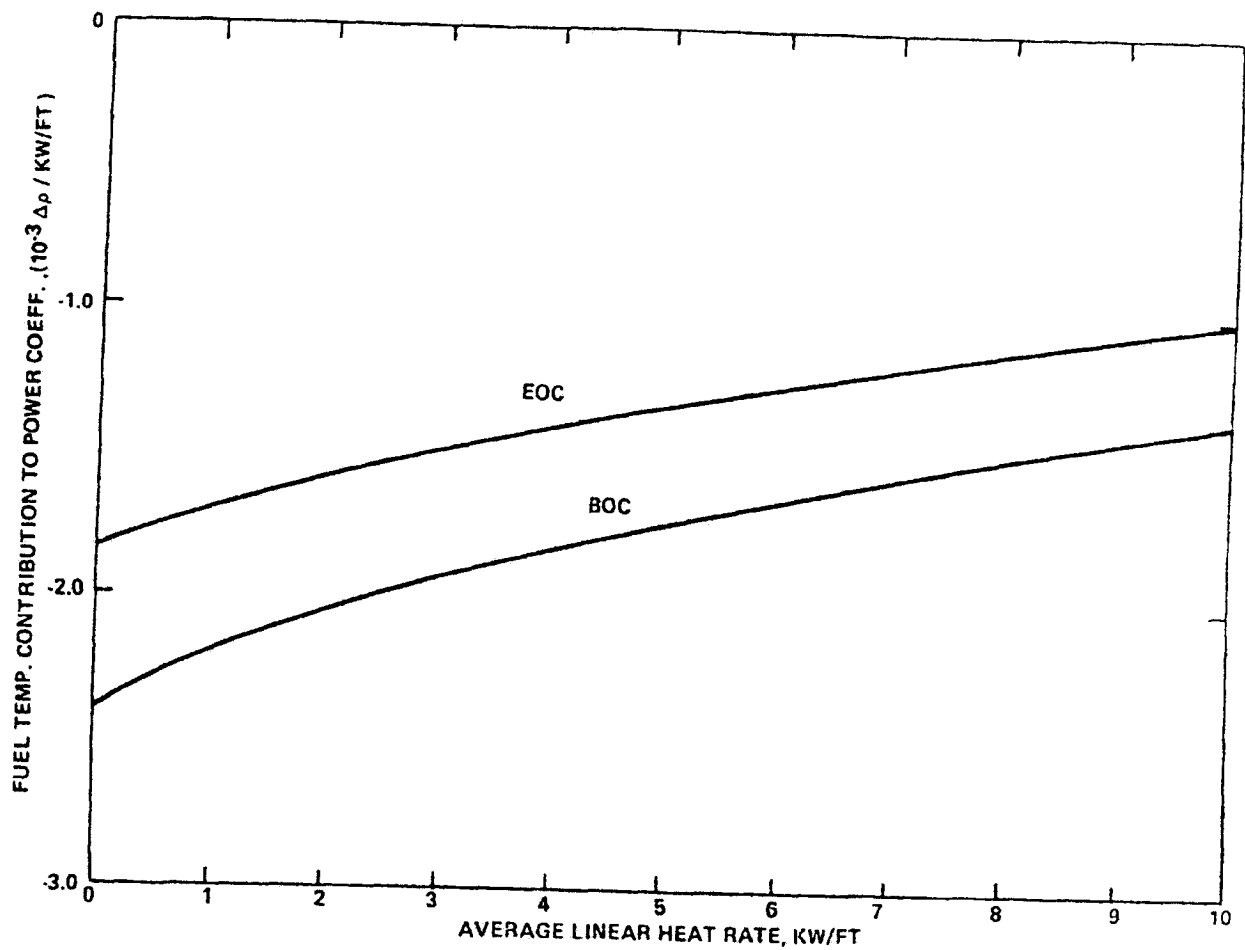
FUEL TEMPERATURE COEFFICIENT vs  
EFFECTIVE FUEL TEMPERATURE

FIGURE 4.3-3

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

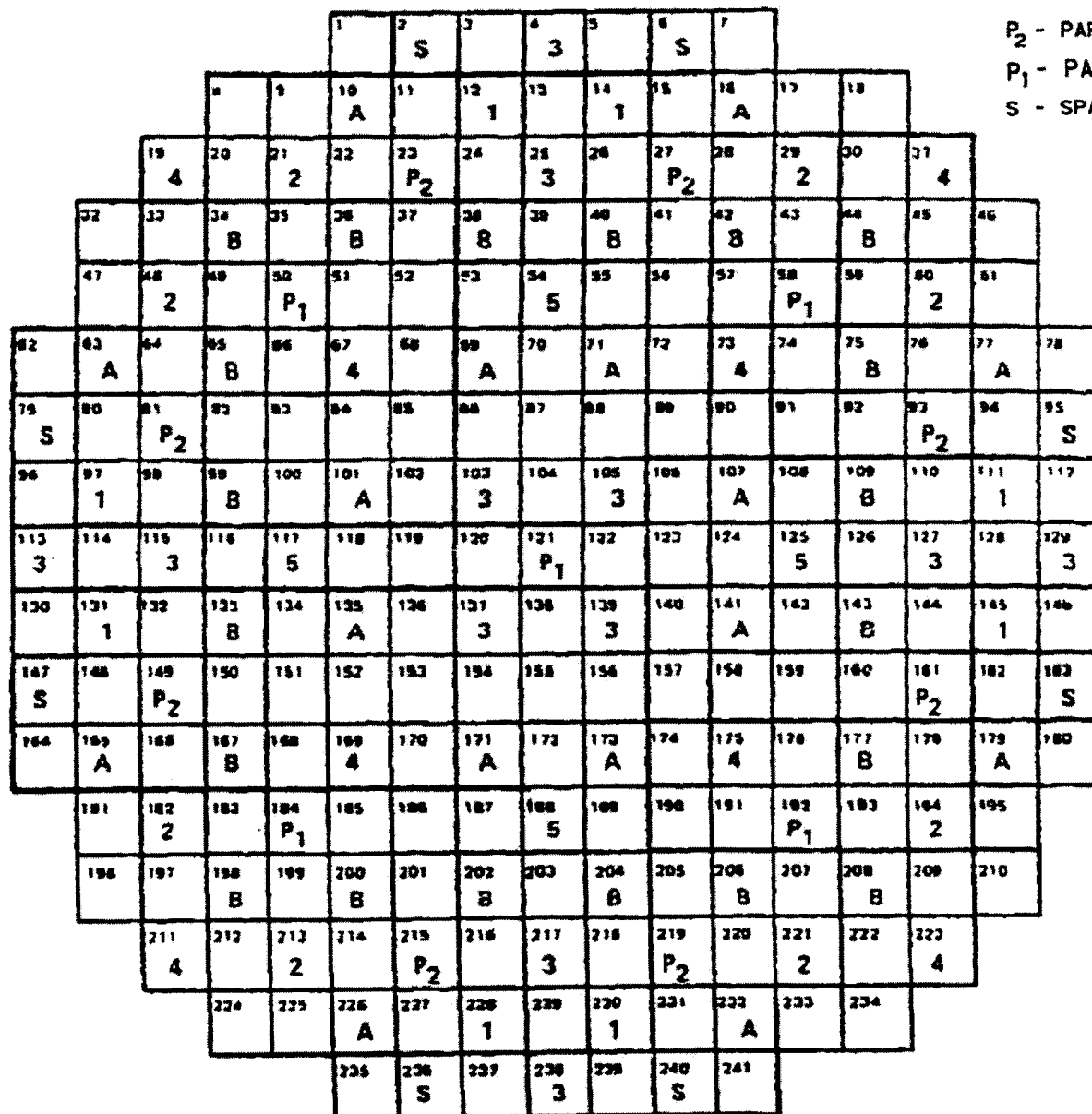
FUEL TEMPERATURE CONTRIBUTION  
TO POWER COEFFICIENT AT EOC

FIGURE 4.3-4

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5 - FIRST REGULATING BANK  
 4 - SECOND REGULATING BANK  
 3 - THIRD REGULATING BANK  
 2 - FOURTH REGULATING BANK  
 1 - LAST REGULATING BANK  
 B - SHUTDOWN BANK B  
 A - SHUTDOWN BANK A  
 P<sub>2</sub> - PART-STRENGTH GROUP 2  
 P<sub>1</sub> - PART-STRENGTH GROUP 1  
 S - SPARE CEA LOCATIONS



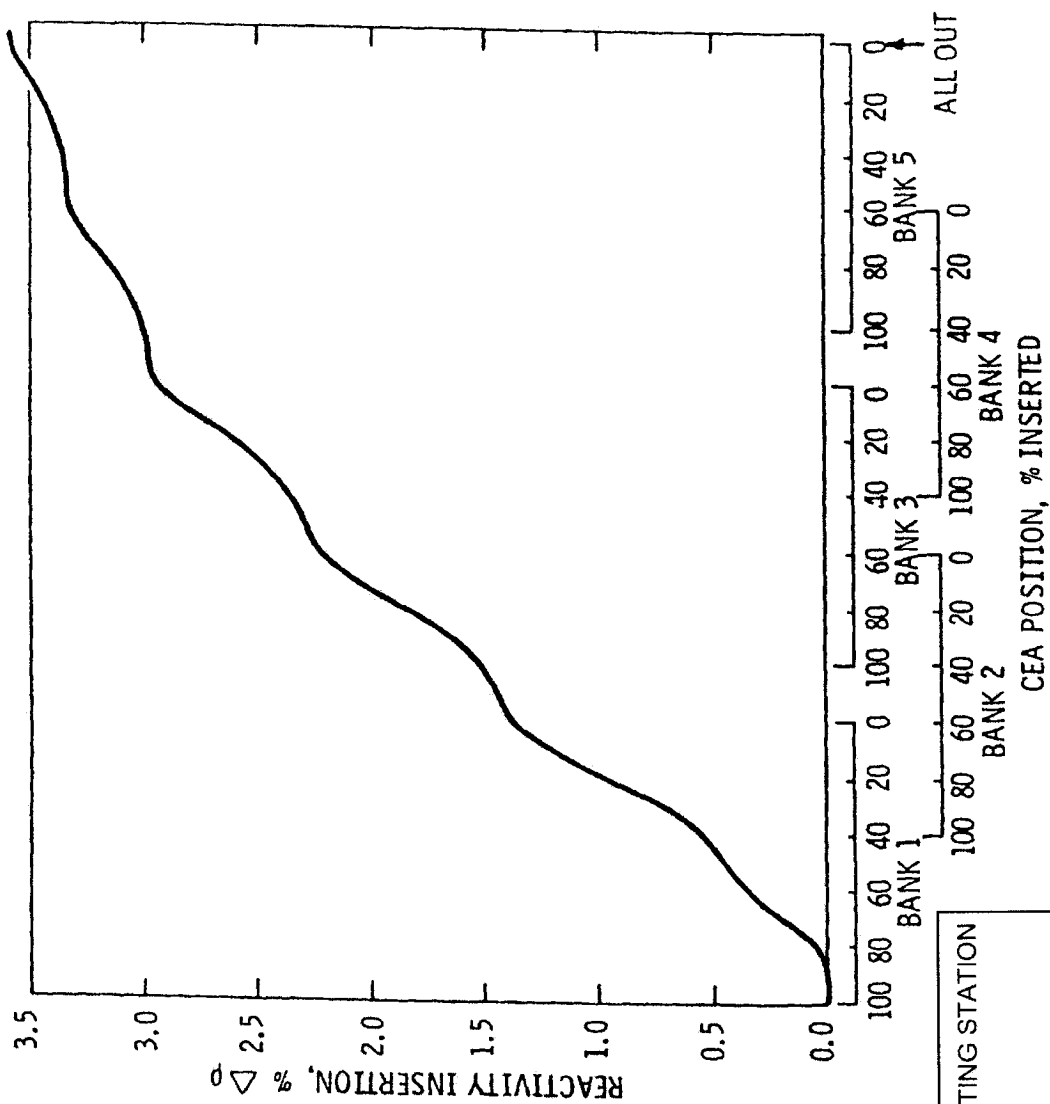
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

CEA BANK IDENTIFICATION

FIGURE 4.3-6

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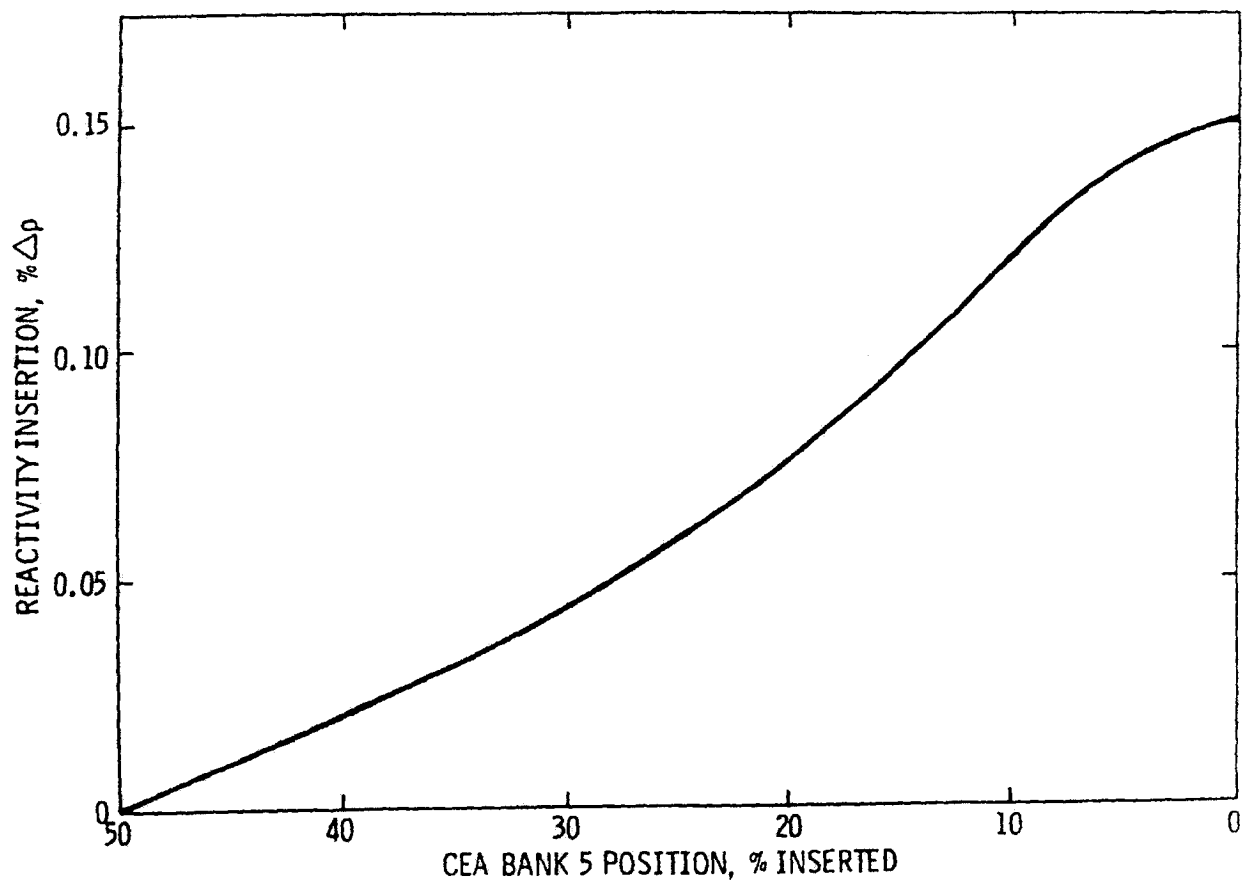


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TYPICAL INTEGRAL WORTH vs WITHDRAW  
AT ZERO POWER, EOC 1 CONDITIONS  
FIGURE 4.3-7

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TYPICAL INTEGRAL WORTH vs WITHDRAW  
AT HOT FULL POWER, EOC 1,  
EQUILIBRIUM XENON CONDITIONS  
FIGURE 4.3-8

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	Stationary Eigenvalues	Eigenfunction	Harmonic
1.00	— 000	$J_0(\alpha_{01}r) \sin \beta Z$	Fundamental
0.99	— 010	$J_0(\alpha_{01}r) \sin 2\beta Z$	1st Axial
0.98	— 001	$J_1(\alpha_{11}r) \sin \beta Z \cos \theta$	1st Azimuthal
0.97	— 011	$J_1(\alpha_{11}r) \sin 2\beta Z \cos \theta$	1st Axial, 1st Azimuthal
	— 002	$J_2(\alpha_{21}r) \sin \beta Z \cos 2\theta$	2nd Azimuthal
0.96	— 020	$J_0(\alpha_{01}r) \sin 3\beta Z$	2nd Axial
	— 100	$J_0(\alpha_{02}r) \sin \beta Z$	1st Radial
0.95	— 012	$J_2(\alpha_{21}r) \sin 2\beta Z \cos 2\theta$	1st Axial, 2nd Azimuthal
	— 021	$J_1(\alpha_{11}r) \sin 3\beta Z \cos \theta$	2nd Axial, 1st Azimuthal
0.94	— 110	$J_0(\alpha_{02}r) \sin 2\beta Z$	1st Radial, 1st Axial
0.93	— 022	$J_2(\alpha_{21}r) \sin 3\beta Z \cos 2\theta$	2nd Axial, 2nd Azimuthal

The indices indicate radial, axial and azimuthal components of the separable modes in that order

$\alpha_{ij}$  indicates the  $j$ th zero of the  $i$ th Bessel Function

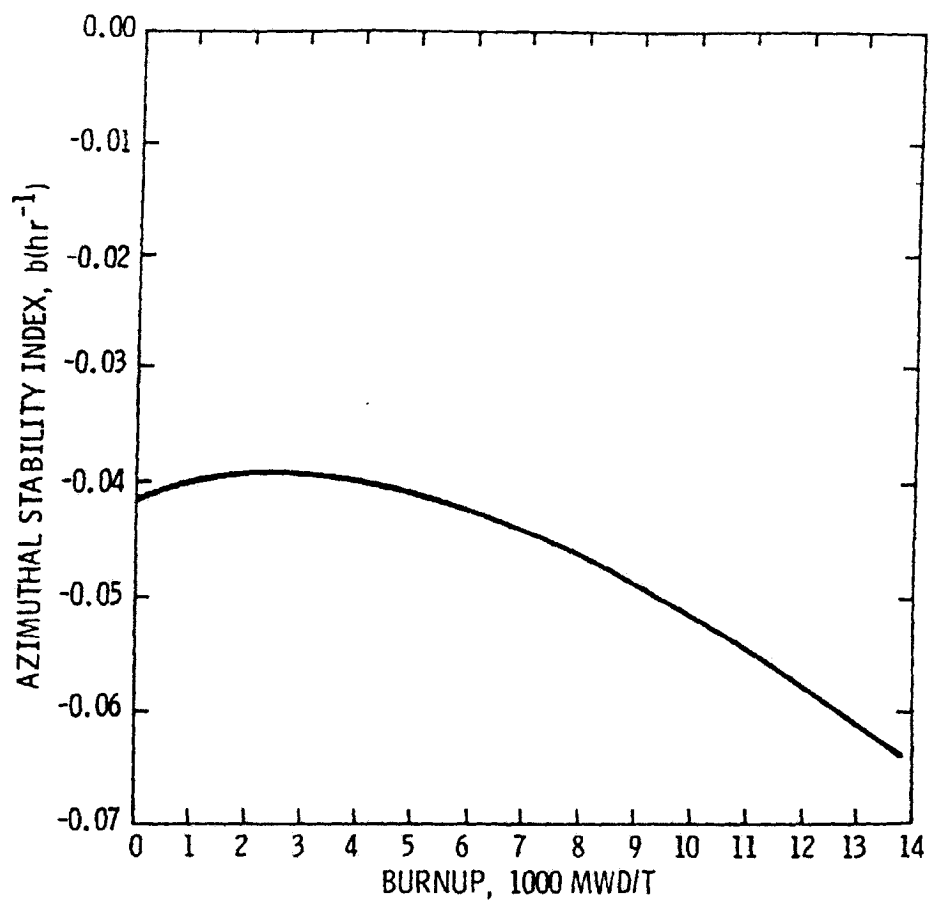
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REACTIVITY DIFFERENCE BETWEEN  
FUNDAMENTAL AND EXCITED STATES OF A  
BARE CYLINDRICAL REACTOR

FIGURE 4.3-9

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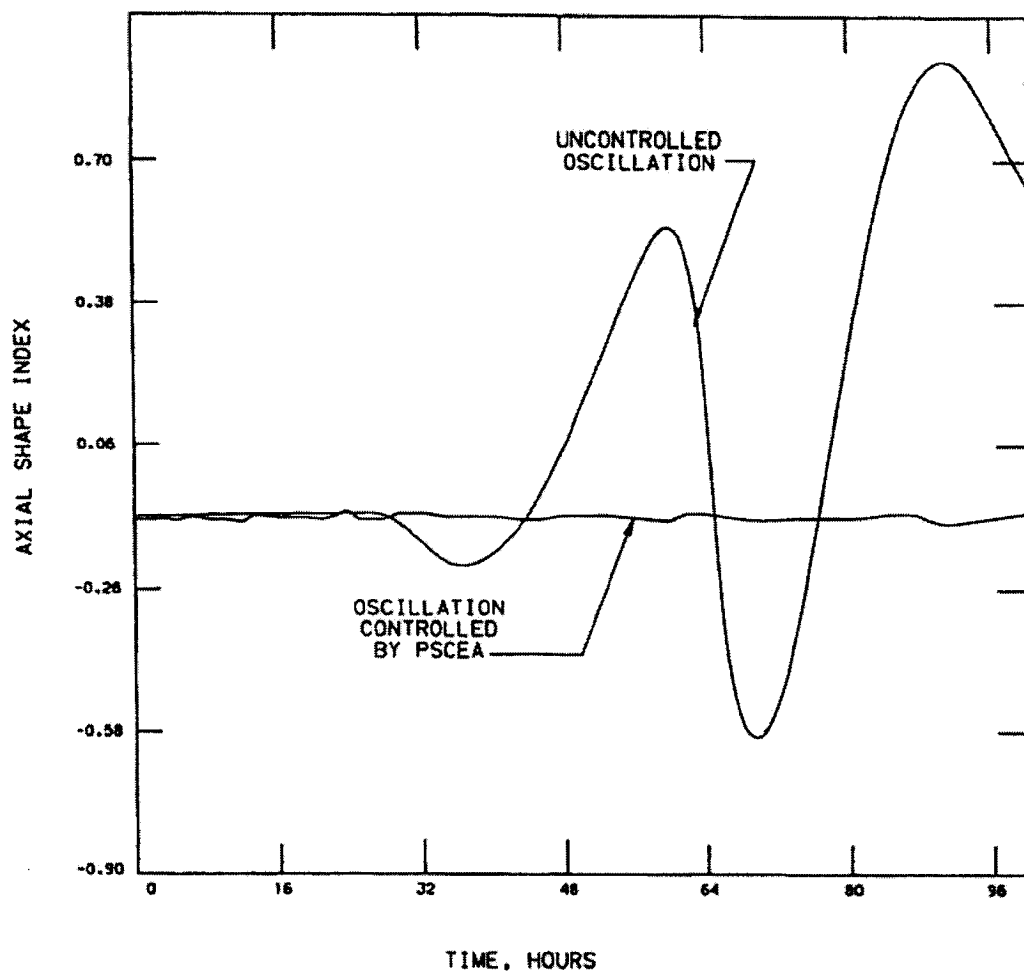


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

EXPECTED VARIATION OF THE AXIMUTHAL  
STABILITY INDEX, HOT FULL POWER, NO CEAs  
FIGURE 4.3-10

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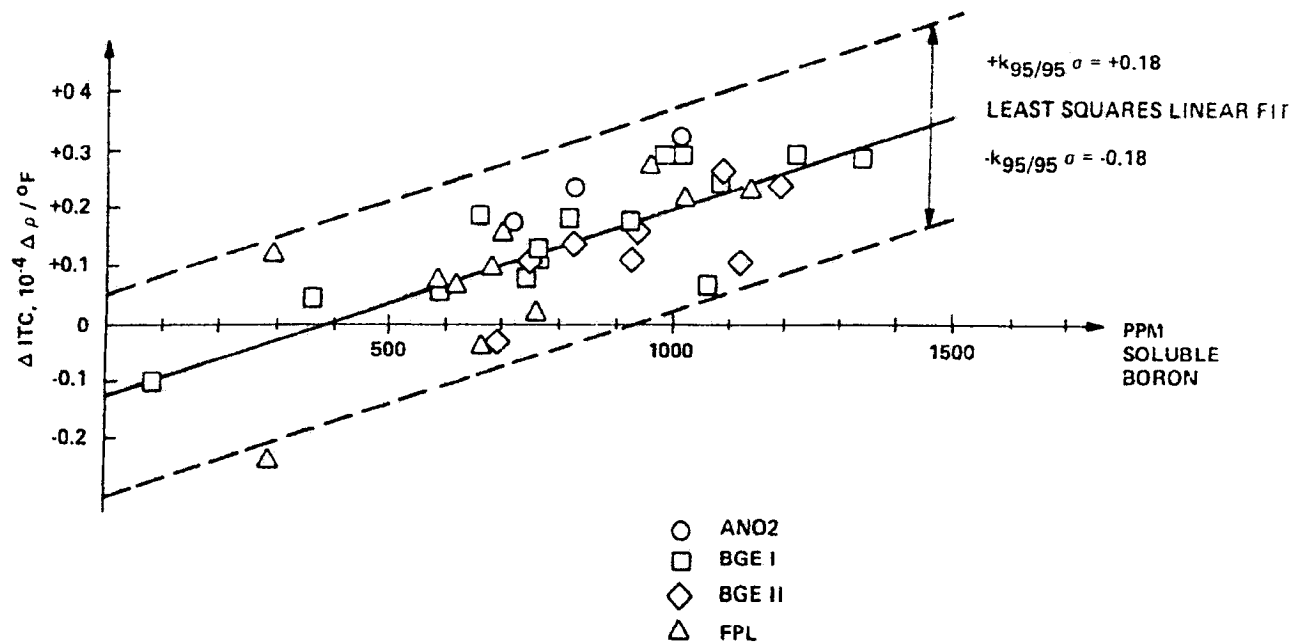


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PLCEA CONTROLLED AND UNCONTROLLED  
OSCILLATION  
FIGURE 4.3-11

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PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

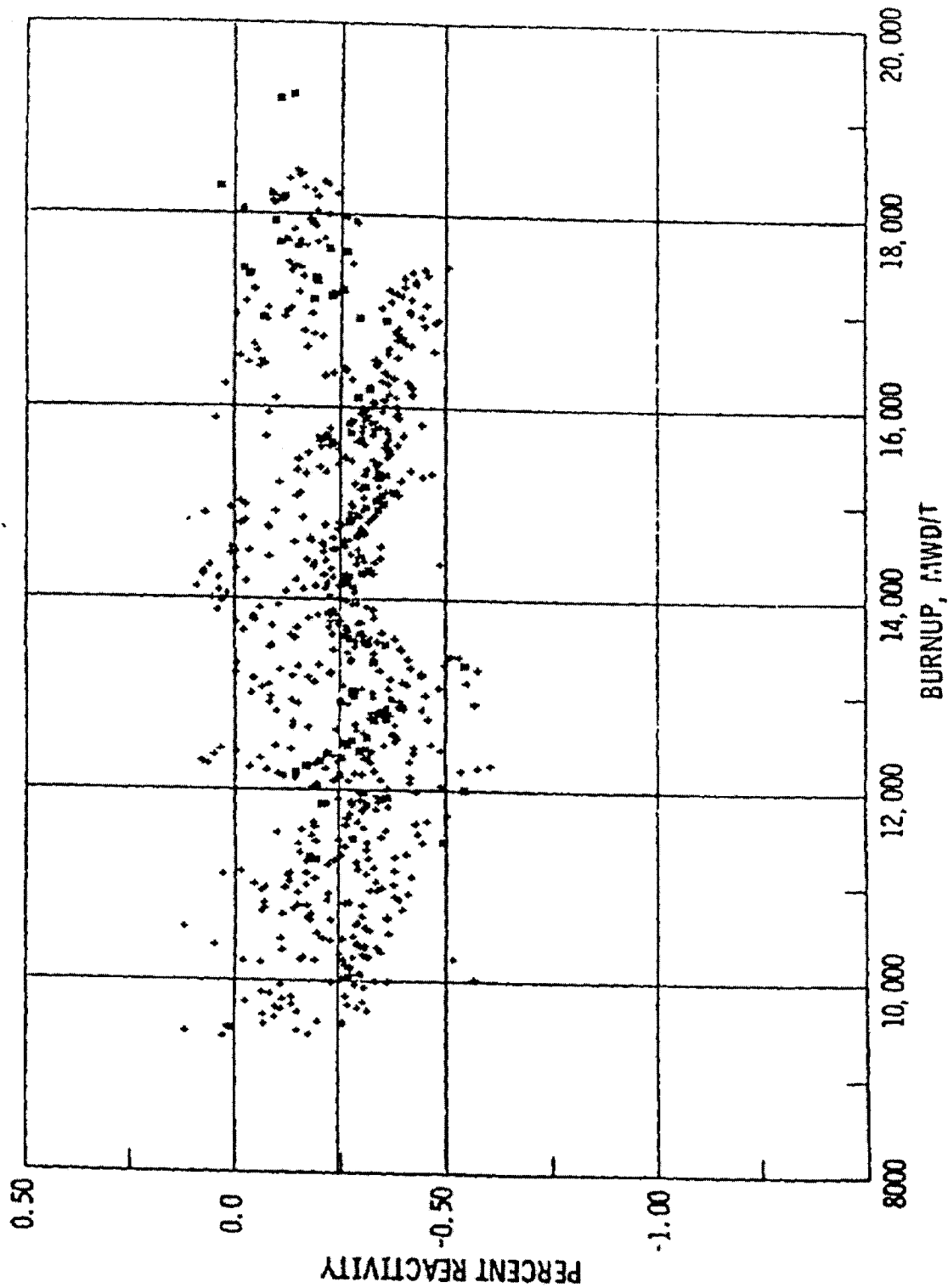
CALCULATION - MEASUREMENT ITC DIFFERENCE  
 vs SOLUBLE BORON 3D ROCS (DIT)

FIGURE 4.3-12

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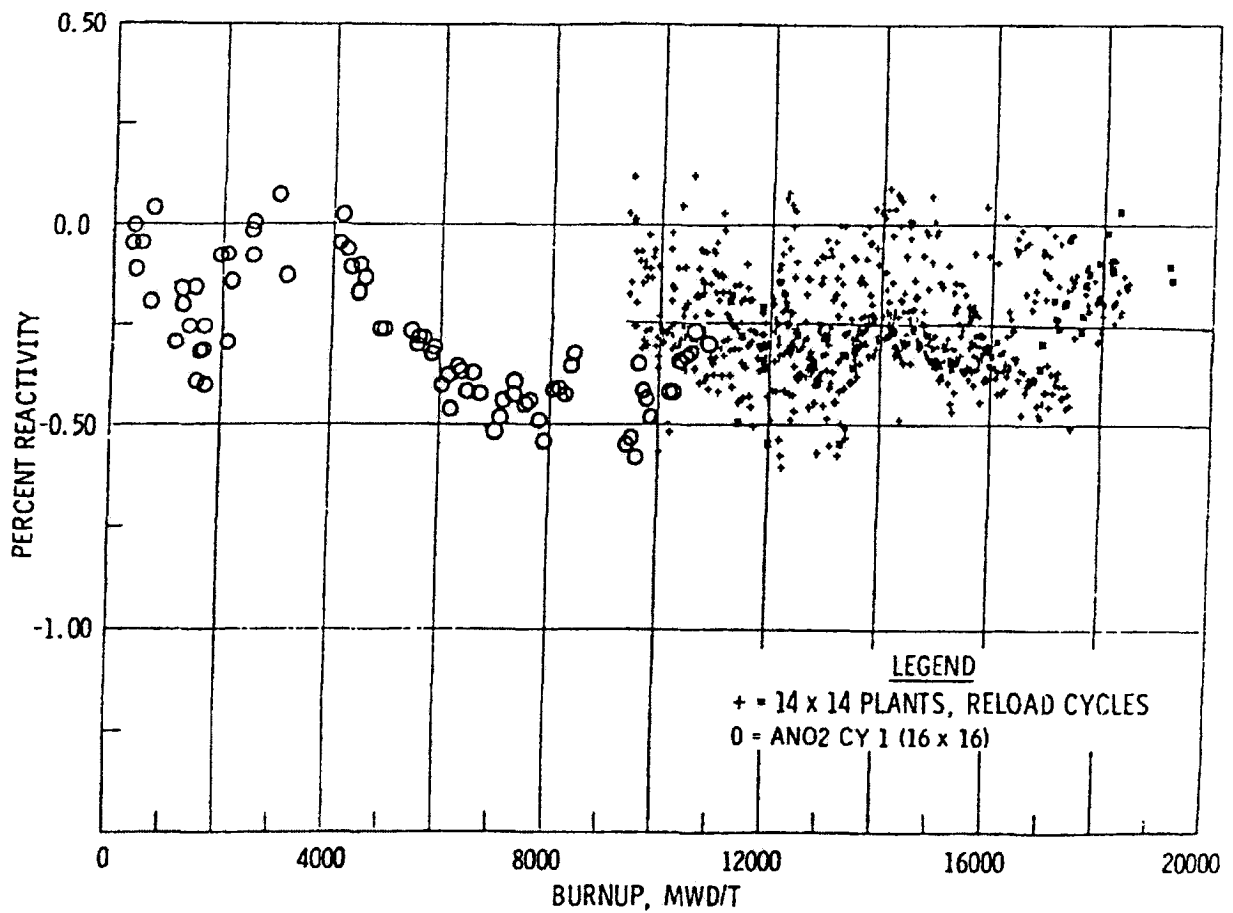
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

ROCS/DIT REACTIVITY FROM CORE FOLLOW  
CALCULATIONS, 14x14 PLANTS, RELOAD  
CYCLES

FIGURE 4.3-13

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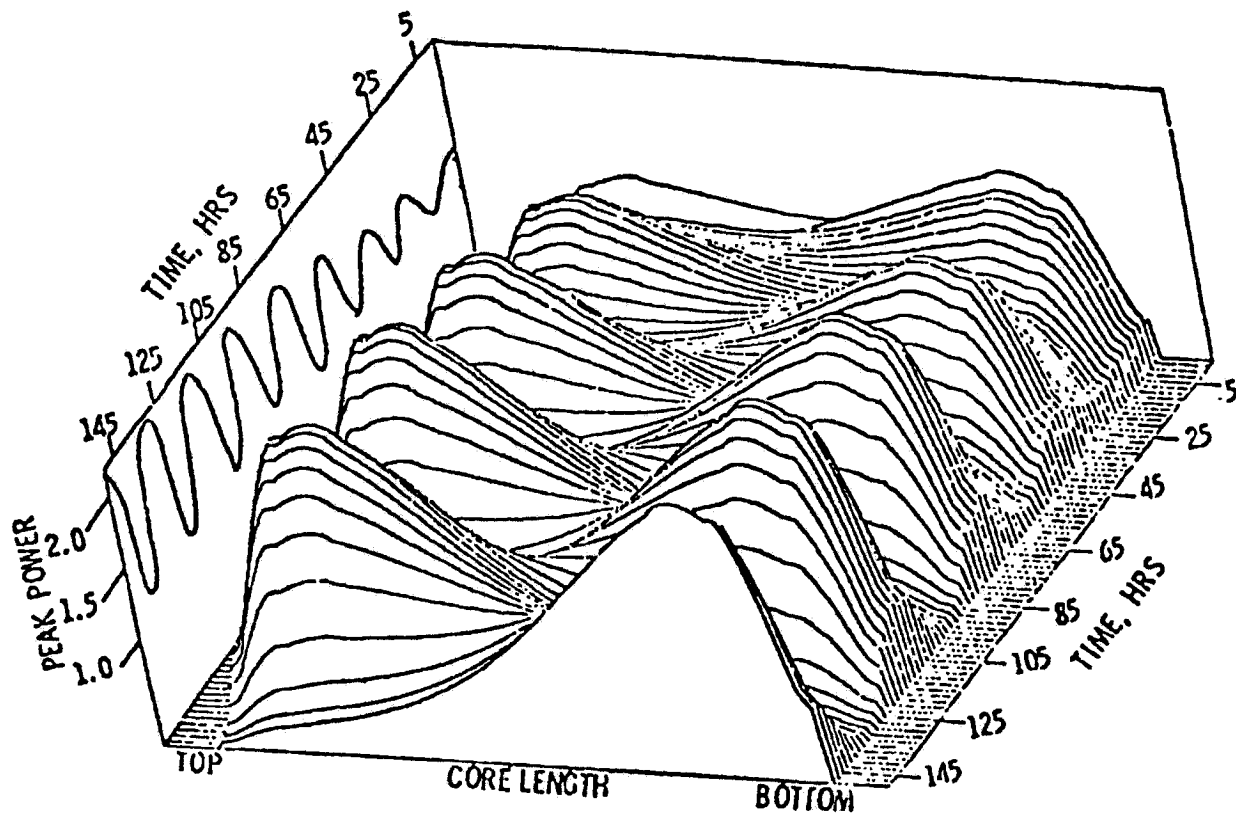
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

ROCS/DIT REACTIVITY FROM CORE FOLLOW  
 CALCULATIONS, 16x16 AND 14x14  
 ASSEMBLY PLANTS

FIGURE 4.3-14

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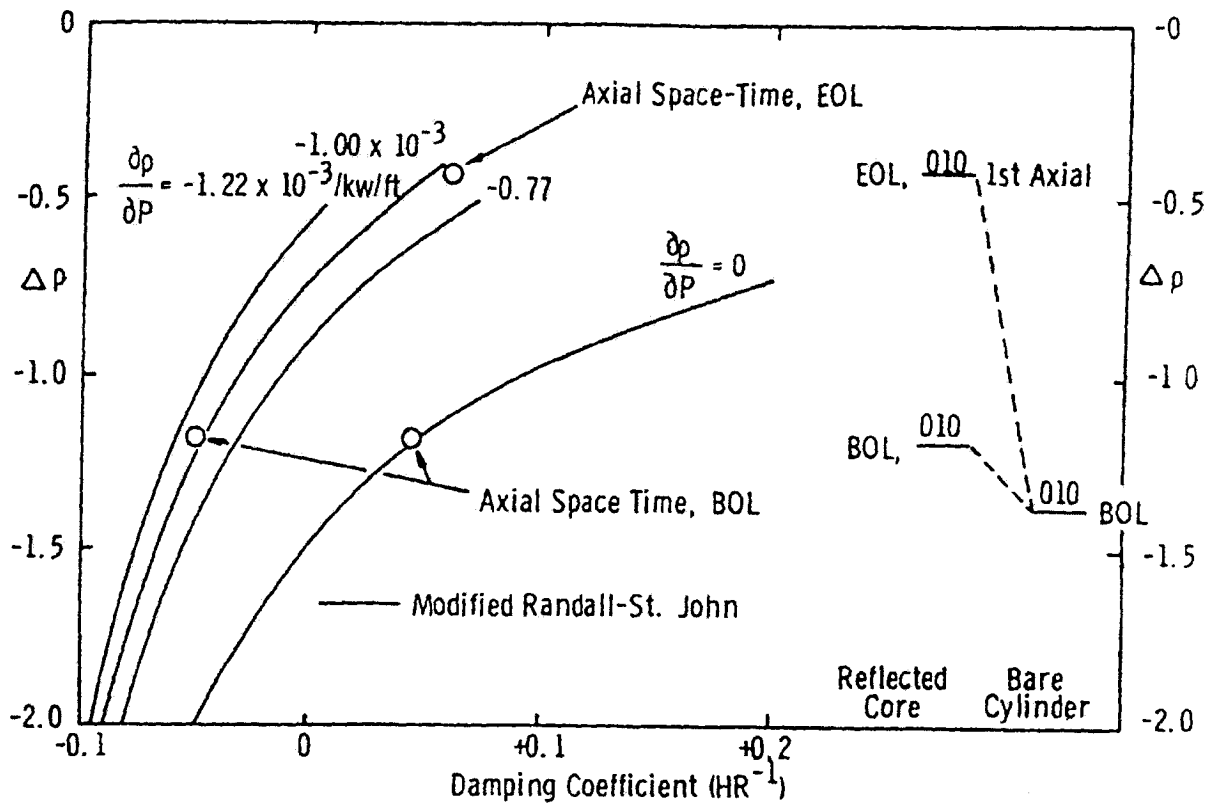
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

A DIVERGENT AXIAL OSCILLATION IN AN EOC  
CORE WITH REDUCED POWER FEEDBACK  
( $\alpha_c = 0.96 \times 10^{-4} \text{ } ^\circ\text{P/KTW/FT}$ )

FIGURE 4.3-15

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

DAMPING COEFFICIENT vs REACTIVITY  
DIFFERENCE BETWEEN FUNDAMENTAL AND  
EXCITED STATE

FIGURE 4.3-16

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					0.901 1.367	1.101 1.434	1.175 1.550	1.234 1.550
Assy Avg. Rod Radial Power Factor →		0.749	1.100	1.338	1.024	1.075	1.422	
Assy Maximum Rod Radial Power Factor →		1.202	1.392	1.441	1.089	1.171	1.520	
	0.551 1.033	1.013 1.172	0.965 1.024	0.961 1.032	0.858 0.974	0.962 1.071	1.003 1.075	
	0.749 1.202	1.013 1.172	0.876 0.910	0.966 1.083	0.919 0.982	1.129 1.186	0.891 0.935	1.079 1.207
	1.100 1.392	0.965 1.024	0.966 1.083	0.750 0.869	0.889 0.992	0.841 0.898	0.917 1.053	0.615 0.757
	0.901 1.367	1.338 1.441	0.961 1.032	0.919 0.982	0.889 0.992	0.661 0.840	0.852 0.920	0.918 1.009
	1.101 1.434	1.024 1.089	0.858 0.974	1.129 1.186	0.841 0.898	0.852 0.920	0.934 1.009	1.001 1.031
	1.175 1.550	1.075 1.171	0.962 1.071	0.891 0.935	0.917 1.053	0.918 1.009	1.001 1.031	1.054 1.123
	1.234 1.550	1.422 1.520	1.003 1.075	1.079 1.207	0.615 0.757	0.892 0.952	1.039 1.121	0.994 1.042
								0.739 0.813

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

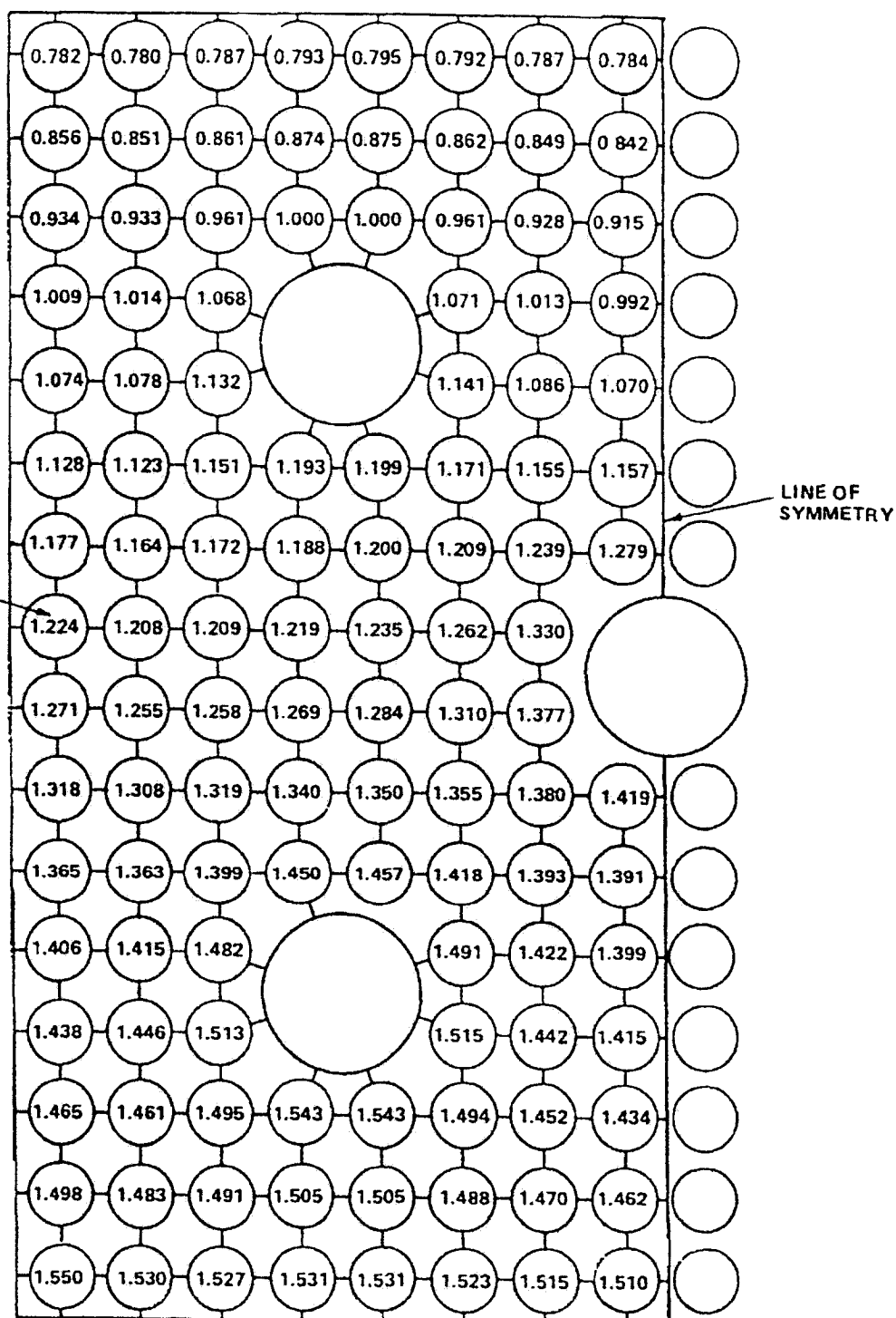
CORE WIDE PLANAR POWER DISTRIBUTION  
FOR SAMPLE DNB ANALYSIS

FIGURE 4.4-2

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ROD RADIAL  
POWER FACTOR



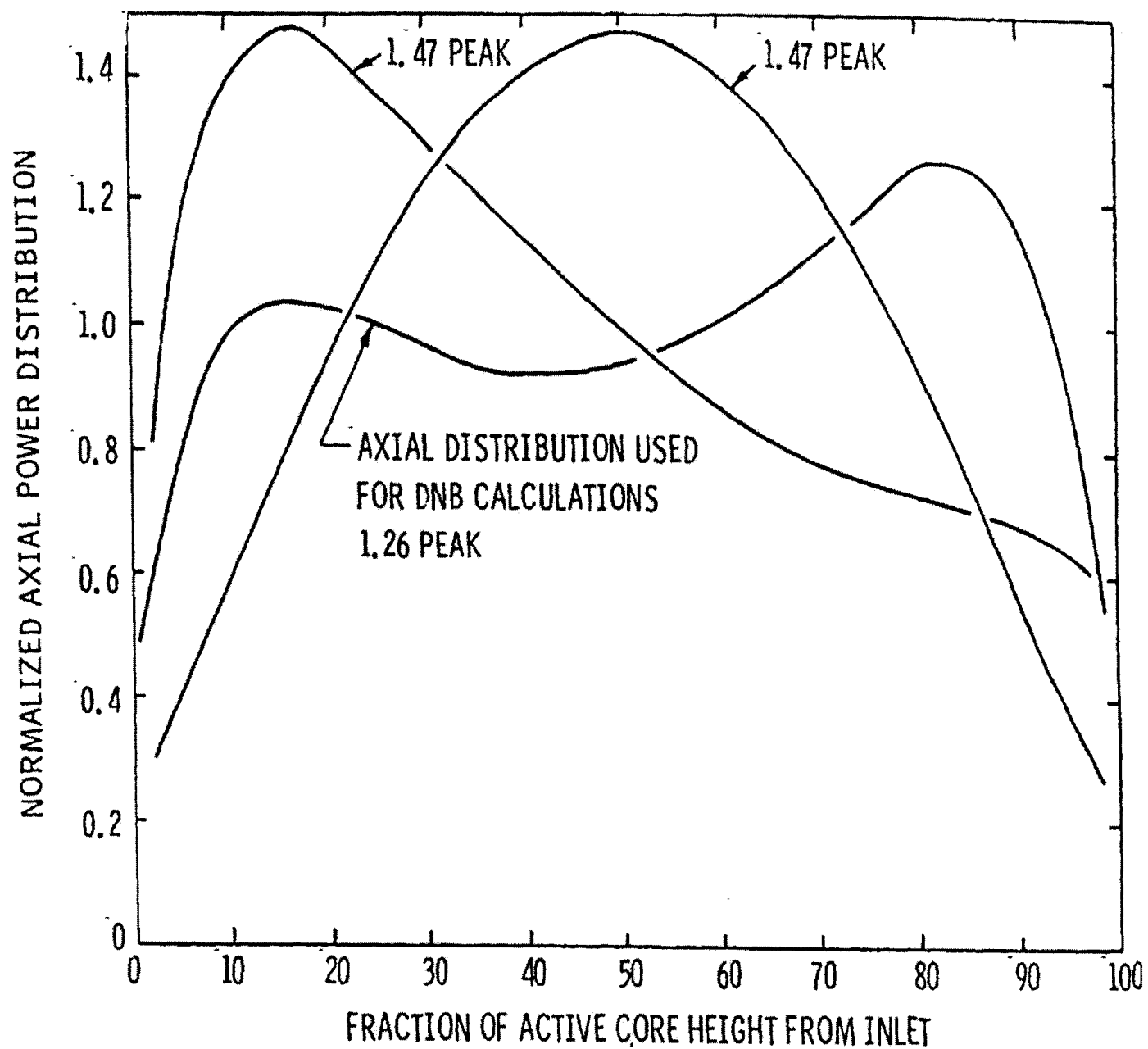
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

ROD RADIAL POWER FACTORS IN HOT ASSEMBLY  
FOR SAMPLE DNB ANALYSIS

FIGURE 4.4-3

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TYPICAL AXIAL POWER DISTRIBUTIONS

FIGURE 4.4-4

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					0.0 -13	0.0 - 9	0.0 - 7	0.0 - 6		
EXIT VOID FRACTION, %										
EXIT QUALITY, %					0.0 -17	0.0 -11	0.0 - 6	0.0 -12	0.0 -10	0.0 - 4
			0.0 -21	0.0 -12	0.0 -12	0.0 -13	0.0 -14	0.0 -13	0.0 -10	
0.0 -17	0.0 -12	0.0 -13	0.0 -13	0.0 -13	0.0 -13	0.0 -11	0.0 -14	0.0 -11		
0.0 -10	0.0 -12	0.0 -14	0.0 -17	0.0 -15	0.0 -15	0.0 -15	0.0 -15	0.0 -19		
0.0 -14	0.0 - 6	0.0 -13	0.0 -13	0.0 -15	0.0 -18					
	0.0 -10			0.0 -14			0.0 -19			

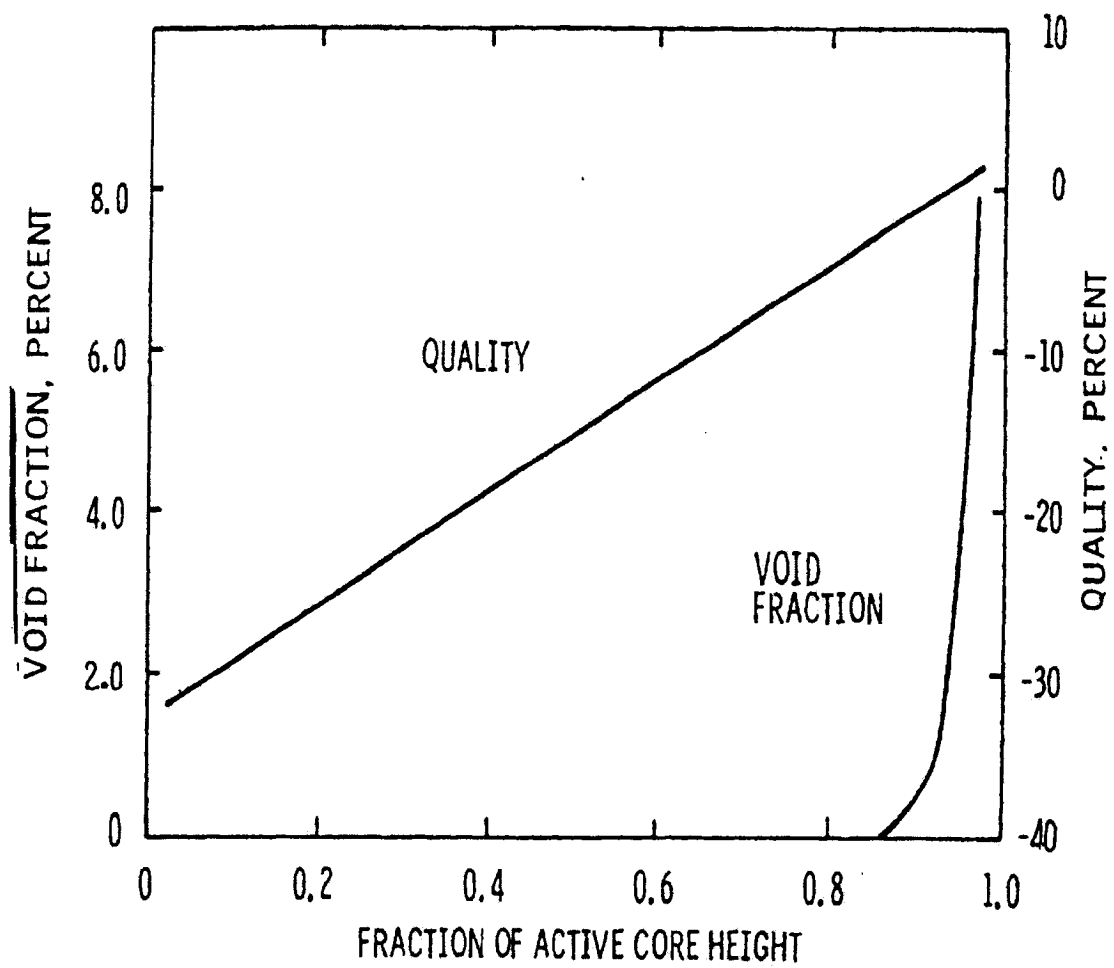
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

AVERAGE VOID FRACTIONS AND QUALITIES AT  
THE EXIT OF DIFFERENT CORE REGIONS

FIGURE 4.4-5

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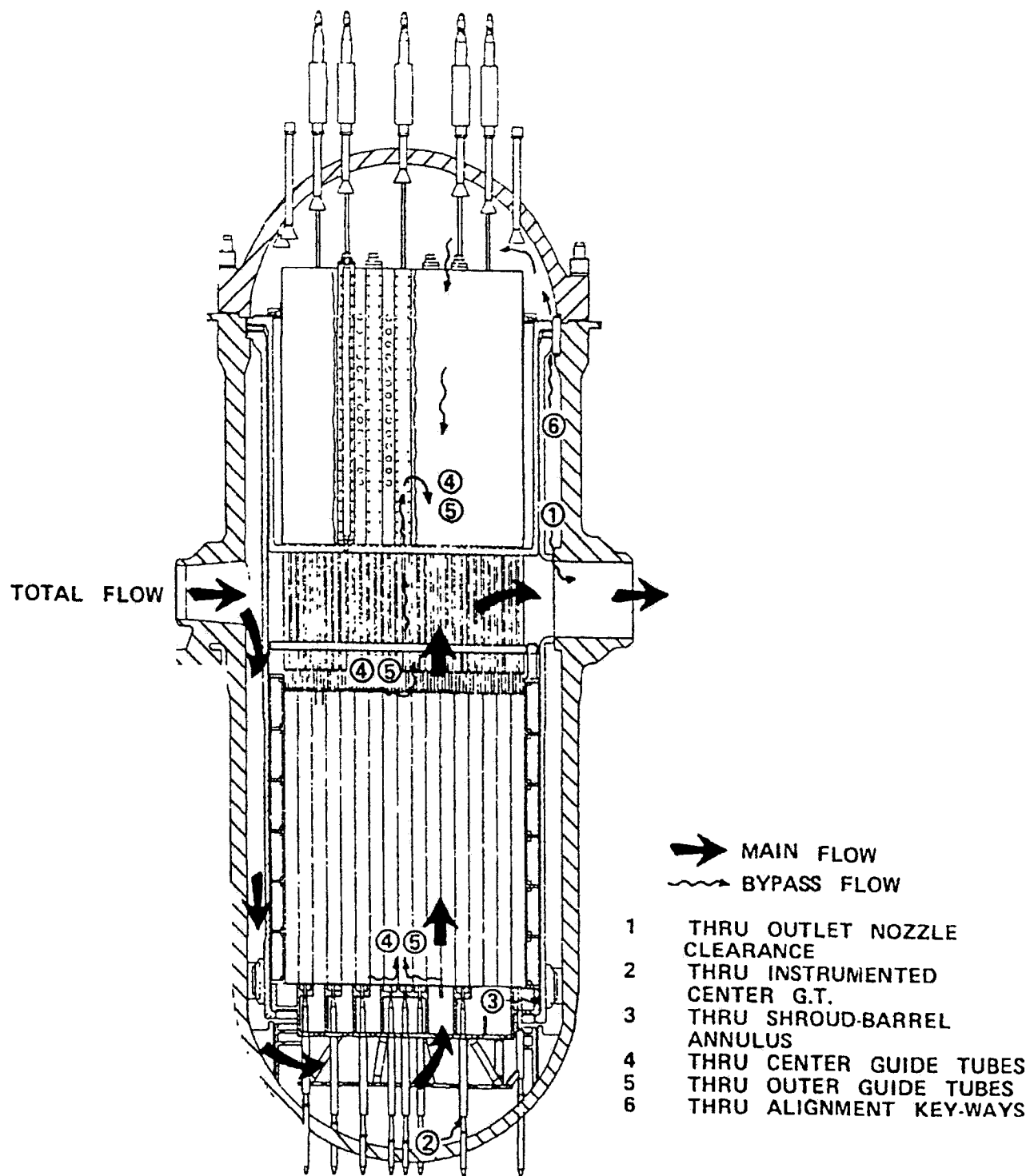
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

AXIAL DISTRIBUTION OF VOID FRACTION AND  
QUALITY IN THE SUBCHANNEL ADJACENT TO  
THE ROD WITH MINIMUM DNBR

FIGURE 4.4-6

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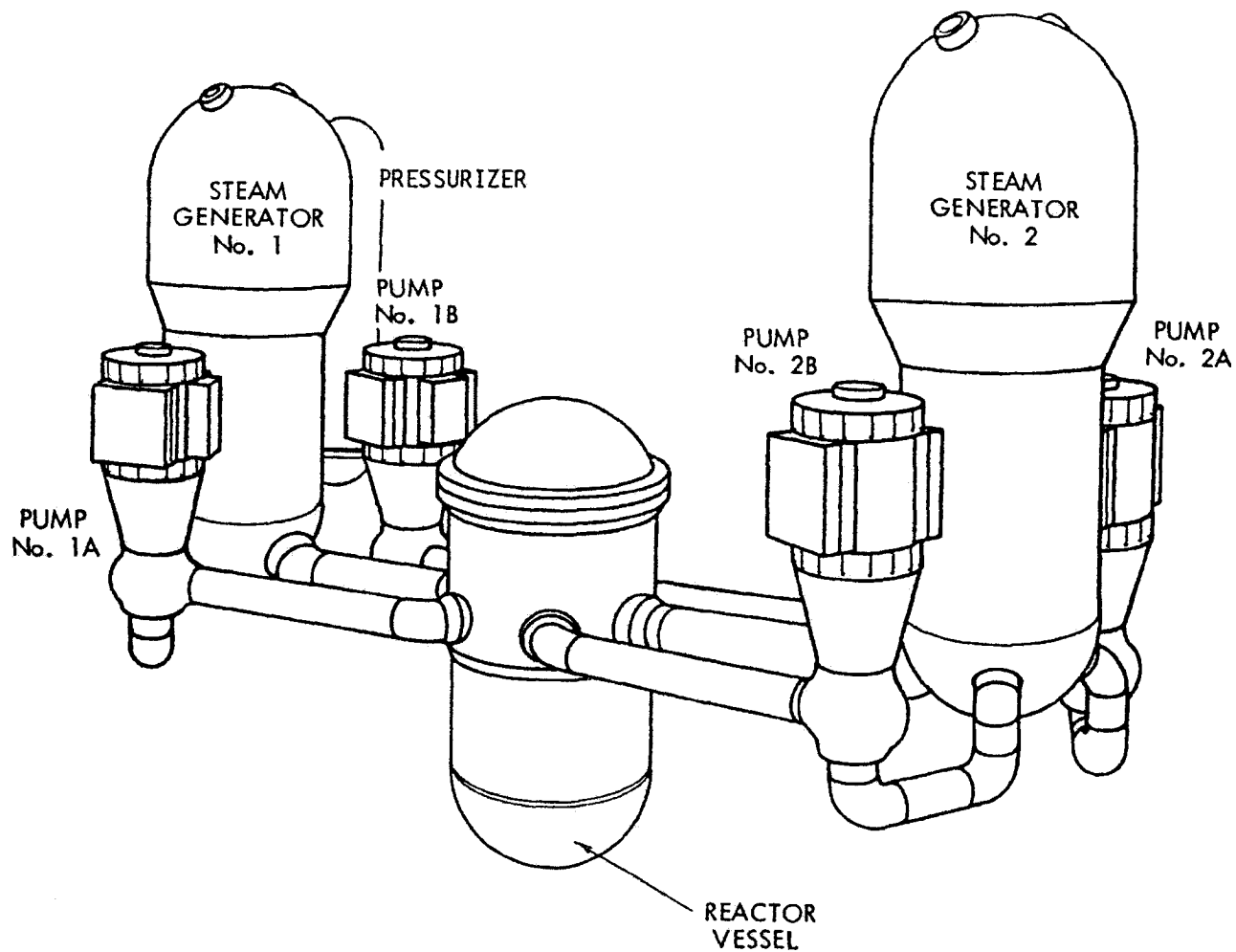
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

REACTOR FLOW PATHS

FIGURE 4.4-7

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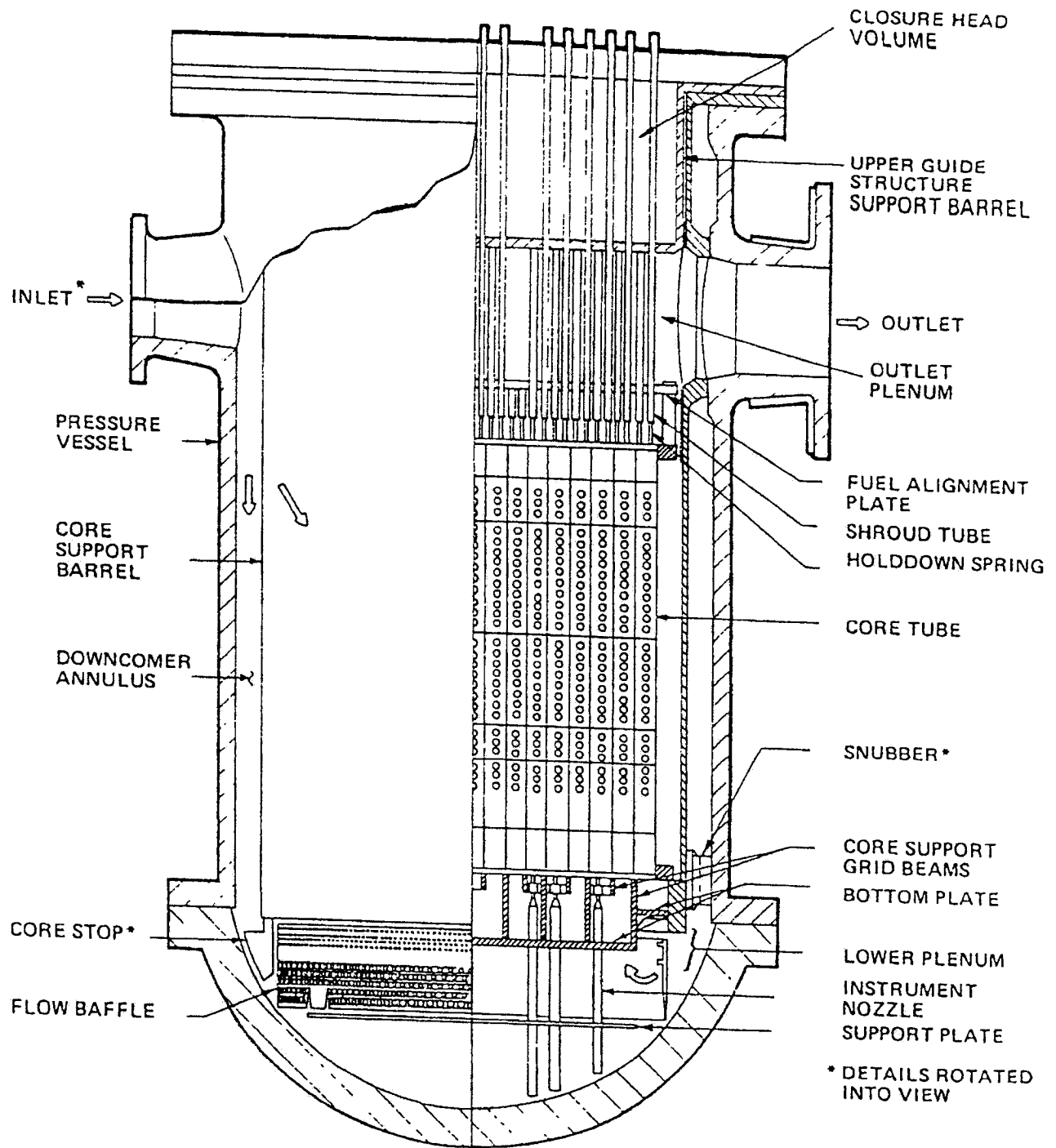
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

ISOMETRIC VIEW OF THE REACTOR  
COOLANT SYSTEM

FIGURE 4.4-8

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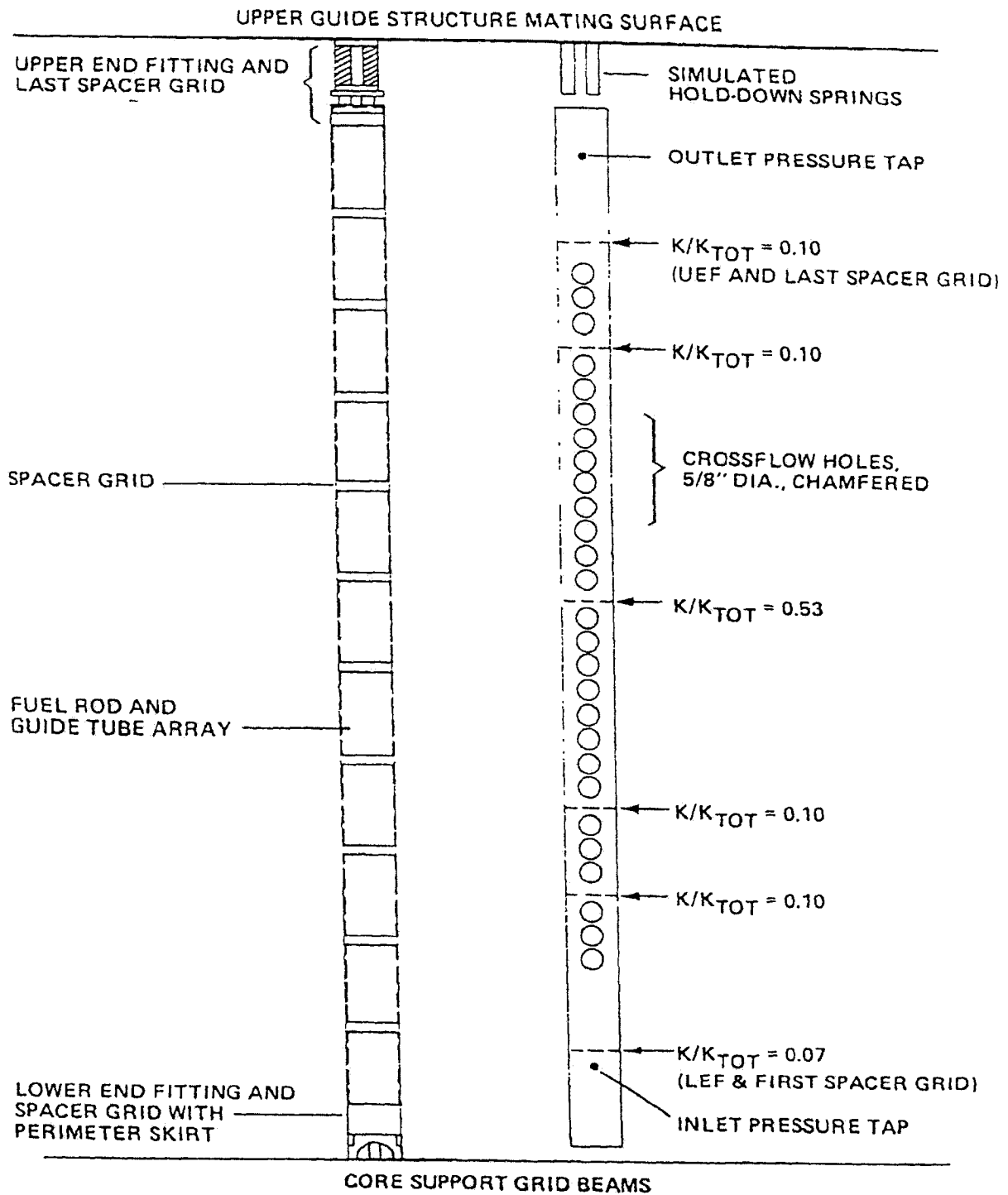
PALO VERDE NUCLEAR GENERATING STATION  
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REACTOR FLOW MODEL

FIGURE 4.4-9

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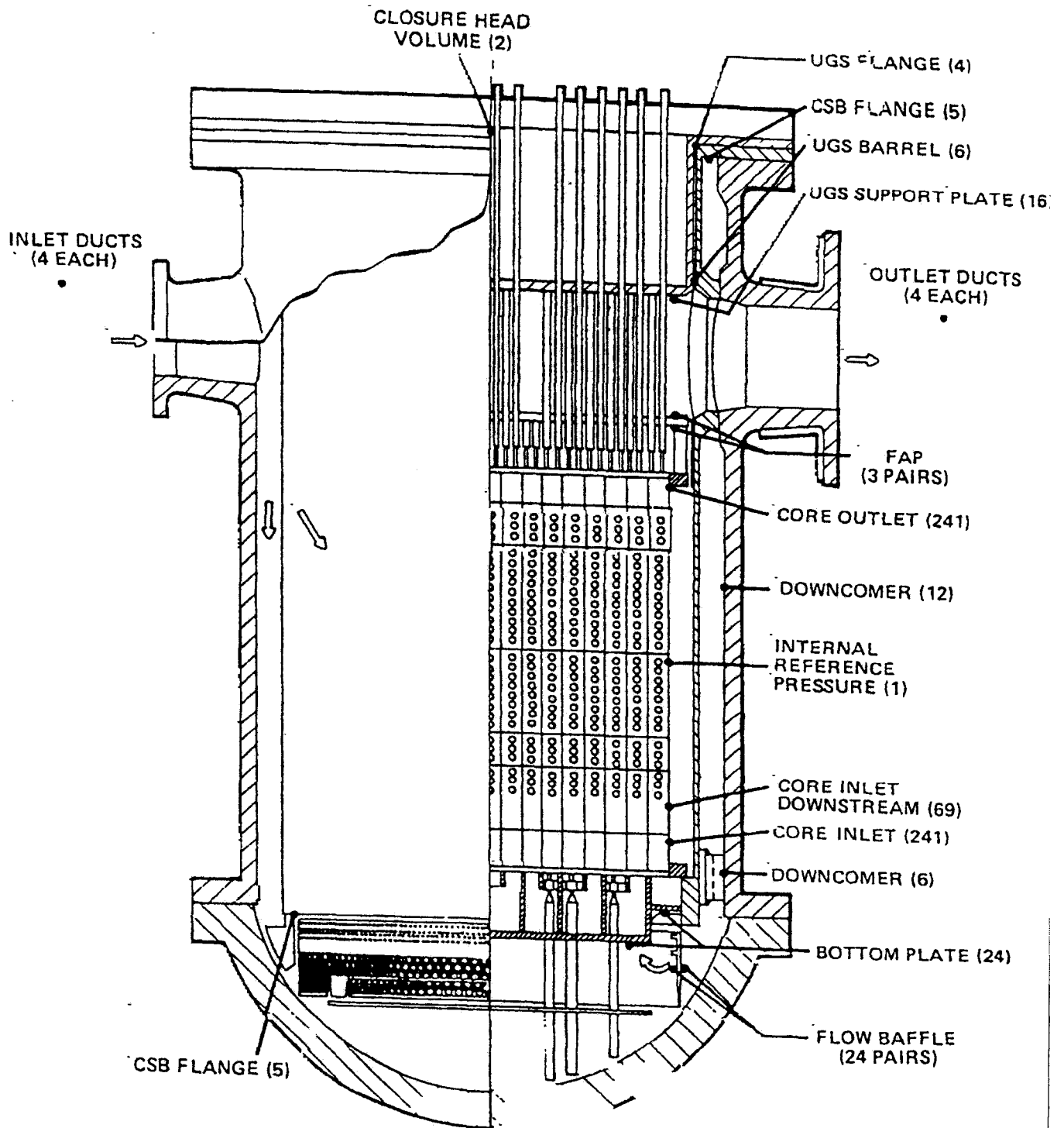
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

COMPARISON OF REACTOR AND MODEL  
FUEL ASSEMBLY LAYOUT

FIGURE 4.4-10

JUNE 2001

REVISION 11



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PRESSURE TRAP LOCATIONS IN THE  
REACTOR FLOW MODEL

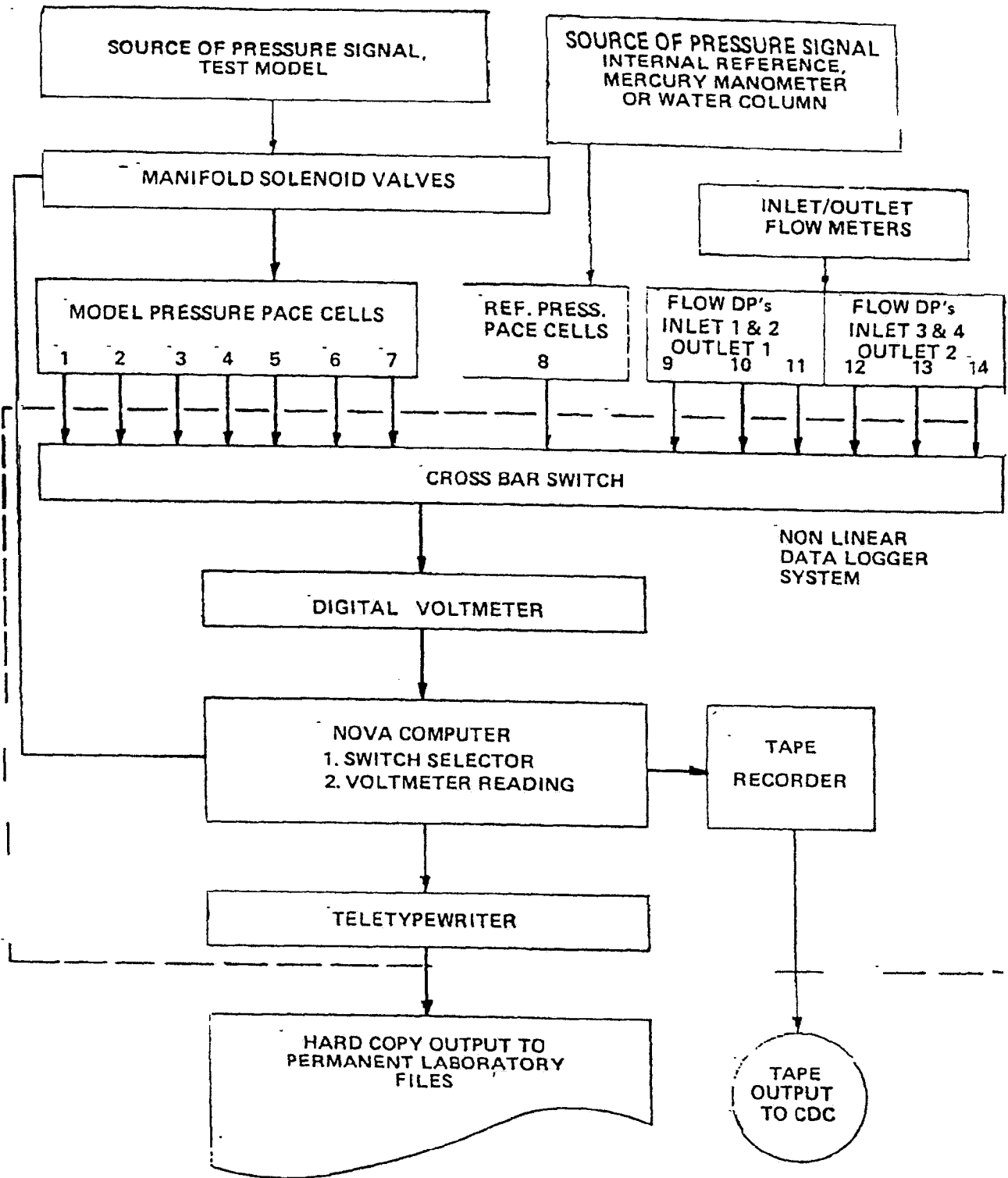
FIGURE 4.4-11

JUNE 2001

REVISION 11

REVISION 11





PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SCHEMATIC OF DATA ACQUISITION SYSTEM

FIGURE 4.4-13

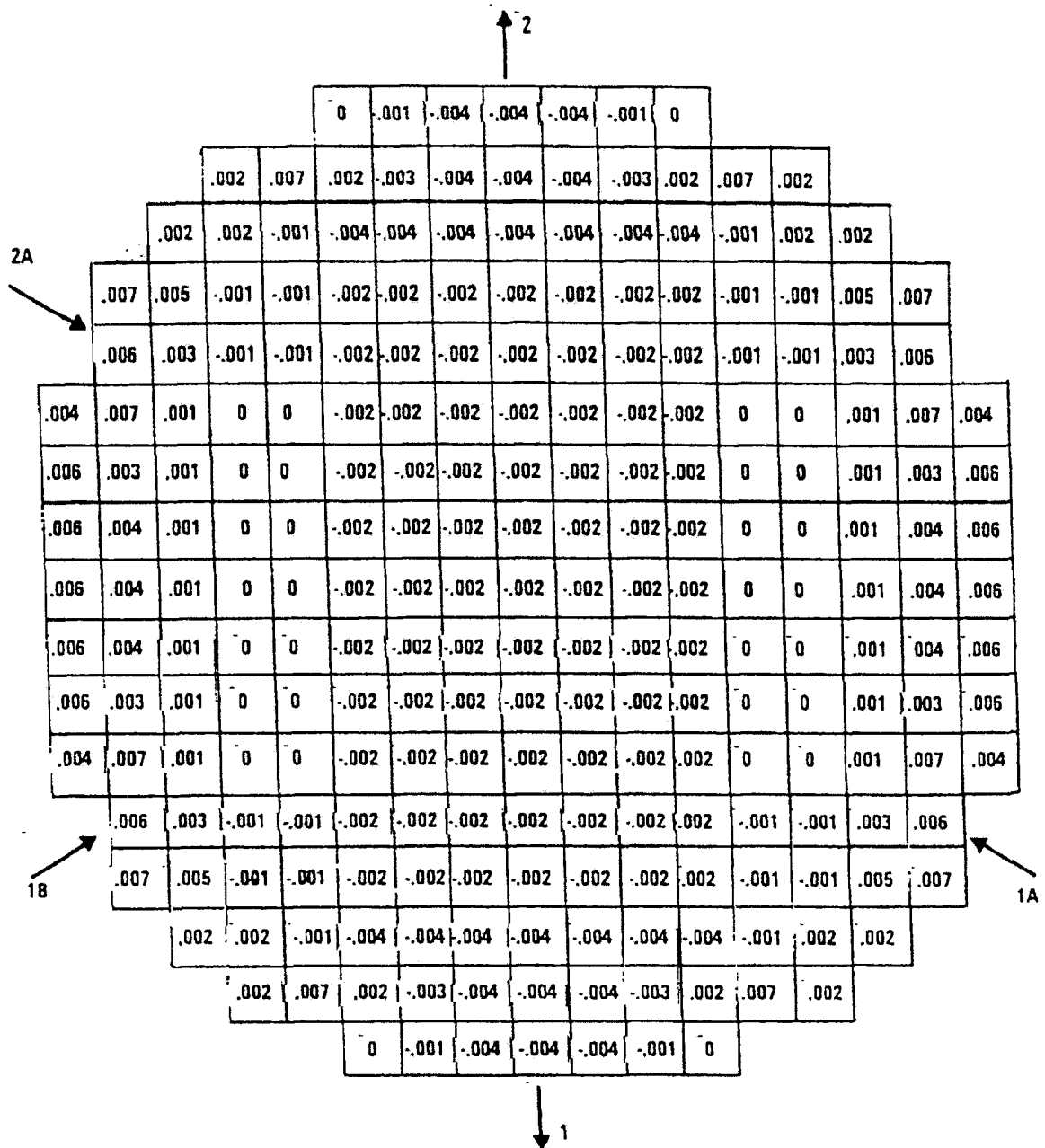
JUNE 2001

REVISION 11

					1.11 1.01	0.97 1.01	1.00 1.01	1.05 1.01	0.99 1.01	0.95 1.01	0.93 0.99												
						0.86 0.99	0.98 1.01	0.87 0.96	0.83 0.89	0.84 0.96	1.04 0.96	0.93 0.89	0.90 0.96	1.02 0.96	0.87 1.01	0.94 1.01							
							0.93 1.01	1.16 0.96	1.12 1.08	0.97 1.03	1.11 1.08	1.08 1.03	1.13 1.08	1.11 1.08	1.06 1.03	1.09 1.08	0.85 0.89	0.99 0.96	1.10 1.01				
								1.07 1.01	0.89 0.89	0.95 0.96	0.93 0.89	0.95 1.01	0.95 1.01	1.01 1.01	1.00 1.01	1.07 1.01	0.96 1.01	0.96 1.01	0.92 0.96	0.88 0.89	0.84 0.96	0.98 1.01	
									1.10 1.01	1.08 1.08	0.98 0.96	1.08 1.08	1.05 0.99	1.02 1.01	0.95 0.99	1.07 1.01	0.99 1.01	0.95 0.99	1.04 1.01	1.08 1.08	0.96 0.96	1.09 1.08	1.12 0.99
0.90 1.01	0.86 0.89	1.03 1.08	0.89 0.99	0.98 1.01	0.98 1.01	0.95 1.01	0.95 1.01	0.99 0.99	1.15 1.01	1.01 1.01	1.04 0.99	0.98 1.01	1.03 1.01	0.98 1.03	0.94 0.96	0.90 1.01							
0.95 1.01	1.03 0.96	1.05 1.03	1.02 1.01	1.04 1.01	1.07 0.99	1.03 1.01	1.06 1.01	1.08 1.01	1.05 1.01	1.01 1.01	1.05 1.01	1.05 1.01	1.05 0.99	1.12 1.08	1.20 0.96	0.96 1.01							
1.02 1.01	0.90 0.96	1.02 1.08	0.92 0.99	0.97 1.01	0.98 1.01	0.99 1.01	1.03 0.99	0.96 1.01	0.96 1.01	1.01 1.01	0.91 0.99	0.93 1.01	0.96 1.01	0.98 1.08	1.00 0.96	0.94 0.99							
1.05 0.99	0.88 0.96	0.92 1.03	1.03 1.01	0.87 0.99	0.99 1.01	0.98 1.01	1.03 1.01	1.01 0.99	0.97 0.99	1.02 1.01	1.00 1.01	0.92 1.01	0.95 1.01	0.94 1.08	0.85 0.89	1.16 1.01							
1.05 1.01	1.09 0.96	1.08 1.08	0.96 1.01	0.94 1.01	1.04 0.99	1.06 1.01	1.09 1.01	0.97 1.01	0.91 1.01	0.97 0.99	1.11 1.01	1.05 1.01	0.94 0.99	1.047 1.08	0.81 0.96	0.96 1.01							
0.93 0.99	1.09 0.96	1.04 1.08	1.01 0.99	1.16 1.01	1.12 1.01	1.02 0.99	1.06 1.01	1.02 0.99	1.11 1.01	0.96 1.01	1.05 0.99	1.00 1.01	1.08 1.01	0.98 1.03	1.00 0.96	1.01 1.01							
1.02 1.01	0.92 1.96	1.05 1.03	0.95 1.01	0.79 1.01	1.08 1.01	0.98 1.01	0.99 1.01	0.89 1.01	1.01 1.01	0.99 1.01	1.03 1.01	0.93 1.01	0.93 0.99	1.03 1.08	0.87 0.89	0.90 1.01							
	1.00 1.01	1.08 1.08	0.96 0.96	1.03 1.03	1.05 1.01	0.98 0.99	1.08 1.01	1.03 1.01	1.04 0.99	1.14 1.01	1.03 0.99	1.09 1.08	1.05 0.96	1.13 1.08	1.08 1.01								
	1.01 1.01	0.97 0.96	0.91 0.96	0.86 0.96	0.97 1.01	1.05 1.01	0.97 1.01	1.00 0.99	0.95 1.01	0.90 1.01	1.00 1.01	0.92 0.89	0.93 0.96	0.90 0.89	1.00 1.01								
		1.07 0.99	0.94 0.96	0.93 0.89	1.10 1.08	1.11 1.03	1.13 1.08	1.17 1.08	1.03 1.03	1.11 1.08	1.09 1.03	0.98 1.08	1.00 0.96	1.06 1.01									
			0.94 1.01	1.07 1.01	0.90 0.96	0.99 0.96	0.89 0.89	1.00 0.96	0.88 0.96	0.94 0.89	0.79 0.96	1.07 1.01	0.86 0.99										
					0.93 0.99	0.96 1.01	1.02 1.01	1.04 1.01	1.02 1.01	0.96 1.01	1.03 1.01												

Note: The first (top) values represents the original 4-pump flow distribution based on 3/16 scale flow model tests. The second (bottom) values represents current TORC 4-pump flow distributions based on later Yonggwang 177-assembly tests.

PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 CORE INLET FLOW DISTRIBUTION Qi/Q Bar  
 FIGURE 4.4-14  
 JUNE 2009 REVISION 15



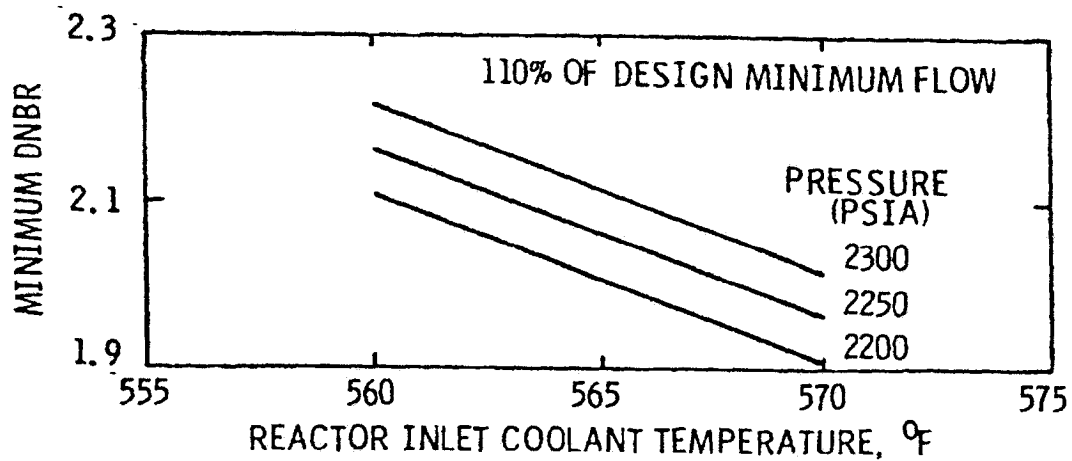
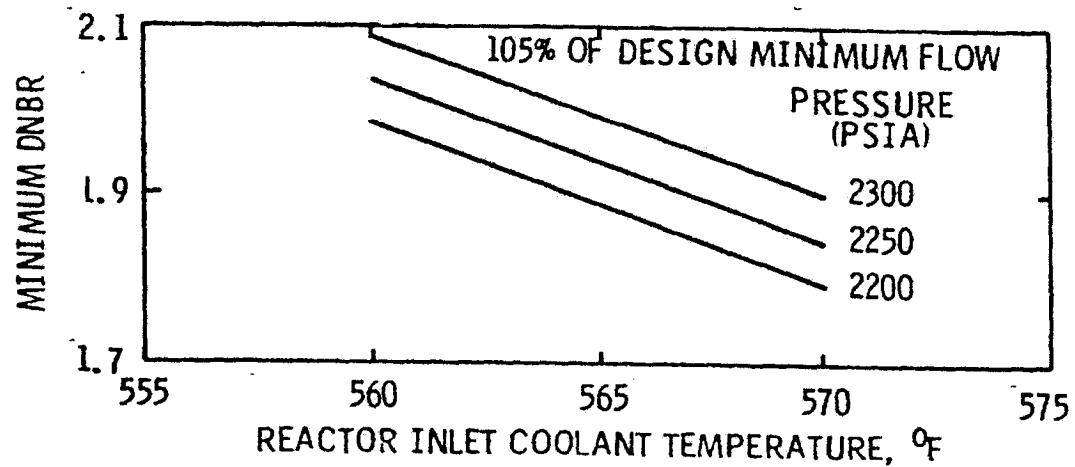
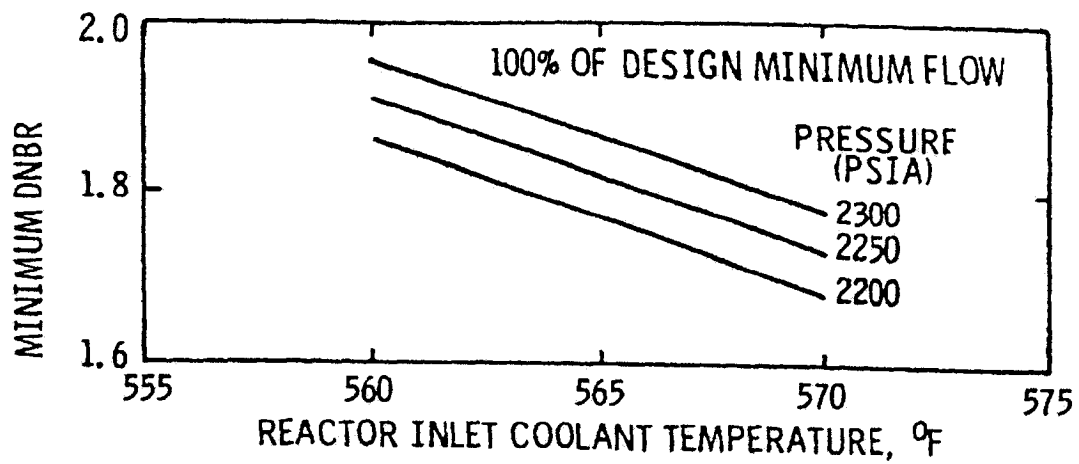
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CORE EXIT EULER NUMBERS,  $E_i$

FIGURE 4.4-15

JUNE 2001

REVISION 11



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SENSITIVITY OF MINIMUM DNBR TO SMALL  
CHANGES IN REACTOR COOLANT CONDITIONS

FIGURE 4.4-16

JUNE 2001

REVISION 11

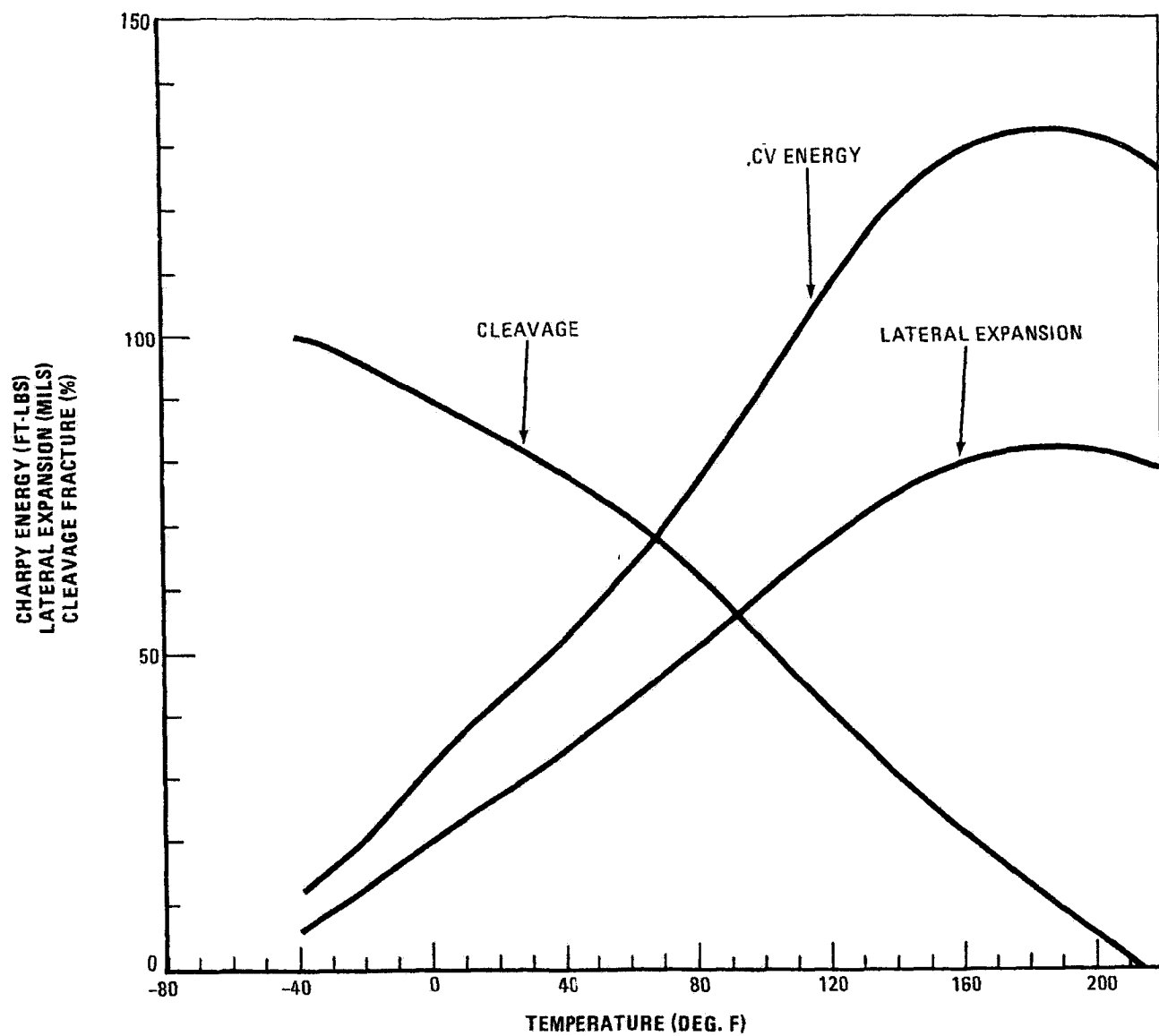


REACTOR COOLANT SYSTEM ARRANGEMENT  
4013 MWt

FIGURE 5.1-3 Sheet 2 of 2

JUNE 2009

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LOWER SHELL PLATE  
CODE NUMBER  
M-4311-1

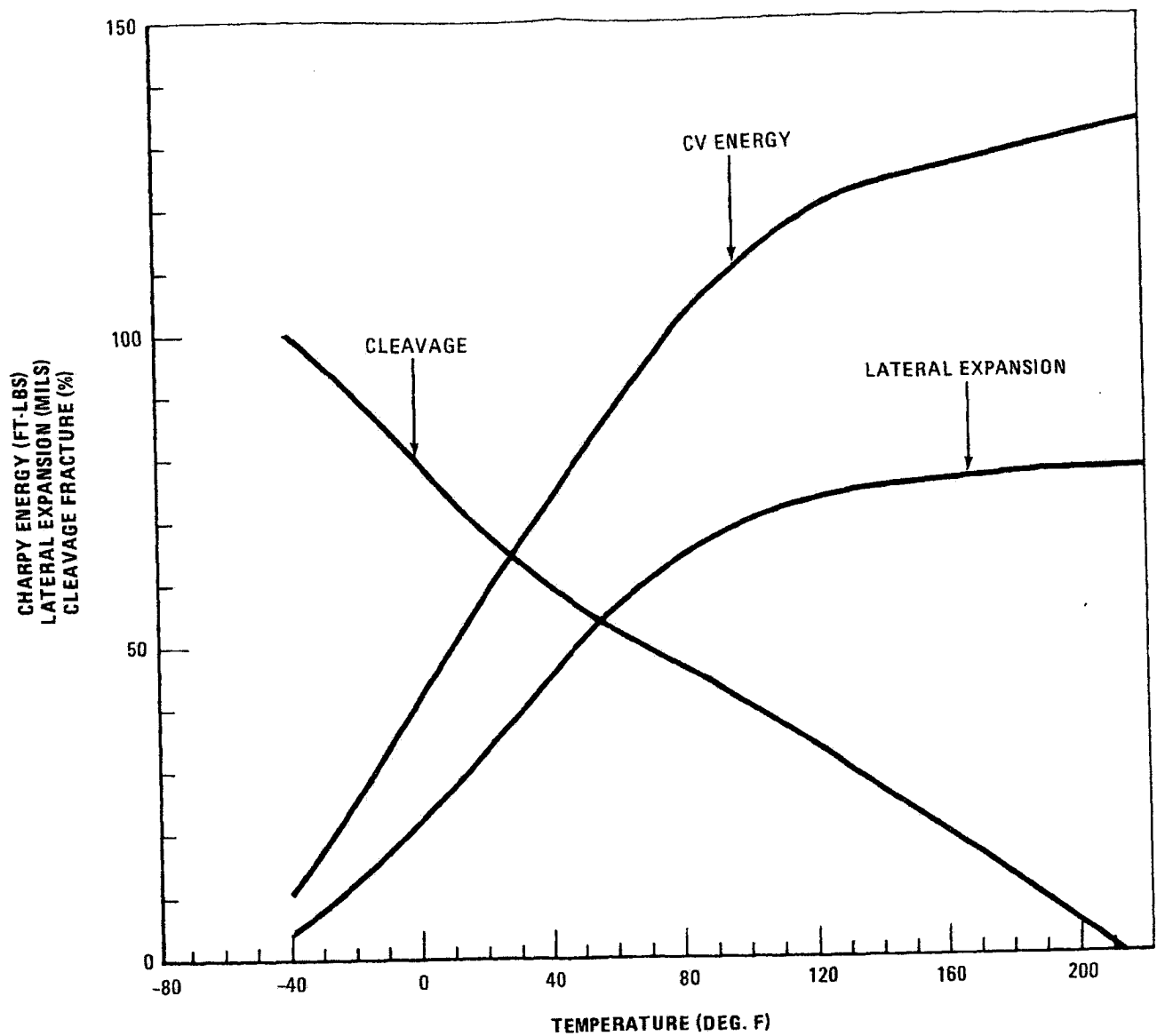
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 1 OF 20

JUNE 2003

REVISION 12



LOWER SHELL PLATE  
CODE NUMBER  
M-4311-2

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

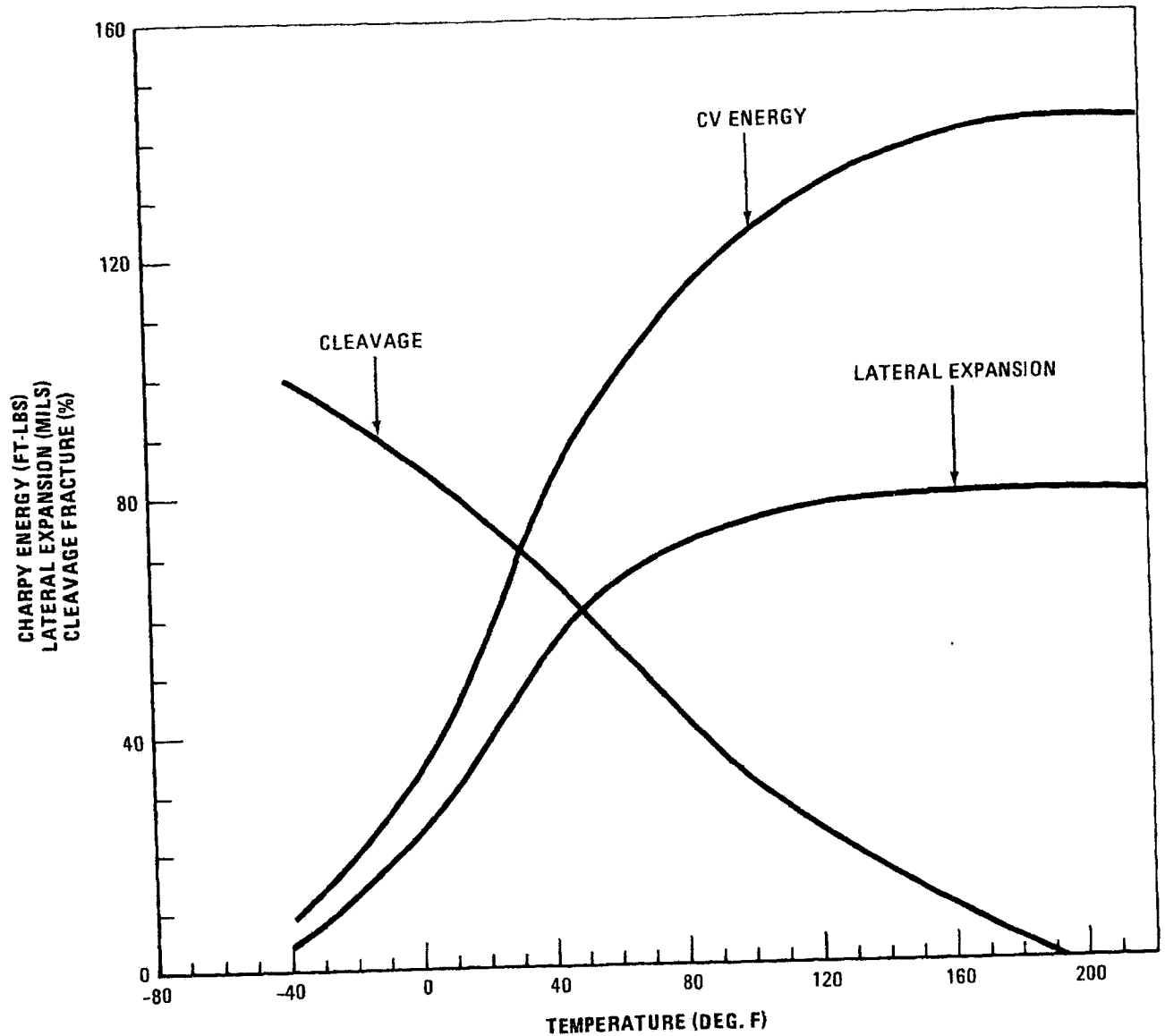
UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 2 OF 20

JUNE 2003

REVISION 12





LOWER SHELL PLATE  
CODE NUMBER  
M-4311-3

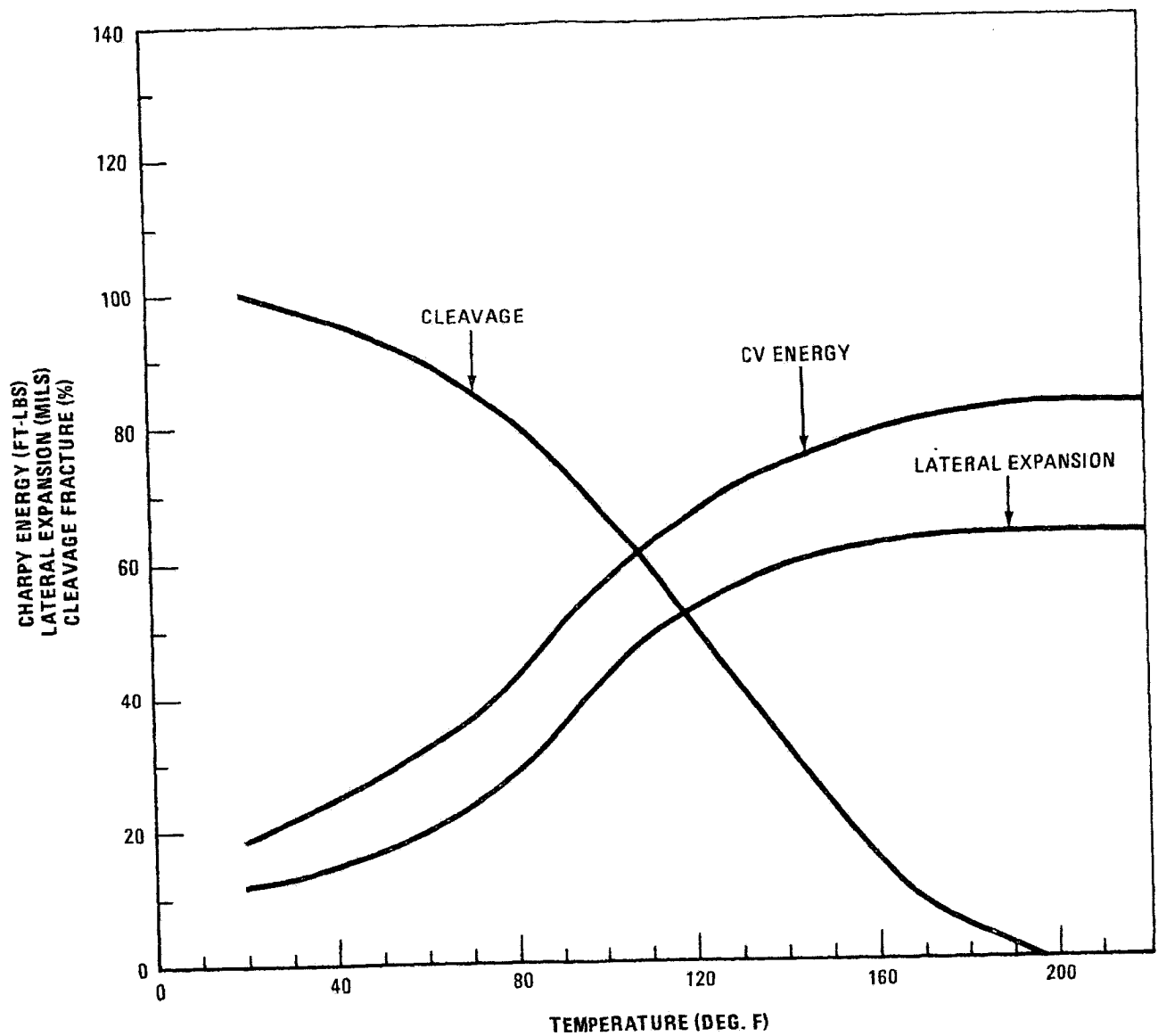
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 3 OF 20

JUNE 2003

REVISION 12



INTERMEDIATE SHELL  
PLATE  
CODE NUMBER  
M-6701-1

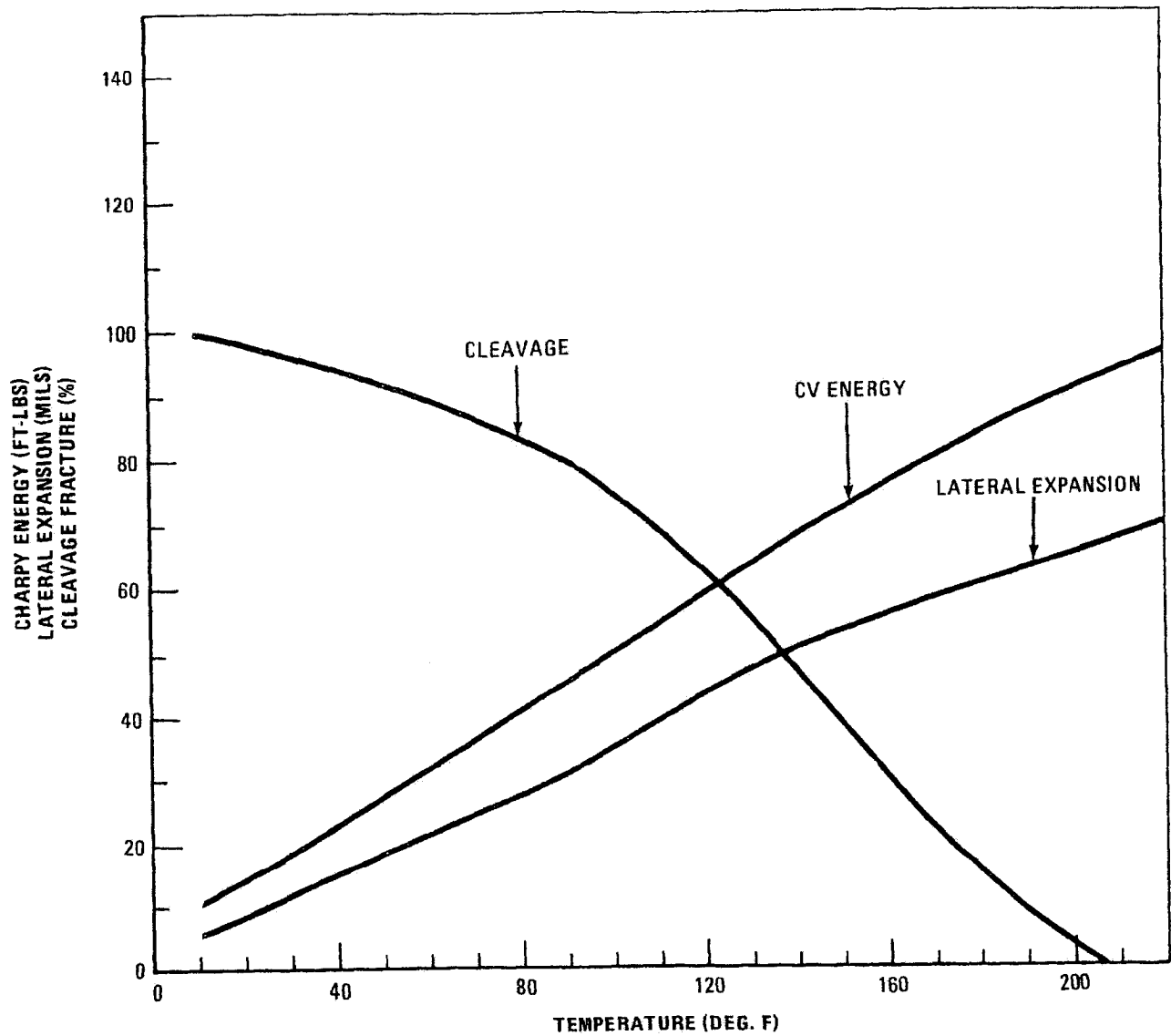
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 4 OF 20

JUNE 2003

REVISION 12



INTERMEDIATE SHELL  
PLATE  
CODE NUMBER  
M-6701-2

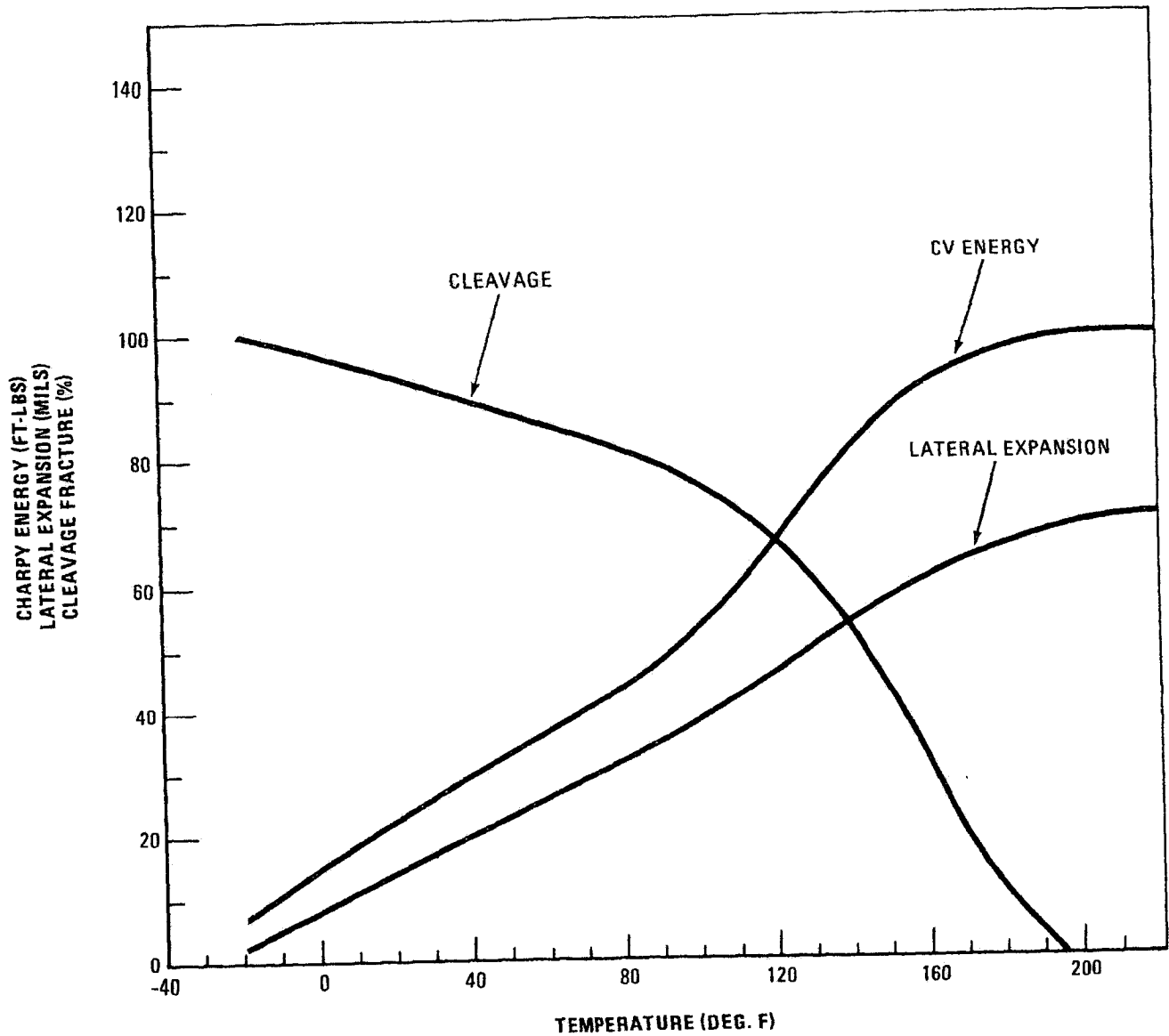
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 5 OF 20

JUNE 2003

REVISION 12



INTERMEDIATE SHELL  
PLATE  
CODE NUMBER  
M-6701-3

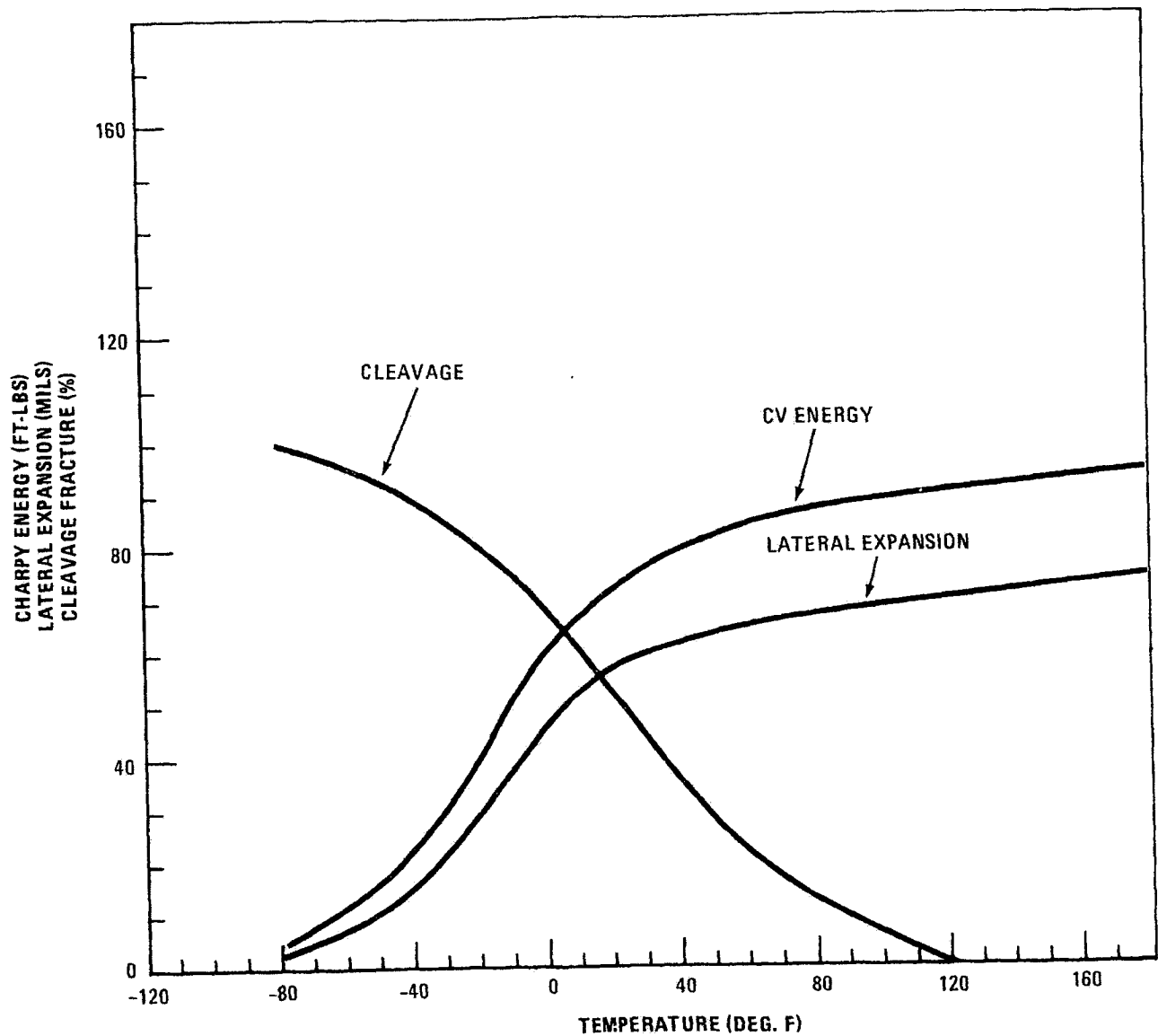
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 6 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-171  
MIL B-4 WIRE  
FLUX LINDE 124

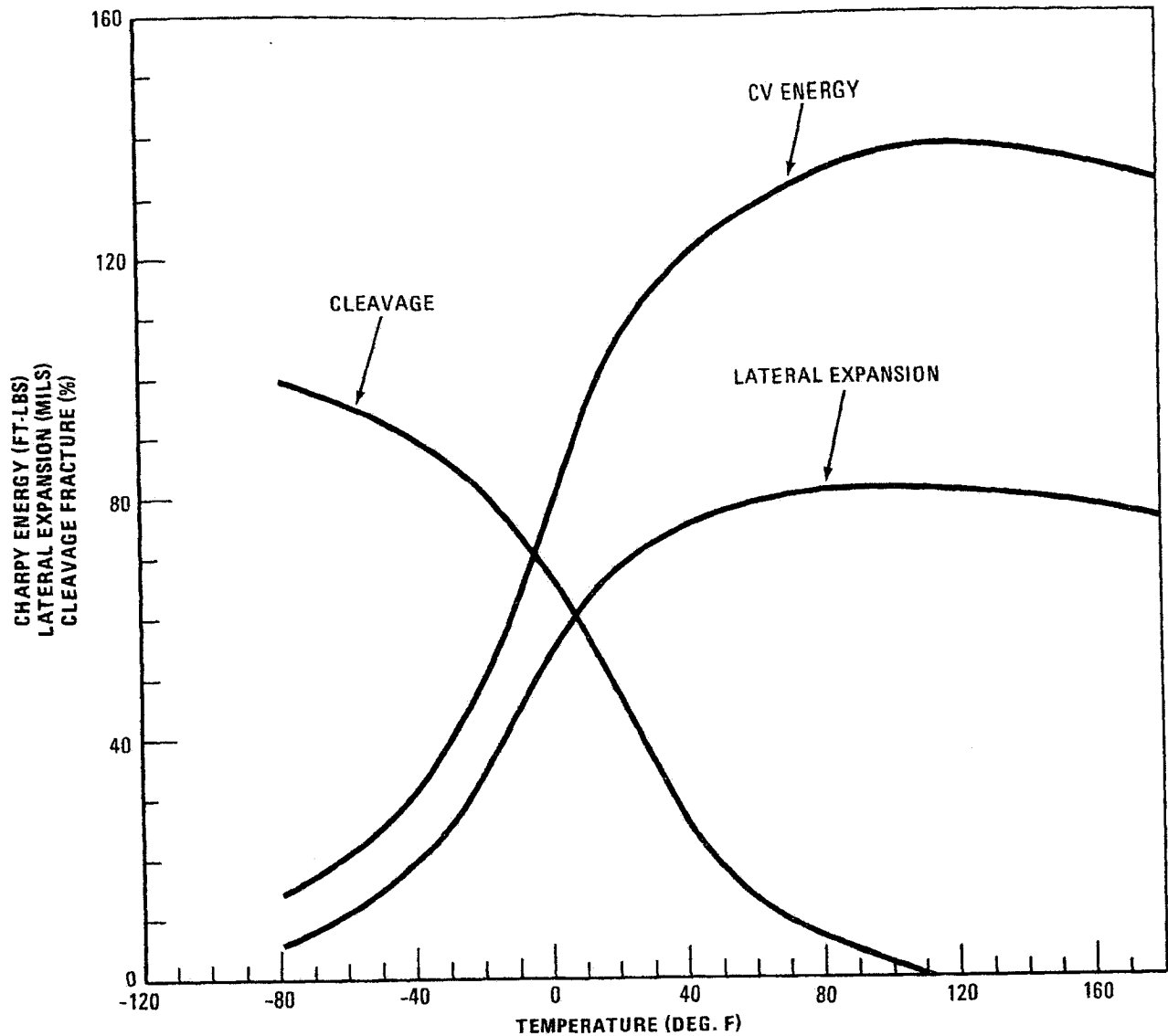
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 7 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-142  
MIL B-4 WIRE  
FLUX LINDE 0091

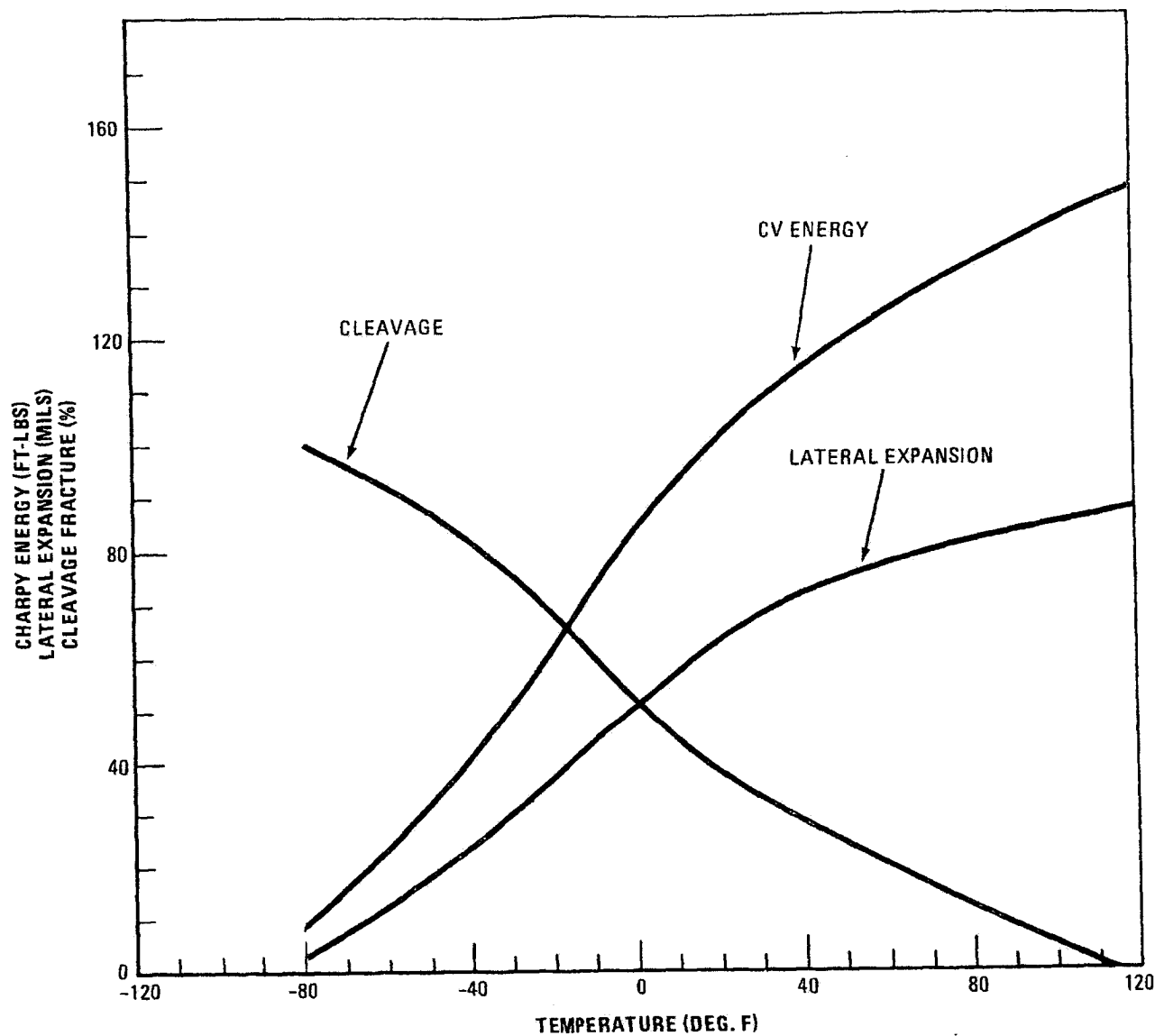
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 8 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-124  
COATED ELECTRODE  
LOT NO FA0ED

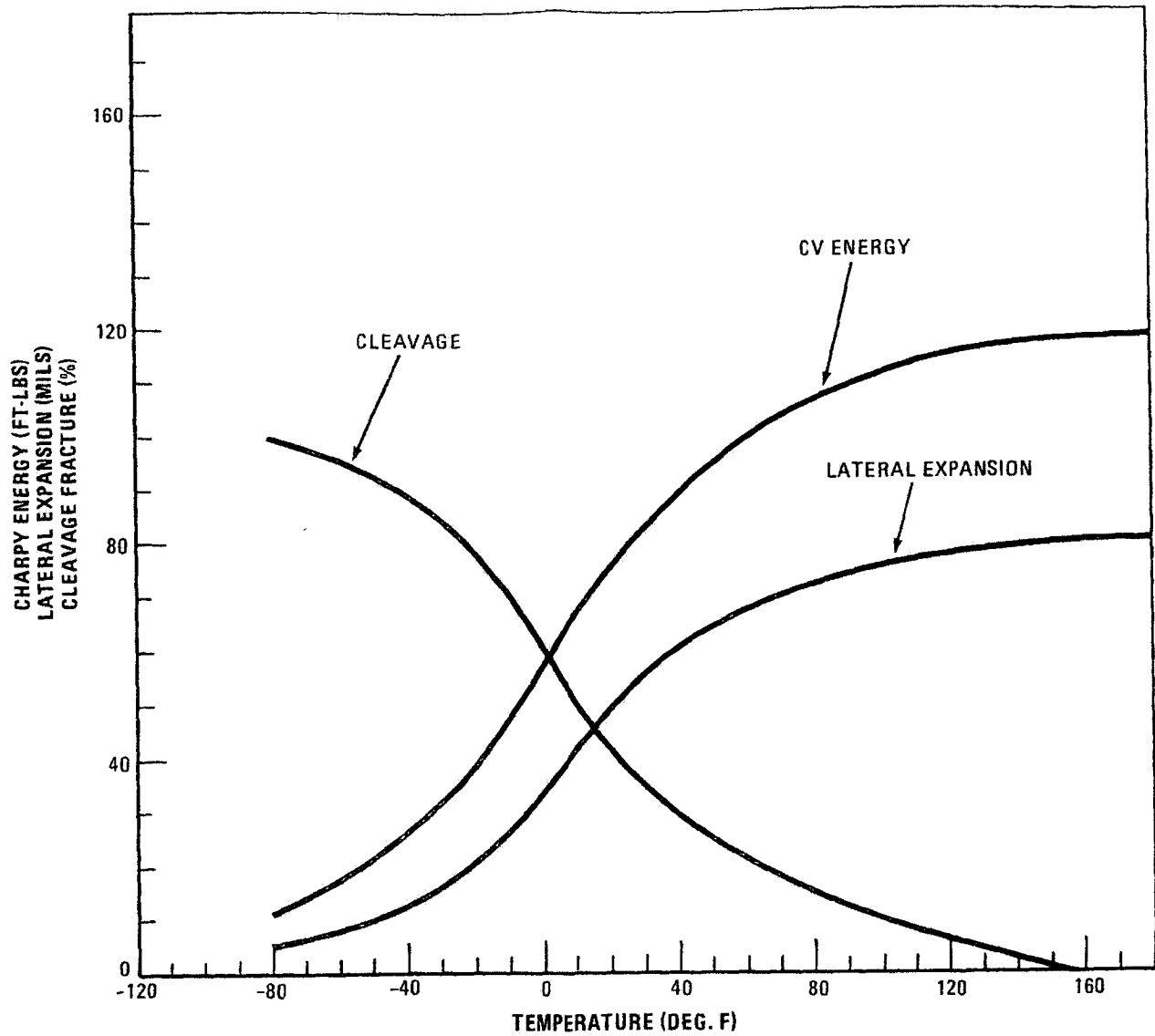
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 9 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-124  
COATED ELECTRODE  
LOT NO. HAAID

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

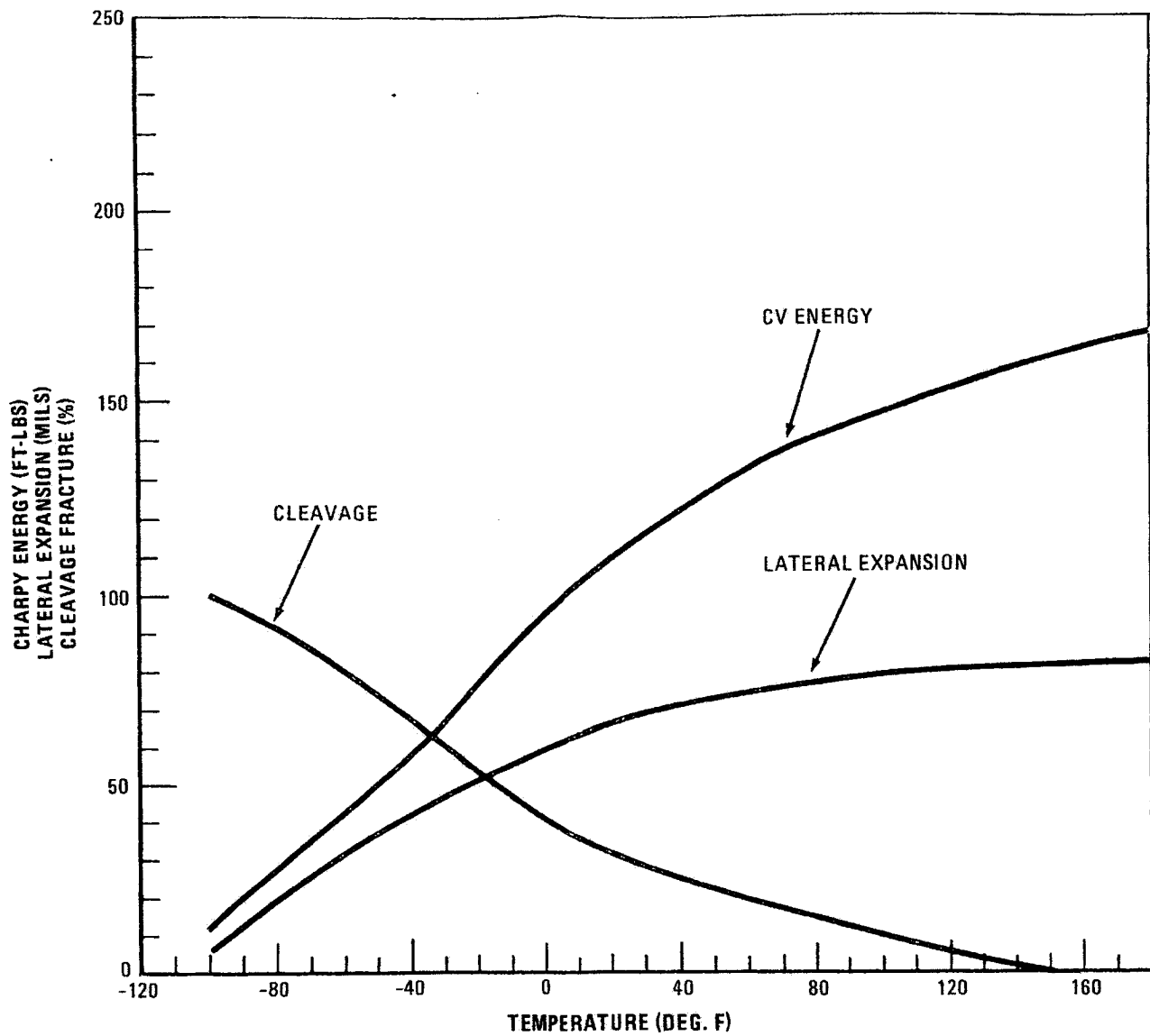
UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 10 OF 20

JUNE 2003

REVISION 12





WELD SEAM NUMBER  
101-124  
COATED ELECTRODE  
LOT NO. GABFE

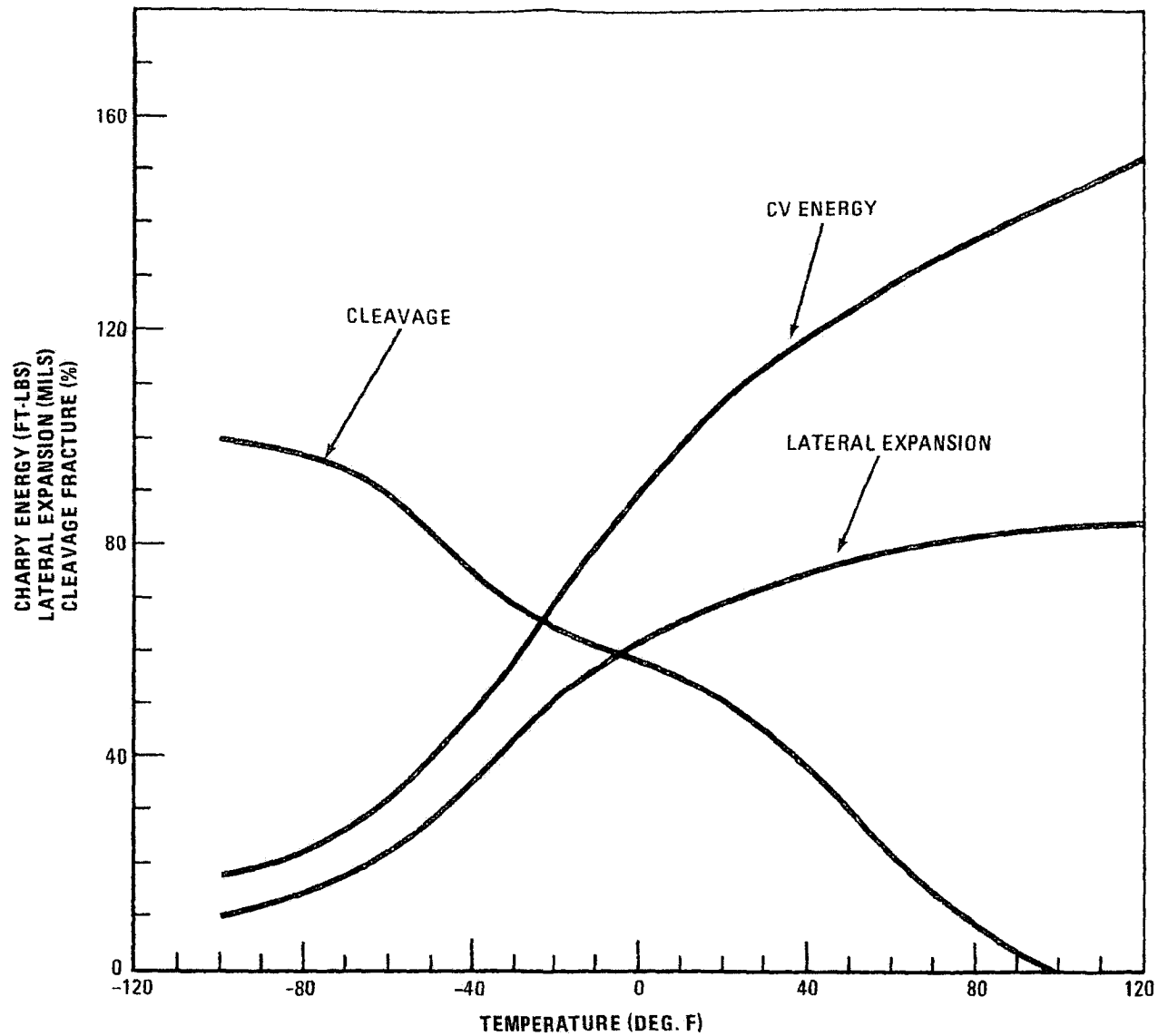
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 11 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-124  
COATED ELECTRODE  
LOT NO. HADEE

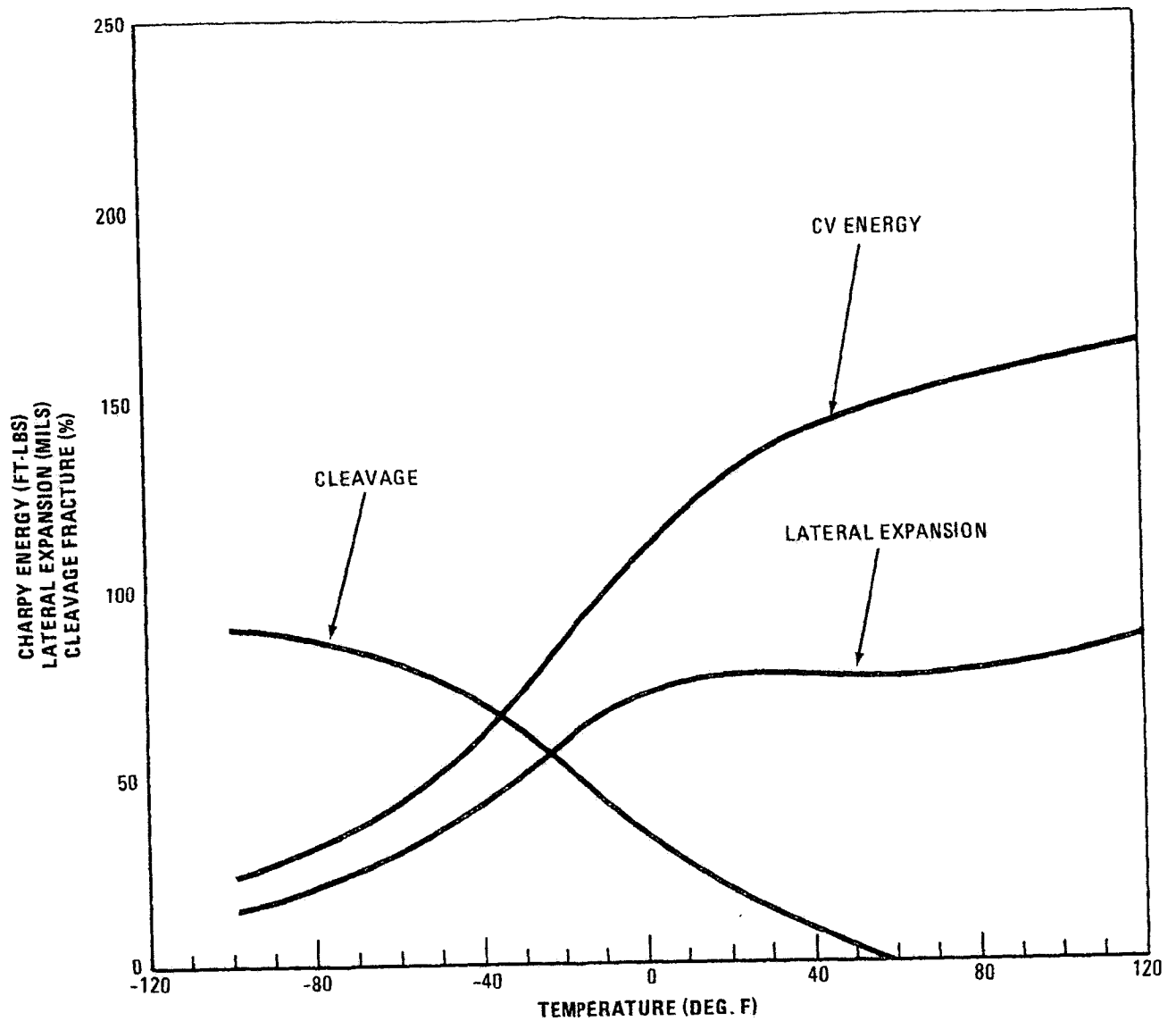
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 12 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-124  
COATED ELECTRODE  
LOT NO. HAACE

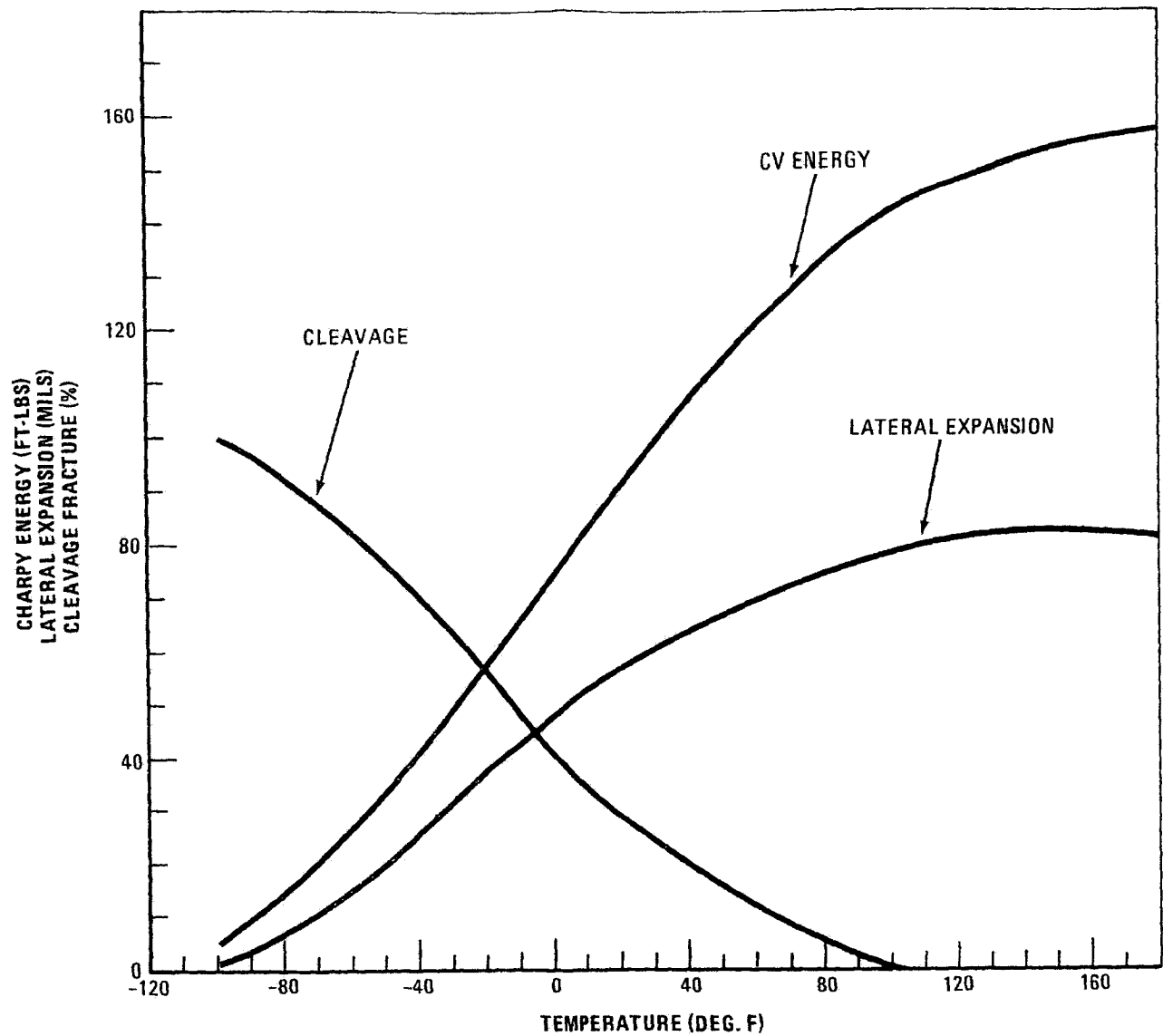
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 13 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-142  
COATED ELECTRODE  
LOT NO. 1A0CE

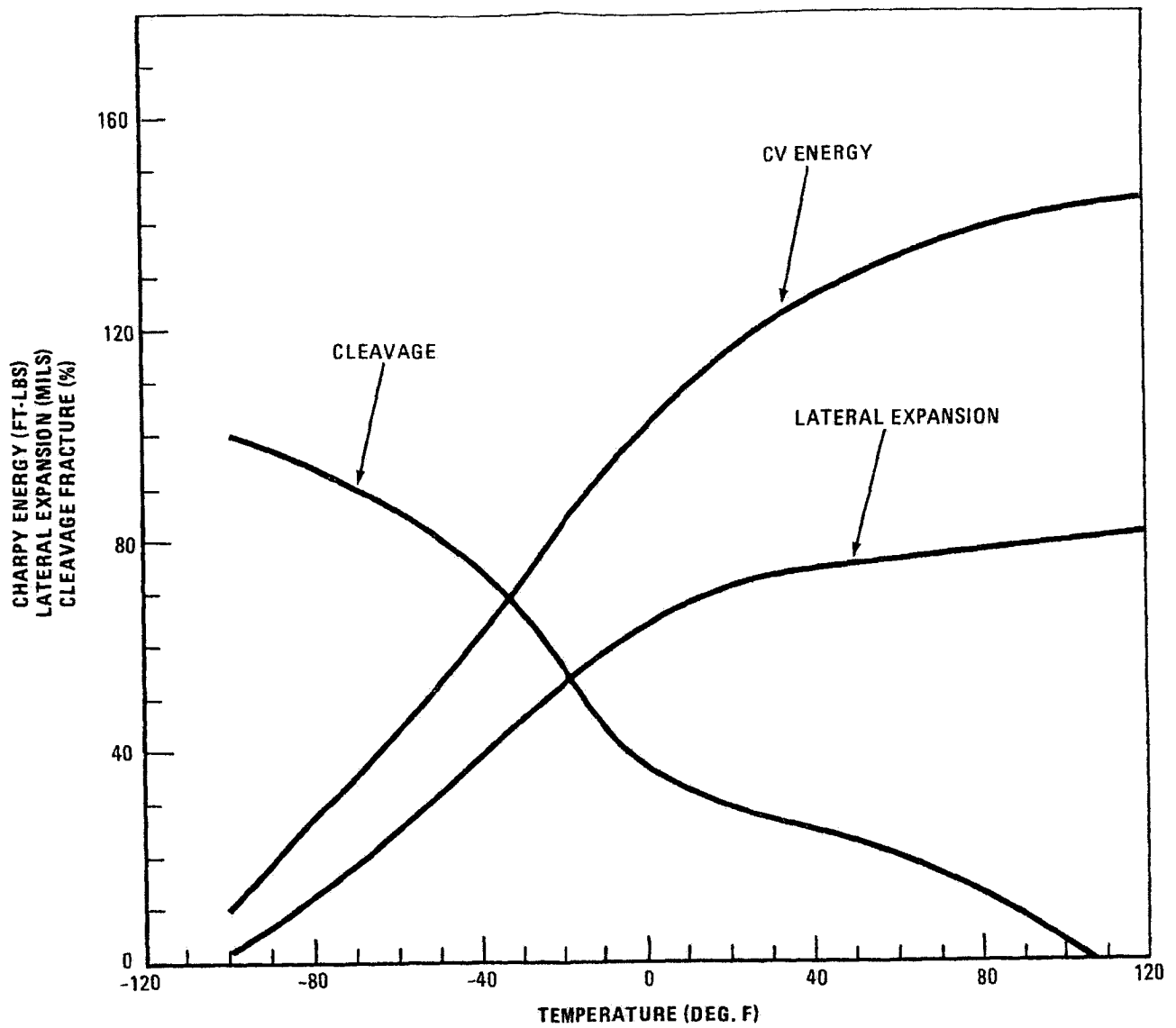
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 14 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-142  
COATED ELECTRODE  
LOT NO. KA0GE

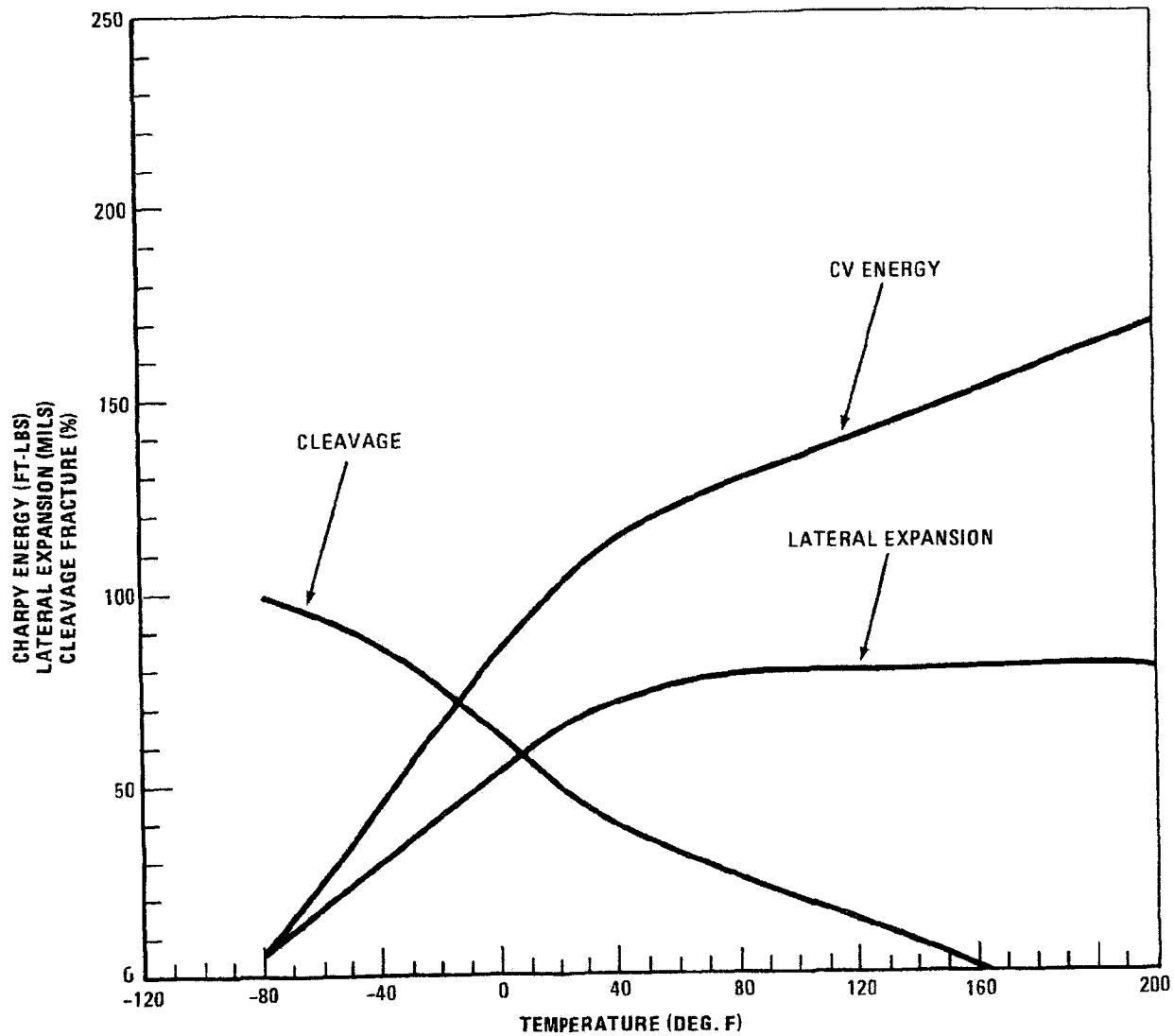
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 15 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBERS  
101-124 & 101-142  
COATED ELECTRODE  
LOT NO. BABEF

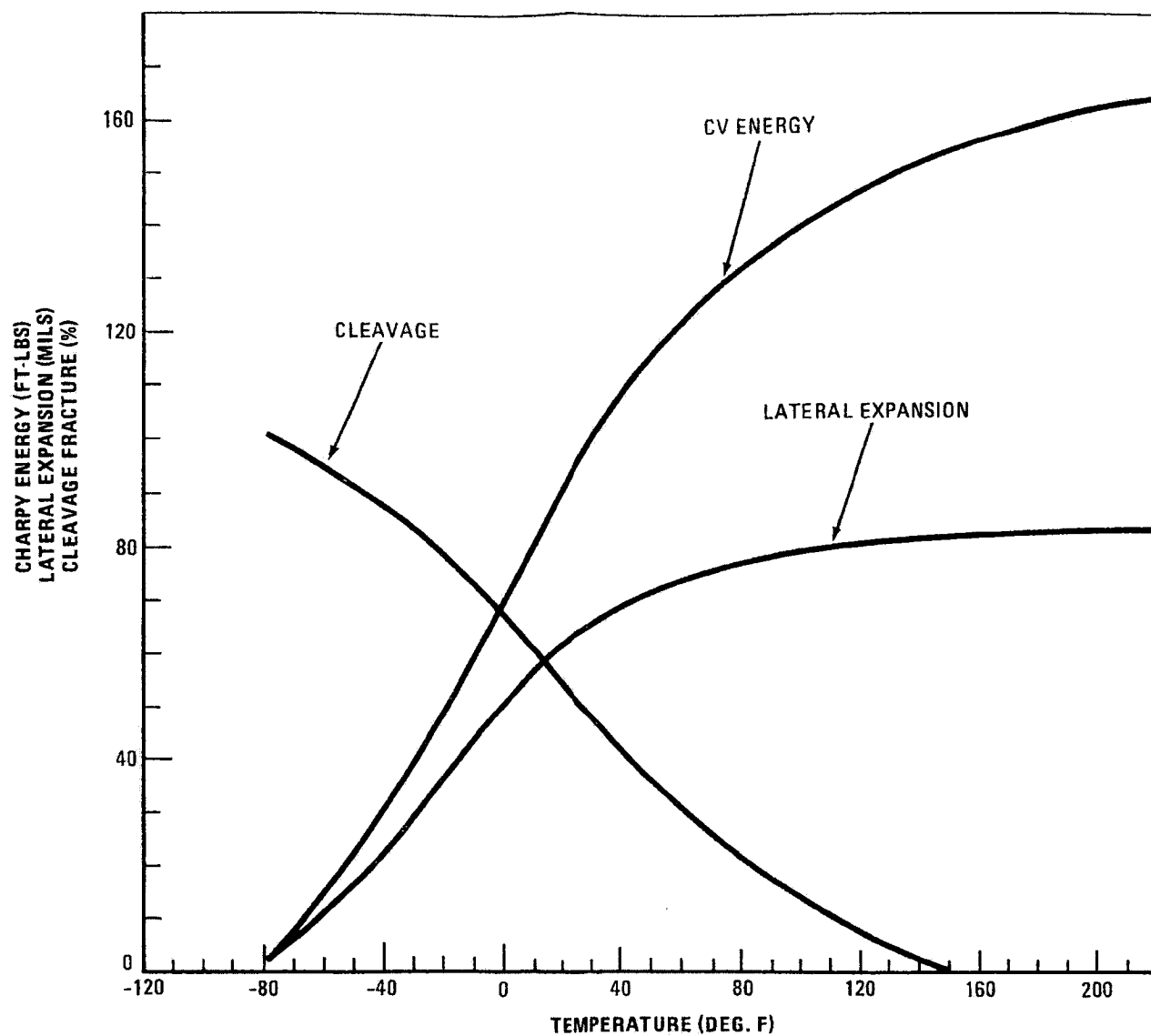
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 16 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBERS  
101-124 & 101-142  
COATED ELECTRODE  
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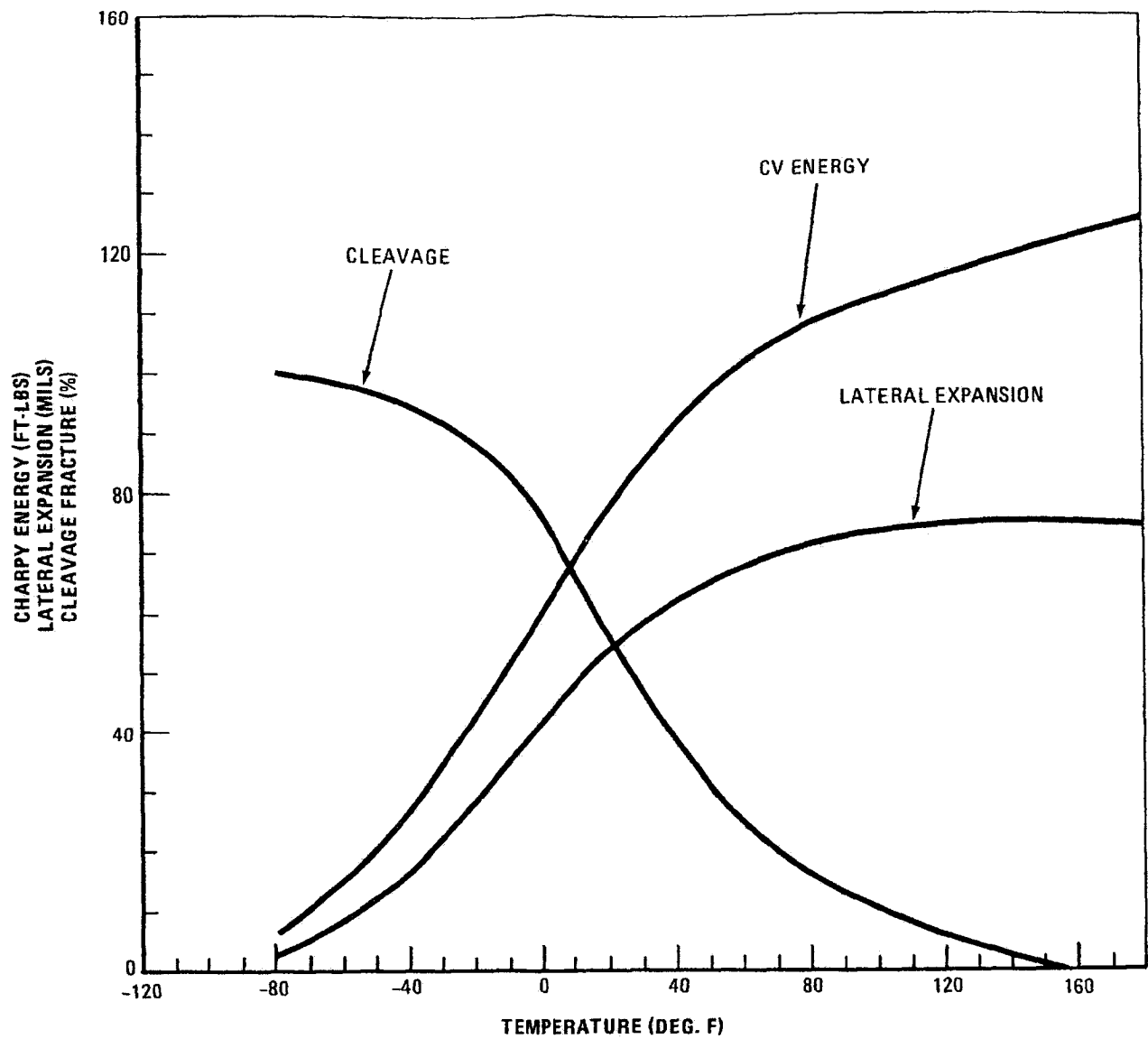
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 17 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-171  
COATED ELECTRODE  
LOT NO. DBBJG

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

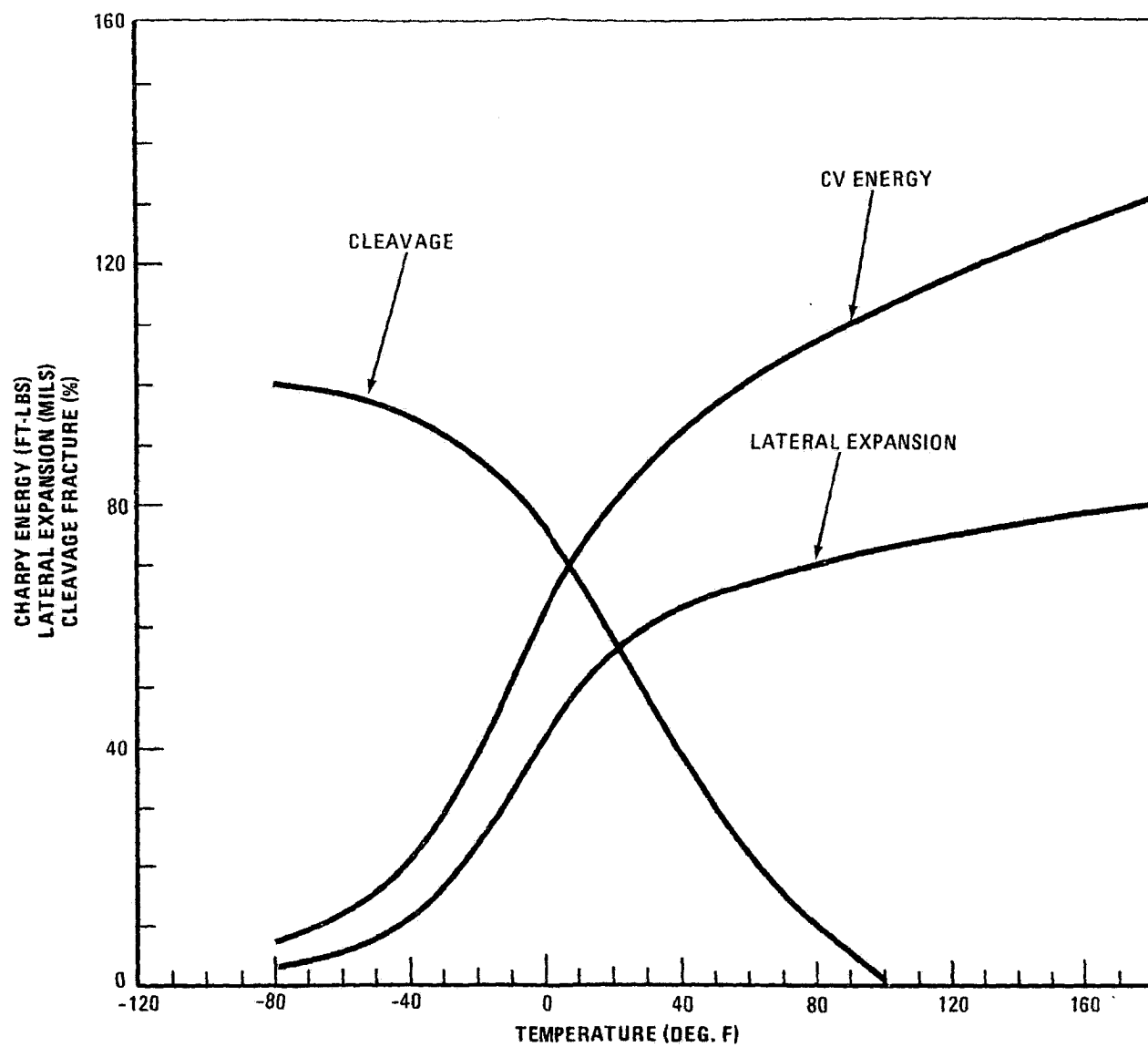
UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 18 OF 20

JUNE 2003

REVISION 12





WELD SEAM NUMBER  
101-171  
COATED ELECTRODE  
LOT NO. DABGG

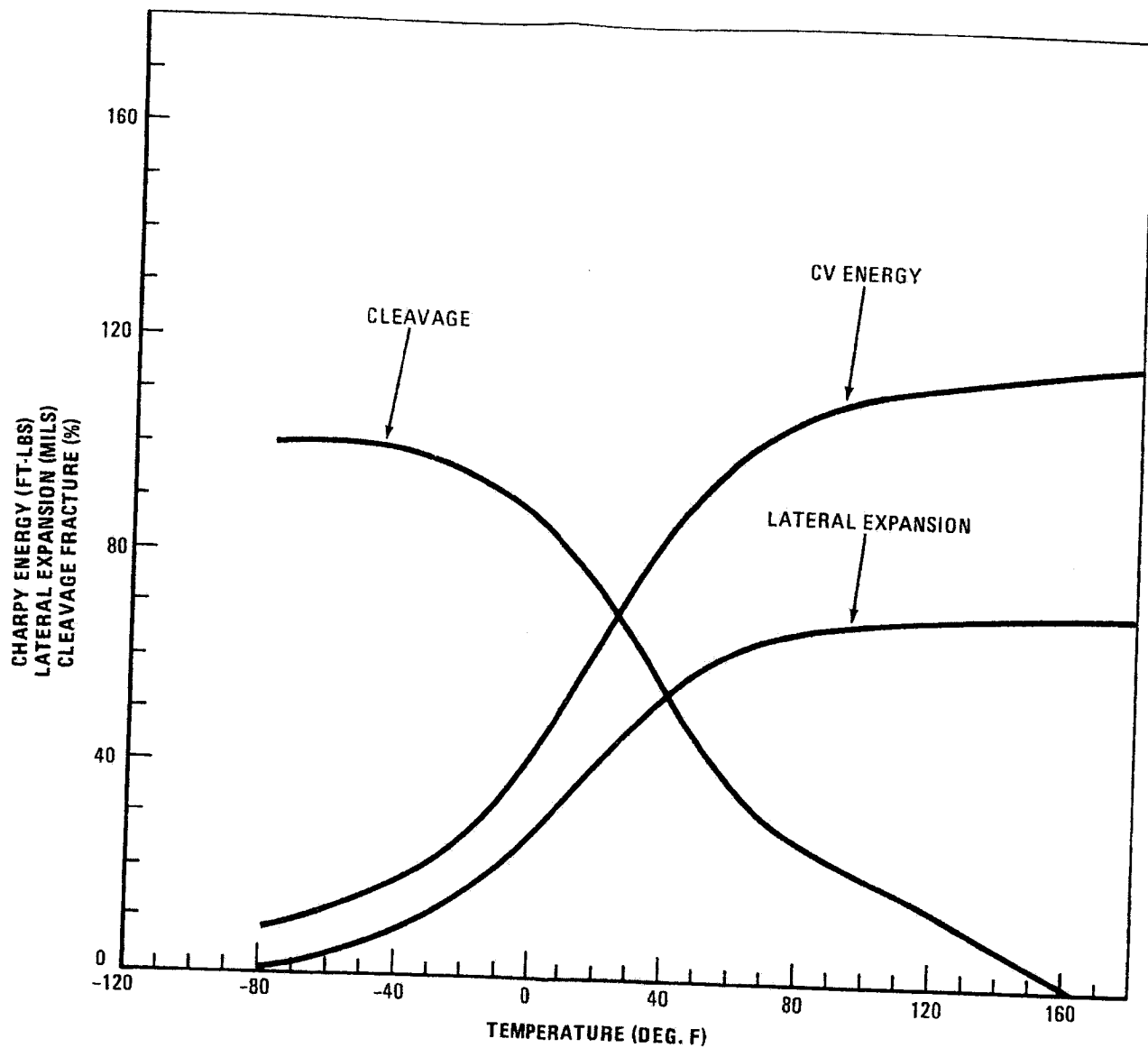
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 19 OF 20

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-171  
COATED ELECTRODE  
LOT NO. FABBG

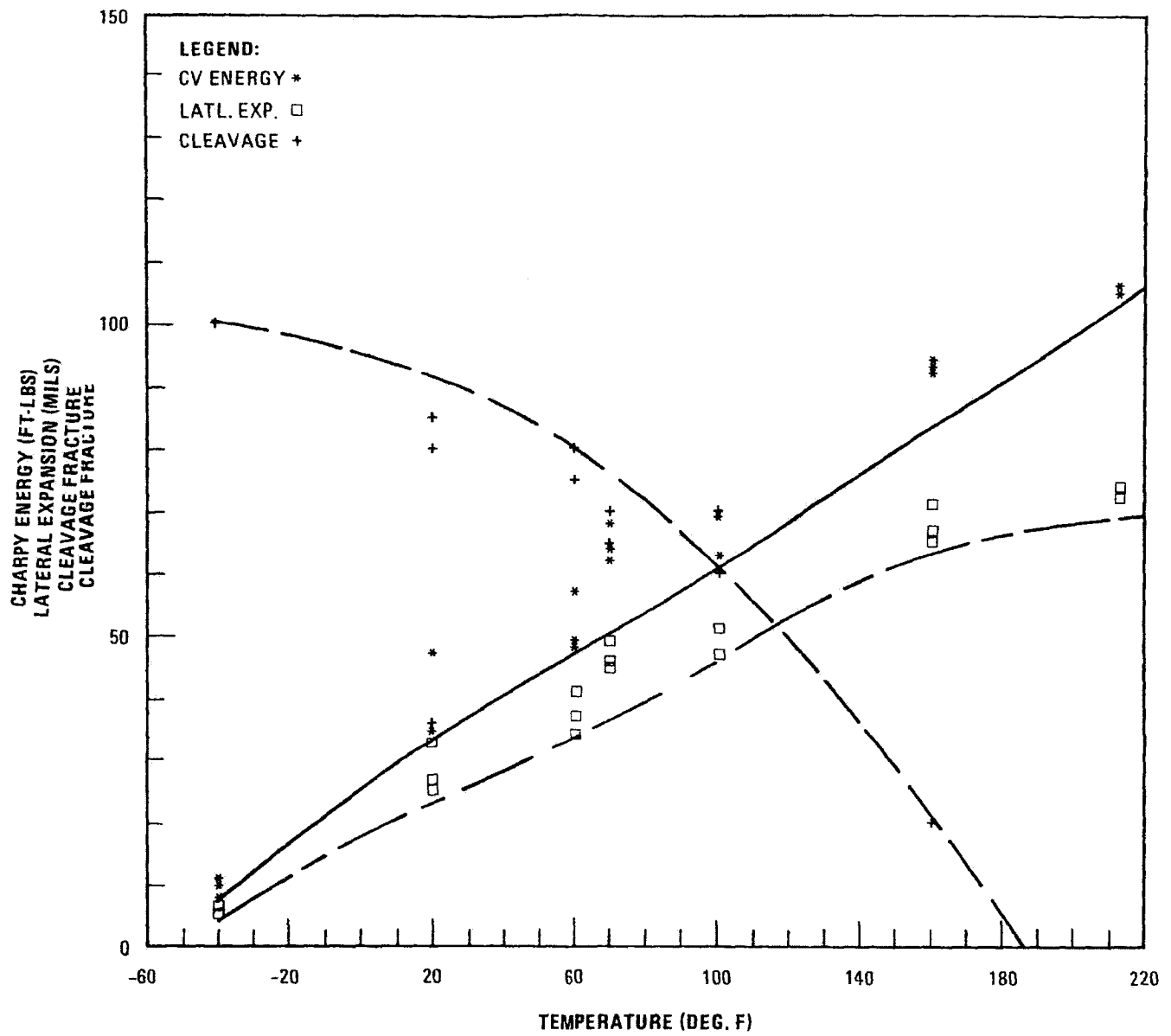
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 1 CHARPY TEST RESULTS

FIGURE 5.2-1 SHEET 20 OF 20

JUNE 2003

REVISION 12



LOWER SHELL PLATE  
 CODE NUMBER  
 F-773-1

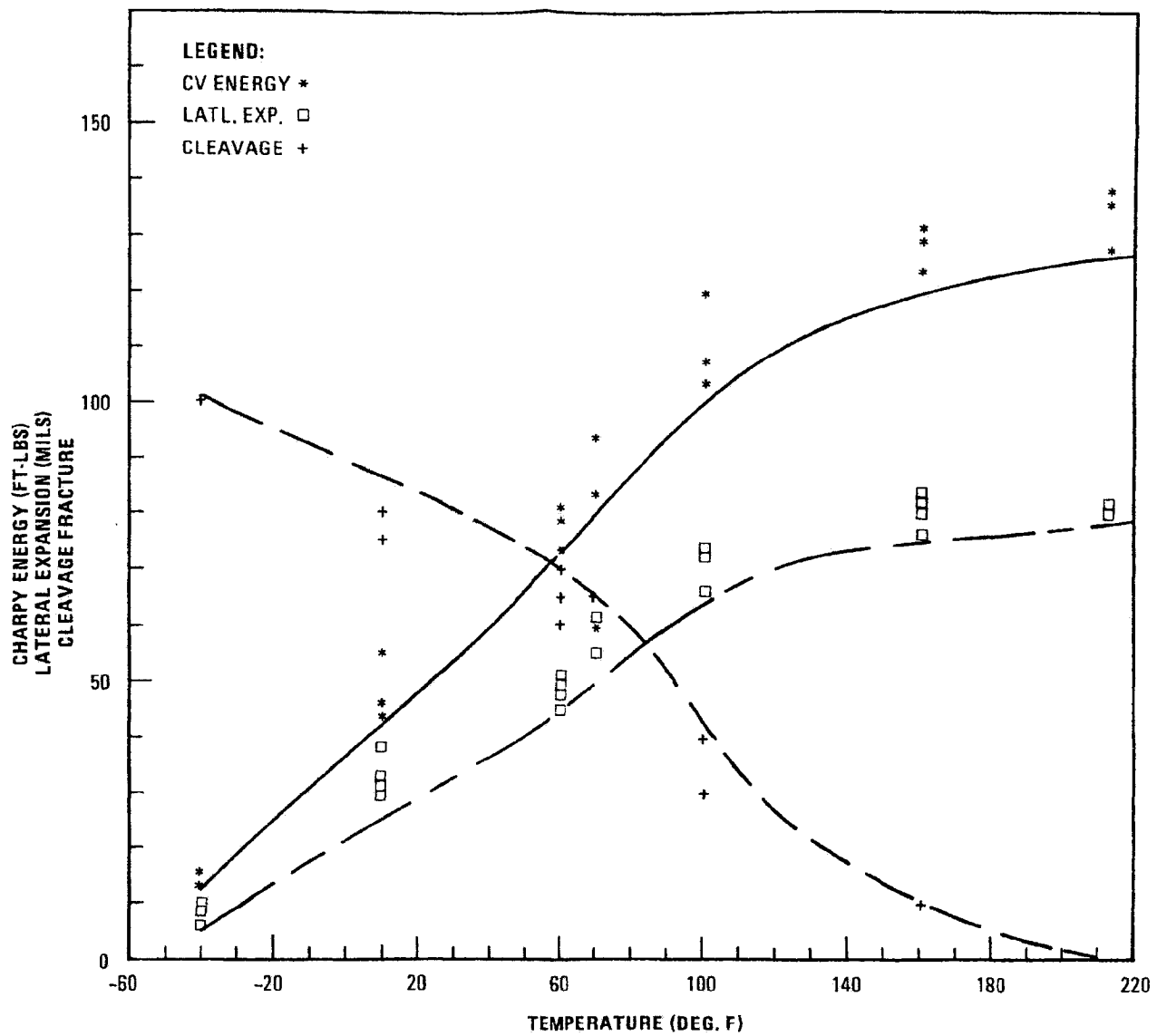
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 1 OF 15

JUNE 2003

REVISION 12



LOWER SHELL PLATE  
 CODE NUMBER  
 F-773-2

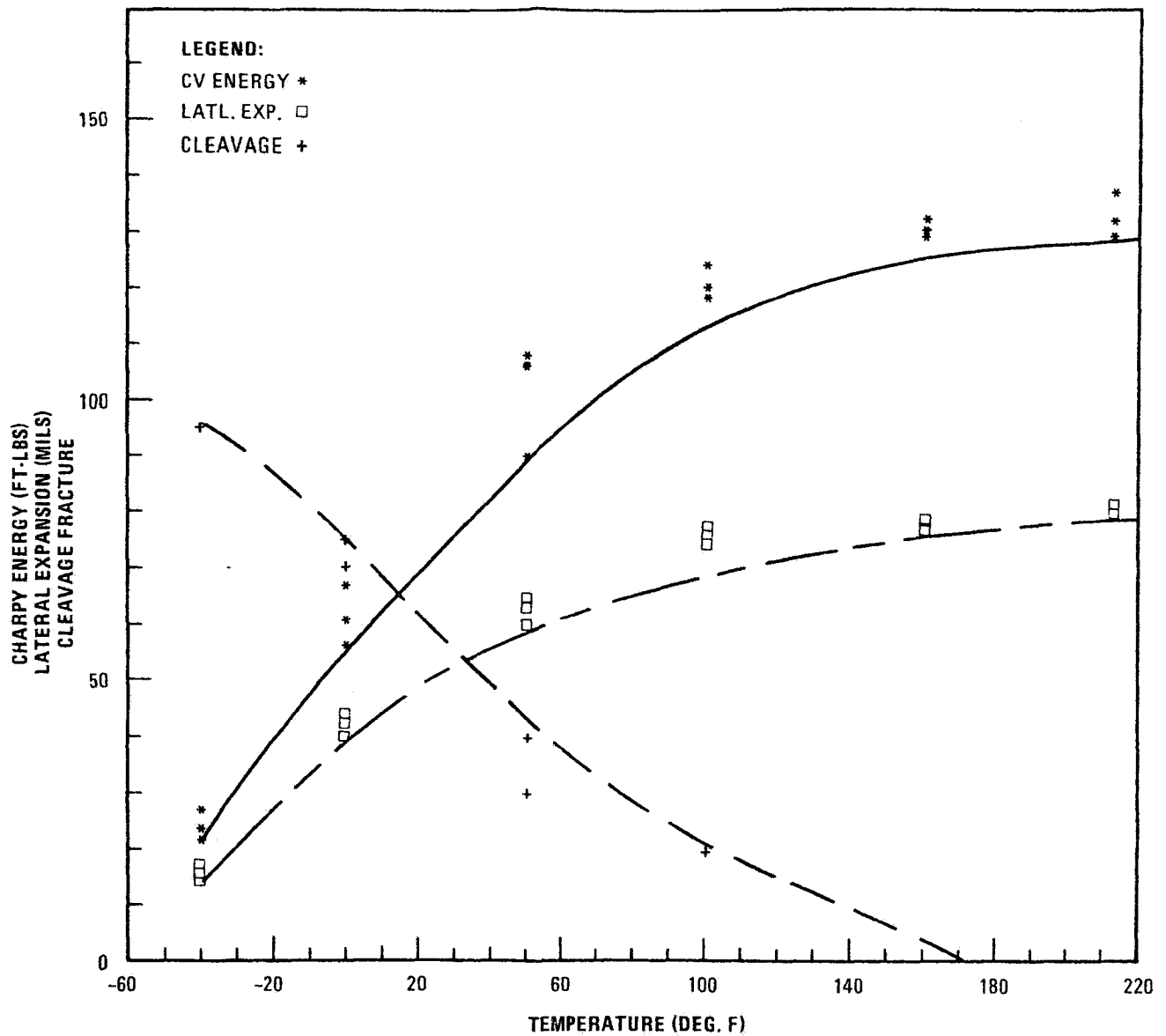
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 2 OF 15

JUNE 2003

REVISION 12



LOWER SHELL PLATE  
 CODE NUMBER  
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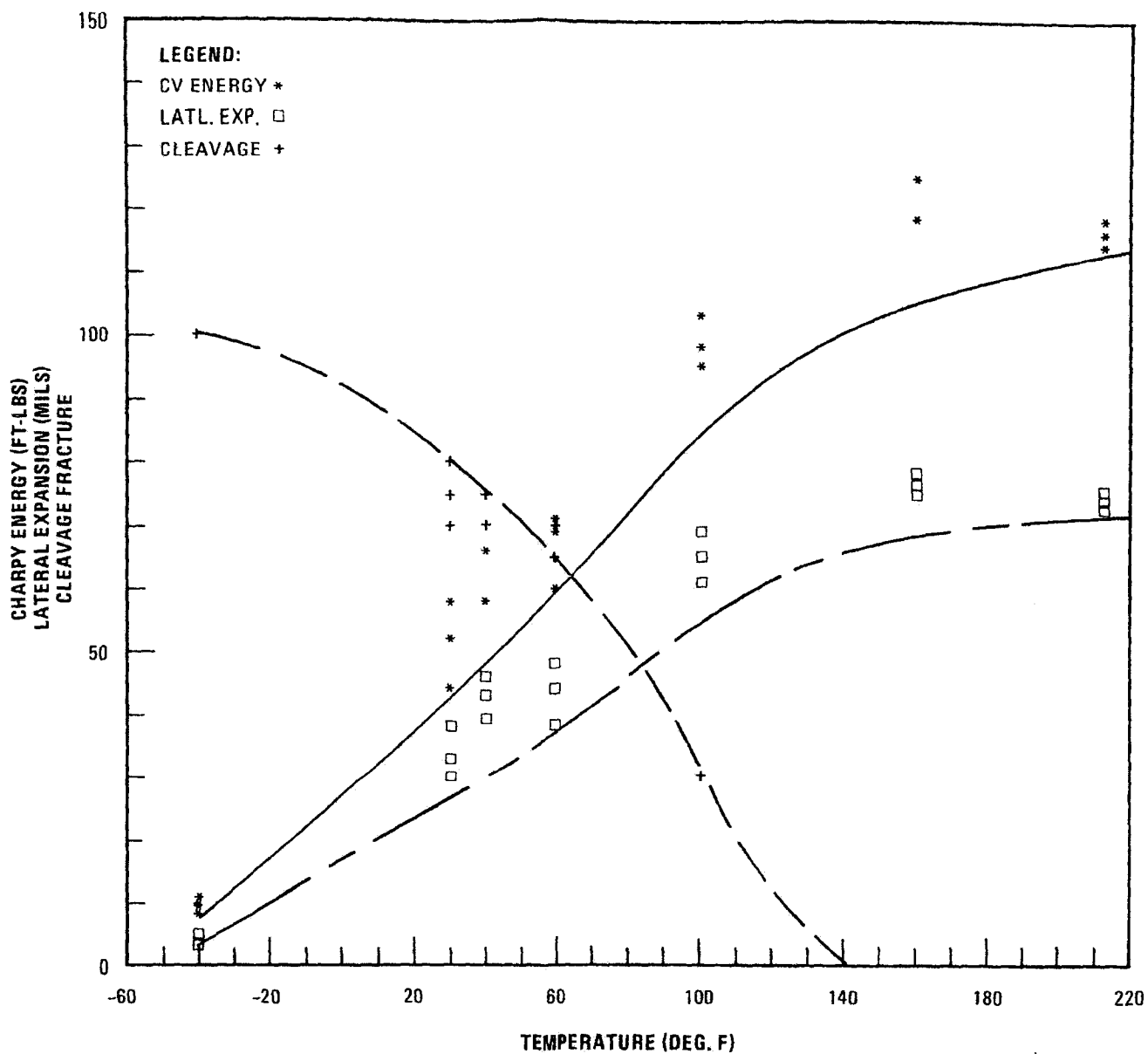
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 3 OF 15

JUNE 2003

REVISION 12



INTERMEDIATE SHELL  
 PLATE  
 CODE NUMBER  
 F-765-4

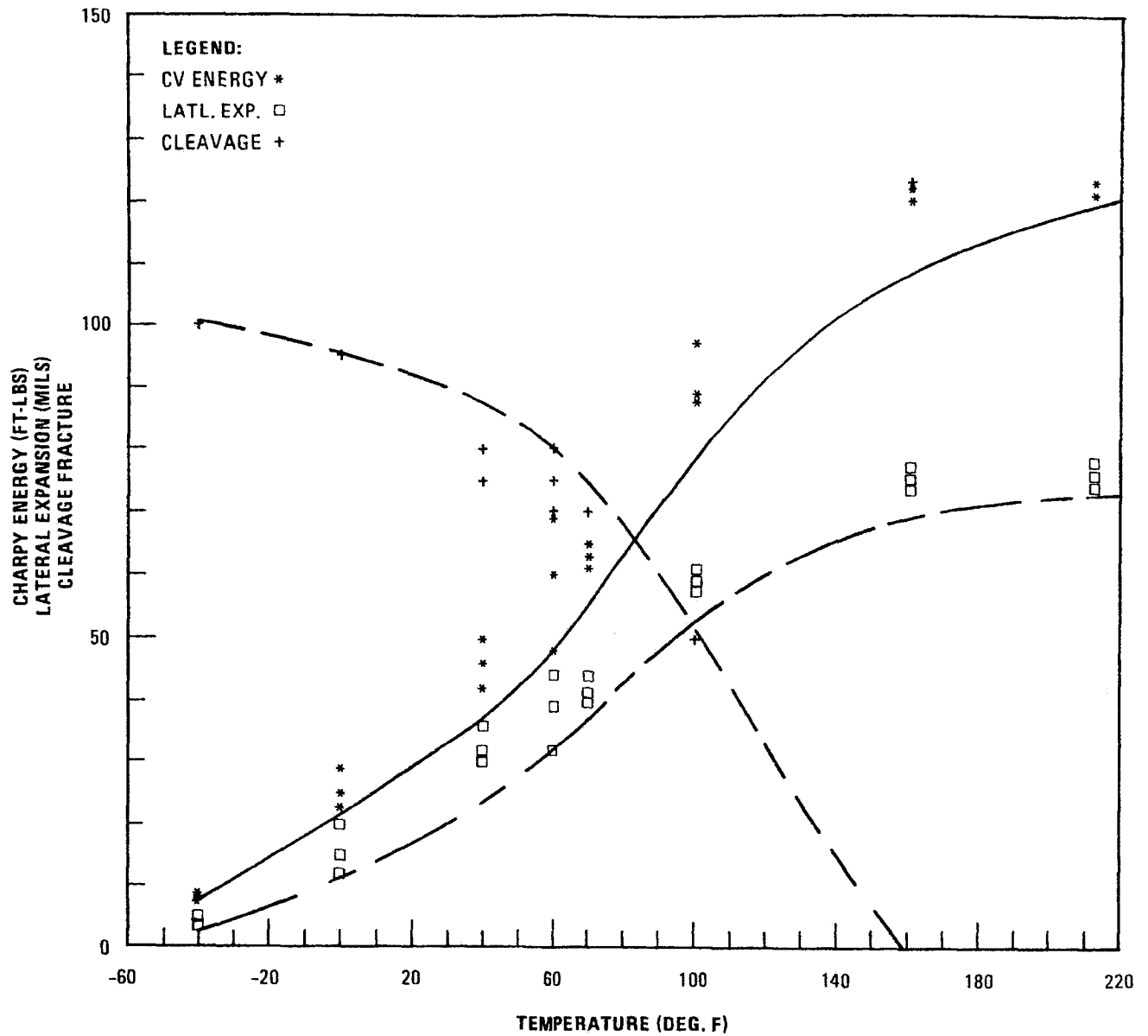
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 4 OF 15

JUNE 2003

REVISION 12



INTERMEDIATE SHELL  
 PLATE  
 CODE NUMBER  
 F-765-5

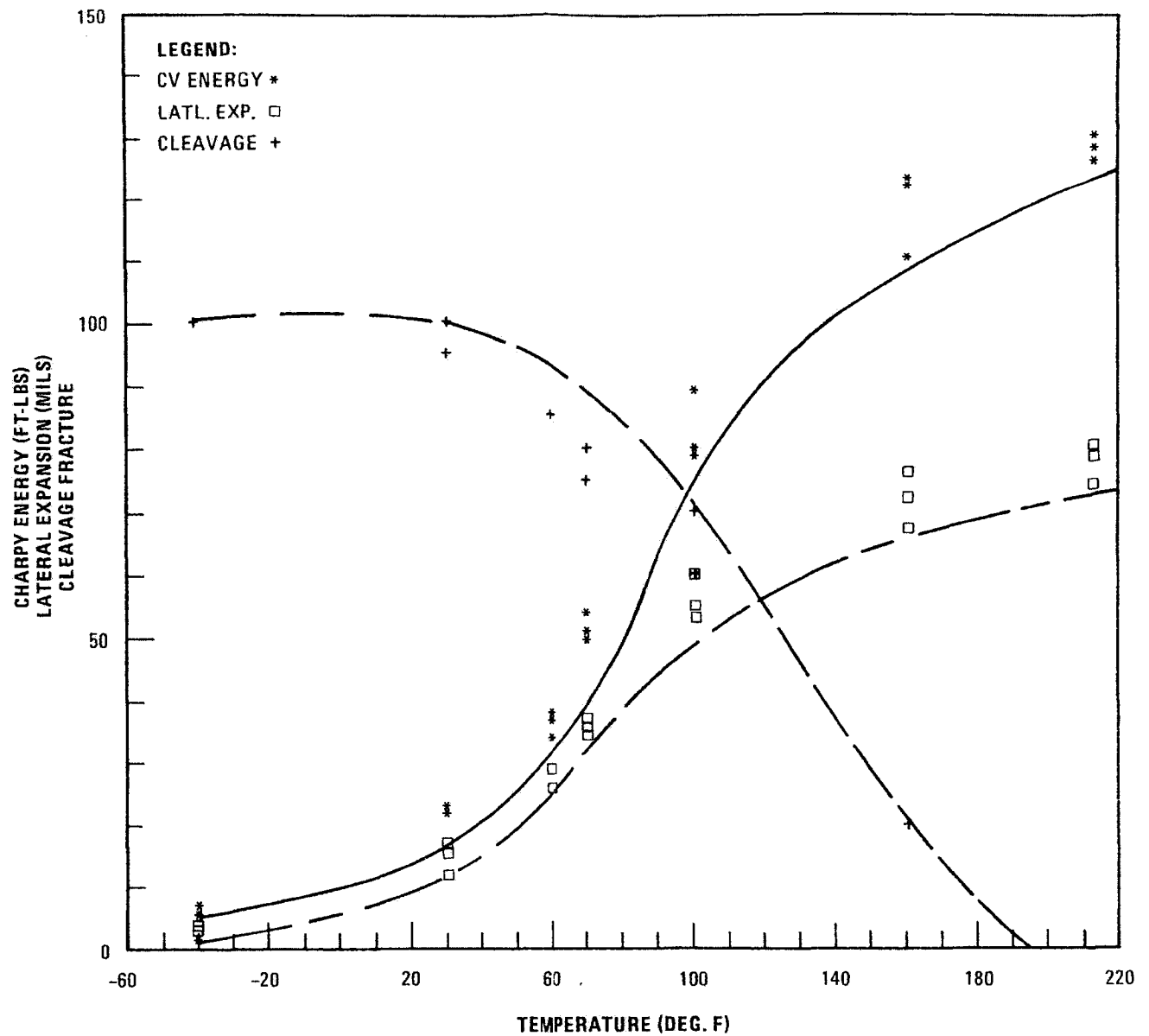
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 5 OF 15

JUNE 2003

REVISION 12



INTERMEDIATE SHELL  
 PLATE  
 CODE NUMBER  
 F-765-6

PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

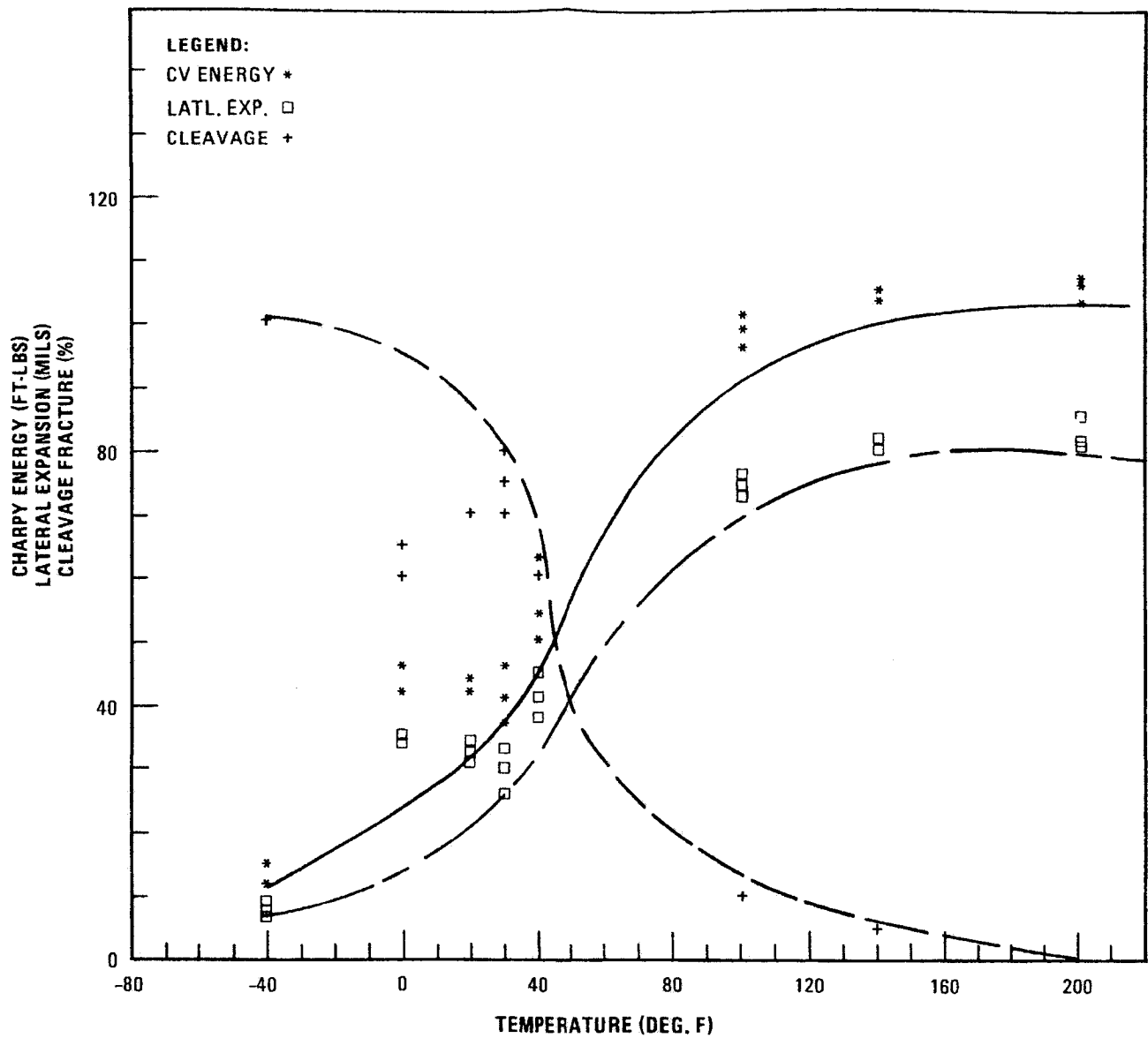
UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 6 OF 15

JUNE 2003

REVISION 12





WELD SEAM NUMBER  
 101-124  
 MIL B-4 WIRE  
 FLUX LINDE 124

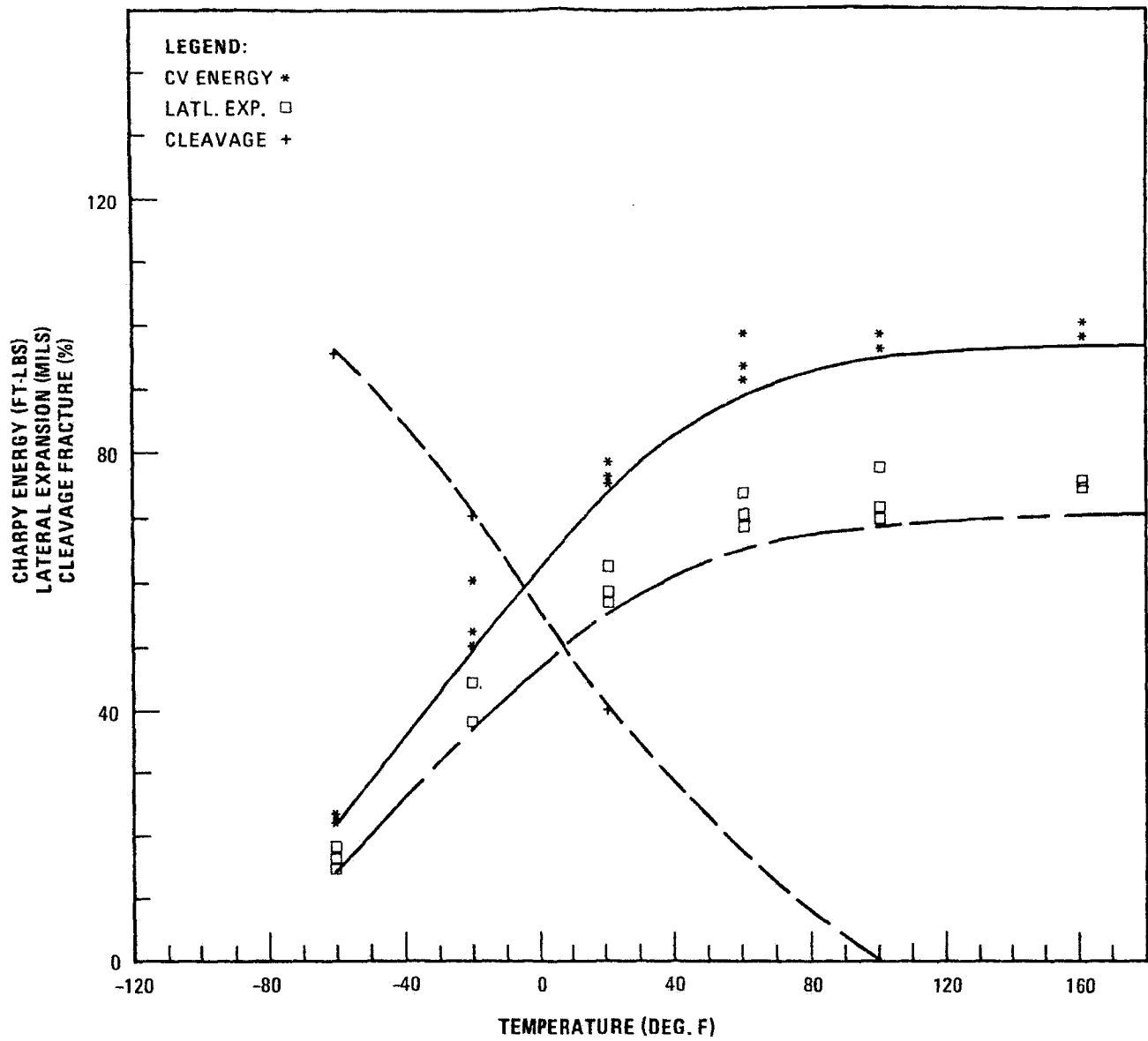
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 7 OF 15

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-142  
 MIL B-4 WIRE  
 FLUX LINDE 124

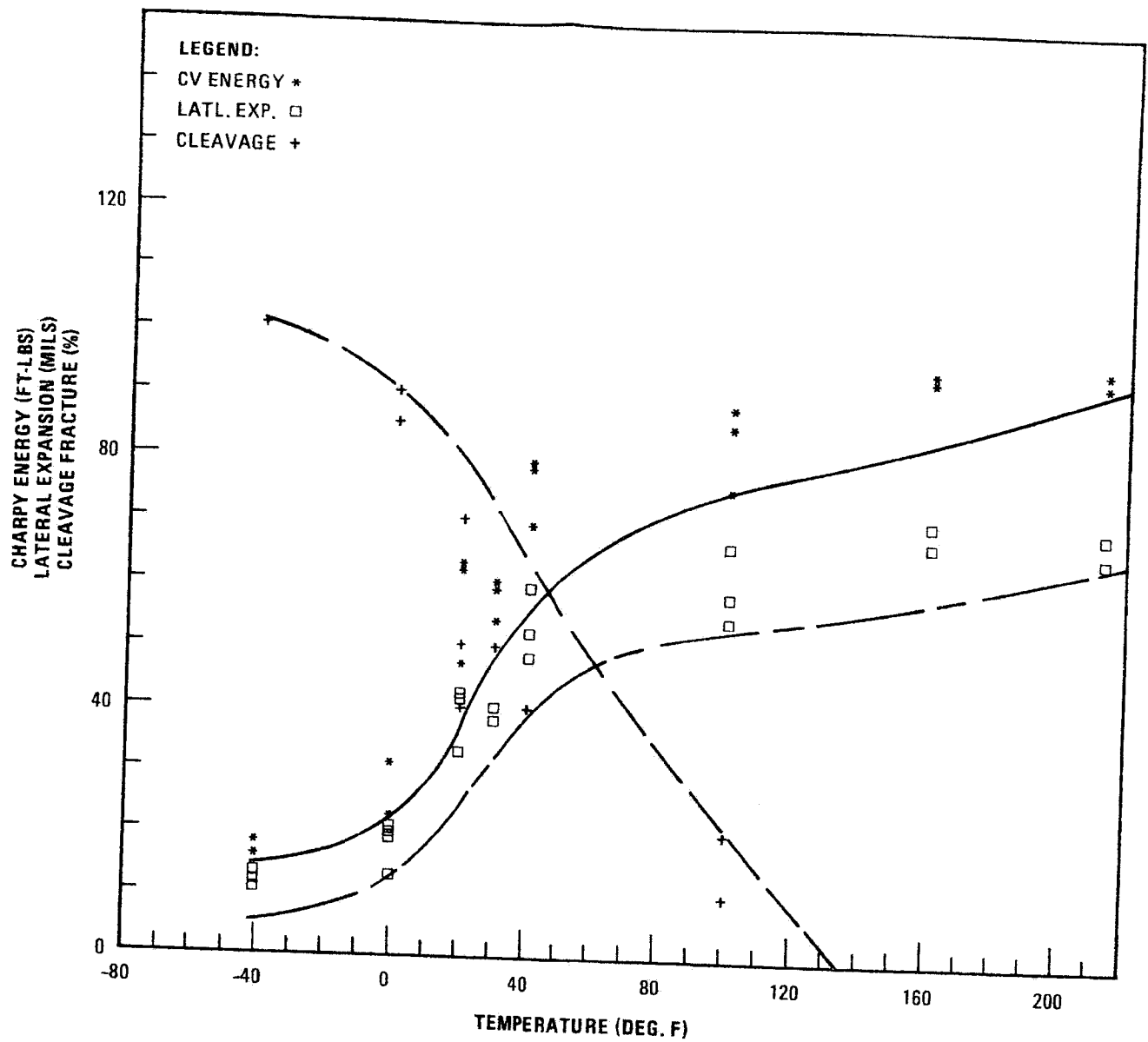
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 8 OF 15

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-171  
 MIL B-4 WIRE  
 FLUX LINDE 124

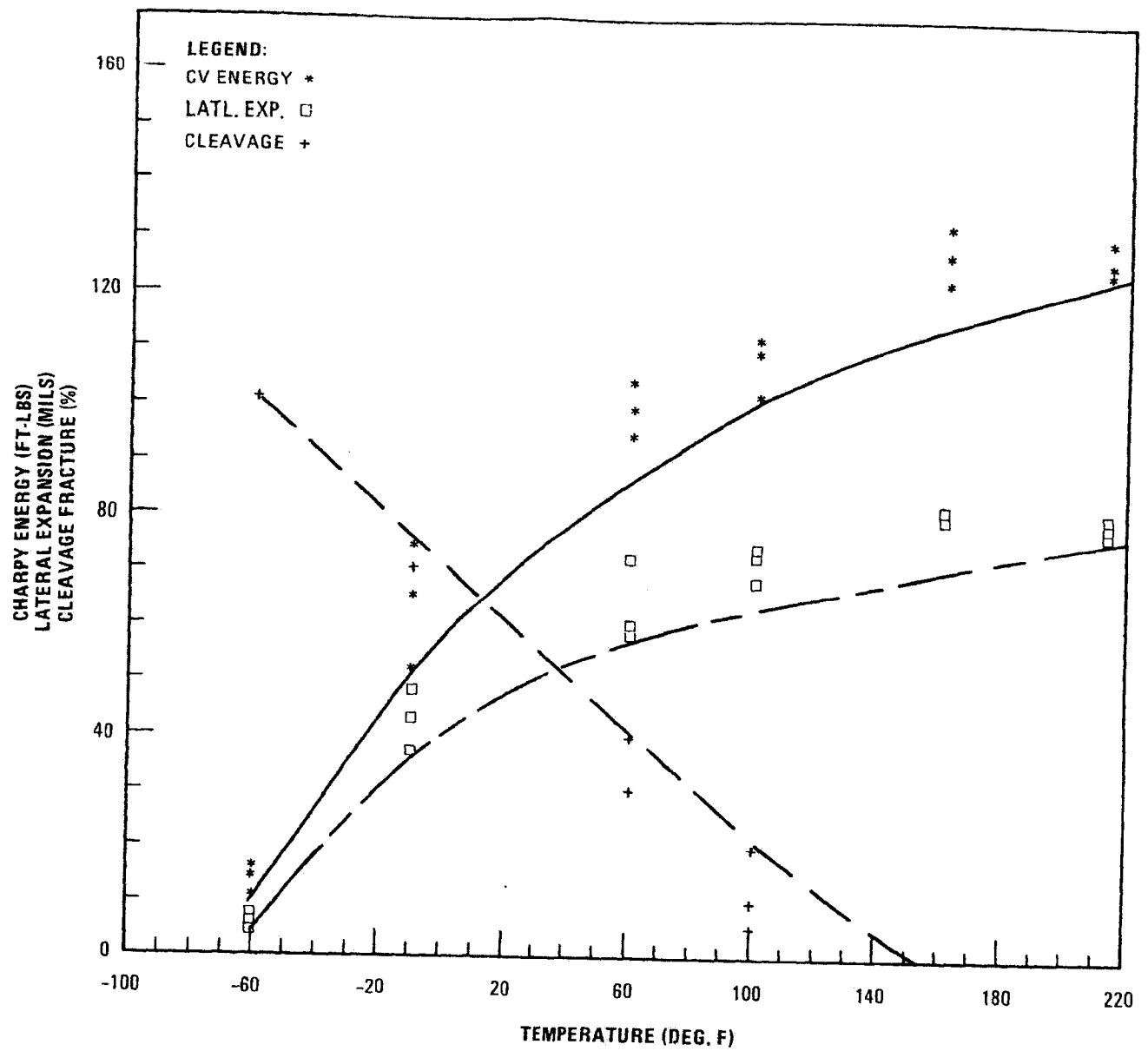
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 9 OF 15

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-124 & 101-142  
 COATED ELECTRODE  
 LOT NO. FAAFF

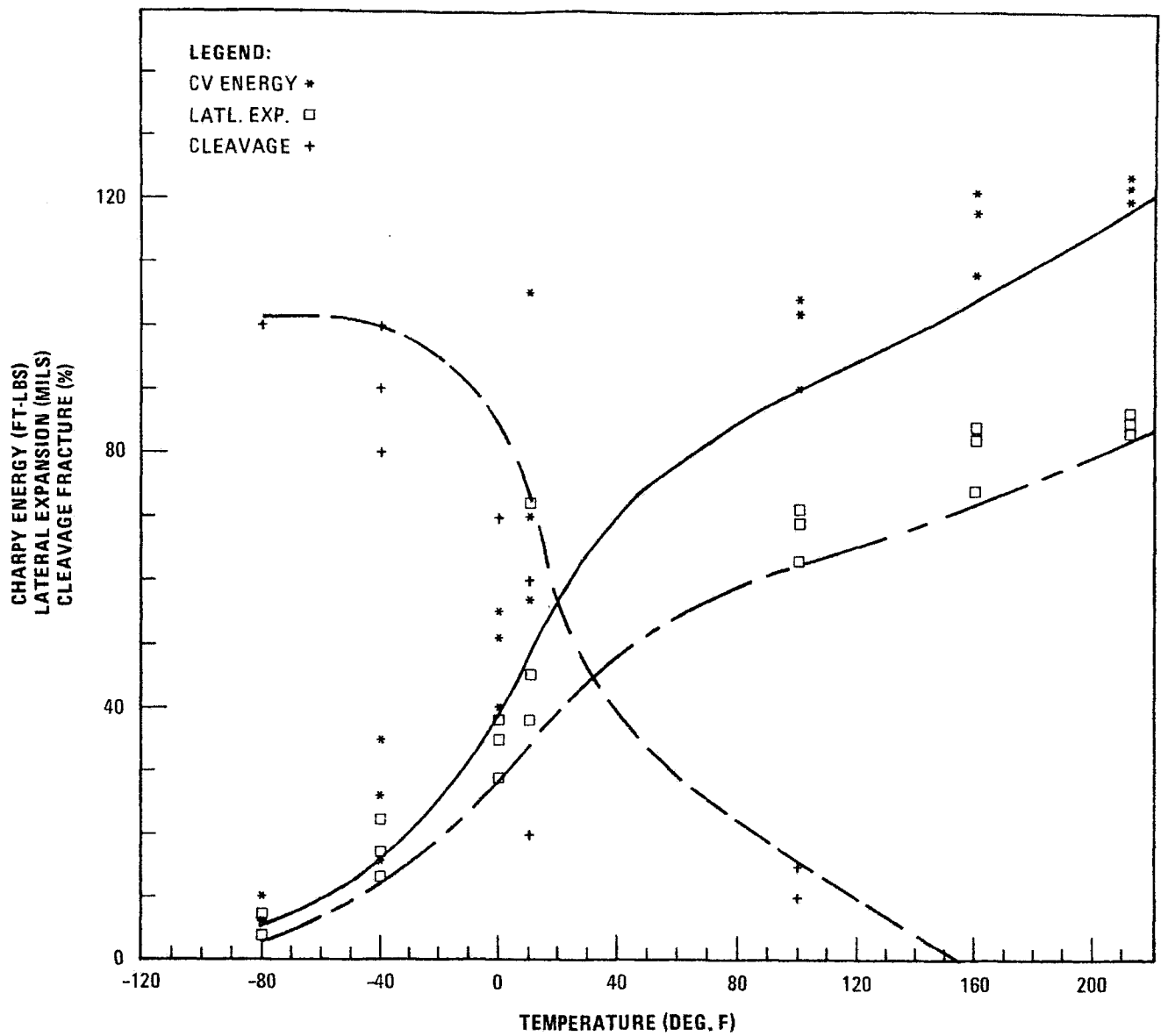
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 10 OF 15

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-124  
 COATED ELECTRODE  
 LOT NO. FAAHF

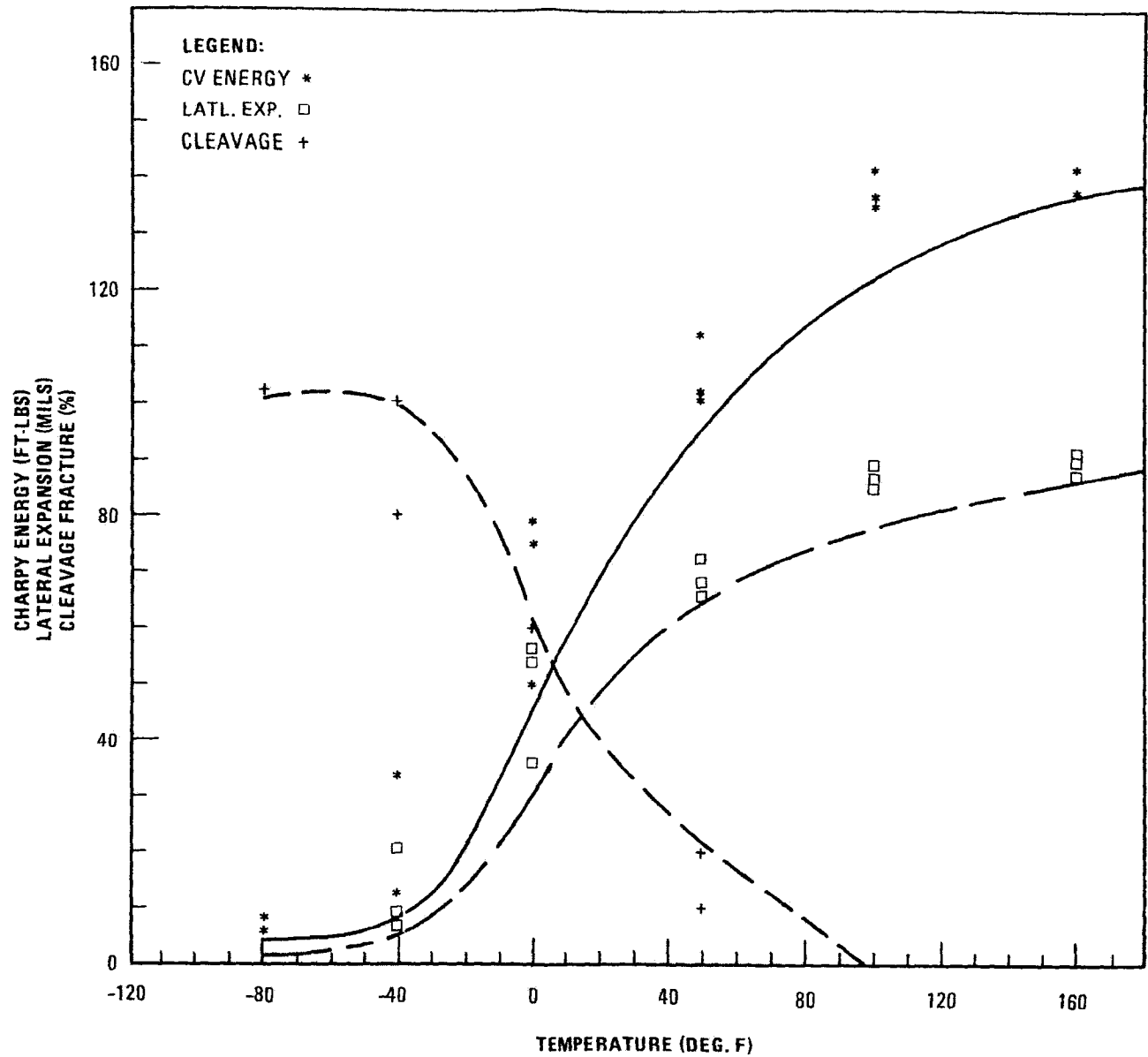
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 11 OF 15

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-124  
 COATED ELECTRODE  
 LOT NO. FABAF

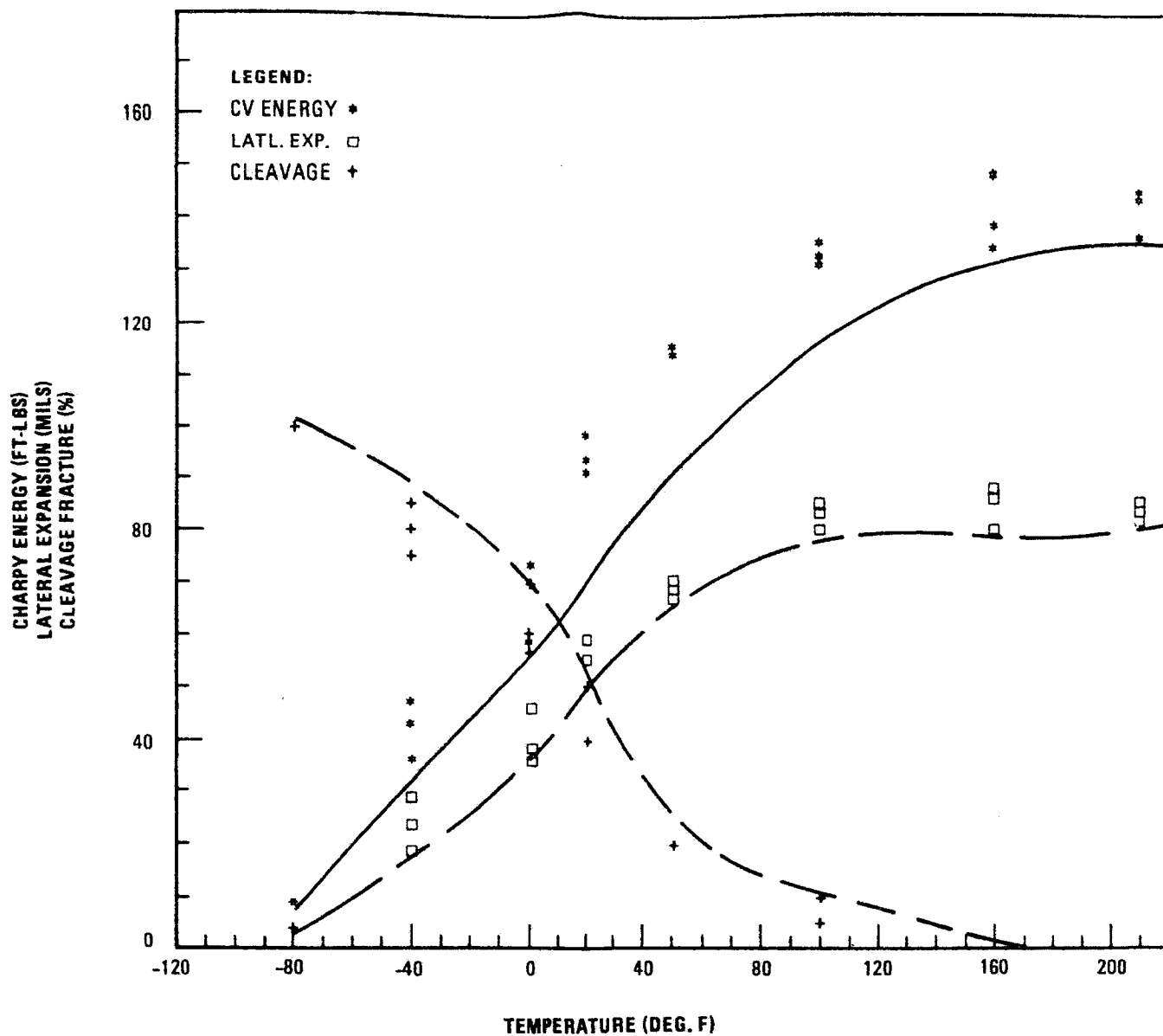
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 12 OF 15

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-142  
 COATED ELECTRODE  
 LOT NO. LA0GF

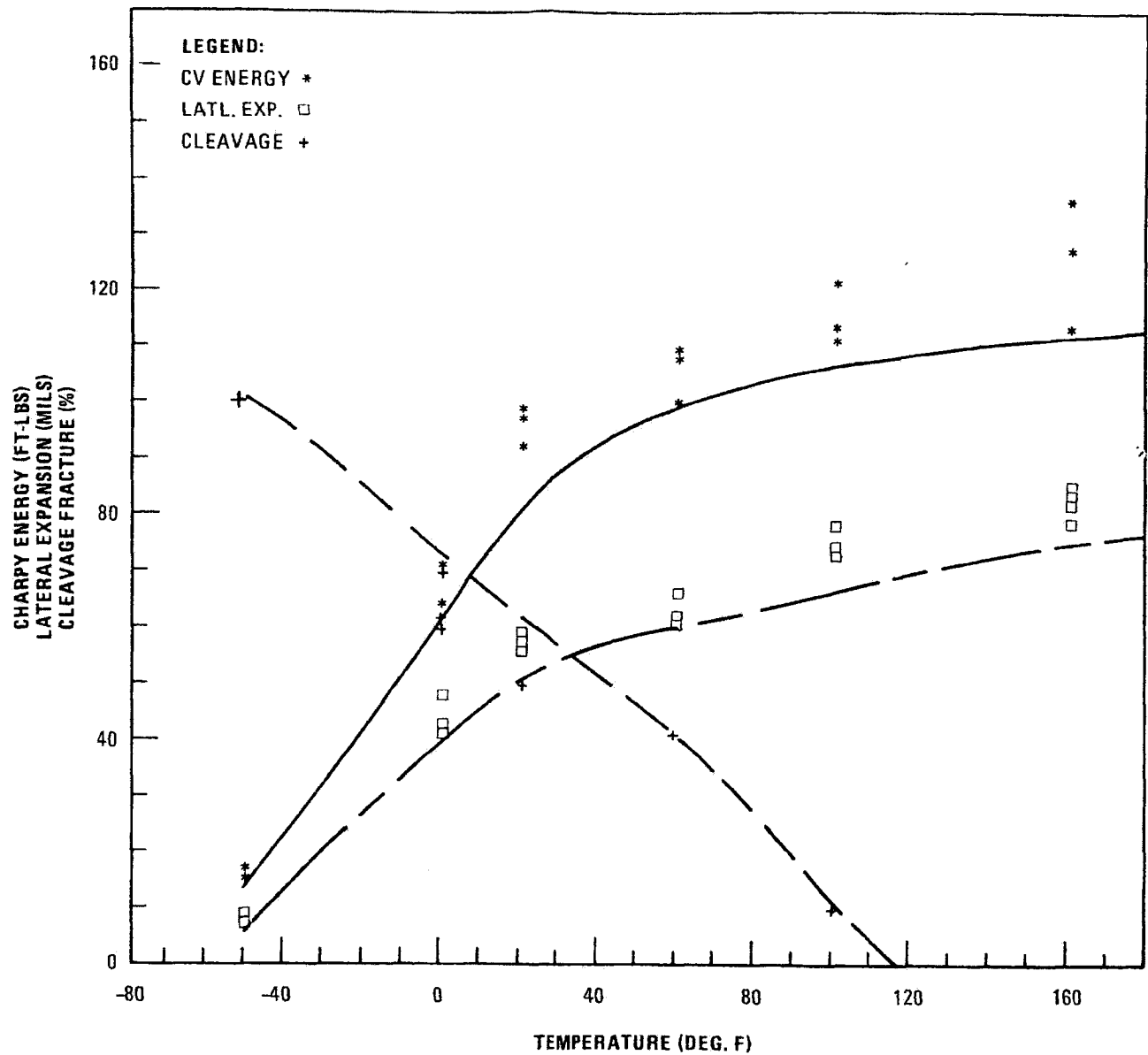
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 13 OF 15

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-171  
 COATED ELECTRODE  
 LOT NO. EAOAH

PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

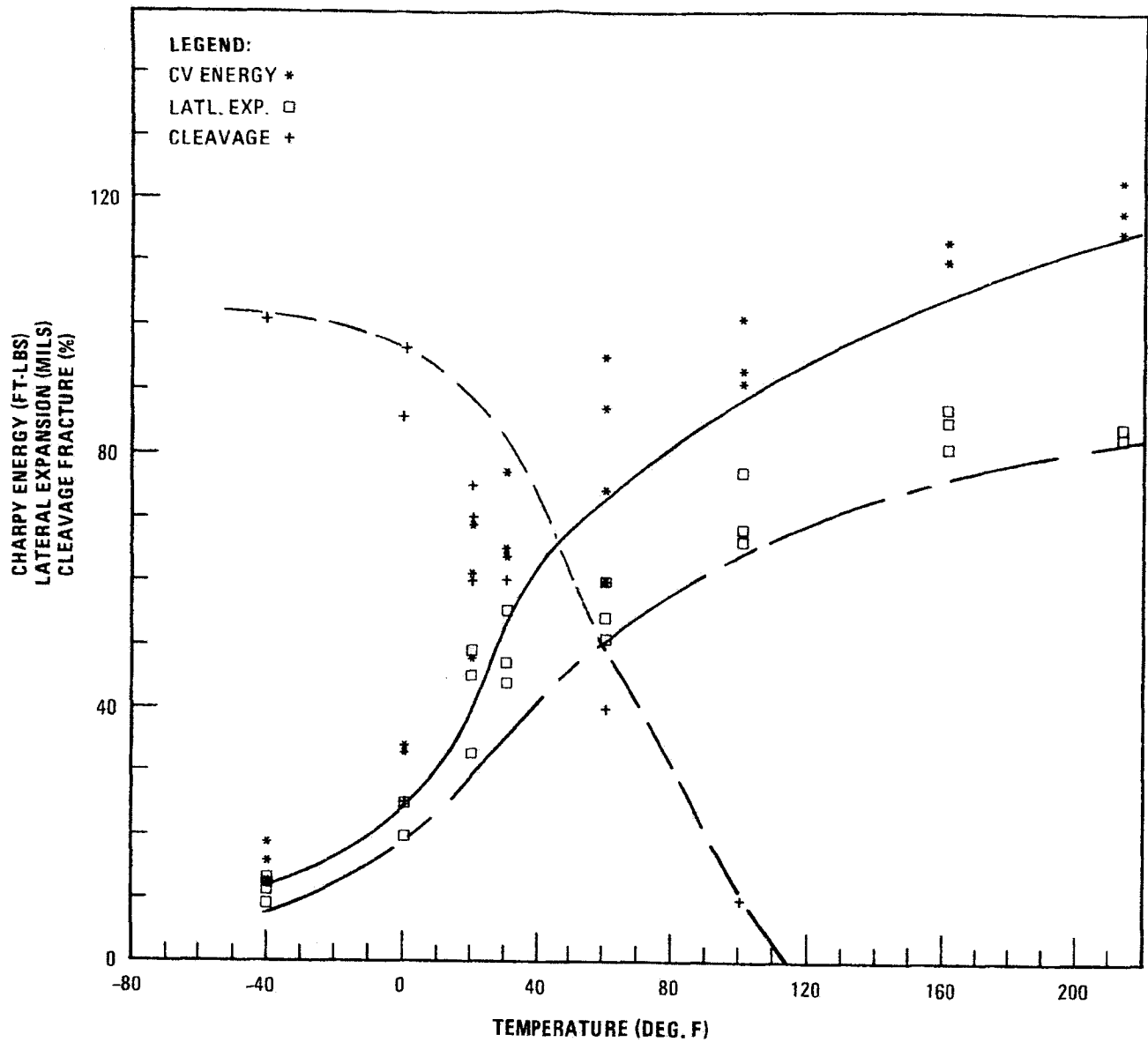
UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 14 OF 15

JUNE 2003

REVISION 12





WELD SEAM NUMBER  
 101-171  
 COATED ELECTRODE  
 LOT NO. JAOEH

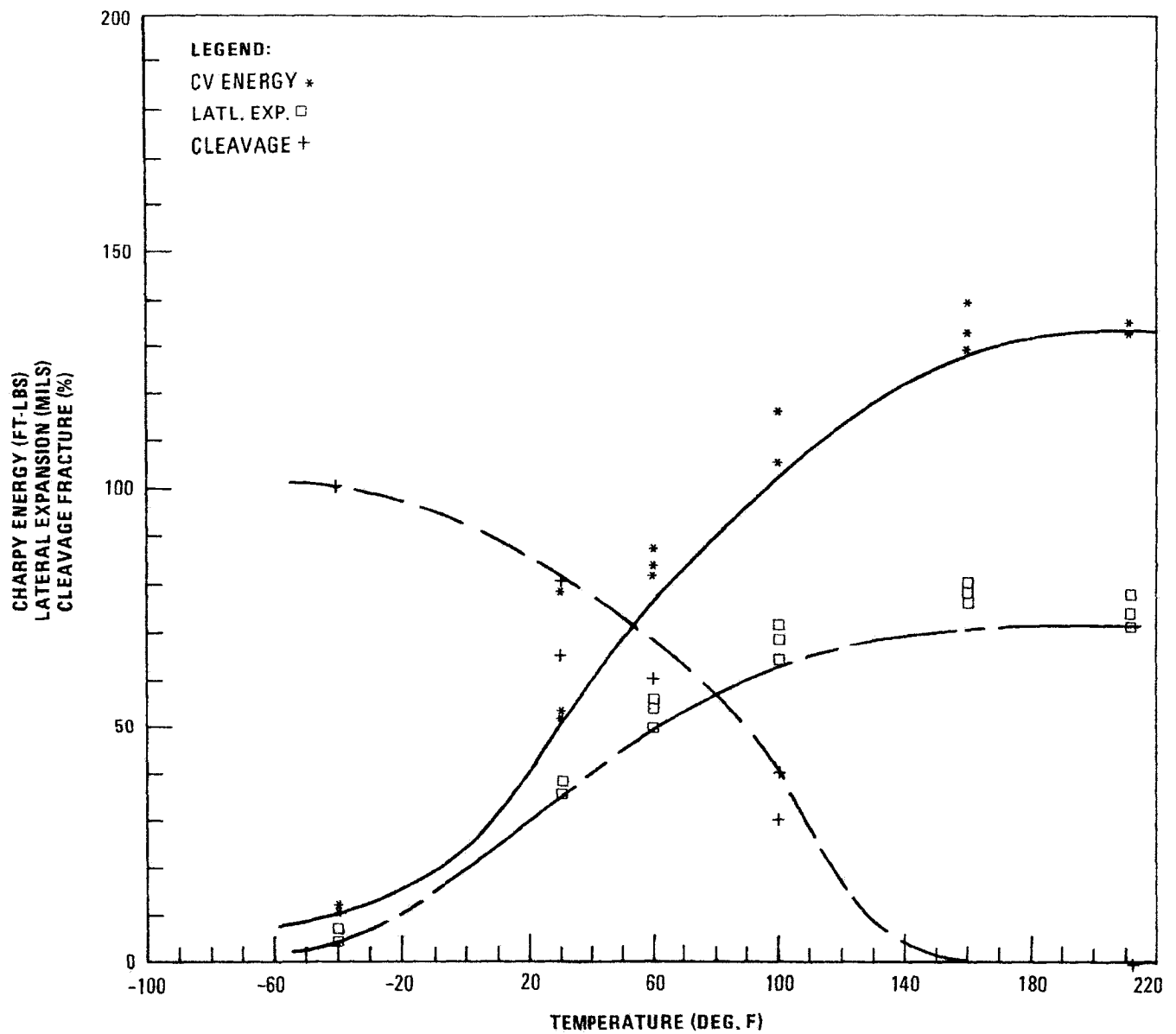
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 2 CHARPY TEST RESULTS

FIGURE 5.2-2 SHEET 15 OF 15

JUNE 2003

REVISION 12



INTERMEDIATE SHELL  
PLATE  
CODE NUMBER  
F-6407-4

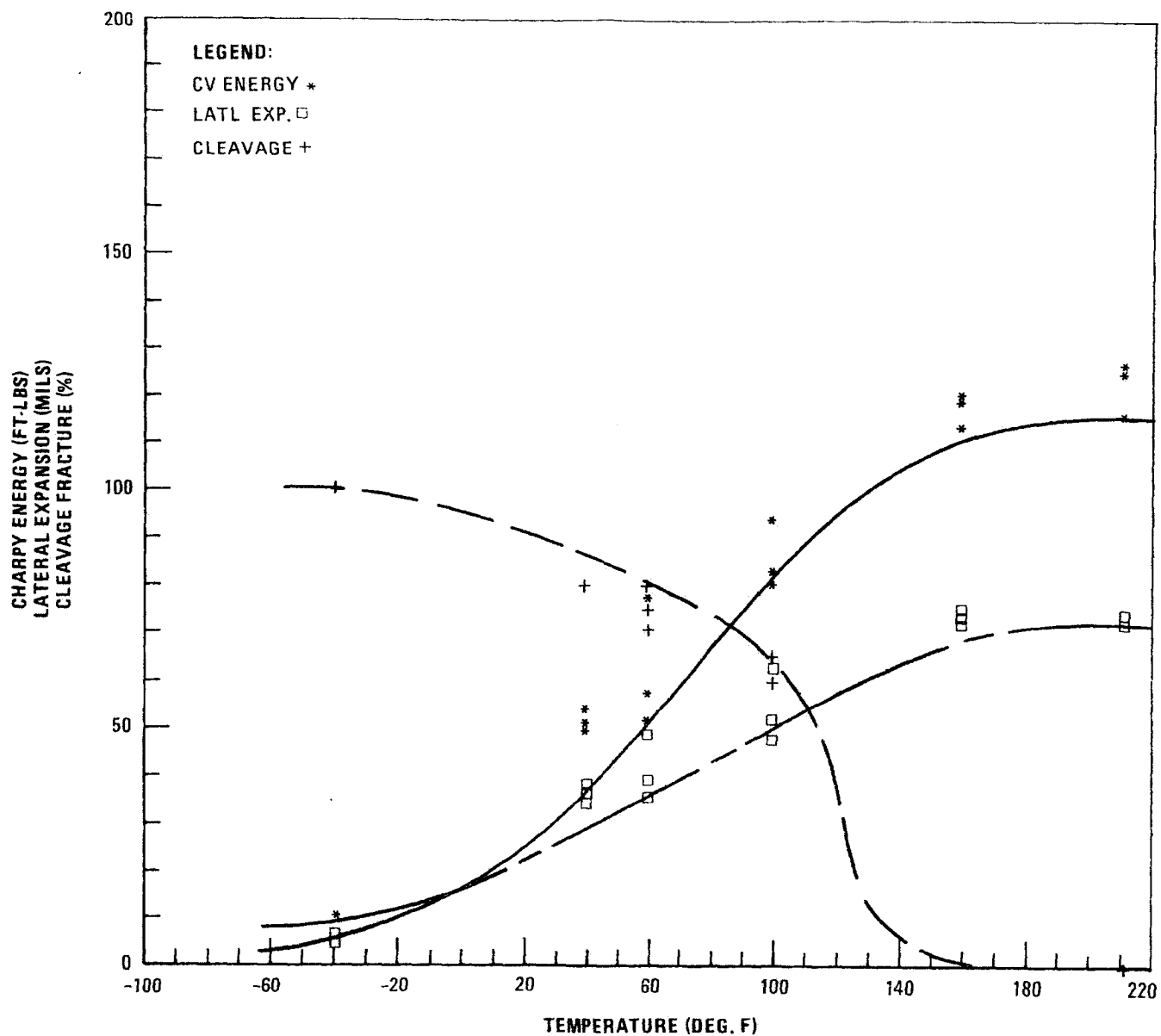
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 1 OF 18

JUNE 2003

REVISION 12



INTERMEDIATE SHELL  
 PLATE  
 CODE NUMBER  
 F-6407-5

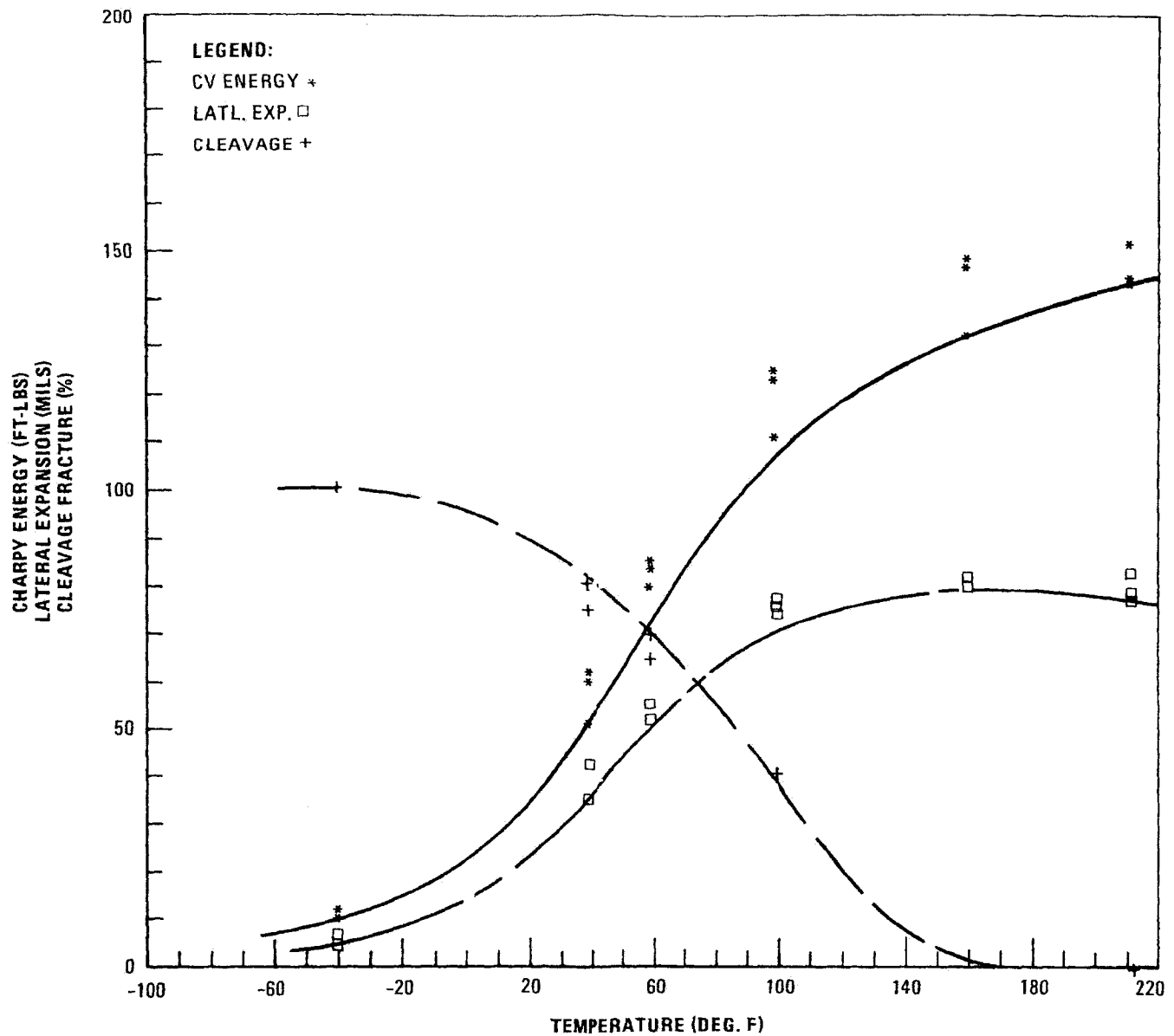
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 2 OF 18

JUNE 2003

REVISION 12



INTERMEDIATE SHELL  
 PLATE  
 CODE NUMBER  
 F-6407-6

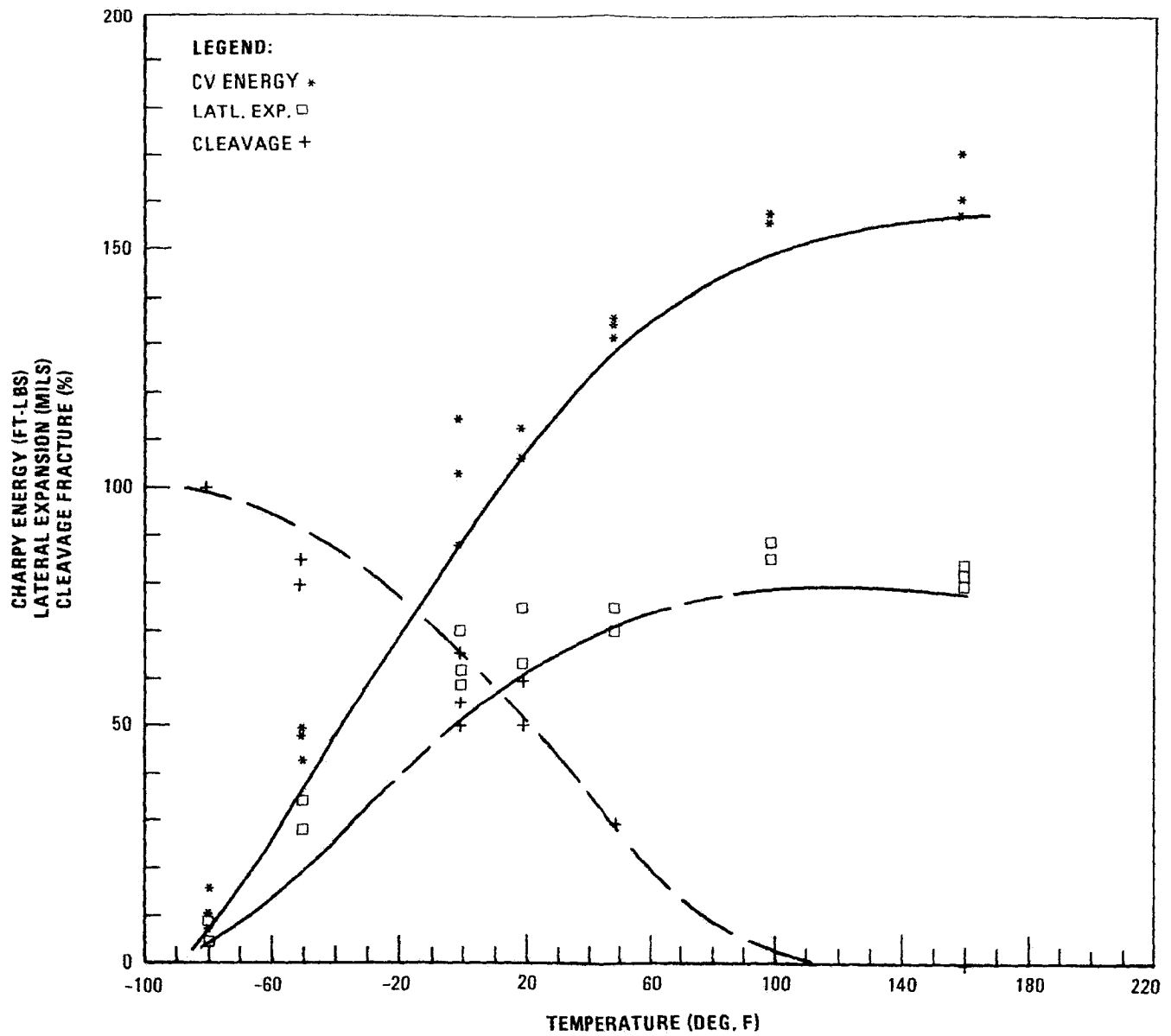
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 3 OF 18

JUNE 2003

REVISION 12



LOWER SHELL PLATE  
 CODE NUMBER  
 F-6411-1

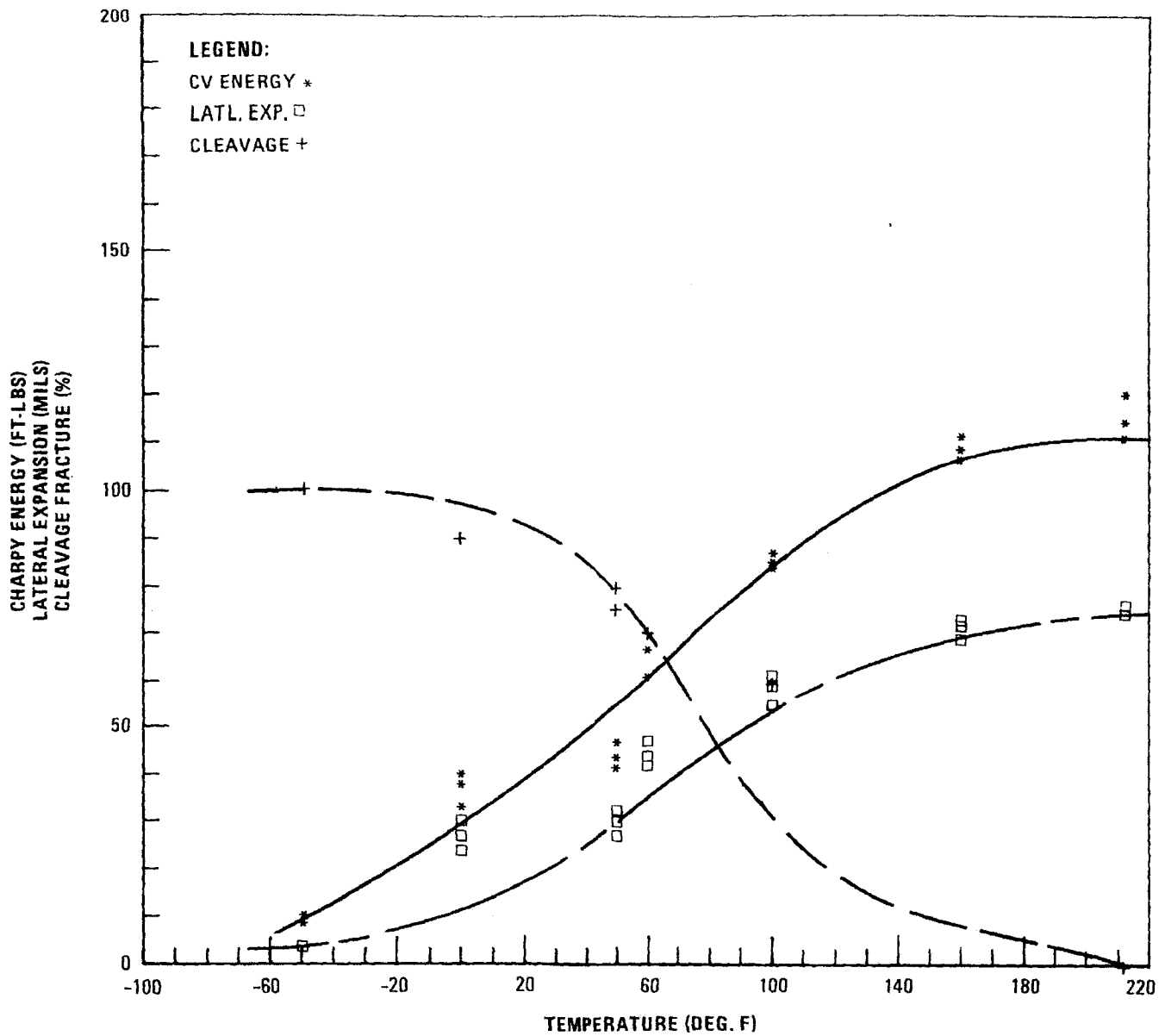
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 4 OF 18

JUNE 2003

REVISION 12



LOWER SHELL PLATE  
CODE NUMBER  
F-6411-2

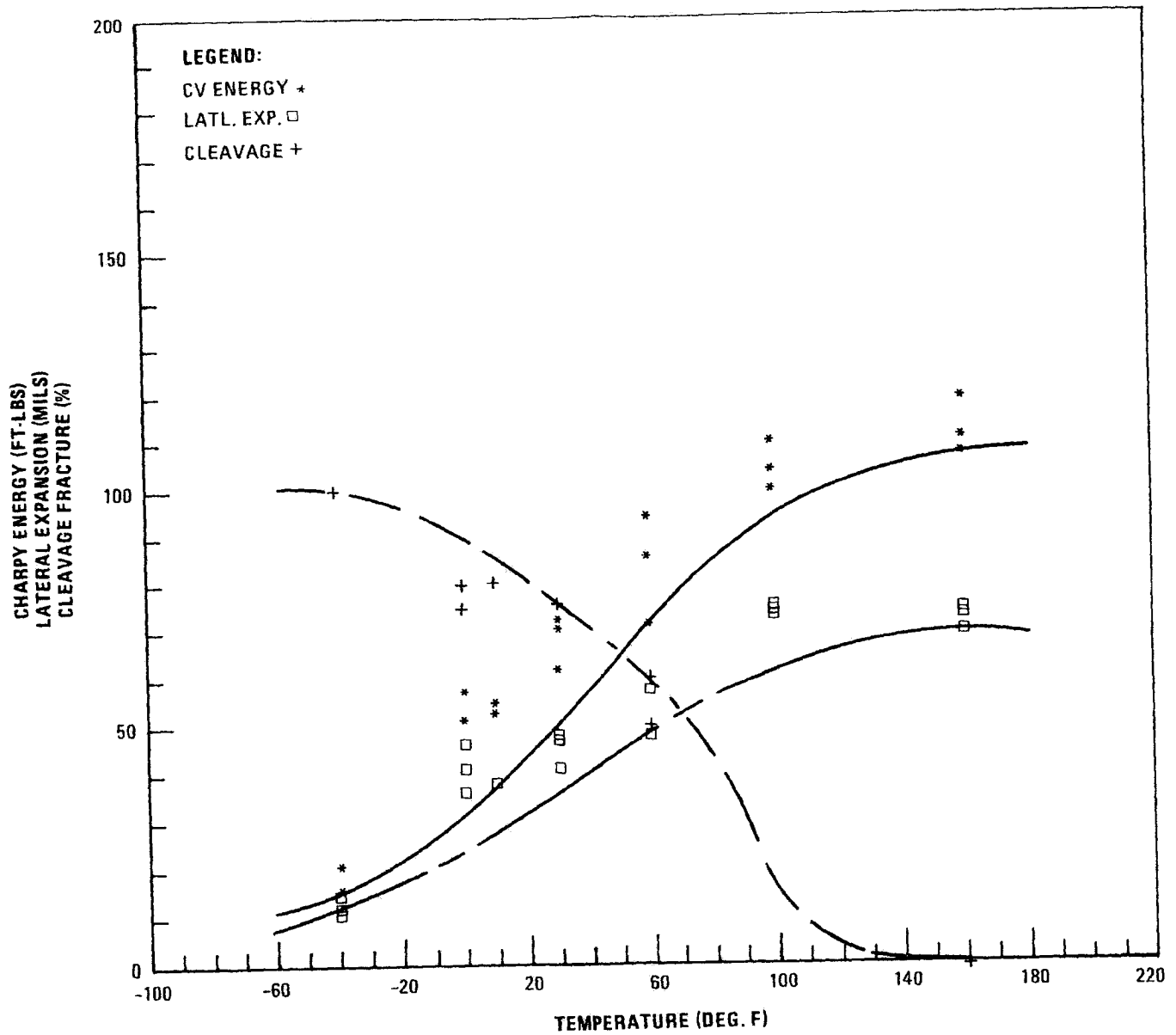
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 5 OF 18

JUNE 2003

REVISION 12



LOWER SHELL PLATE  
 CODE NUMBER  
 F-6411-3

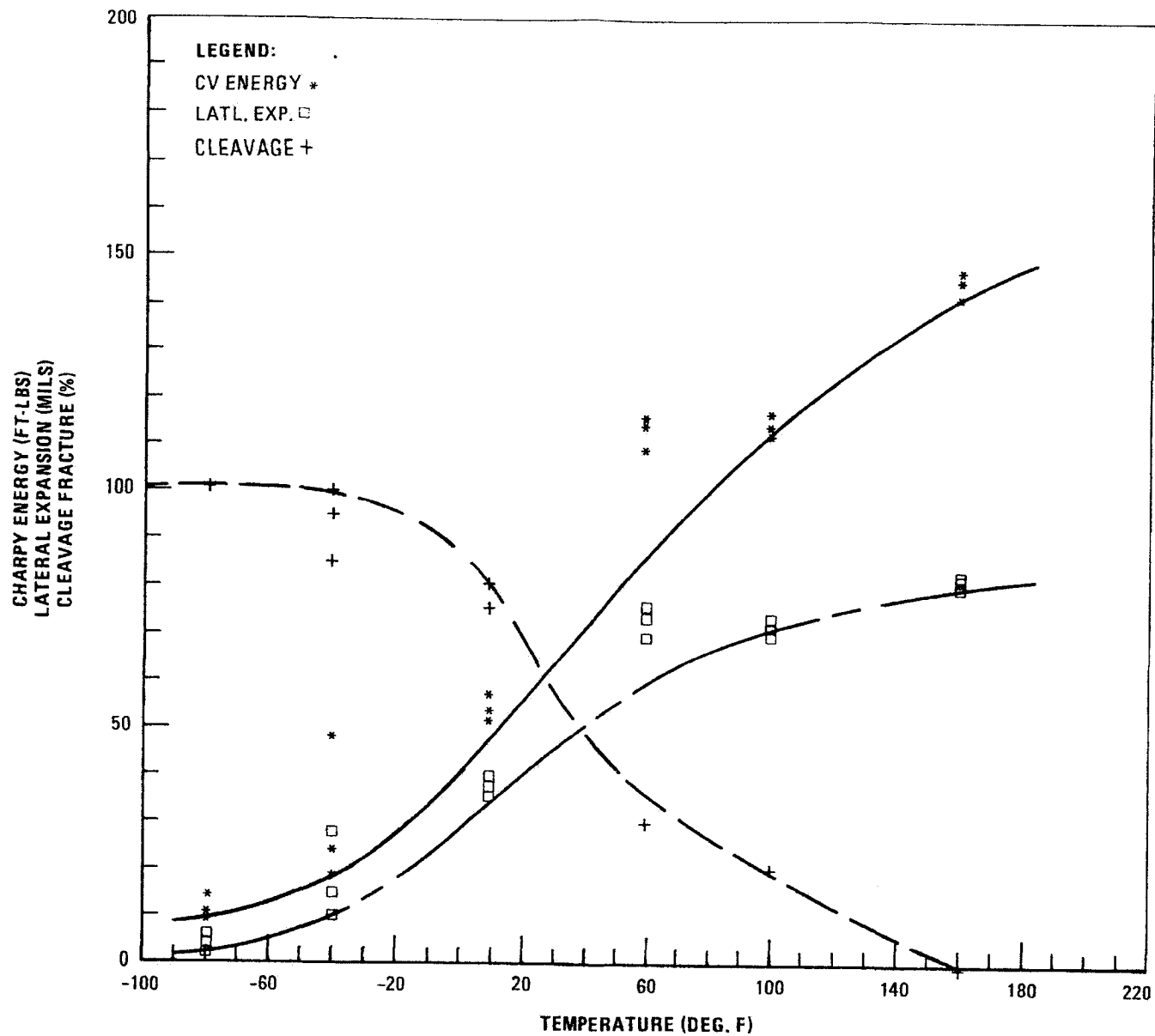
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 6 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-124  
COATED ELECTRODE  
LOT NO. FABBG

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

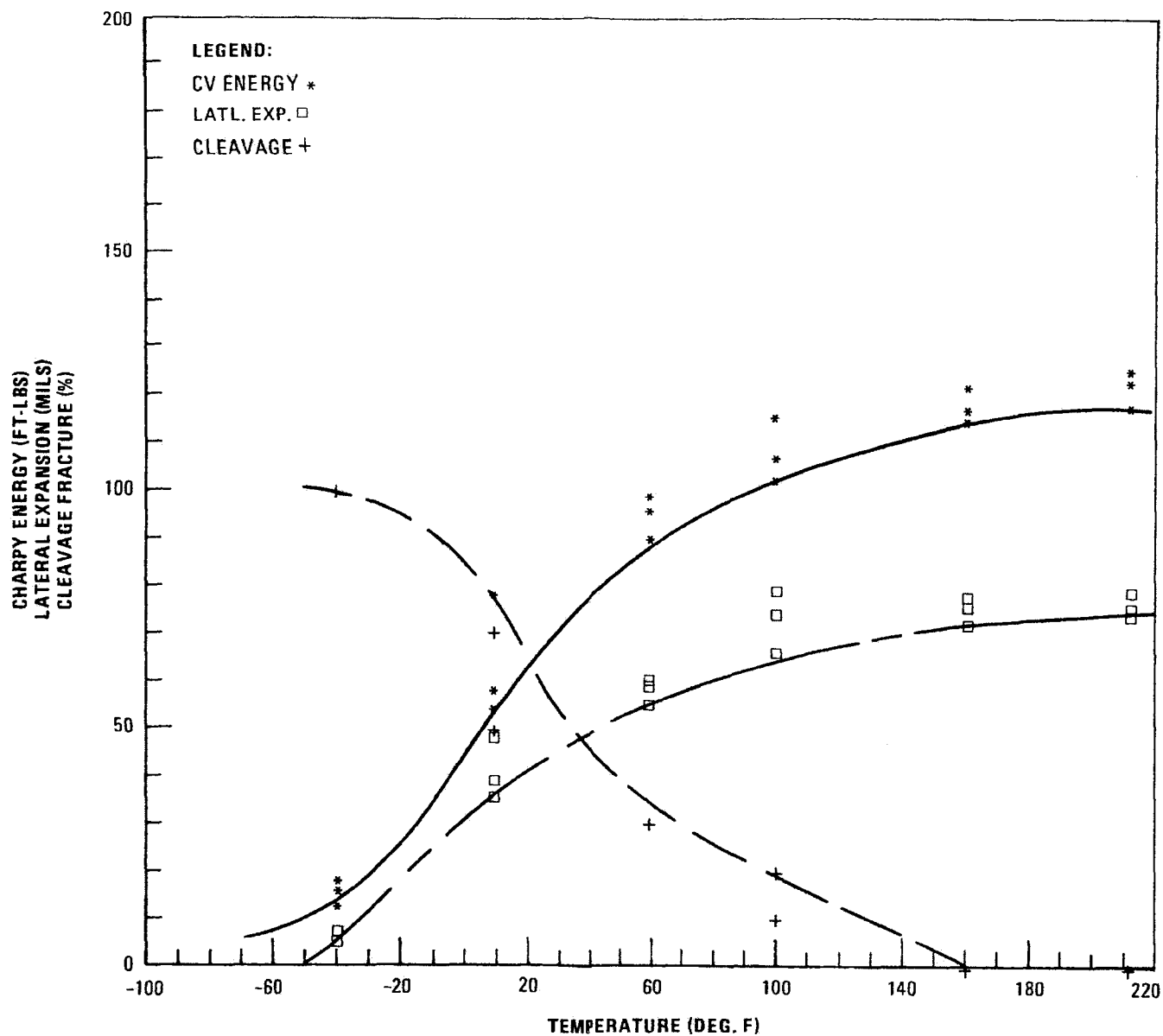
UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 7 OF 18

JUNE 2003

REVISION 12





WELD SEAM NUMBER  
 101-124  
 COATED ELECTRODE  
 LOT NO. GABGG

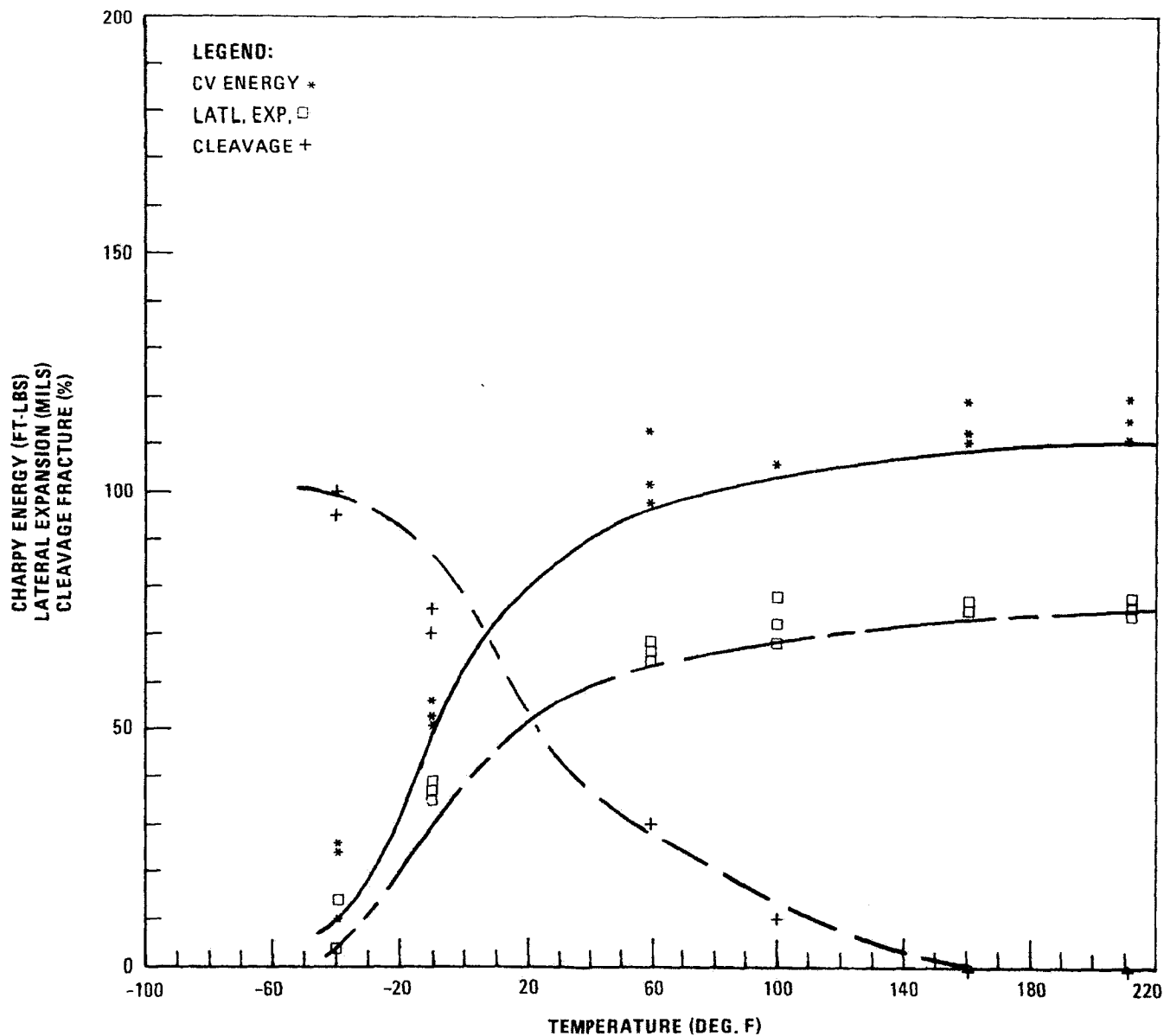
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 8 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-142  
 COATED ELECTRODE  
 LOT NO. HAAHG

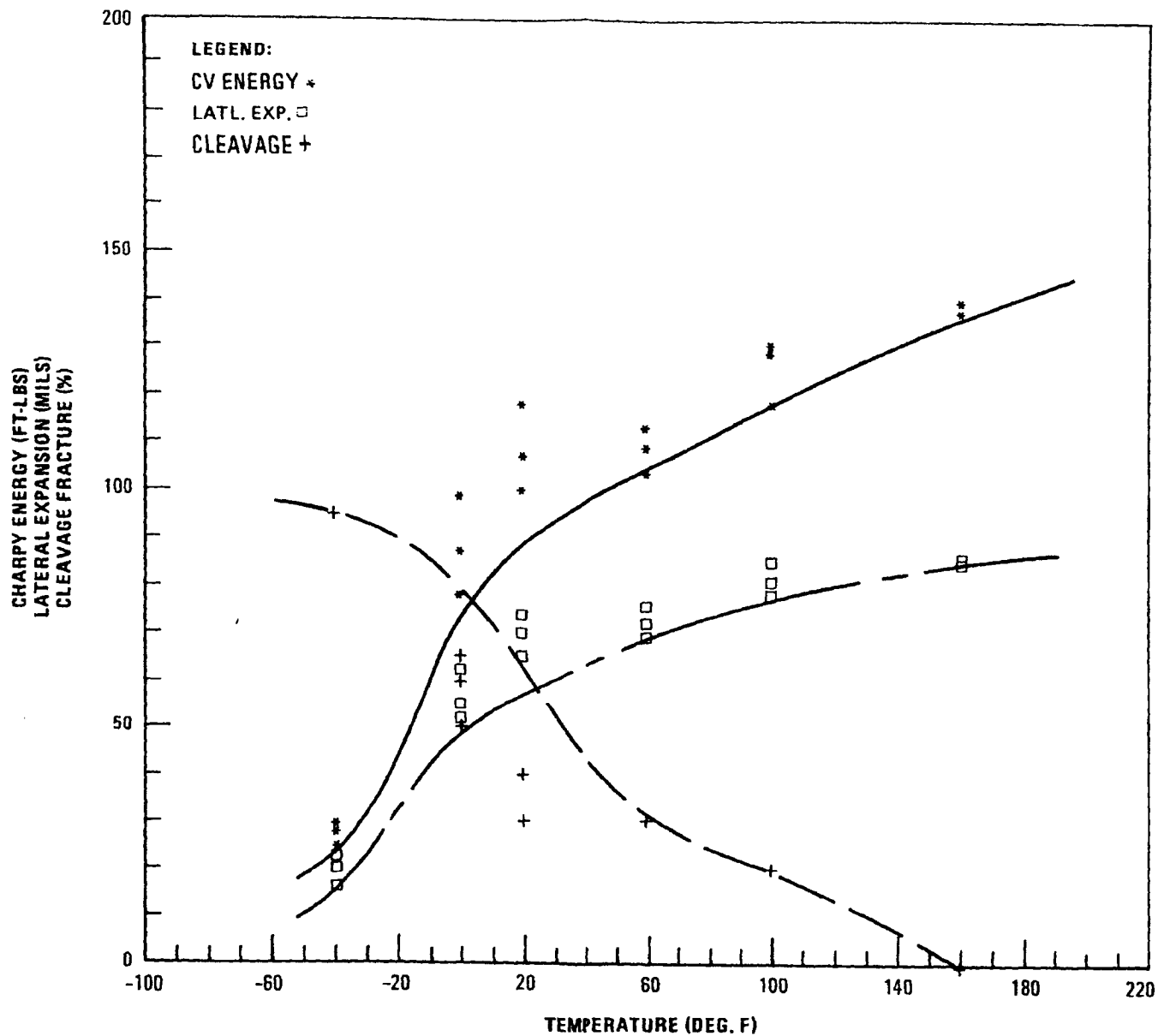
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 9 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-124  
 COATED ELECTRODE  
 LOT NO. HACJG

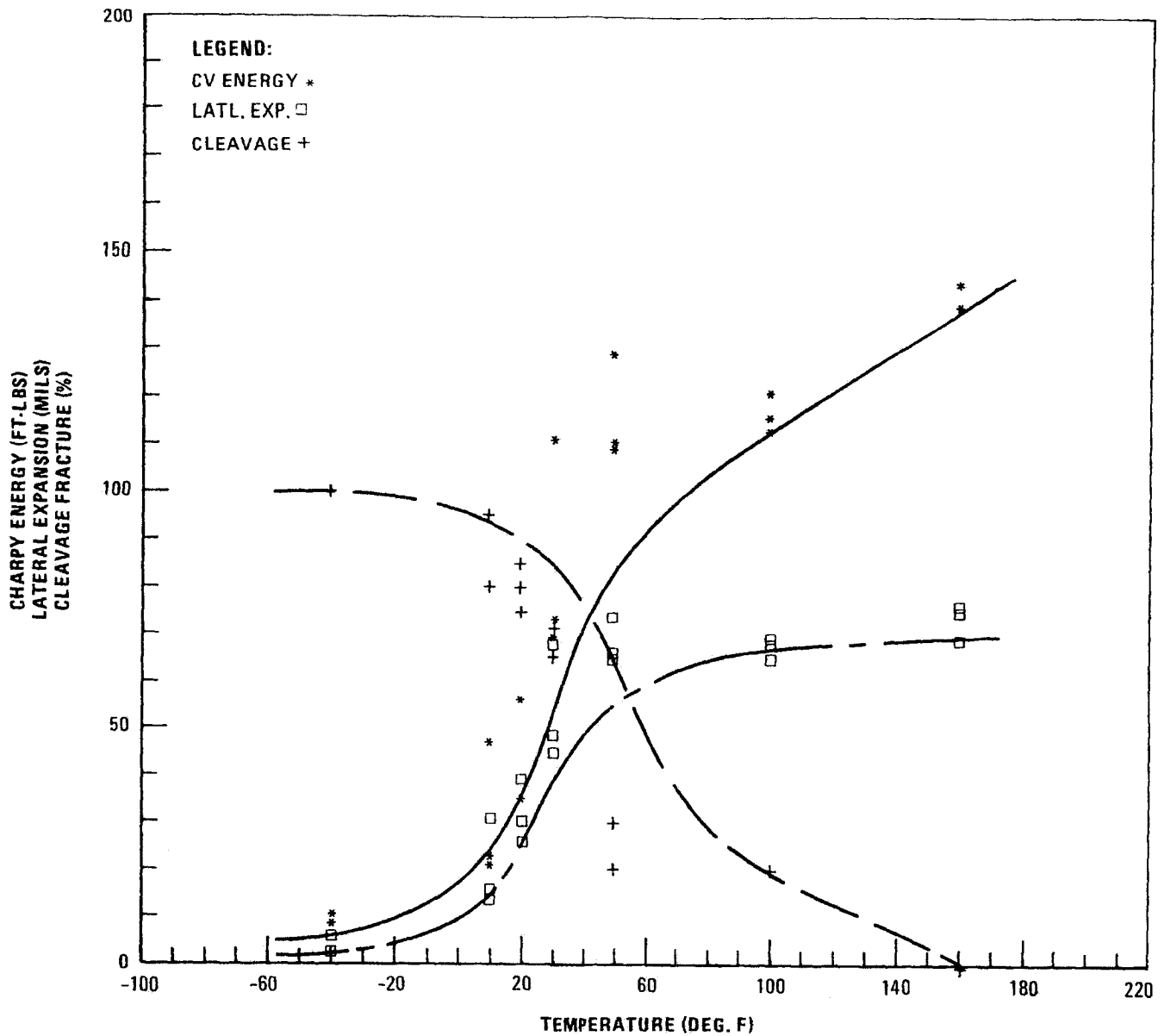
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 10 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-142  
 COATED ELECTRODE  
 LOT NO. LAOHG

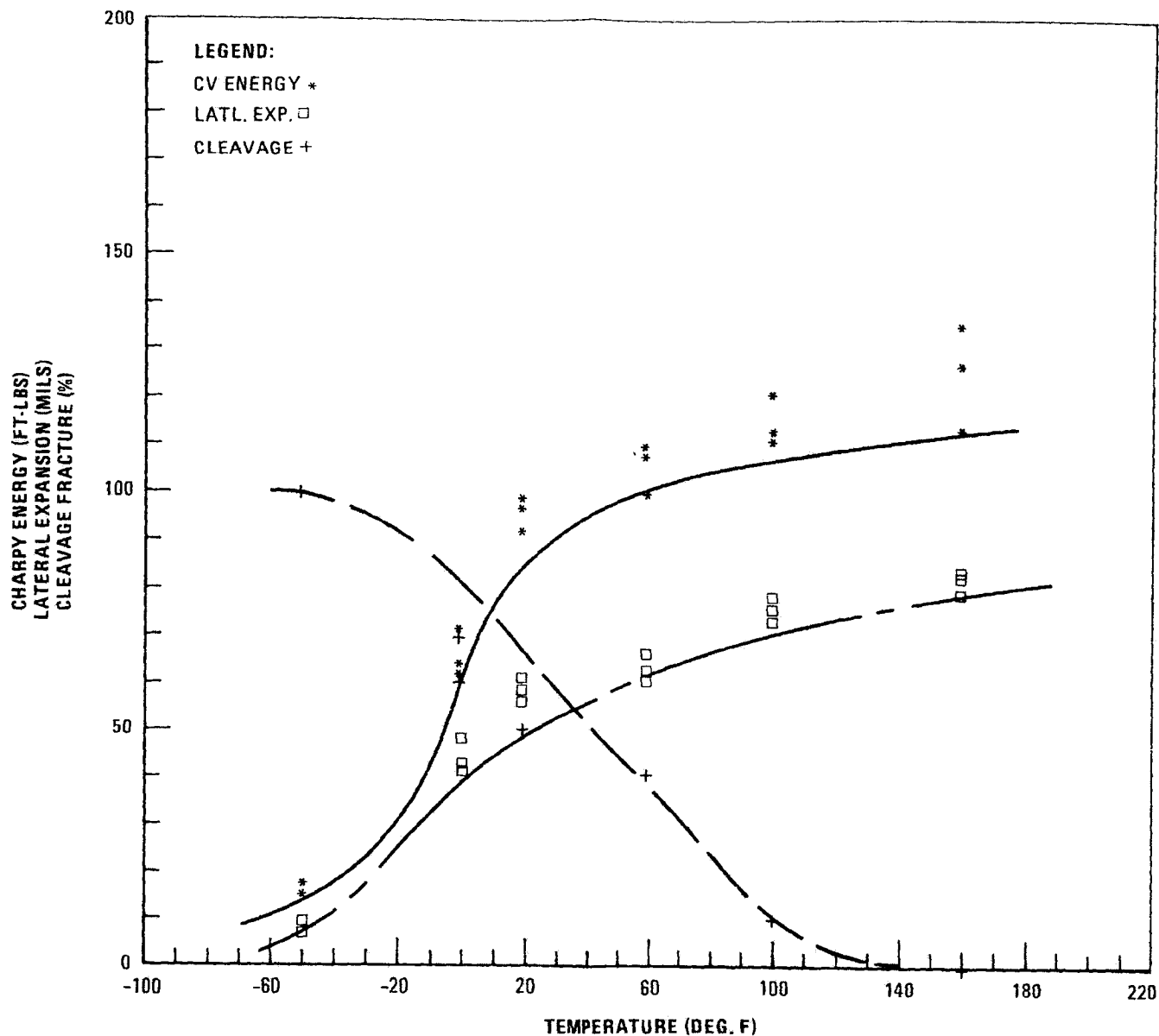
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 11 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-142  
 COATED ELECTRODE  
 LOT NO. EAOAH

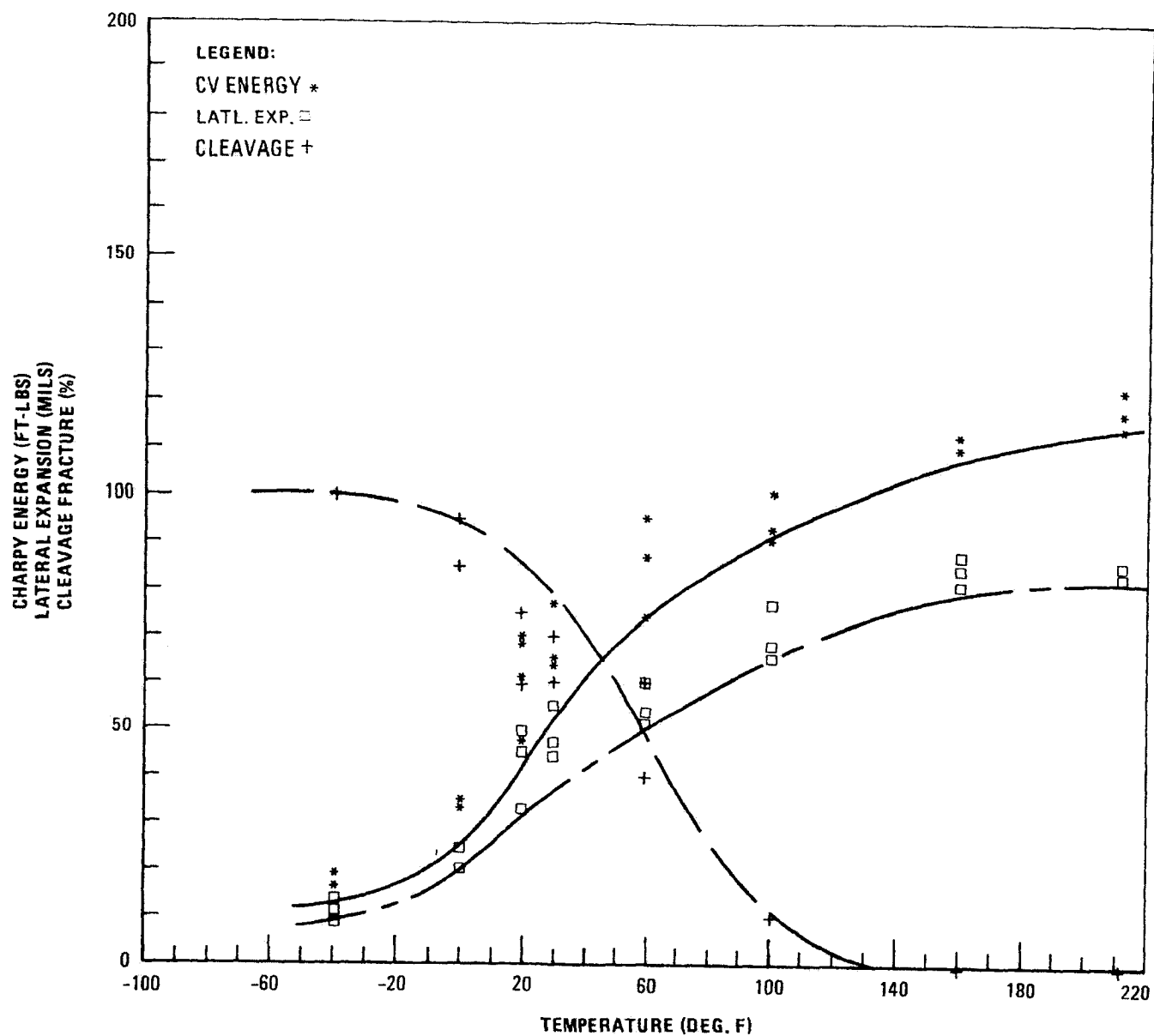
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 12 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
101-142  
COATED ELECTRODE  
LOT NO. JAOEH

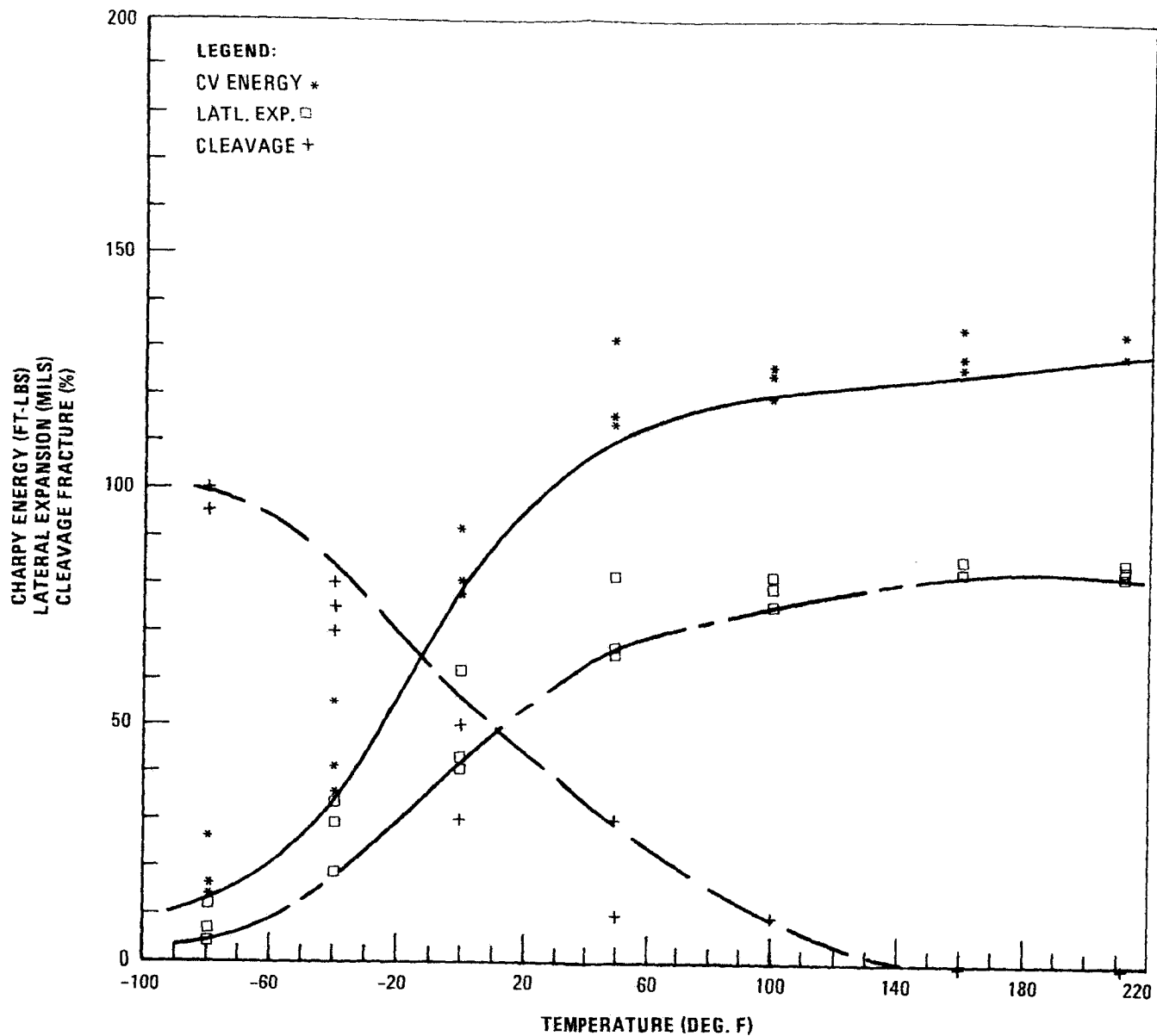
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 13 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-171  
 COATED ELECTRODE  
 LOT NO. CAAIJ

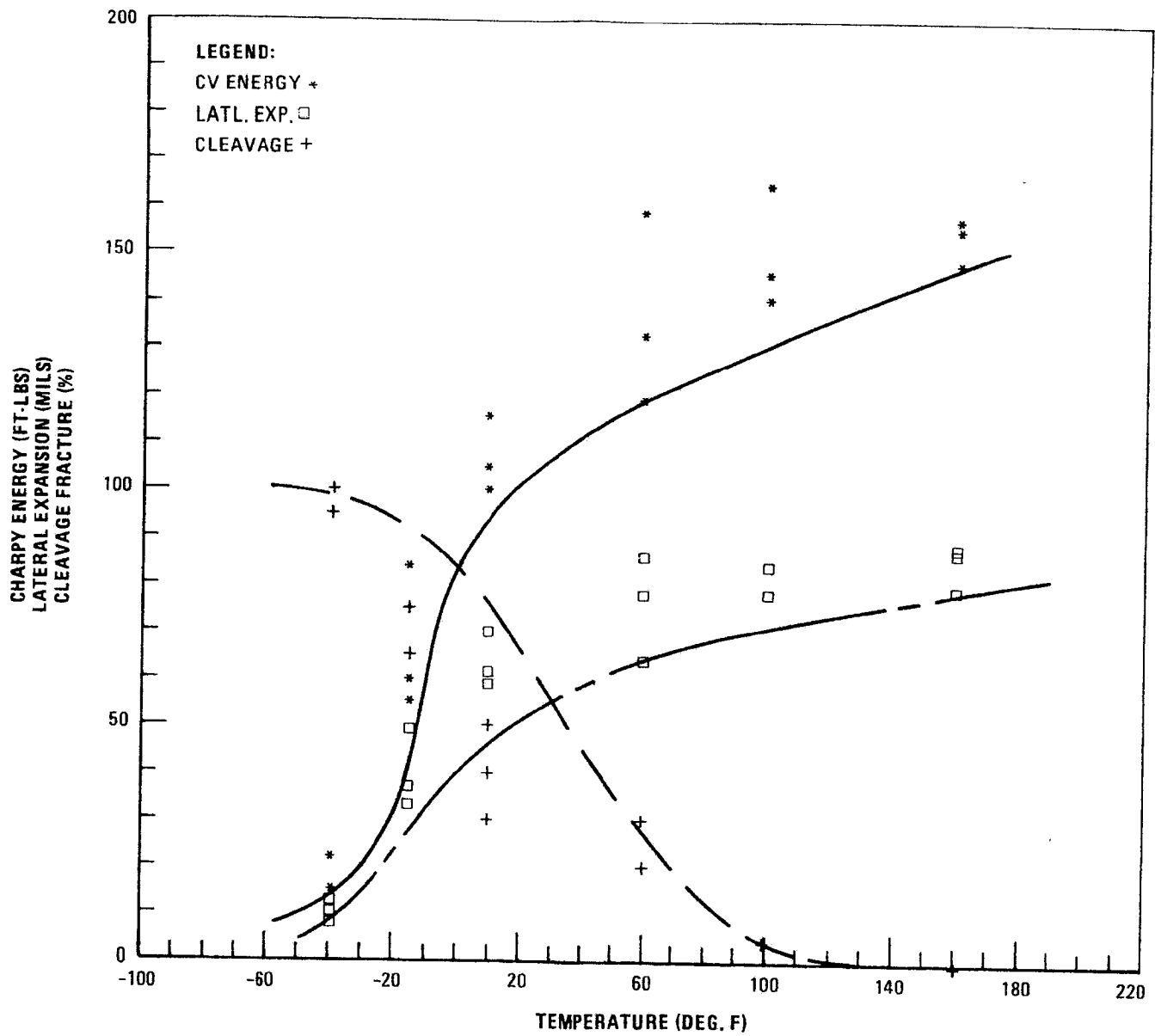
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 14 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-171  
 COATED ELECTRODE  
 LOT NO. 1A0HJ

PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

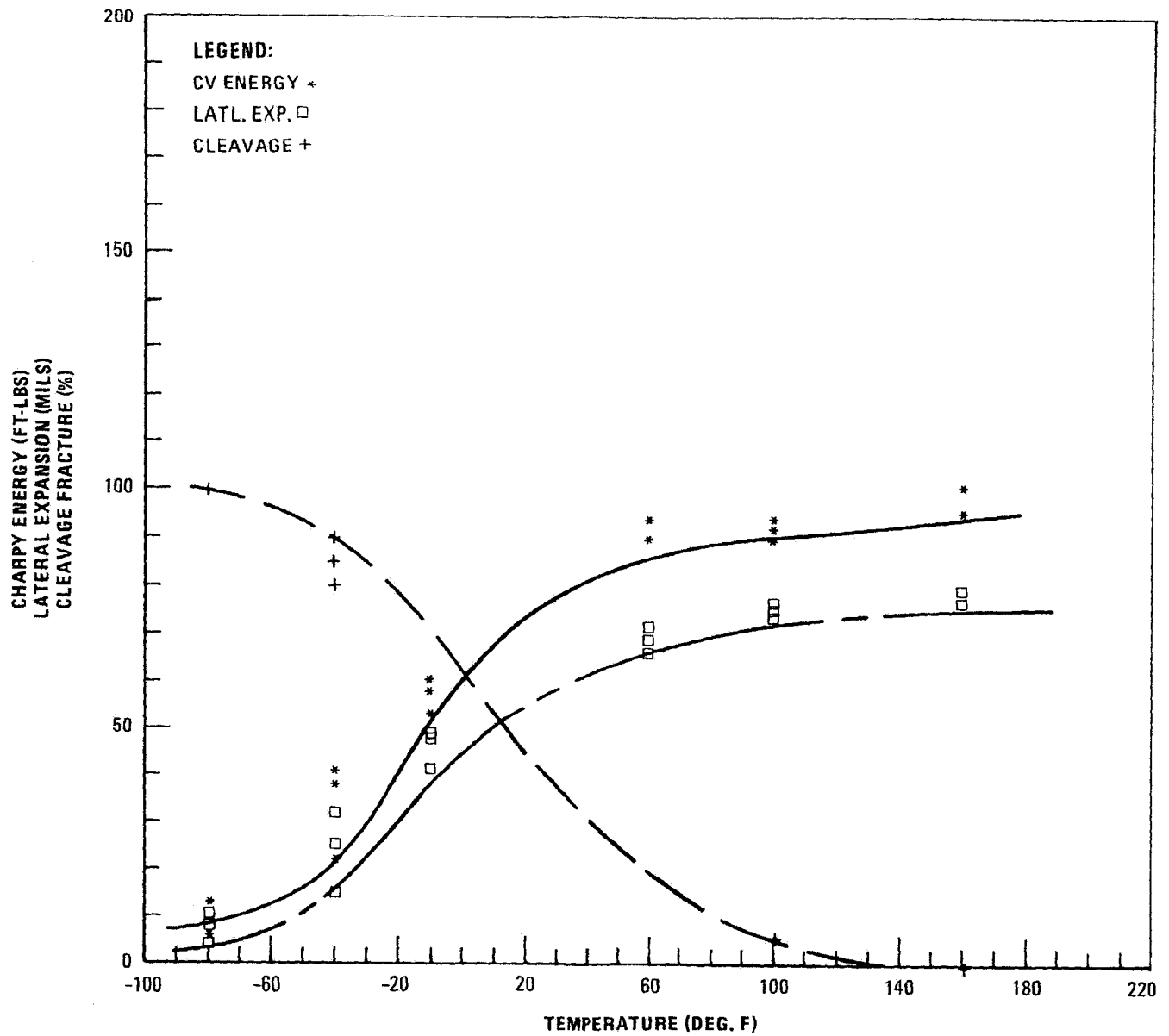
UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 15 OF 18

JUNE 2003

REVISION 12





WELD SEAM NUMBER  
 101-171  
 MIL B-4 WIRE  
 FLUX LINDE 124

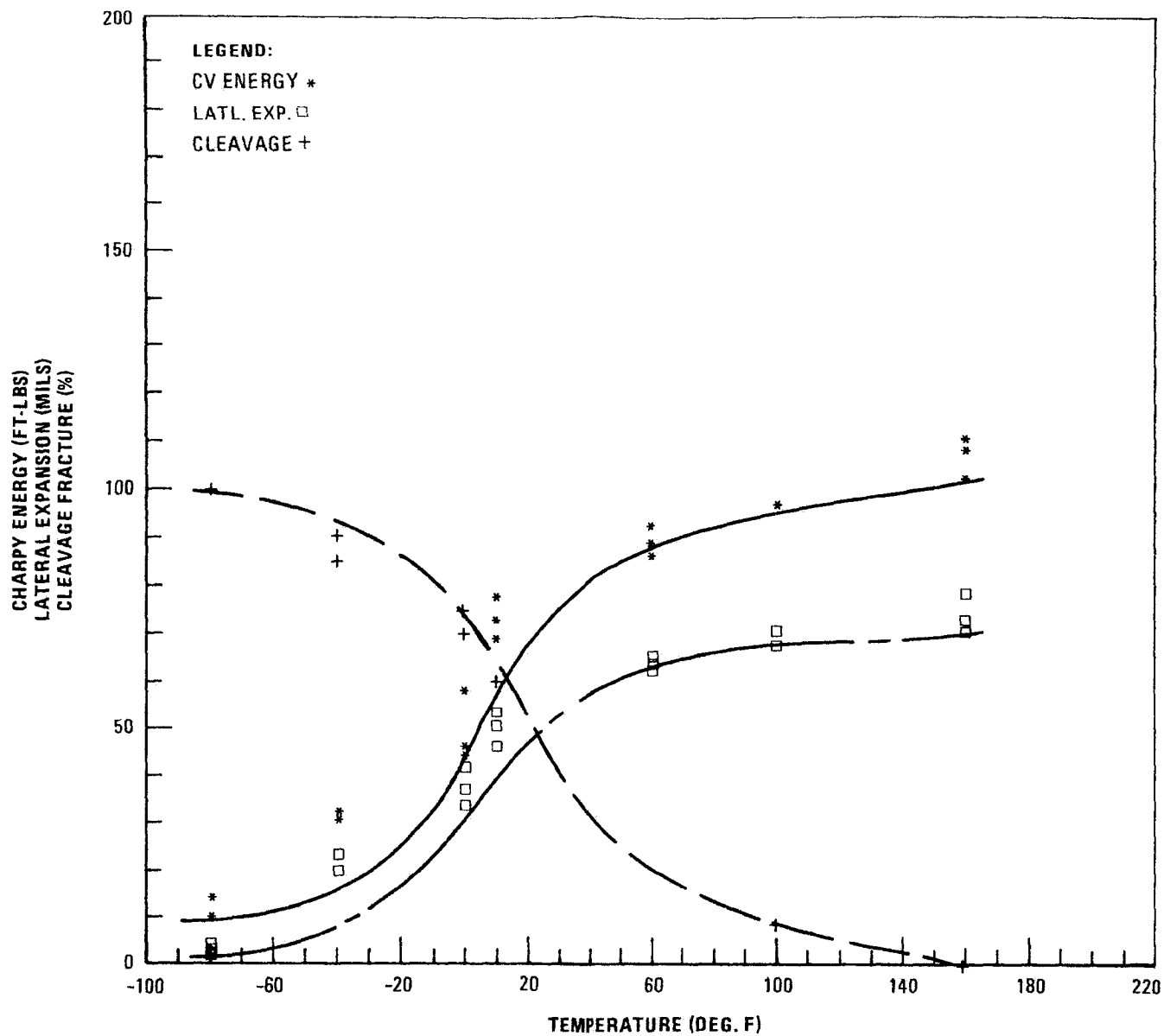
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 16 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-124  
 MIL B-4 WIRE  
 FLUX LINDE 124

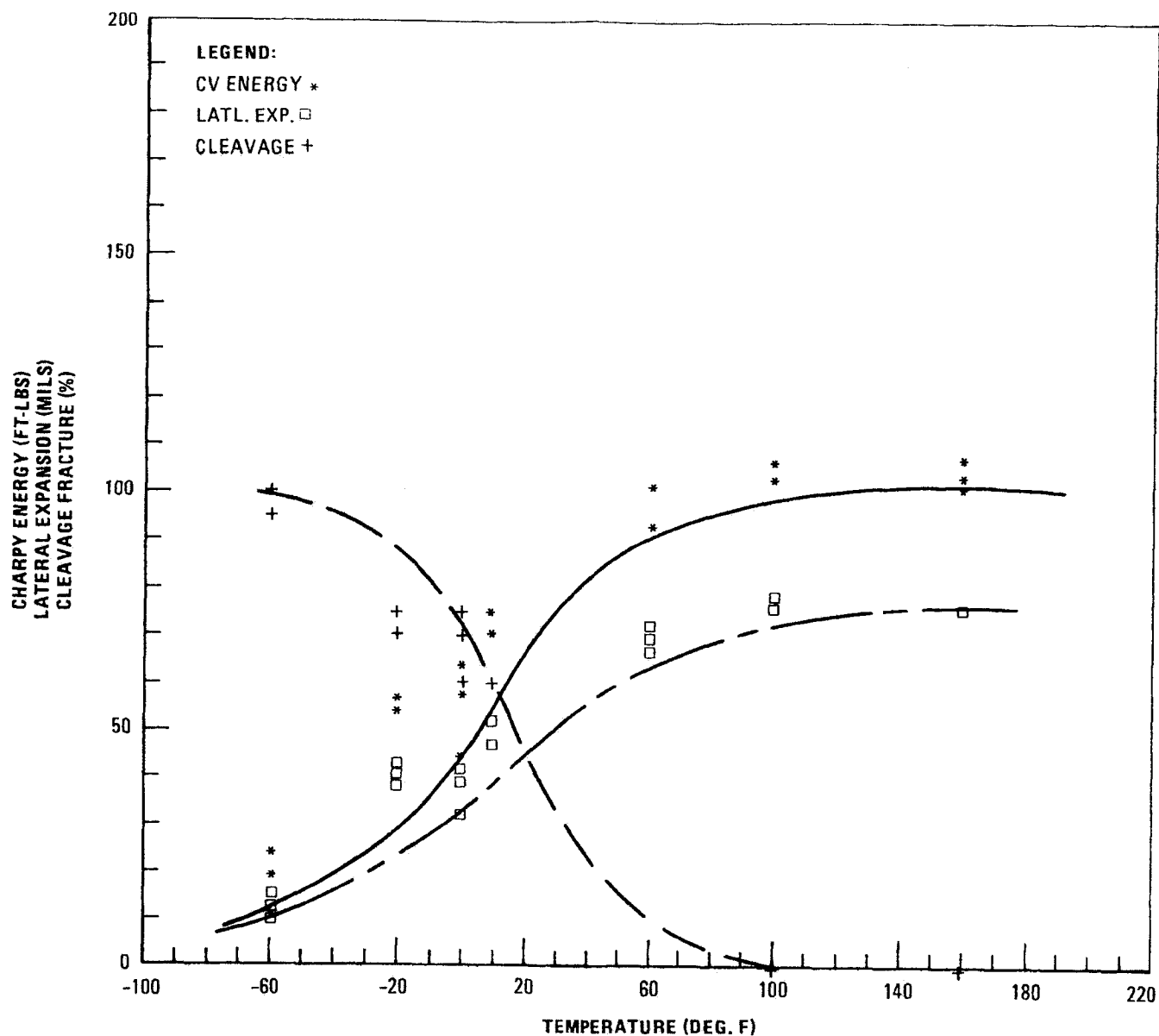
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

FIGURE 5.2-3 SHEET 17 OF 18

JUNE 2003

REVISION 12



WELD SEAM NUMBER  
 101-142  
 MIL B-4 WIRE  
 FLUX LINDE 124

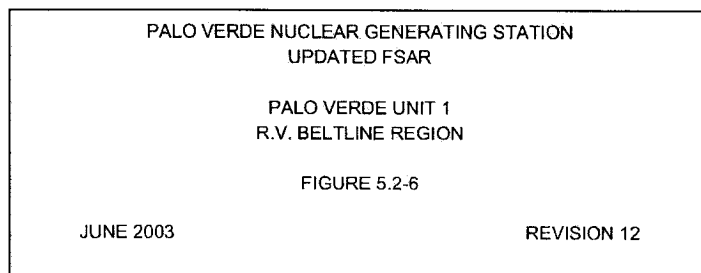
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

UNIT 3 CHARPY TEST RESULTS

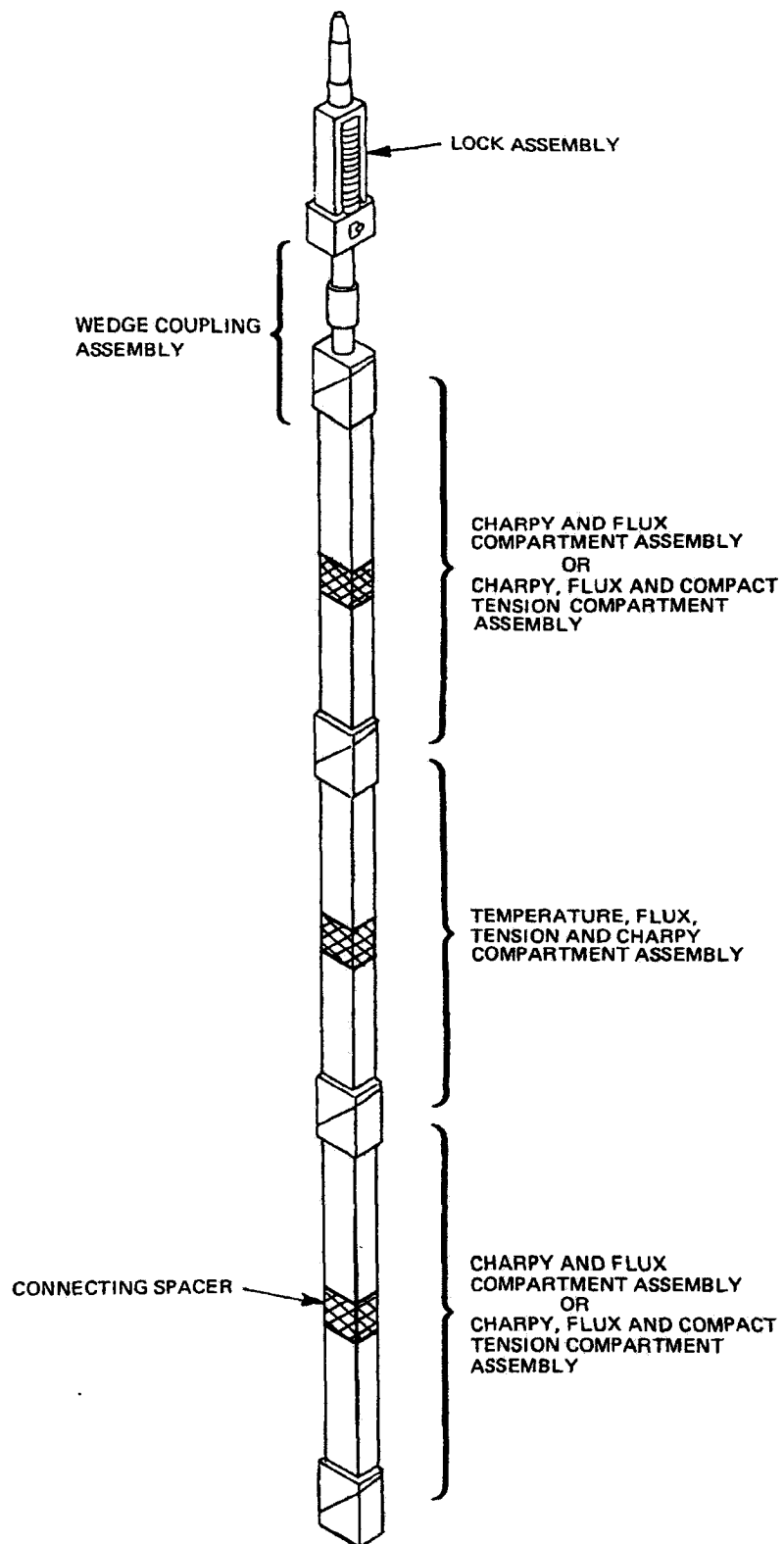
FIGURE 5.2-3 SHEET 18 OF 18

JUNE 2003

REVISION 12



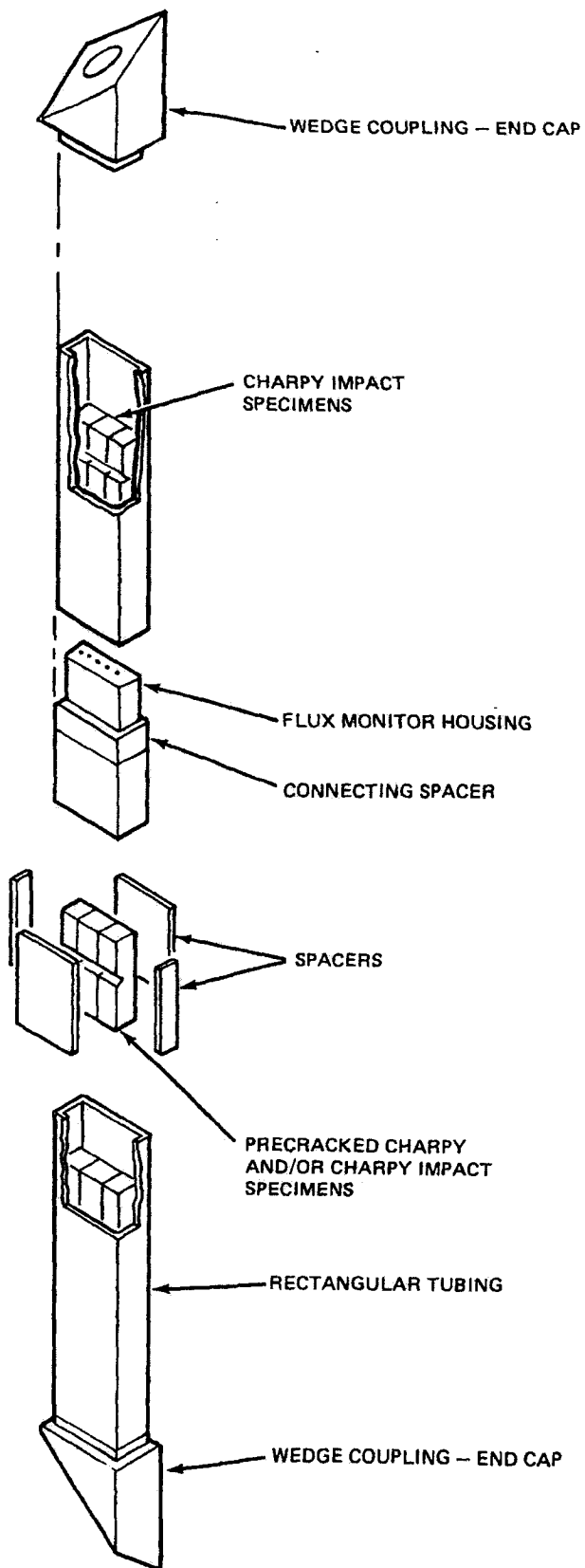
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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SURVEILLANCE CAPSULE ASSEMBLY

FIGURE 5.3-1

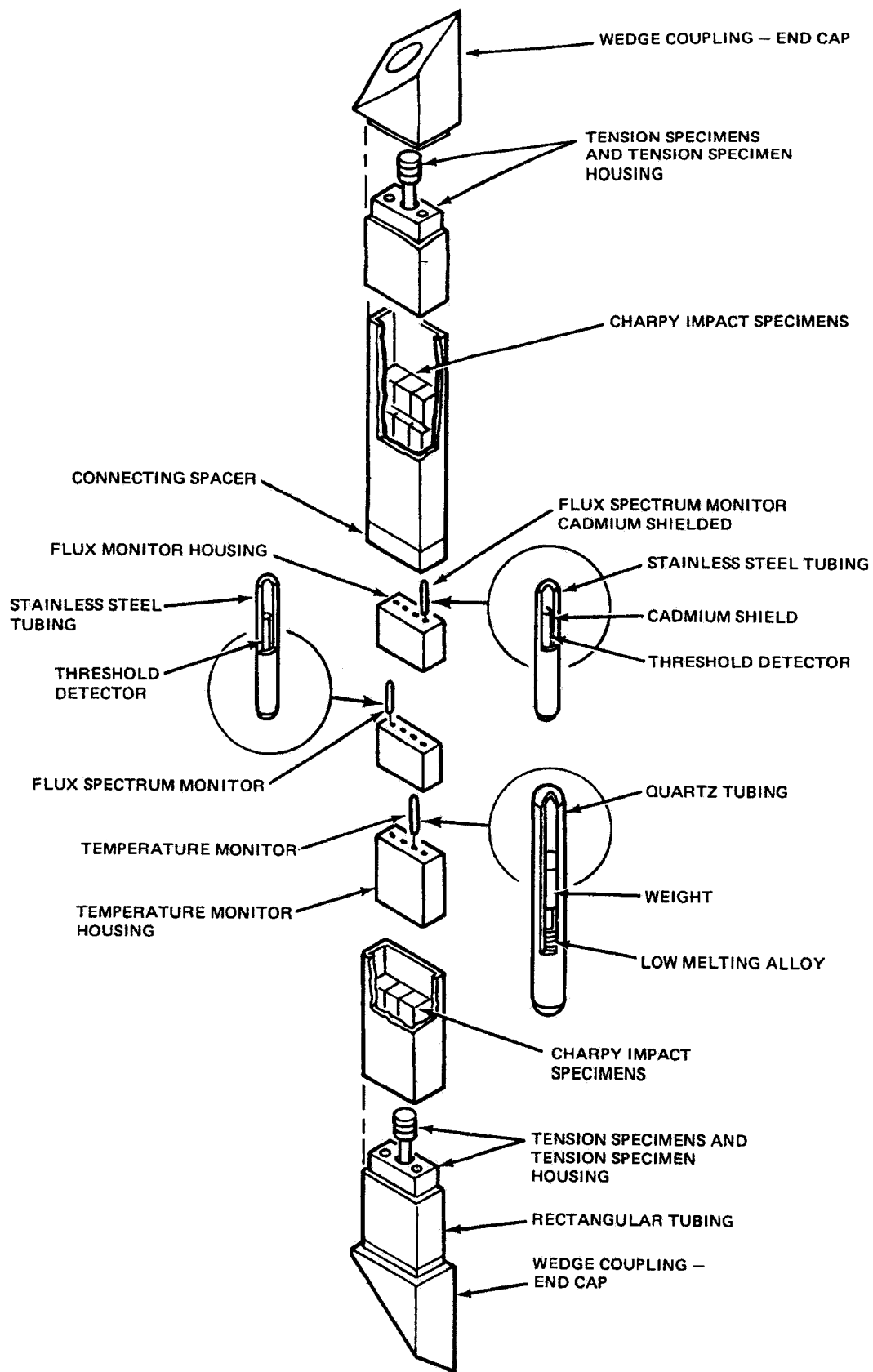


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CHARPY IMPACT  
COMPARTMENT ASSEMBLY  
FIGURE 5.3-2

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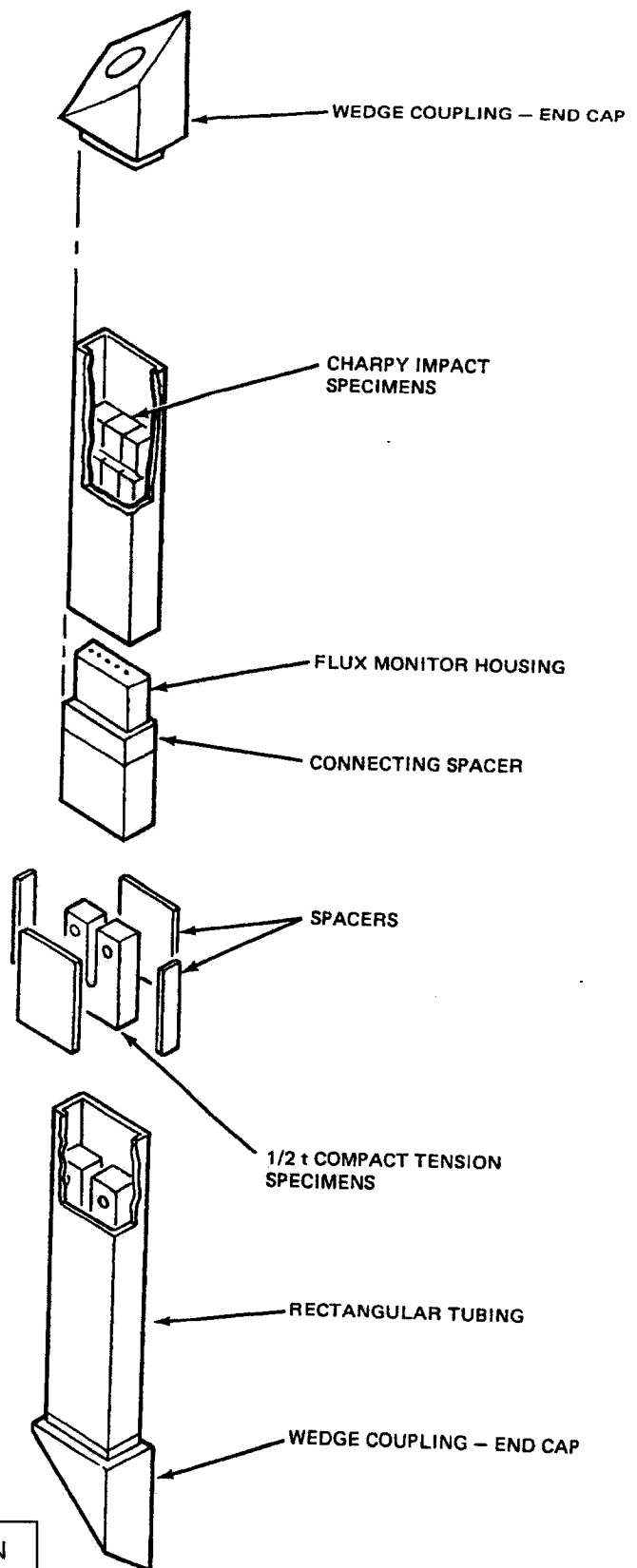


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TEMPERATURE, FLUX AND  
TENSION COMPARTMENT ASSEMBLY  
FIGURE 5.3-3

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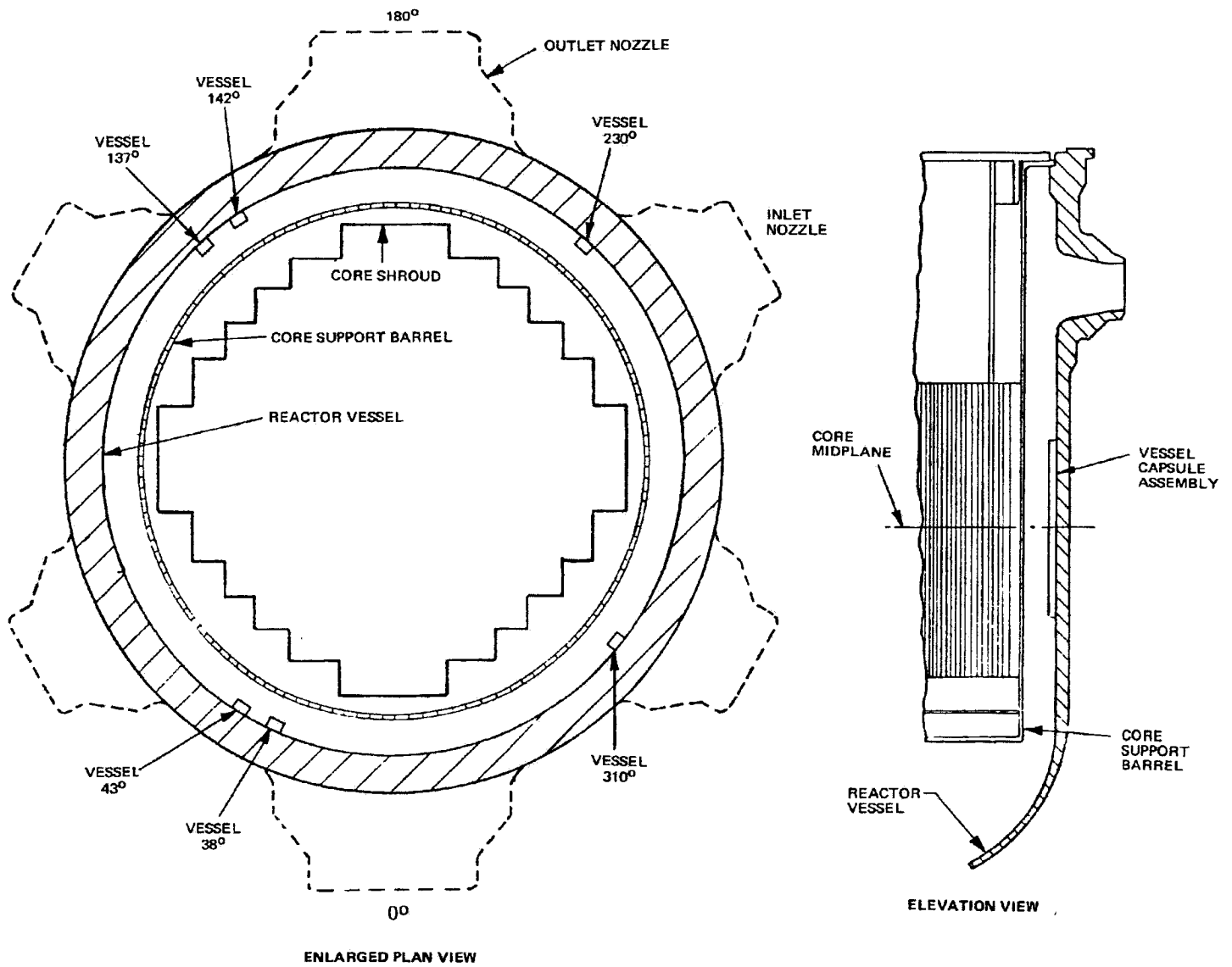
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CHARPY FLUX AND COMPACT  
TENSION COMPARTMENT ASSEMBLY  
FIGURE 5.3-3A

JUNE 2001

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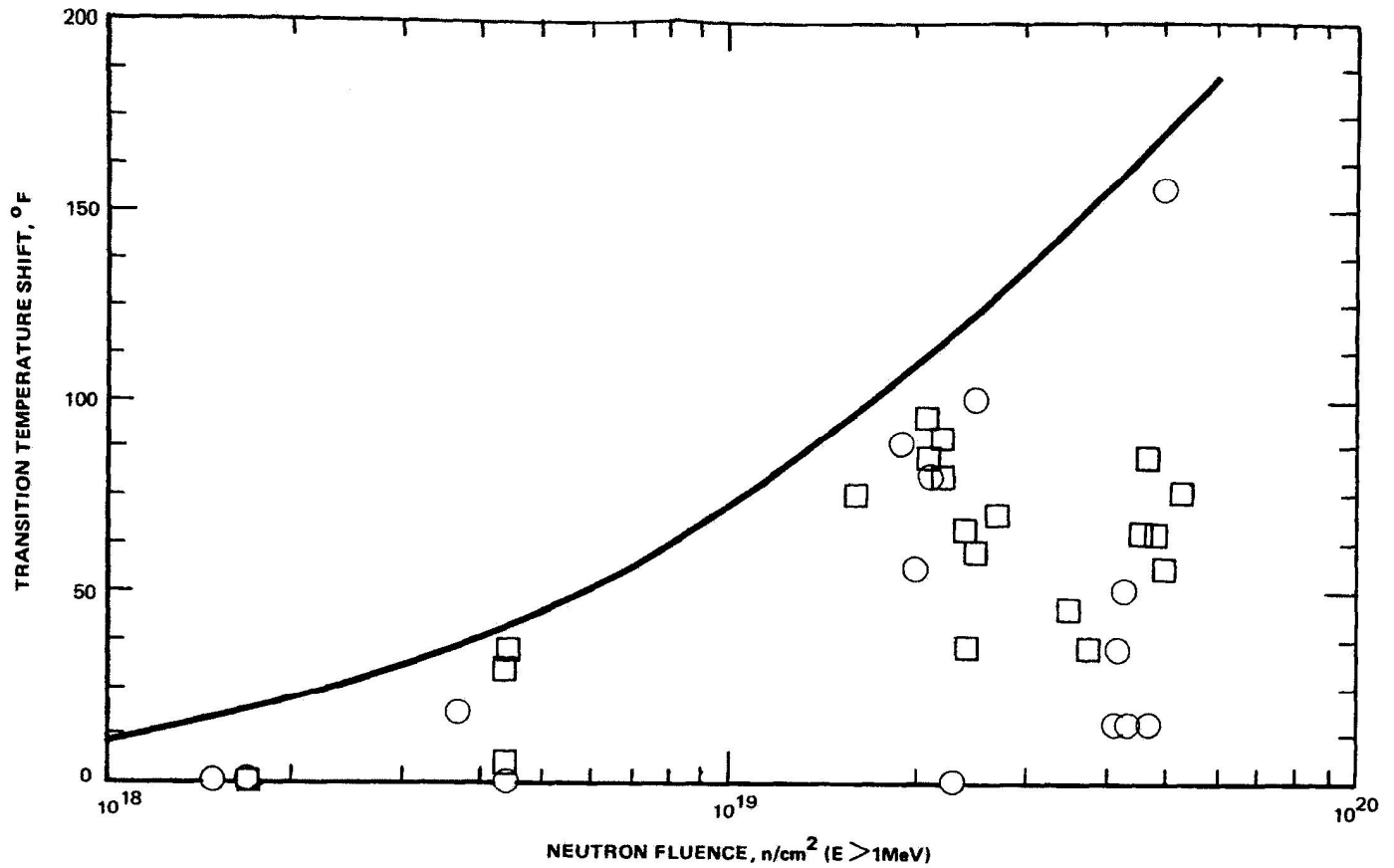
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LOCATIONS OF  
SURVEILLANCE CAPSULE ASSEMBLIES

FIGURE 5.3-4

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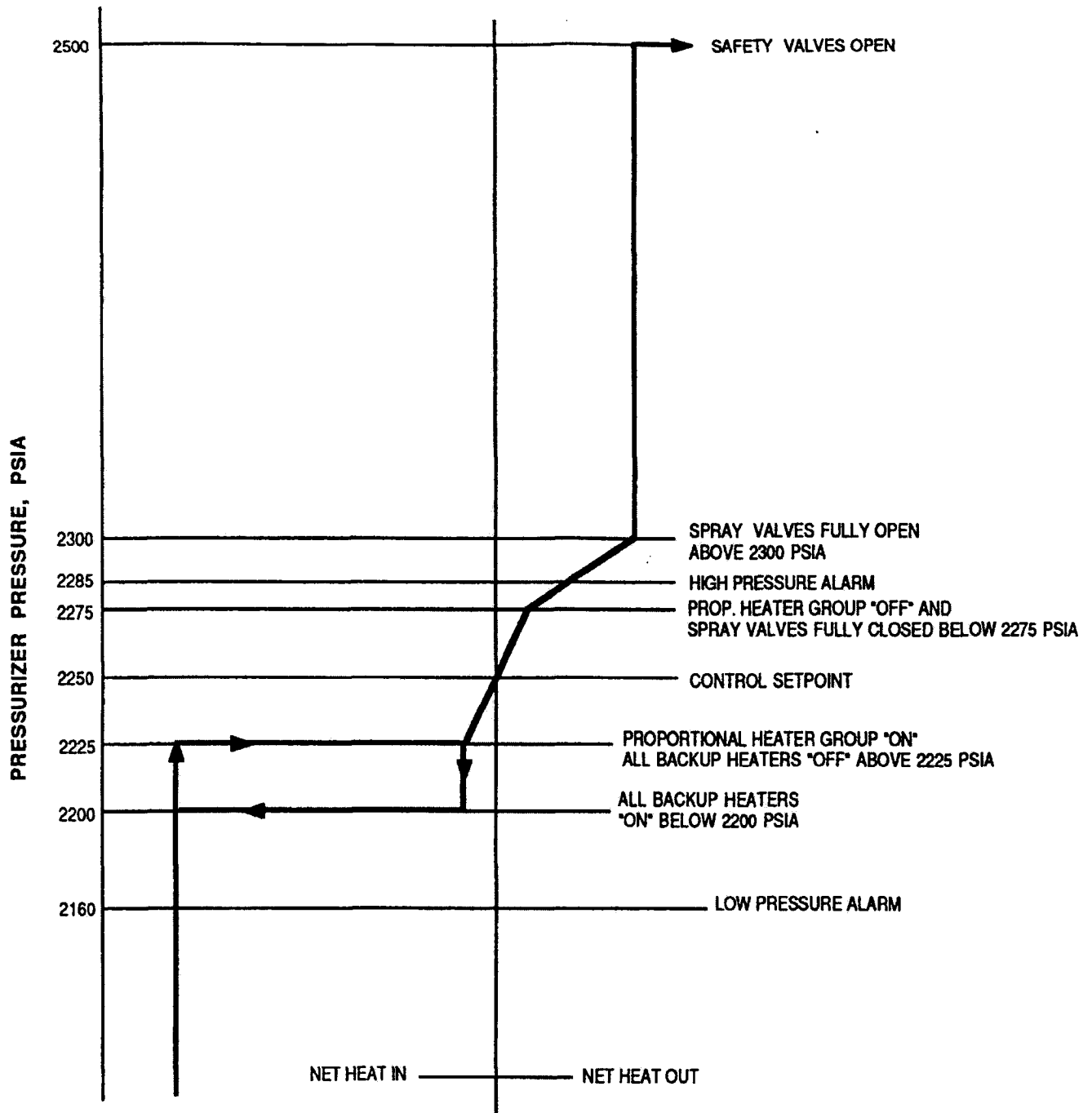
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TRANSITION TEMPERATURE SHIFT FOR PLATE  
AND WELD METAL  
METAL CONTAINING 0.10 W/O COPPER

FIGURE 5.3-5

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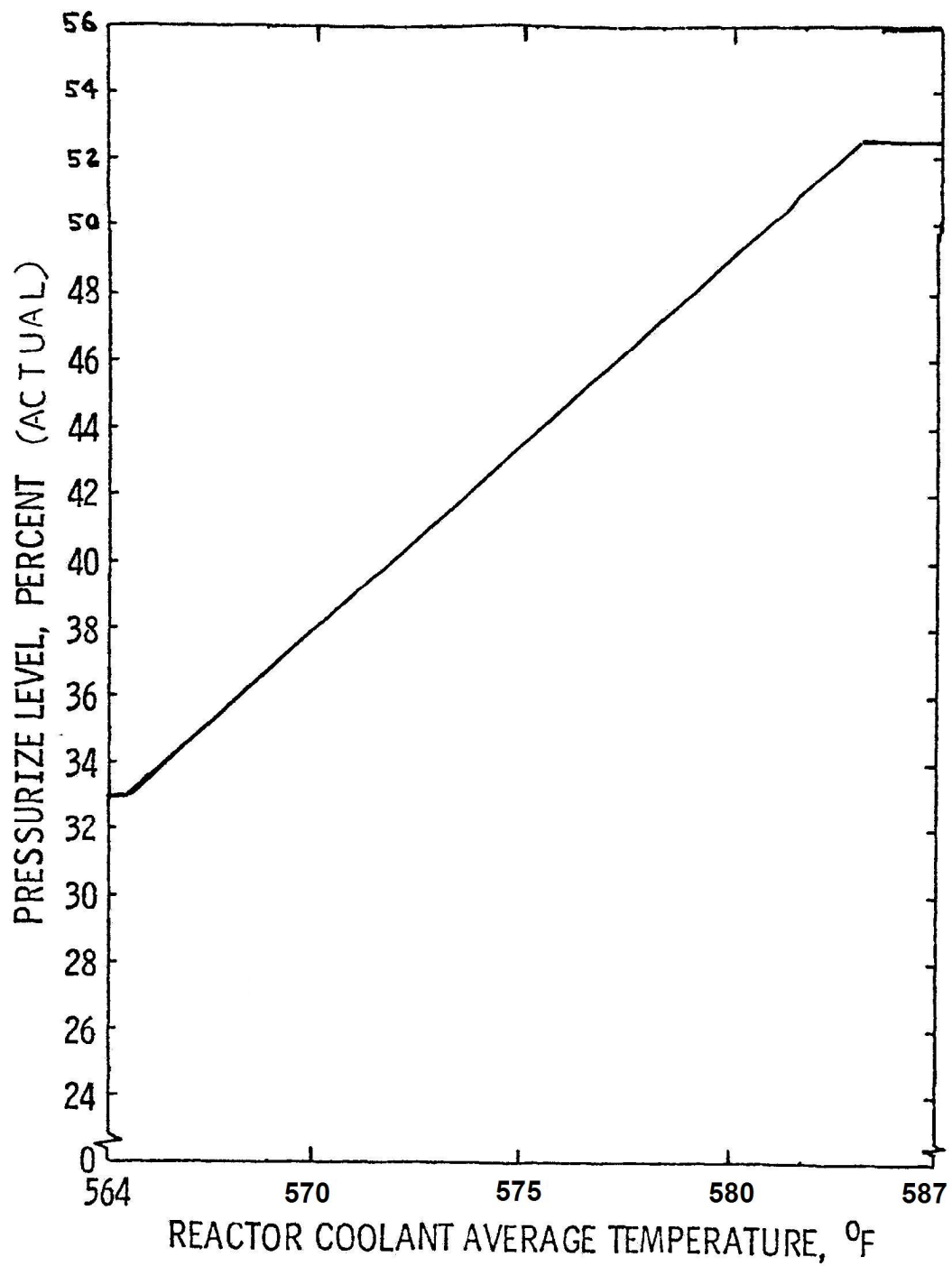
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PALO VERDE PRESSURE  
CONTROL PROGRAM SETPOINTS

FIGURE 5.4-1

JUNE 2001

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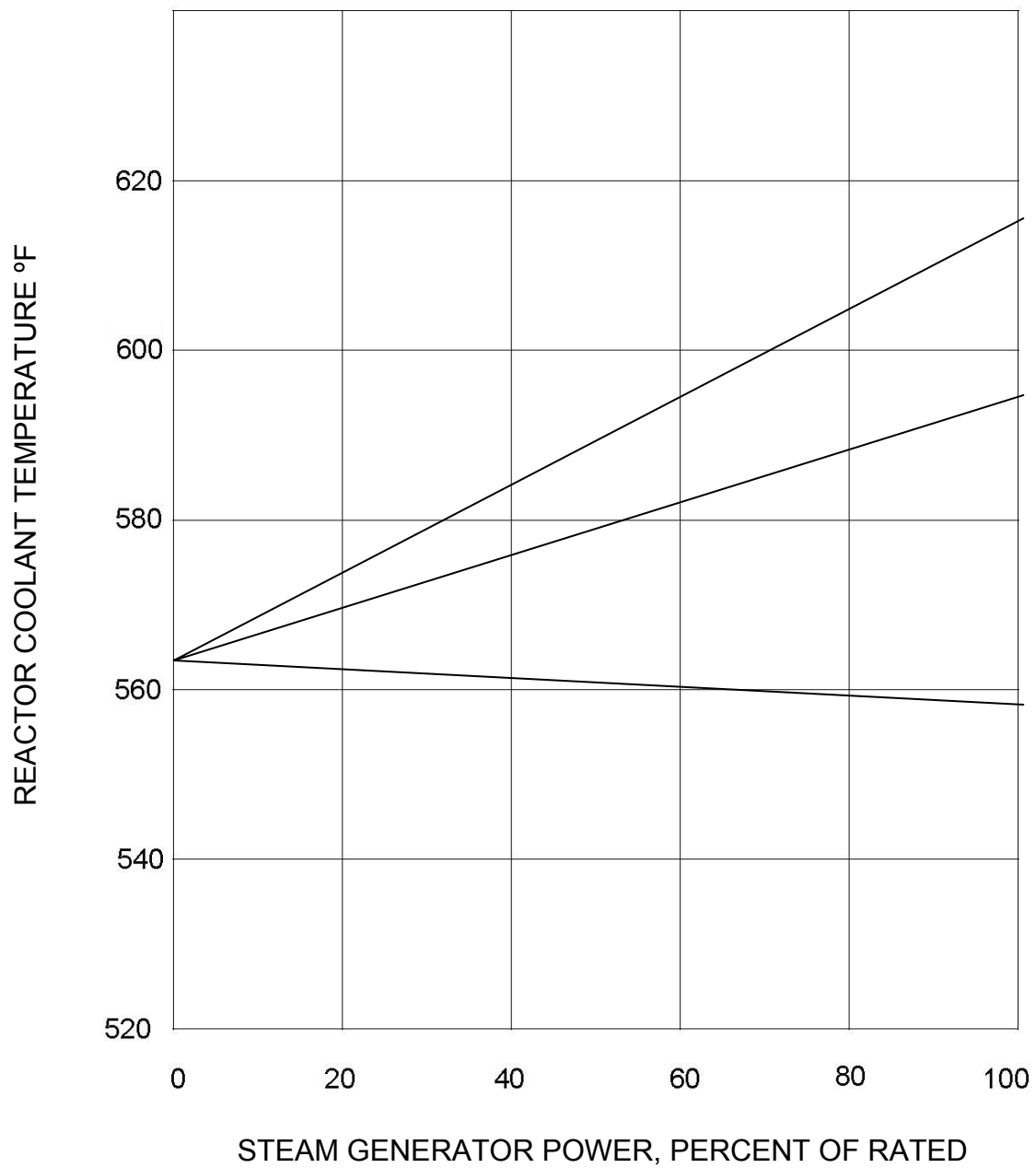
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PALO VERDE PRESSURIZER  
TYPICAL LEVEL SETPOINT PROGRAM

FIGURE 5.4-2

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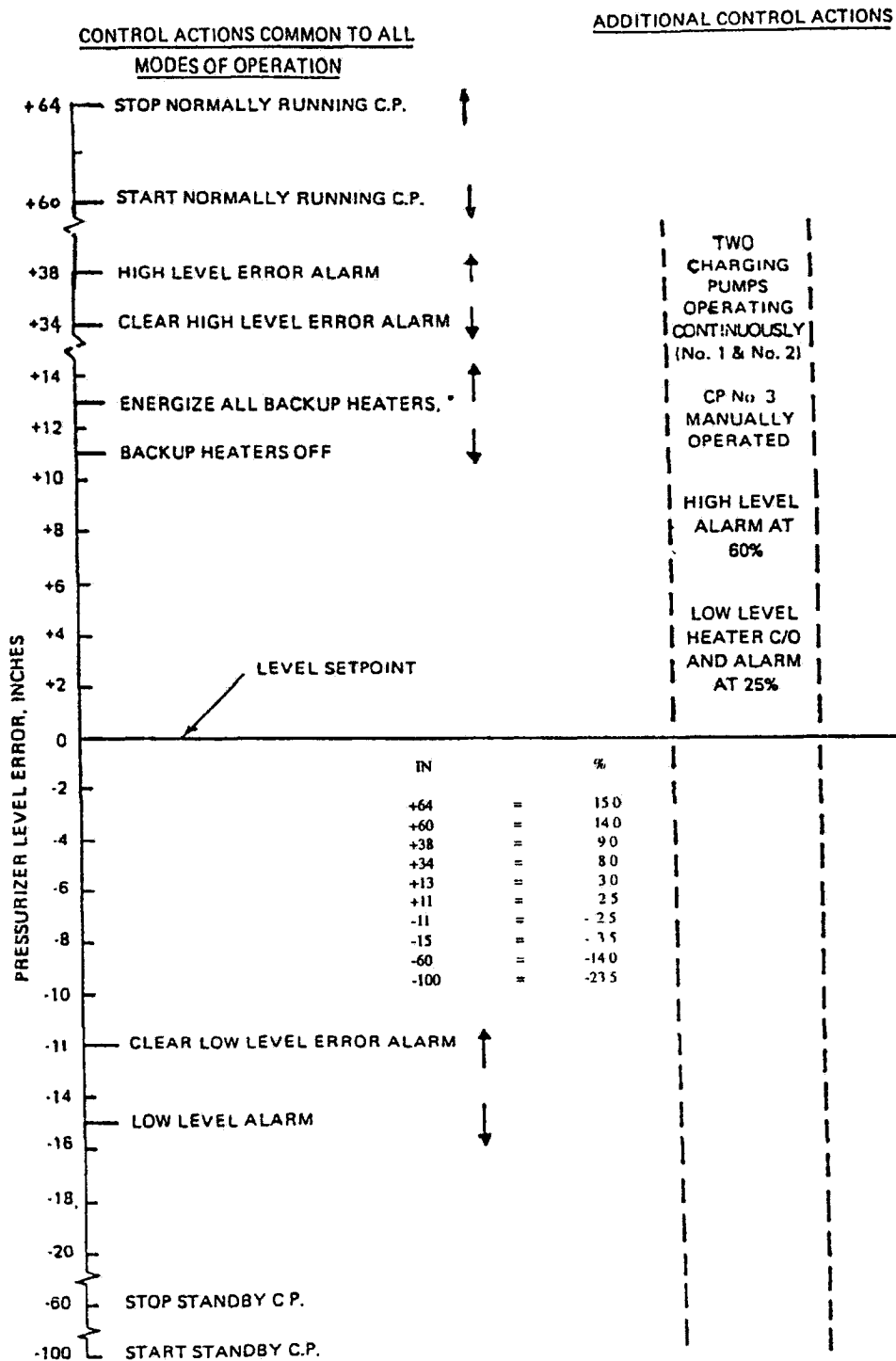
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PALO VERDE TYPICAL  
TEMPERATURE CONTROL PROGRAM

FIGURE 5.4-3

JUNE 2009

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

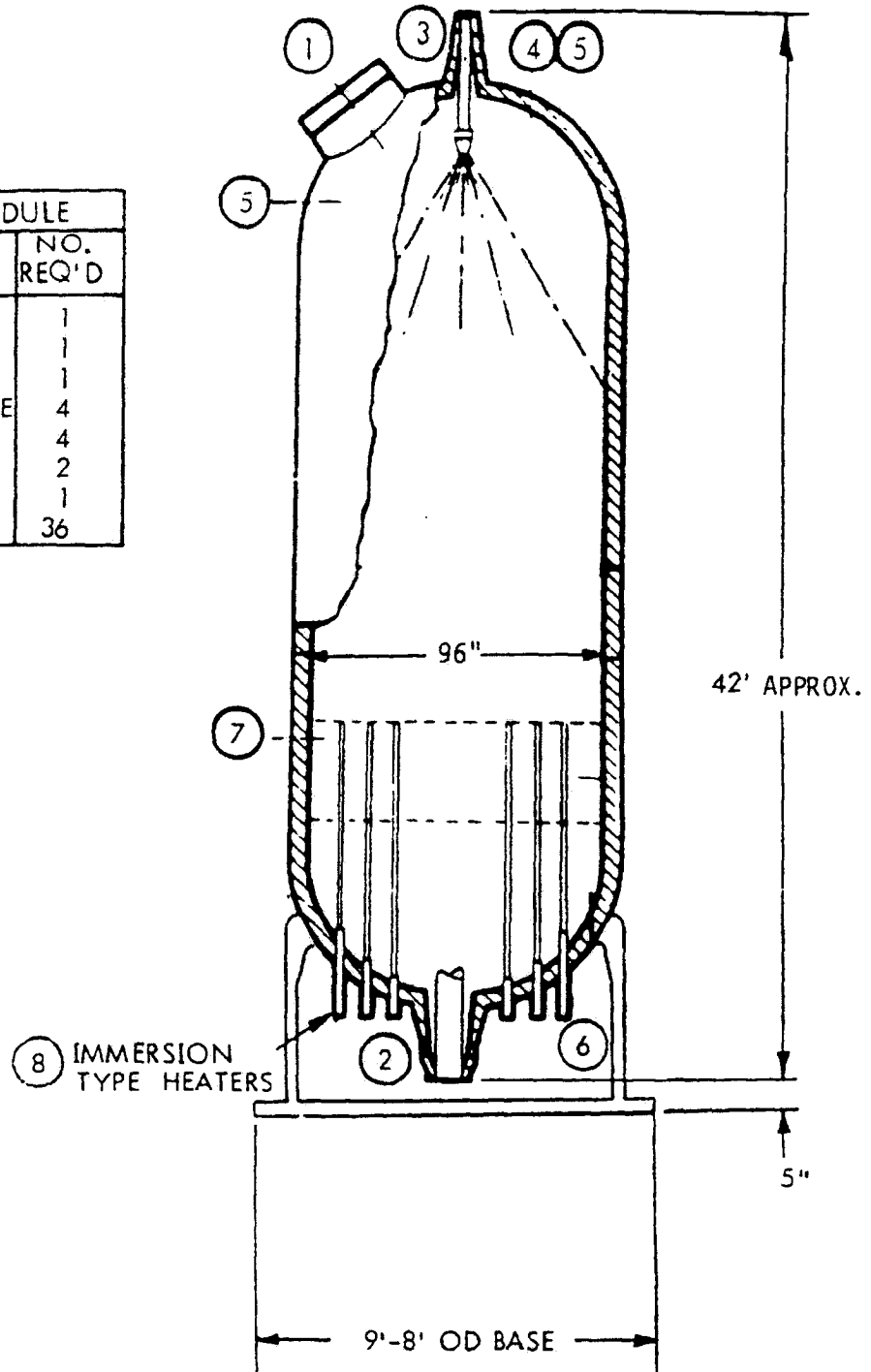
PALO VERDE PRESSURIZER  
TYPICAL LEVEL ERROR PROGRAM

FIGURE 5.4-4

JUNE 2001

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NOZZLE SCHEDULE		
NO.	SERVICE	NO. REQ'D
1	MANWAY	1
2	SURGE	1
3	SPRAY	1
4	SAFETY VALVE	4
5	INSTRUMENT	4
6	INSTRUMENT	2
7	TEMPERATURE	1
8	HEATER	36



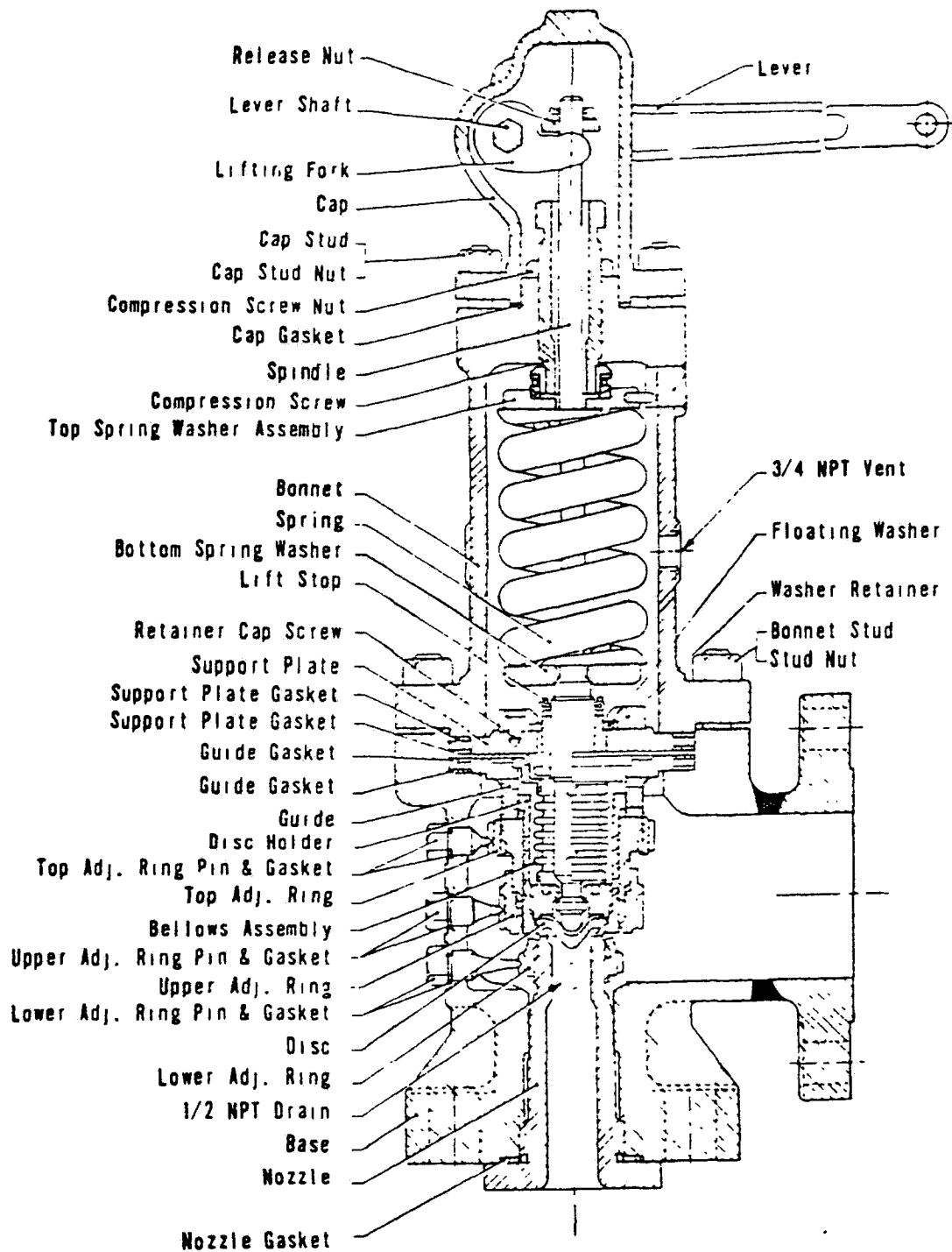
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TYPICAL PRESSURIZER

FIGURE 5.4-5

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

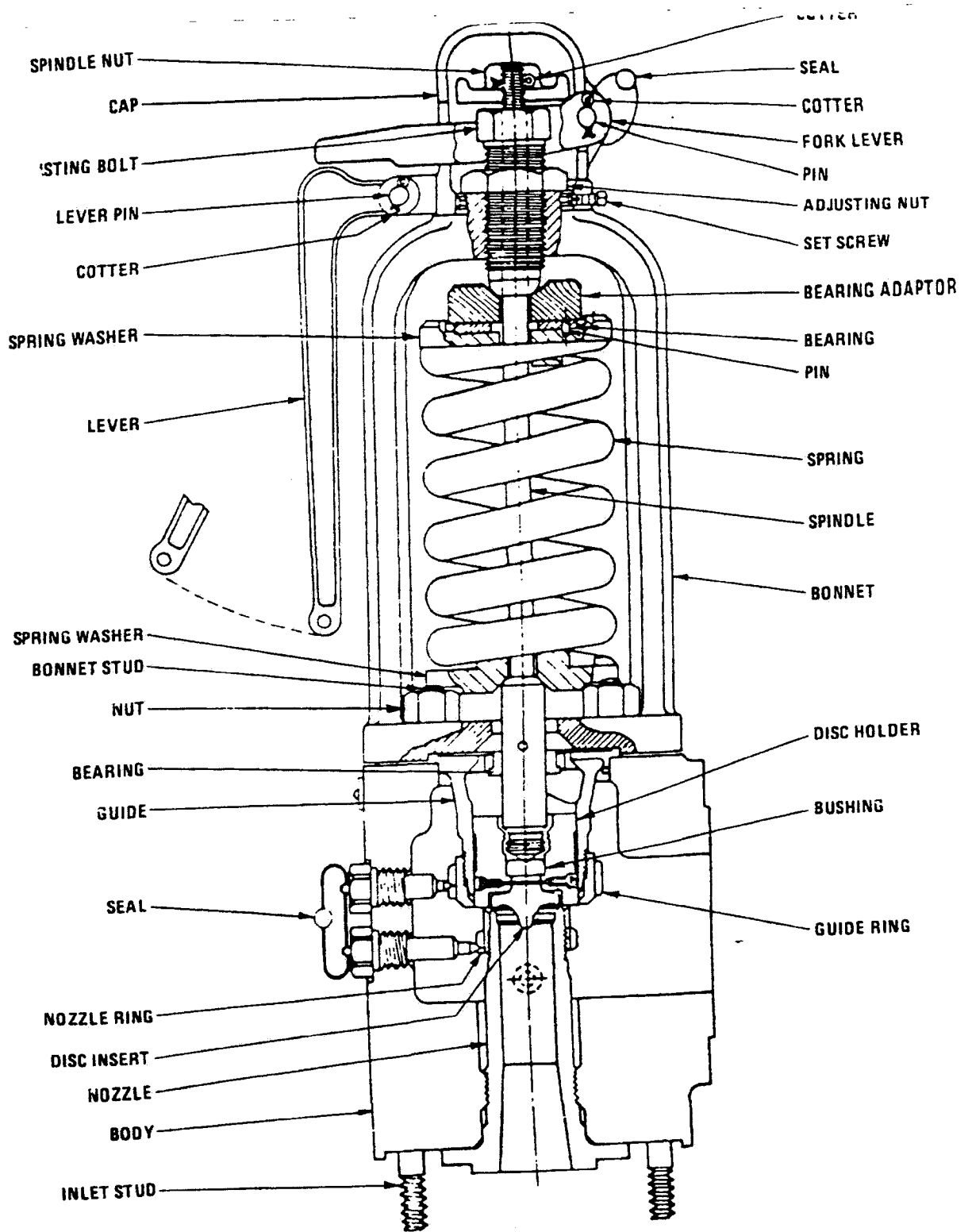
# PRIMARY SAFETY VALVE

FIGURE 5.4-6

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

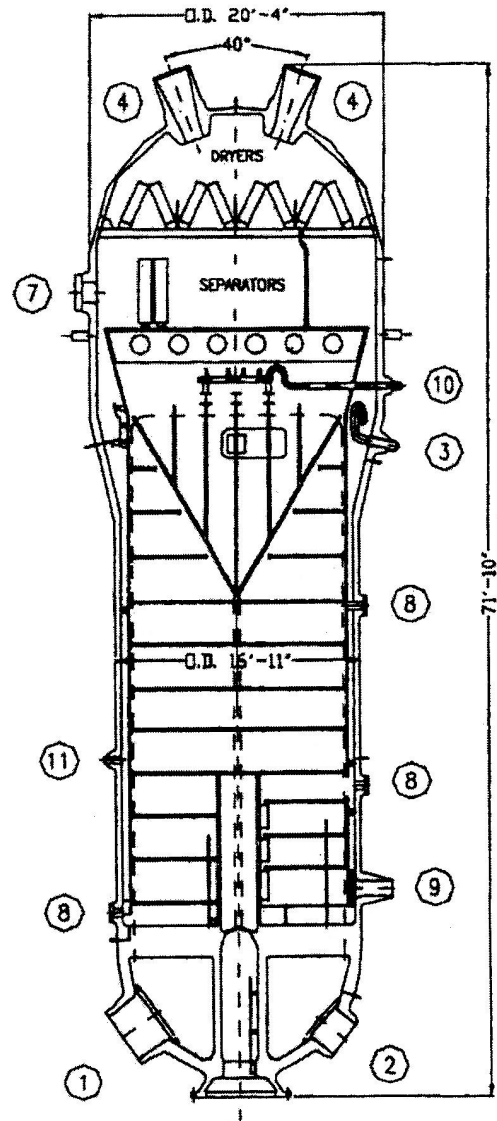
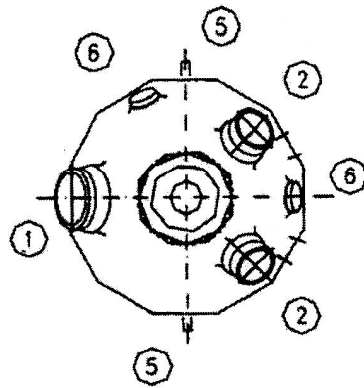
MAIN STEAM SAFETY VALVE

FIGURE 5.4-7

JUNE 2001

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NO.	SERVICE	NO. REQ'D
1	PRIMARY INLET	1
2	PRIMARY OUTLET	2
3	DOWNCOMER FEEDWATER	1
4	STEAM OUTLET	2
5	BLOWDOWN	2
6	PRIMARY MANWAY	2
7	SECONDARY MANWAY	2
8	HANDHOLE	7
9	ECONOMIZER FEEDWATER	2
10	RECIRCULATION	1
11	DOWNCOMER BLOWDOWN	1



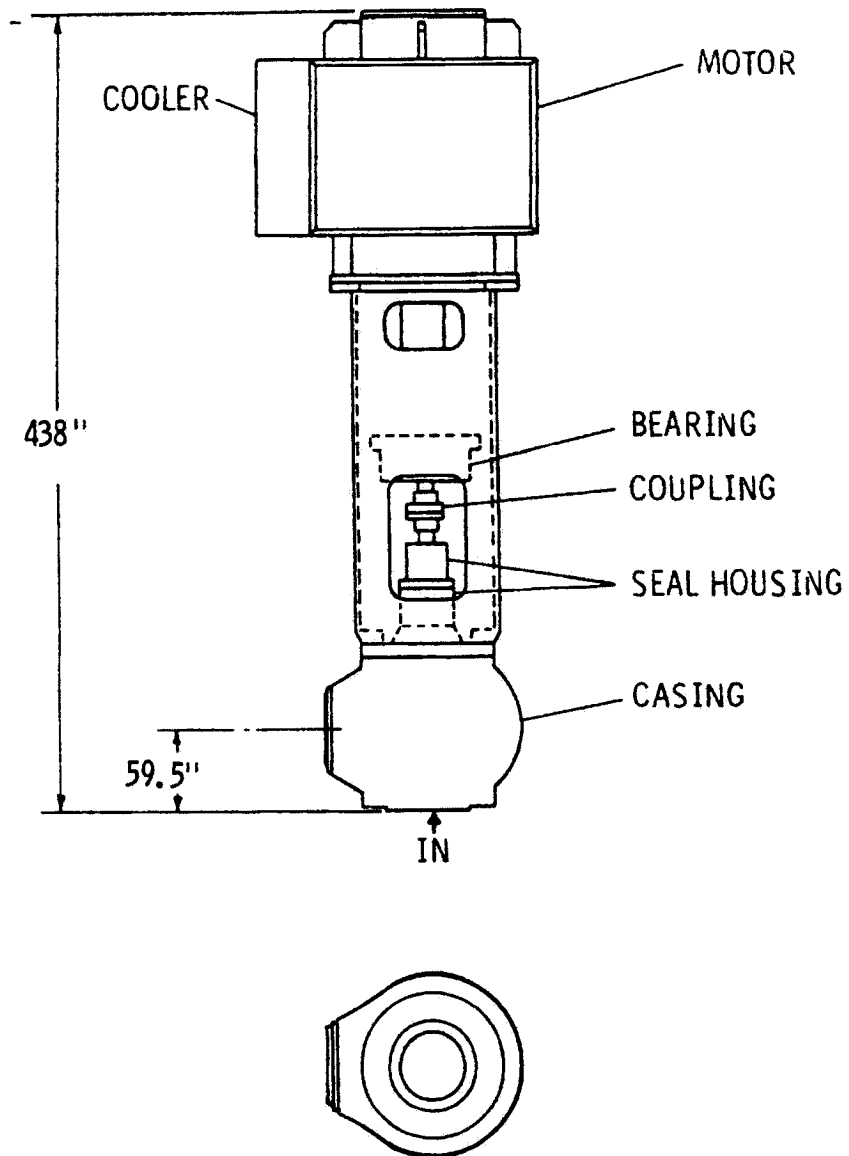
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

STEAM GENERATOR  
(TYPICAL)

FIGURE 5.4-8

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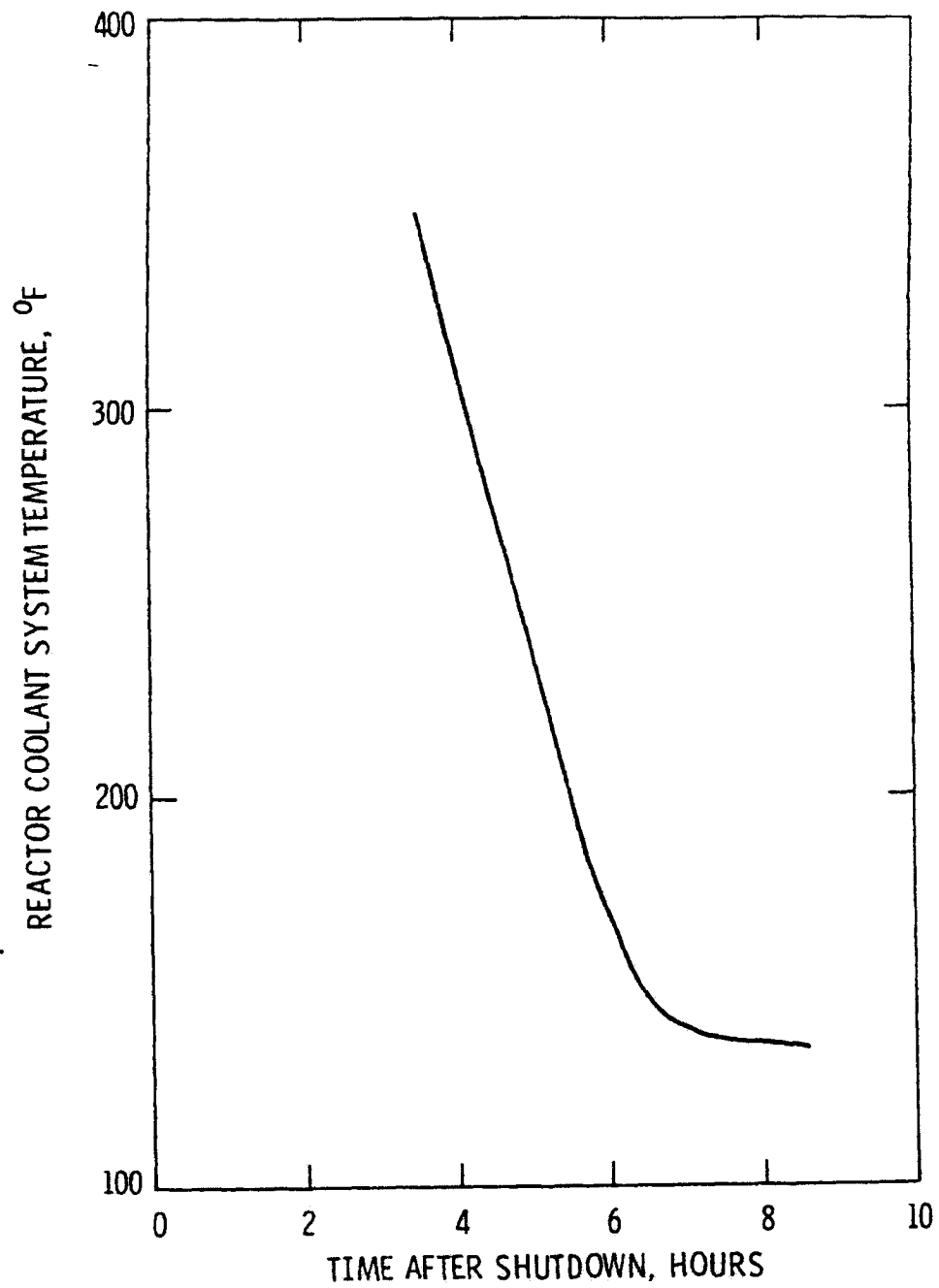


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REACTOR COOLANT PUMP  
(TYPICAL)  
FIGURE 5.4-9

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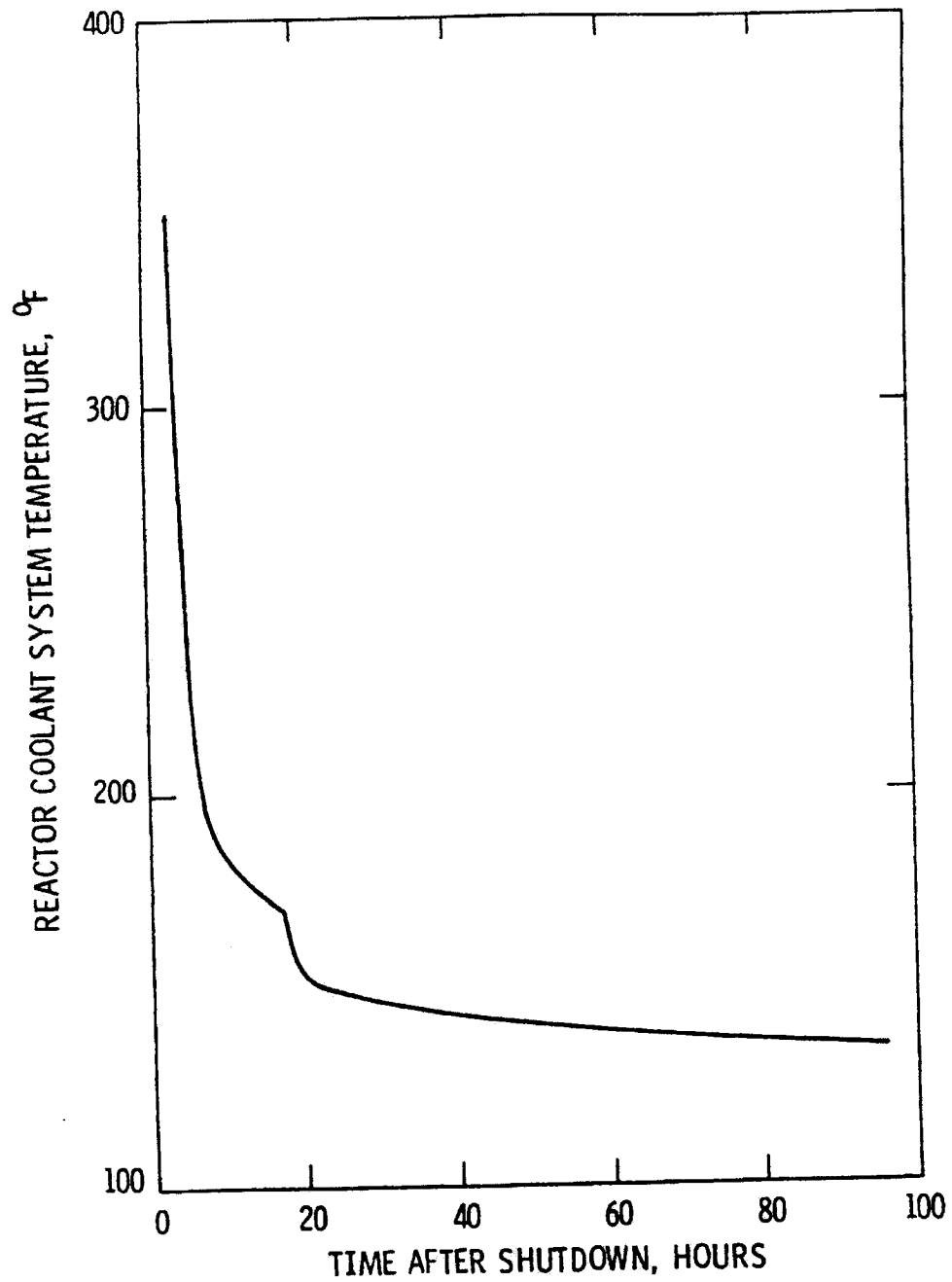
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SHUTDOWN COOLING SYSTEM  
TWO TRAIN COOLDOWN (TYPICAL)

FIGURE 5.4-10

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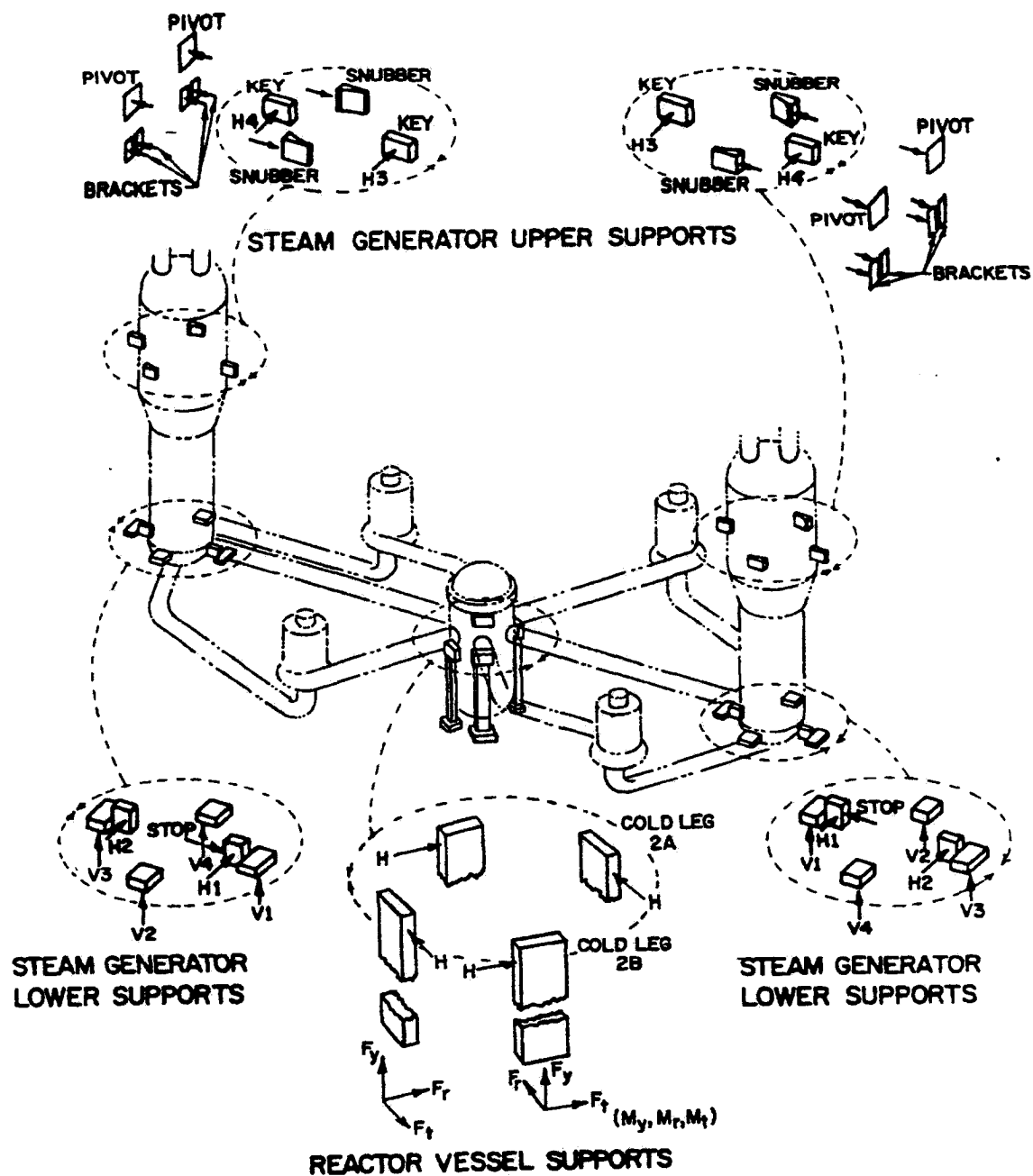
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SHUTDOWN COOLING SYSTEM  
ONE TRAIN COOLDOWN(TYPICAL)

FIGURE 5.4-11

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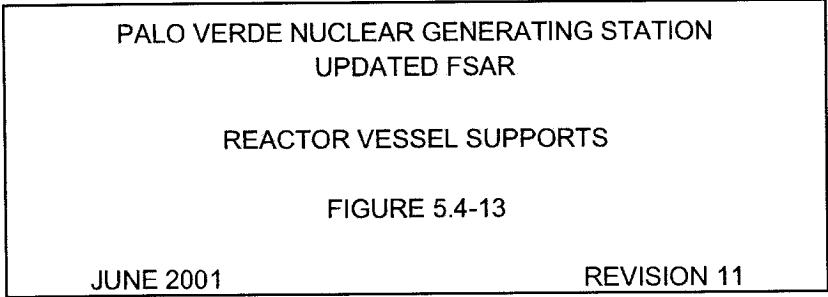
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

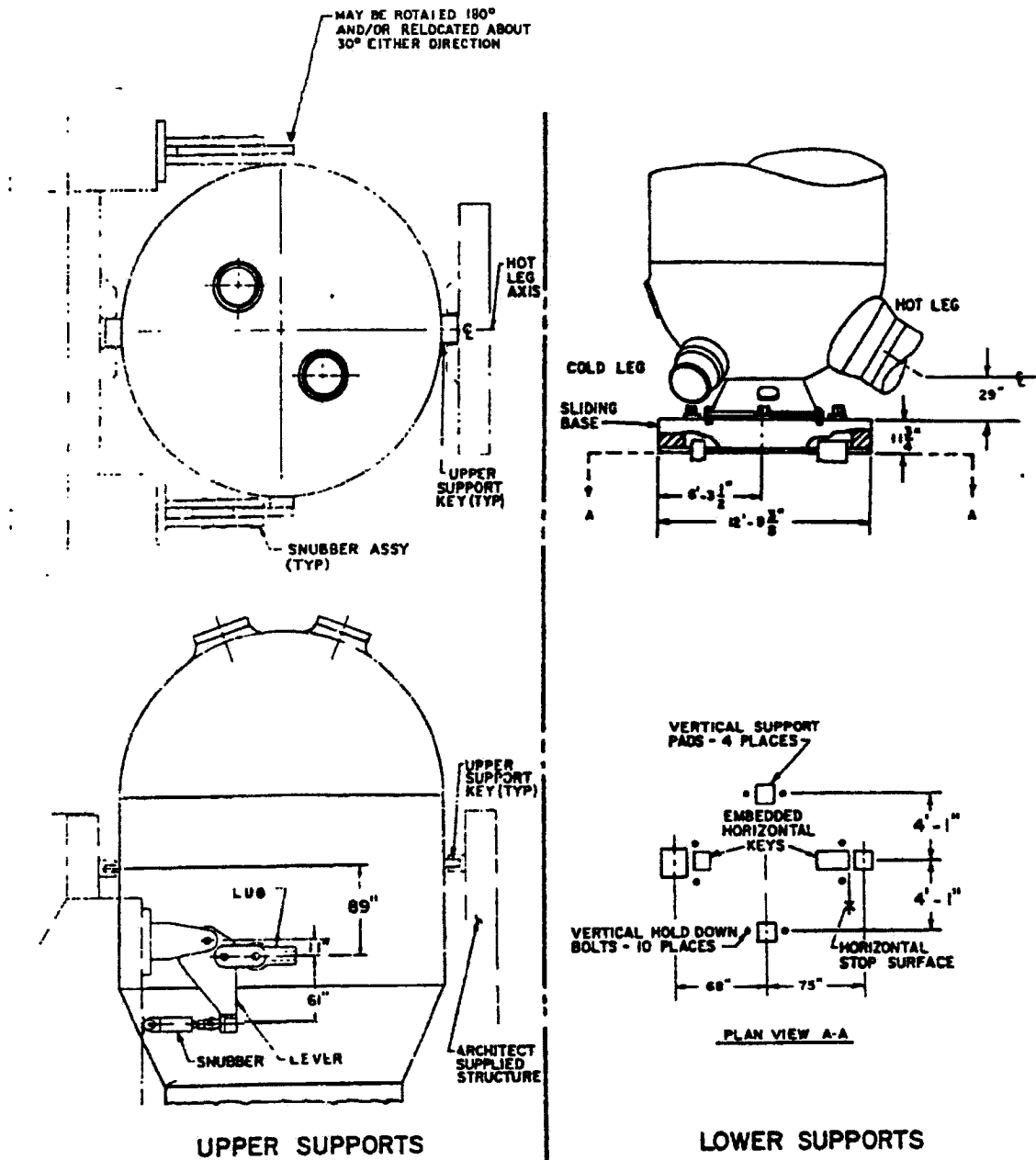
REACTOR COOLANT SYSTEM ARRANGEMENT  
AND SUPPORT POINTS

FIGURE 5.4-12

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

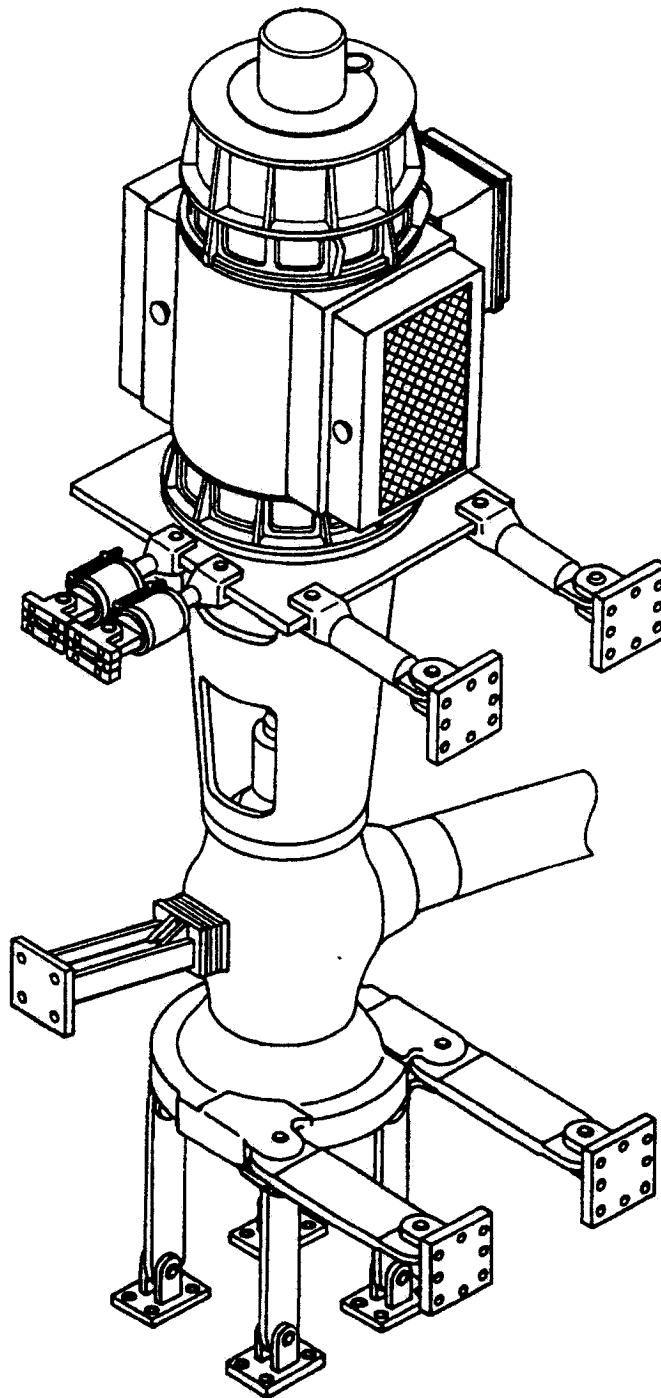
STEAM GENERATOR SUPPORTS  
(TYPICAL)

FIGURE 5.4-14

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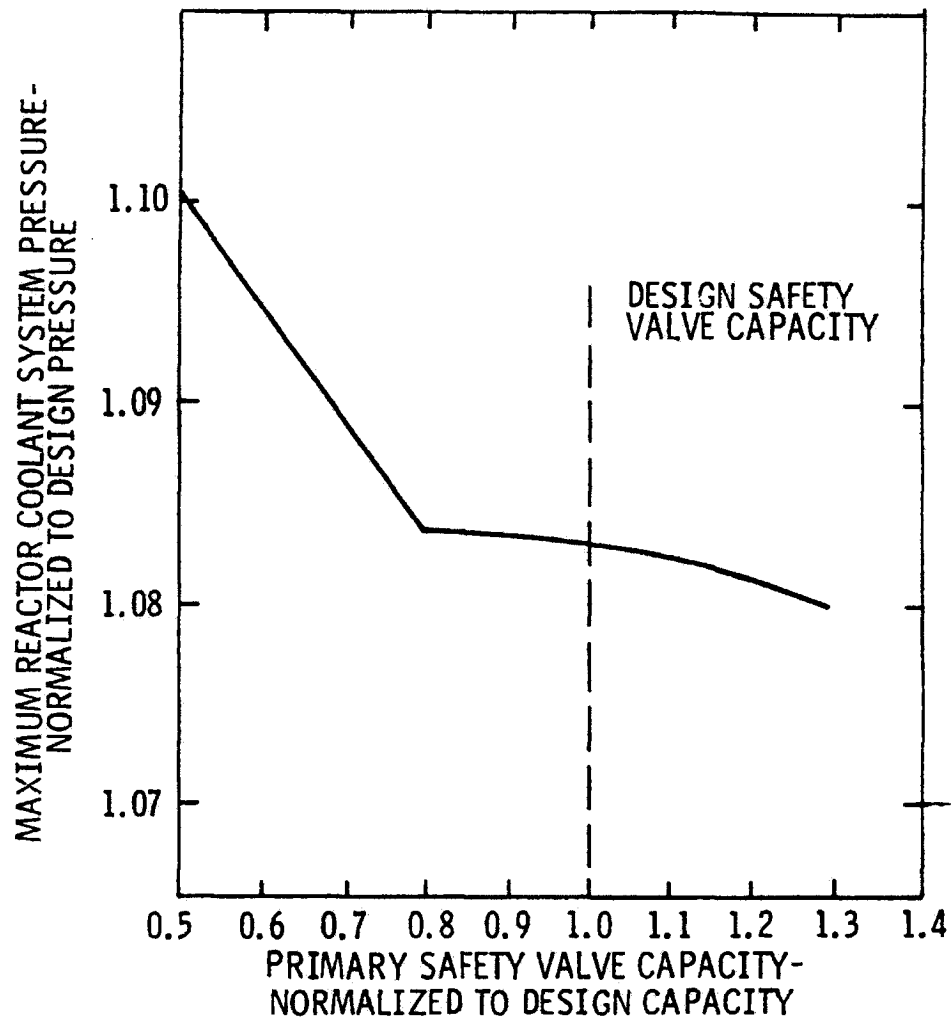
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REACTOR COOLANT PUMP SUPPORTS  
(TYPICAL)

FIGURE 5.4-15

JUNE 2001

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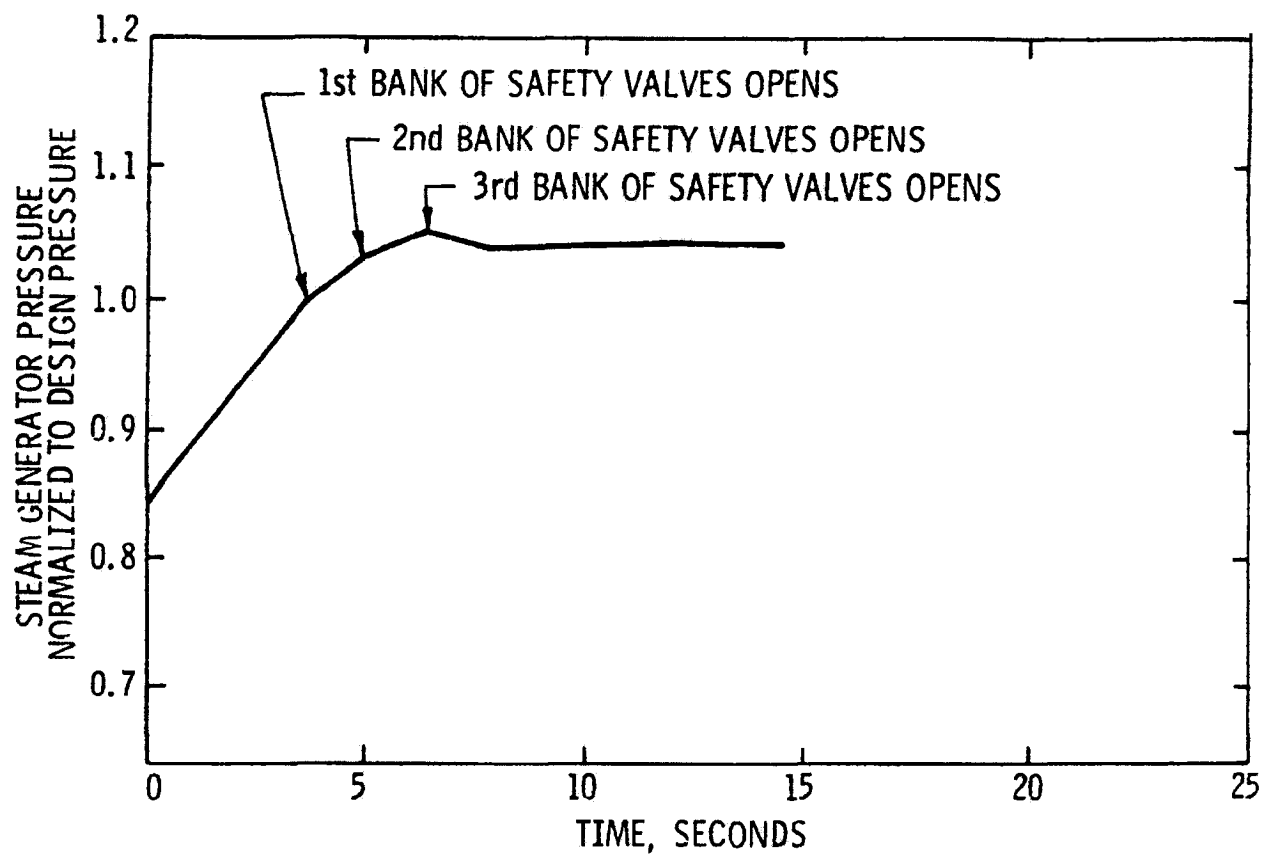
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

OPTIMIZED SAFETY VALVE CAPACITIES

FIGURE 5B-1

JUNE 2001

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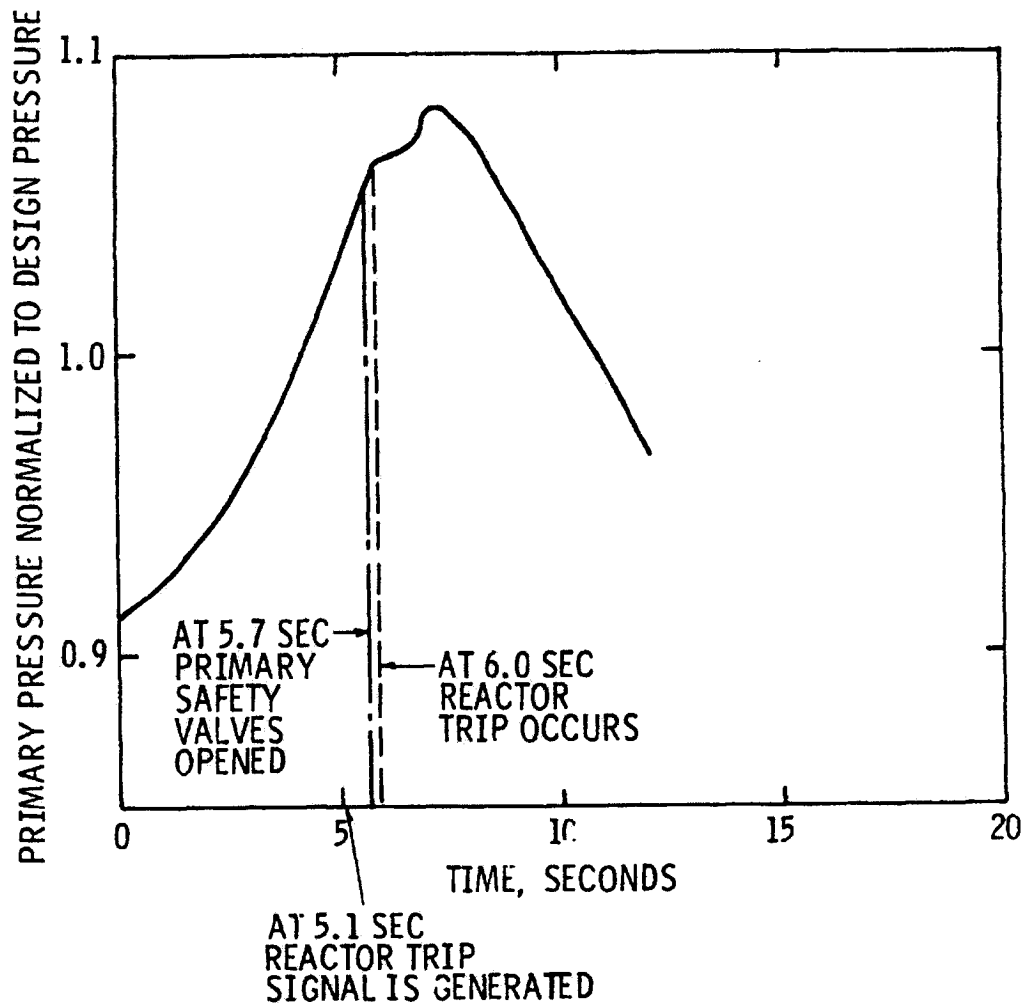
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

STEAM GENERATOR PRESSURE COMPLETE LOSS OF  
TURBINE GENERATOR LOAD

FIGURE 5B-2

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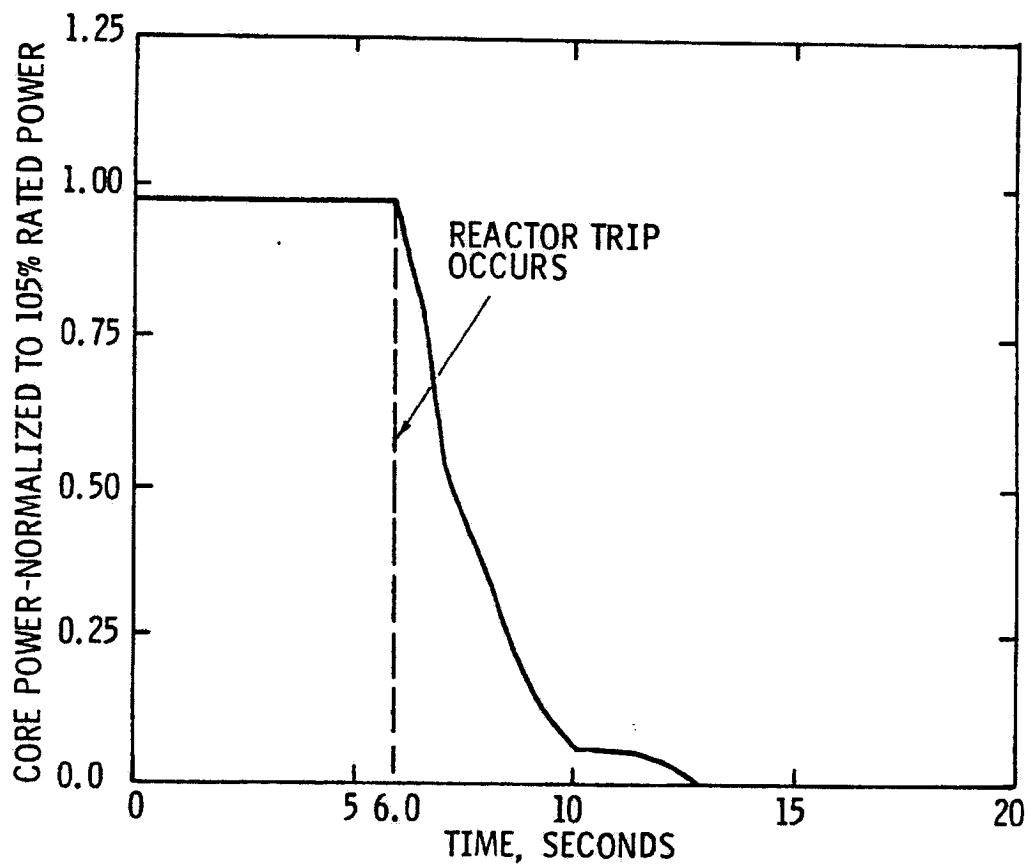
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

MAXIMUM REACTOR COOLANT SYSTEM PRESSURE  
VS TIME FOR WORST CASE LOSS OF  
LOAD INCIDENT

FIGURE 5B-3

JUNE 2001

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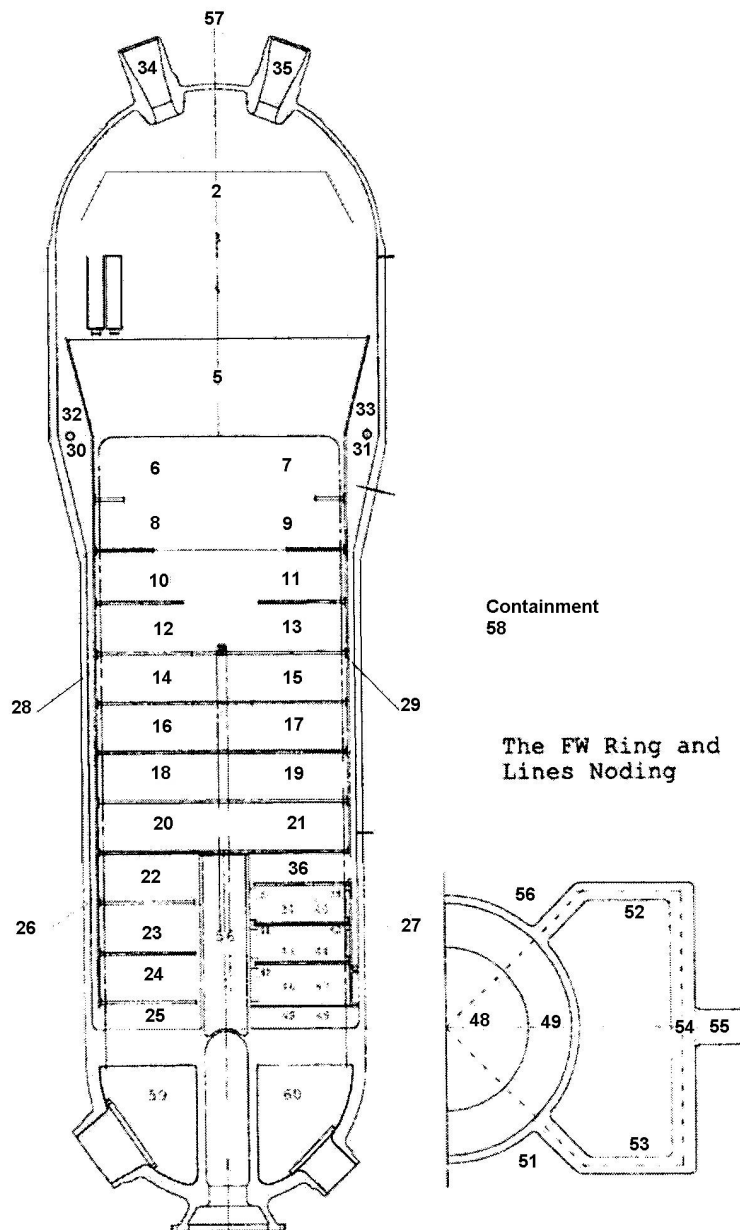
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

MAXIMUM REACTOR POWER  
VS TIME FOR WORST CASE LOSS OF  
LOAD INCIDENT

FIGURE 5B-4

JUNE 2001

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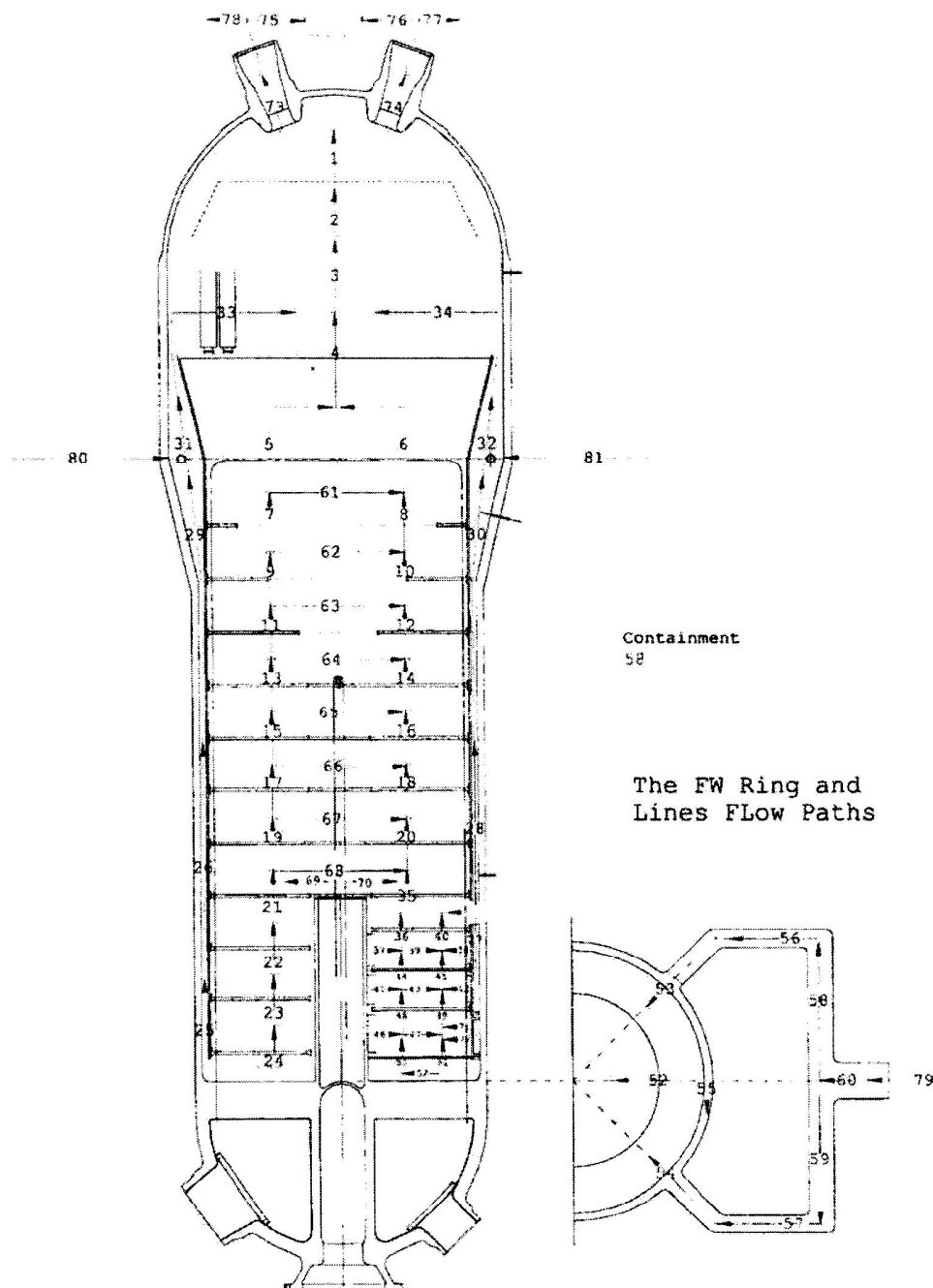
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

STEAM GENERATOR  
CEFLASH MODEL NODES

FIGURE 5D-1A

JUNE 2009

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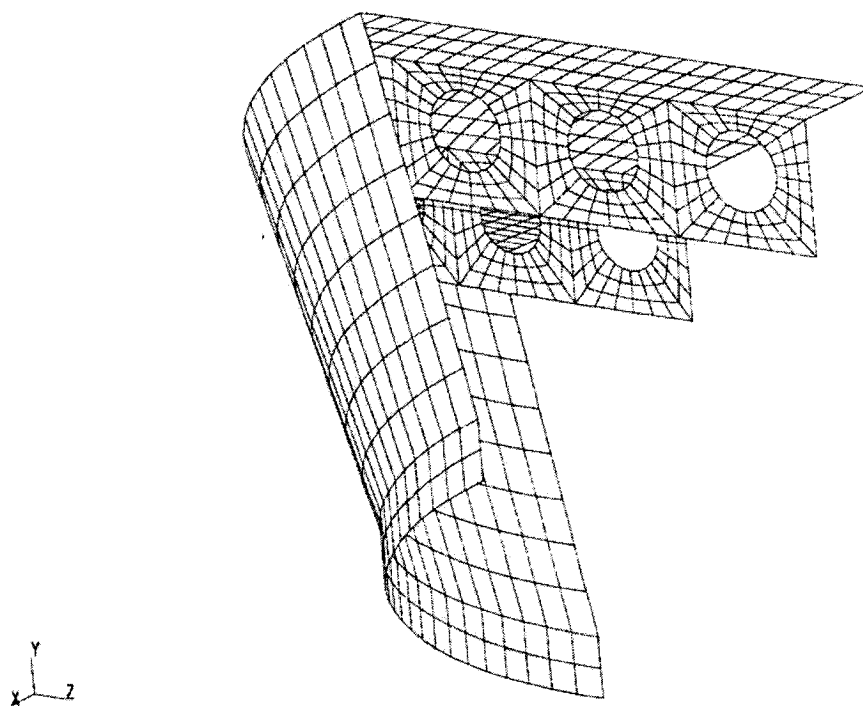
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PV-2 STEAM GENERATOR  
CEFLASH MODEL FLOW PATHS

FIGURE 5D-1B

JUNE 2009

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

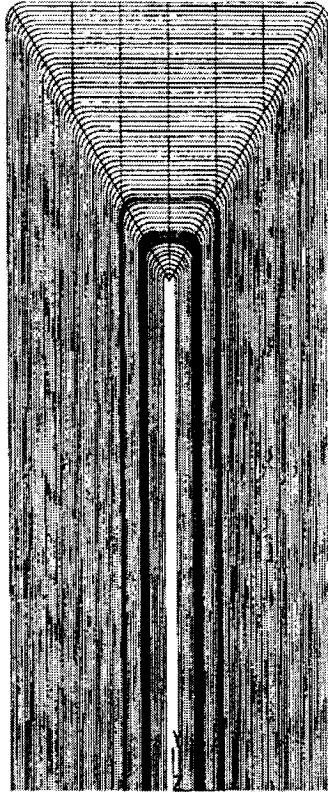
SEPERATOR DECK AND SHROUD ANSYS MODEL  
VIEW OF 90° SECTION MODEL

FIGURE 5D-2

JUNE 2005

REVISION 13





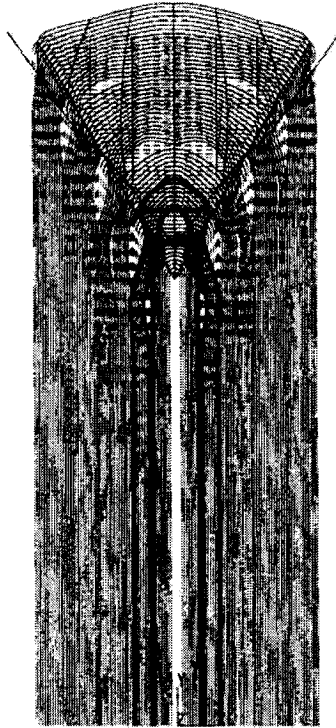
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TUBE BUNDLE FINITE ELEMENT ANSYS MODEL

FIGURE 5D-3

JUNE 2005

REVISION 13



ANSYS 5.4  
APR 23 2001  
11:36:26  
PLOT NO. 2  
DISPLACEMENT  
STEP=1  
SUB=1  
TIME=1  
RSYS=0  
DMX = .068329  
  
DSCA=313.11  
ZV =1  
DIST=246.236  
YF =223.851

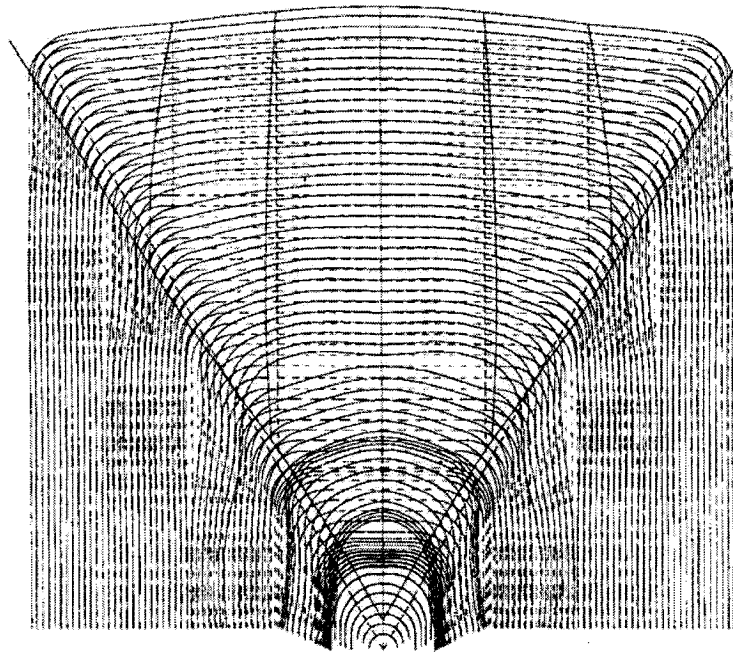
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TUBE BUNDLE DEFORMED SHAPE PLOT

FIGURE 5D-4A

JUNE 2005

REVISION 13



ANSYS 5.4  
APR 23 2001  
11:38:28  
PLOT NO. 3  
DISPLACEMENT  
STEP=1  
SUB =1  
TIME=1  
RSYS=0  
DMX = 0.68329  
  
DSCA=128.423  
ZV =1  
DIST=102.117  
YF =356.229

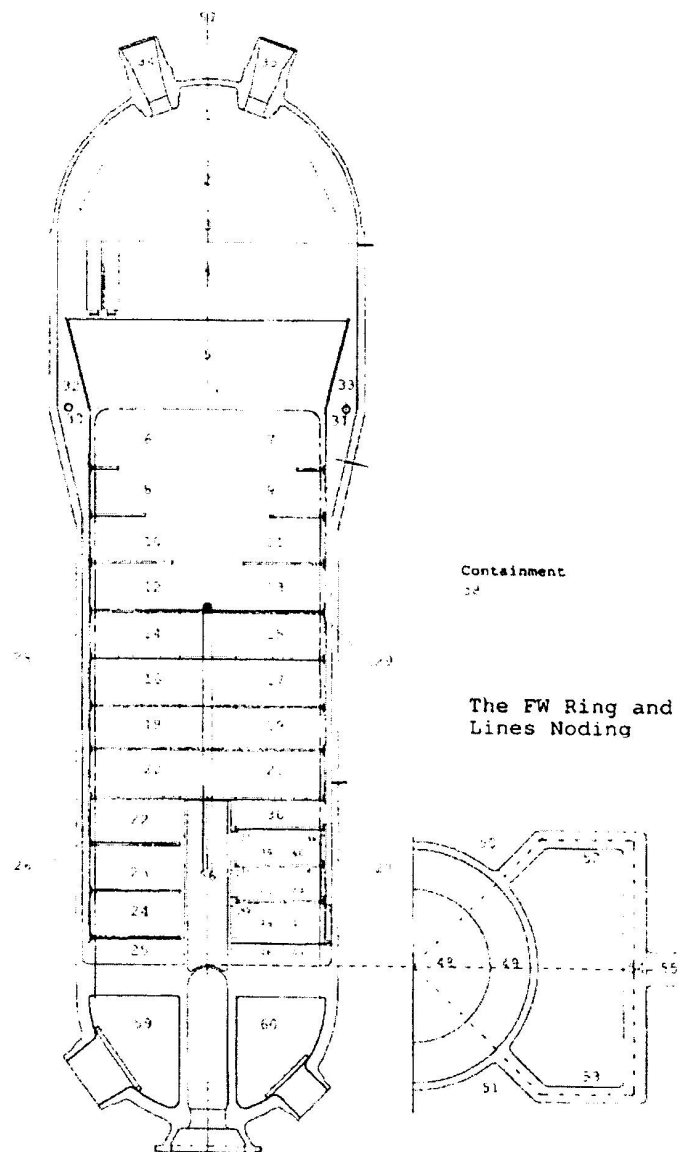
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TUBE BUNDLE TOP REGION DEFORMED SHAPE PLOT  
(EXAGGERATED)

FIGURE 5D-4B

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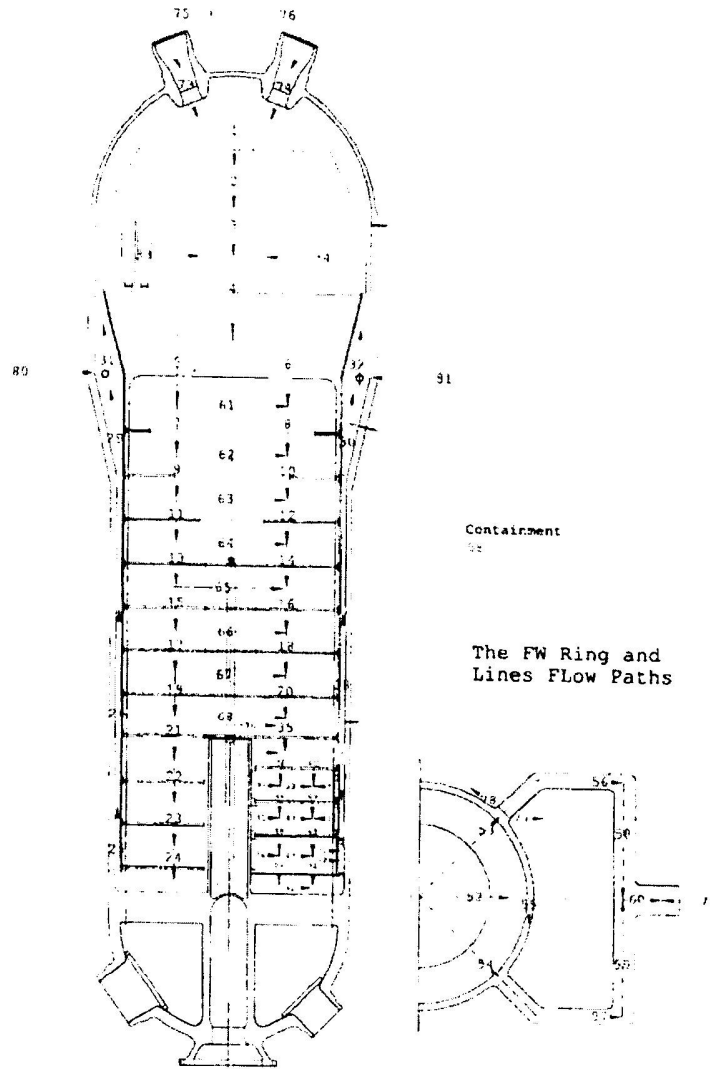
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PV-2 STEAM GENERATOR  
CEFLASH MODEL NODES

FIGURE 5E-1A

JUNE 2009

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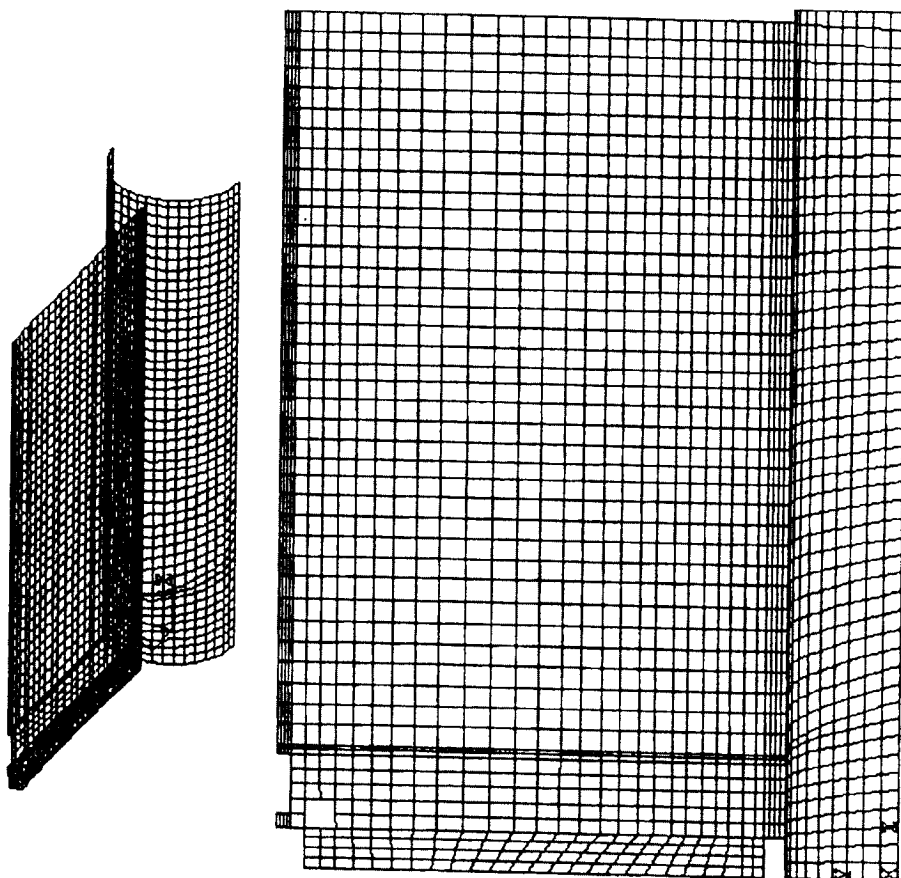
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PV-2 STEAM GENERATOR  
CEFLASH MODEL FLOW PATHS

FIGURE 5E-1B

JUNE 2009

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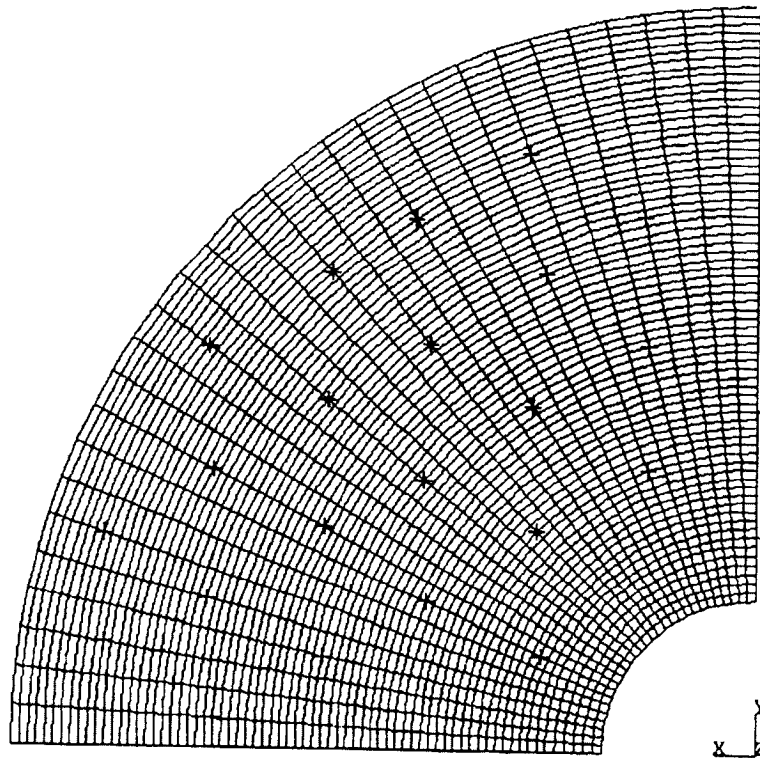
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

ECONOMIZER DIVIDER PLATE,  
SUPPORT CYLINDER AND BLOWDOWN ASSEMBLY  
FINITE ELEMENT ANSYS MODEL

FIGURE 5E-2

JUNE 2005

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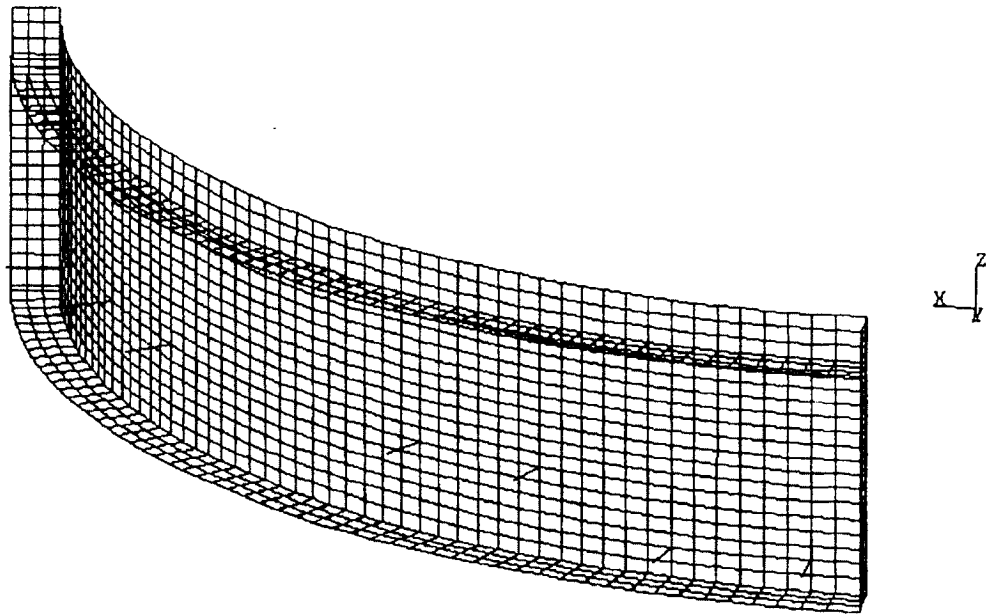
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

COLD LEG DISTRIBUTION PLATE,  
FINITE ELEMENT ANSYS MODEL

FIGURE 5E-3

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

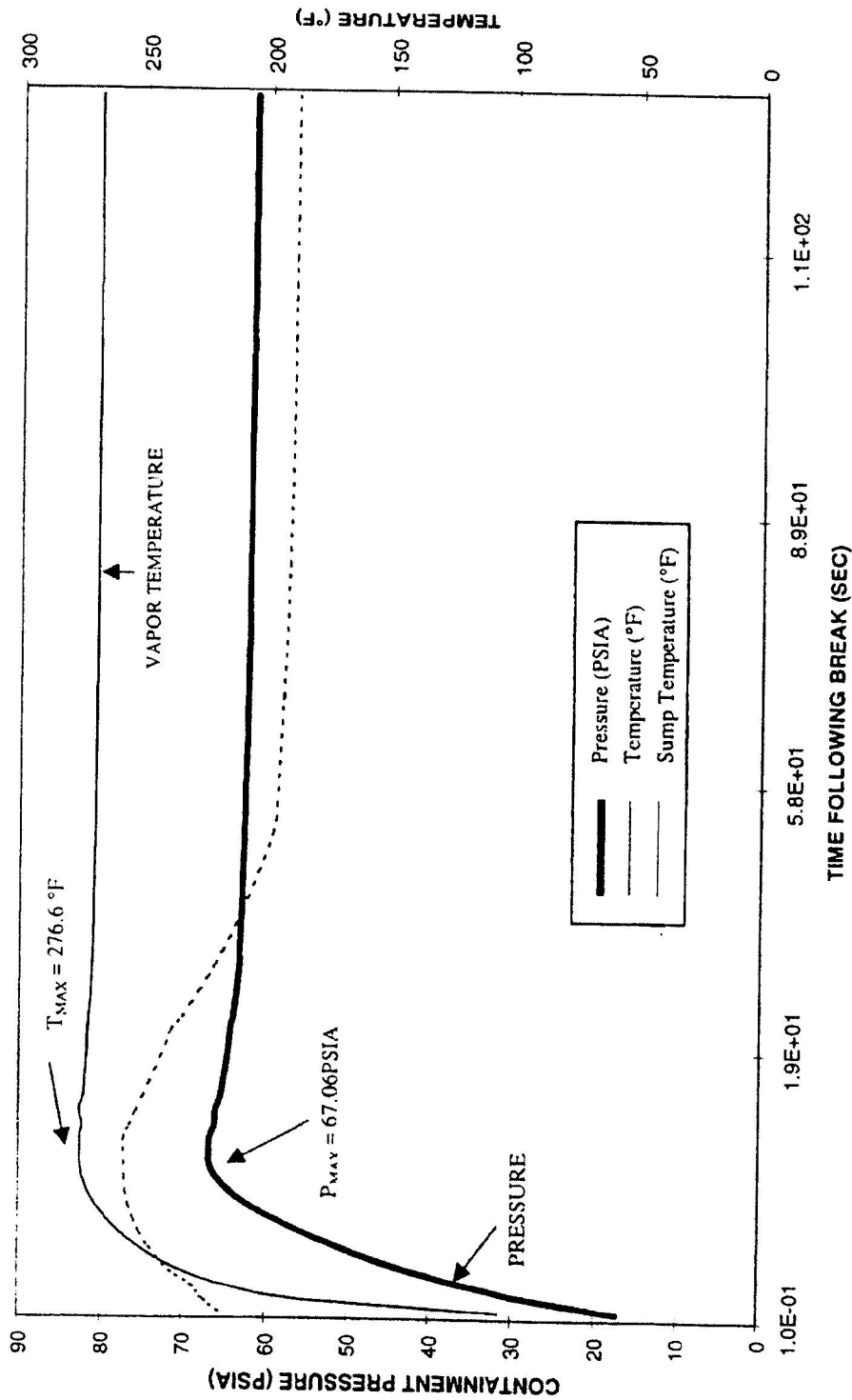
84° SEGMENT FEEDWATER BOX,  
FINITE ELEMENT ANSYS MODEL

FIGURE 5E-4

JUNE 2005

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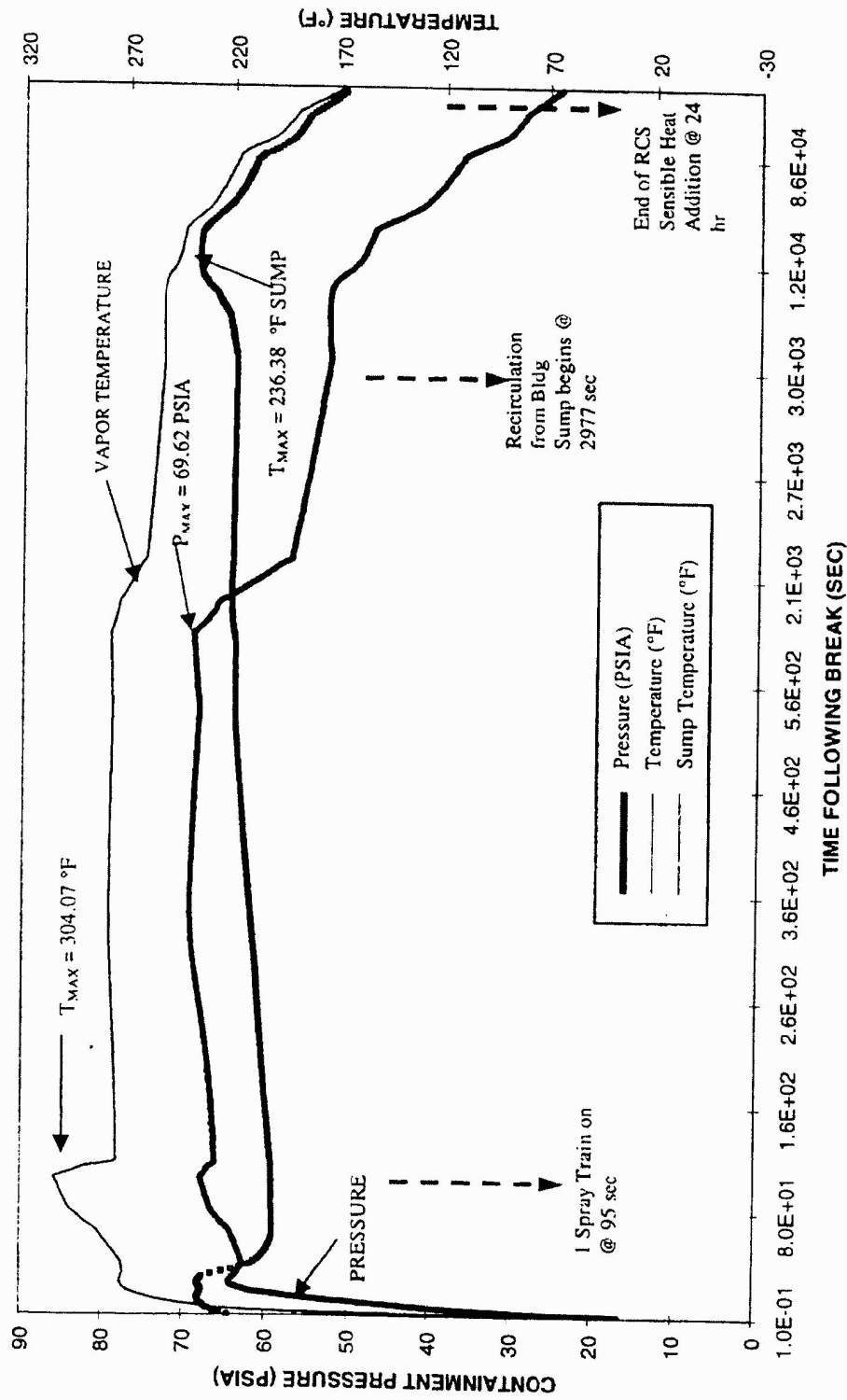
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT PRESSURE AND TEMPERATURE RESPONSE,  
DOUBLE-ENDED HOT LEG SLOT BREAK,  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-1

JUNE 2009

REVISION 15



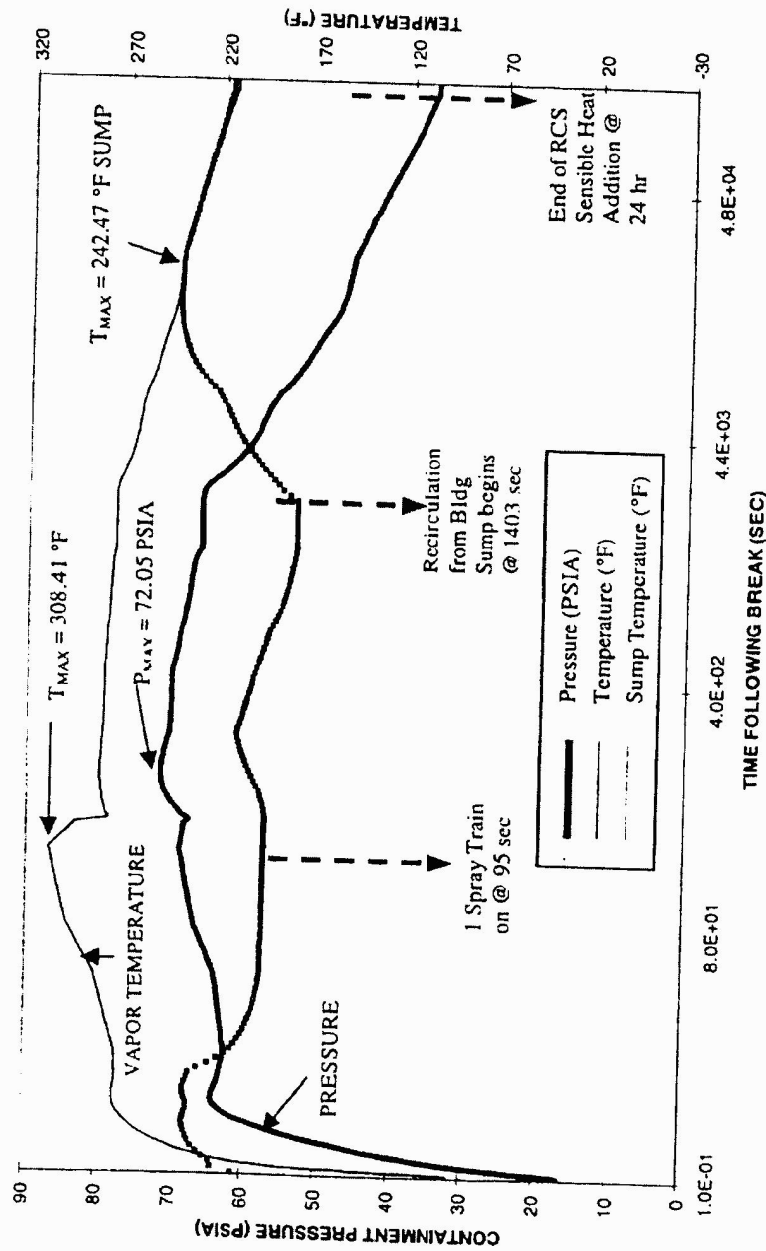
# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

CONTAINMENT PRESSURE AND TEMPERATURE RESPONSE,  
DOUBLE-ENDED DISCHARGE LEG SLOT BREAK, MINIMUM ECCS,,  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-2

JUNE 2009

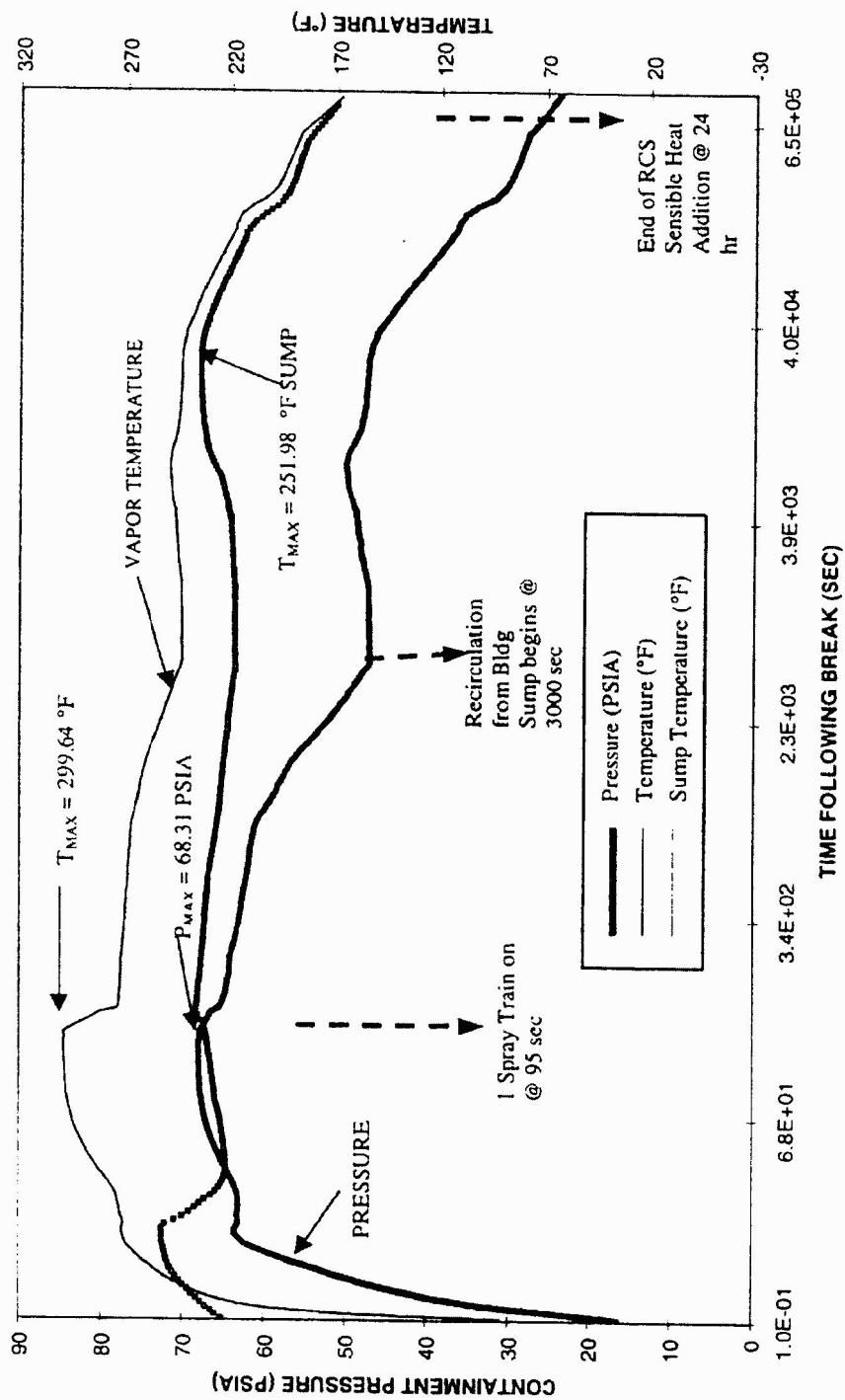
REVISION 15



# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

CONTAINMENT PRESSURE AND TEMPERATURE RESPONSE,  
 DOUBLE-ENDED DISCHARGE LEG SLOT BREAK, MAXIMUM ECCS  
 CORE POWER OF 4070 MWt

FIGURE 6.2.1-3



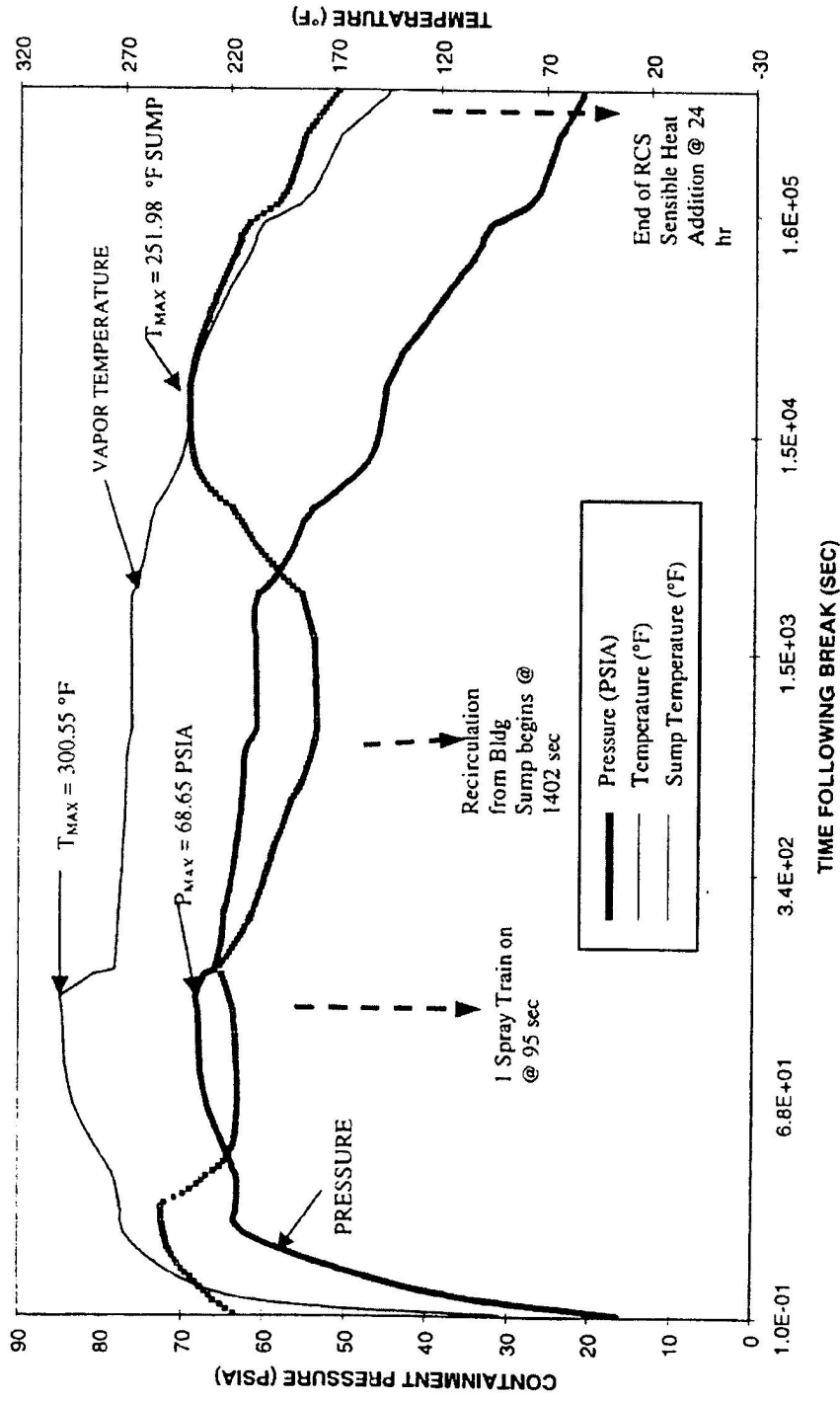
# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

CONTAINMENT PRESSURE AND TEMPERATURE RESPONSE,  
DOUBLE-ENDED SUCTION LEG SLOT BREAK, MINIMUM ECCS  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-4

JUNE 2009

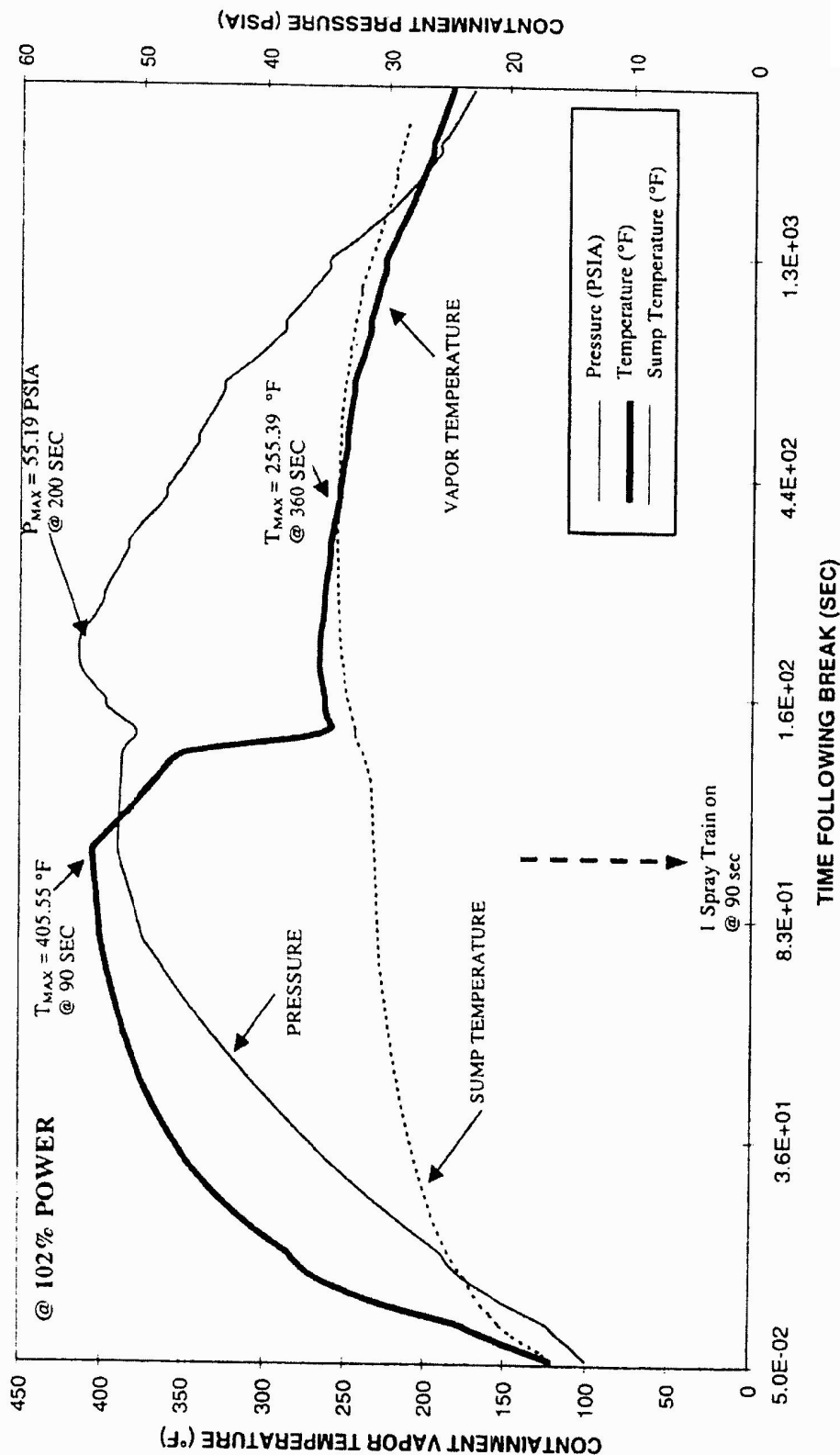
REVISION 15



# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

CONTAINMENT PRESSURE AND TEMPERATURE RESPONSE,  
DOUBLE-ENDED SUCTION LEG SLOT BREAK, MAXIMUM ECCS  
CORE POWER OF 4070 MWt

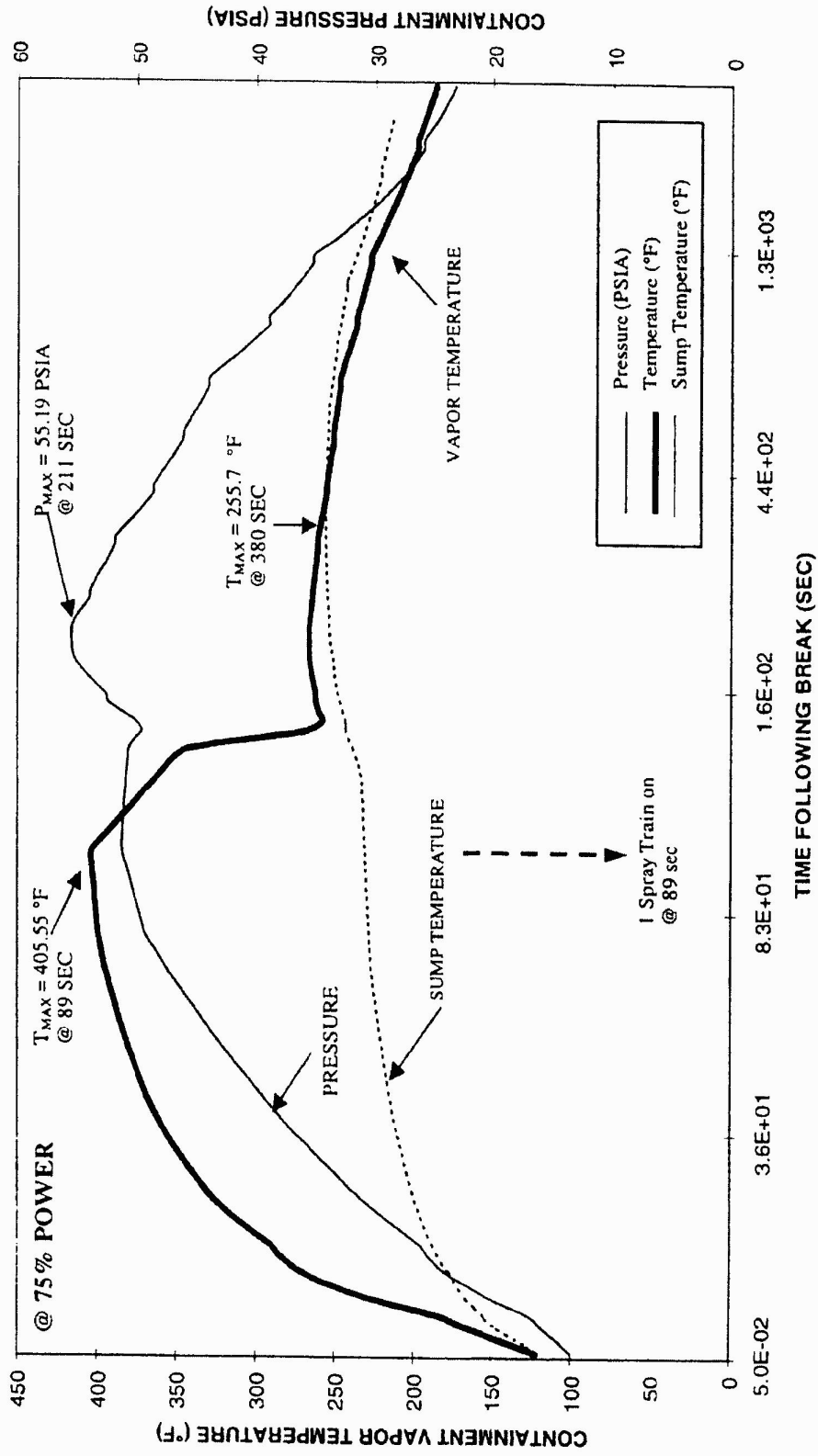
FIGURE 6.2.1-5



# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

CONTAINMENT PRESSURE AND TEMPERATURE RESPONSE, MSLB (GUILLOTINE) INSIDE  
CONTAINMENT WITH LOSS OF ONE TRAIN OF CONTAINMENT SPRAY  
CORE POWER OF 4070 MWt

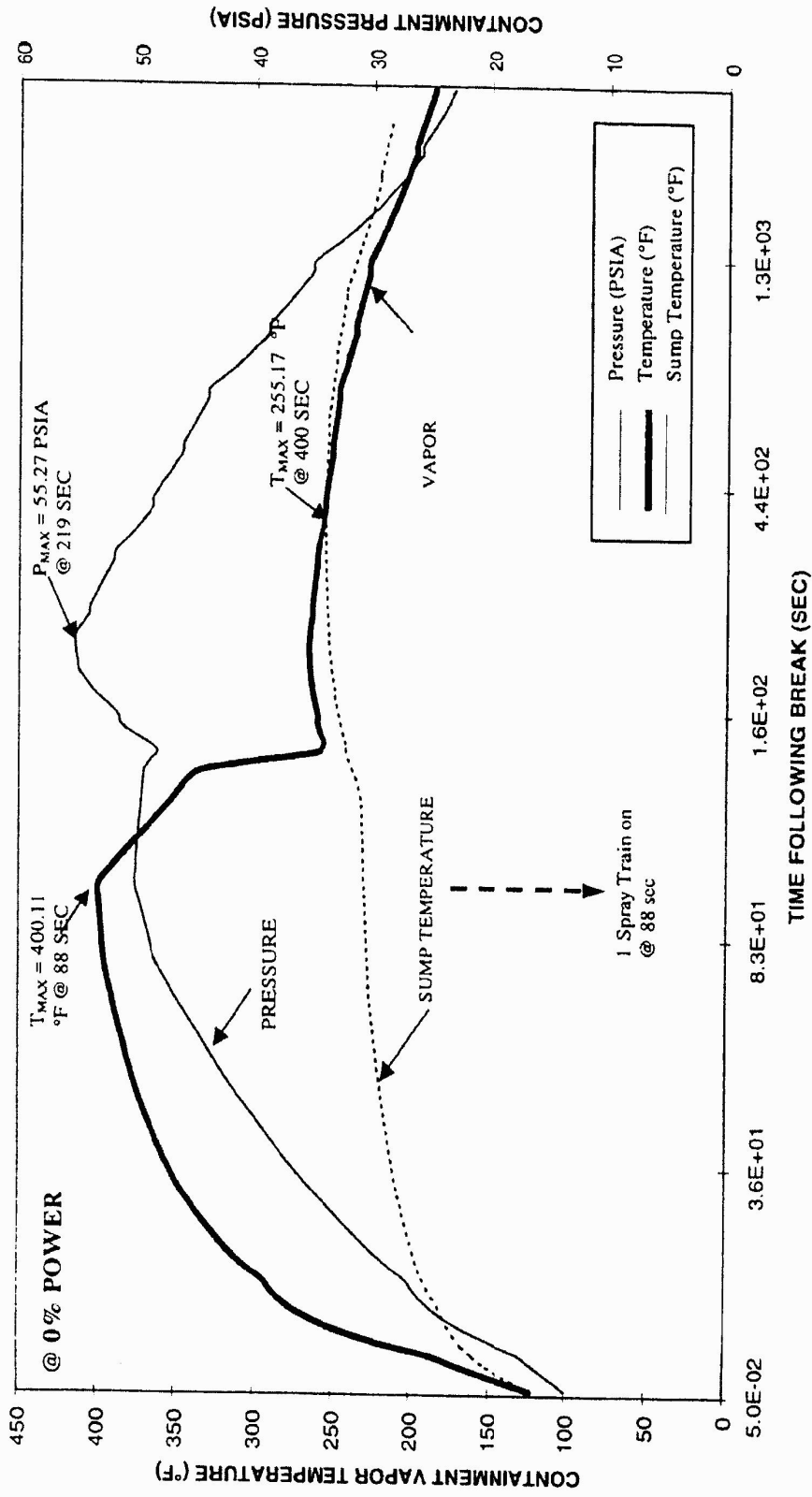
FIGURE 6.2.1-6 SHEET 1 OF 3



# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

CONTAINMENT PRESSURE AND TEMPERATURE RESPONSE, MSLB (GUILLOTINE) INSIDE  
CONTAINMENT WITH LOSS OF ONE TRAIN OF CONTAINMENT SPRAY  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-6 SHEET 2 OF 3

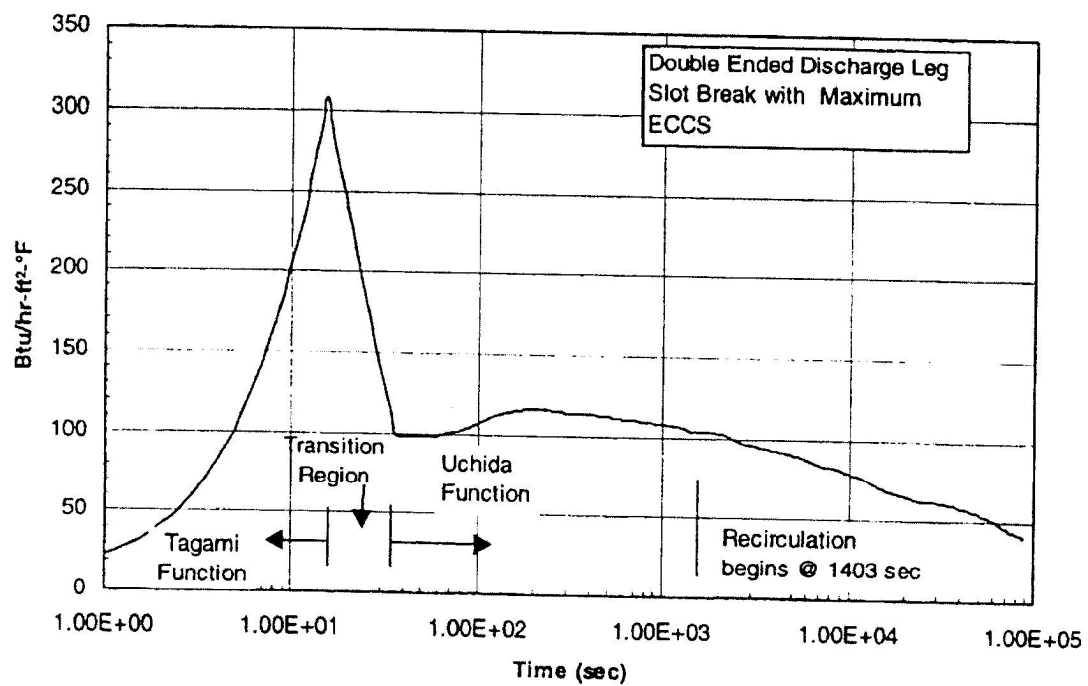


# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

CONTAINMENT PRESSURE AND TEMPERATURE RESPONSE, MSLB (GUILLOTINE) INSIDE  
CONTAINMENT WITH LOSS OF ONE TRAIN OF CONTAINMENT SPRAY  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-6 SHEET 3 OF 3





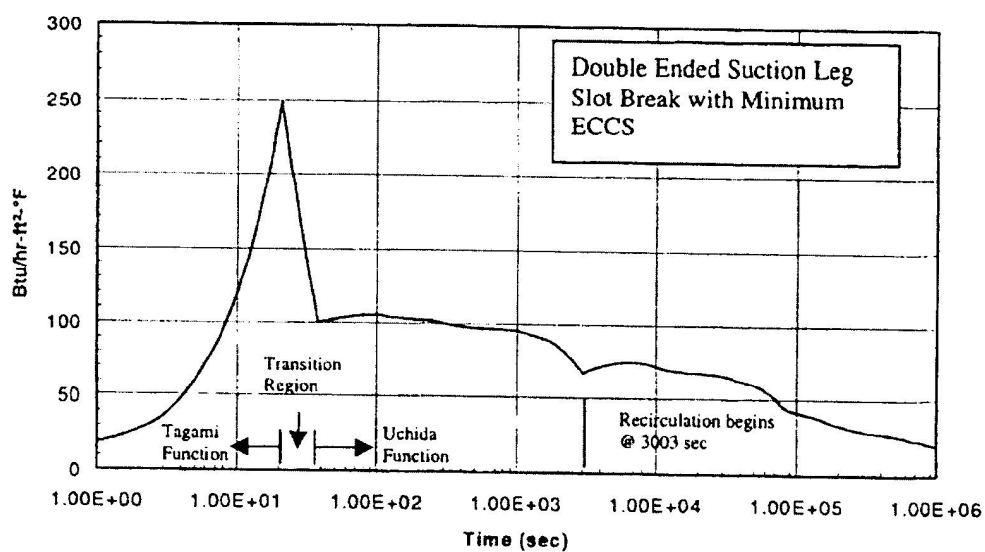
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONDENSING HEAT TRANSFER COEFFICIENT, DOUBLE-ENDED  
DISCHARGE LEG SLOT BREAK, MAXIMUM ECCS,  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-7

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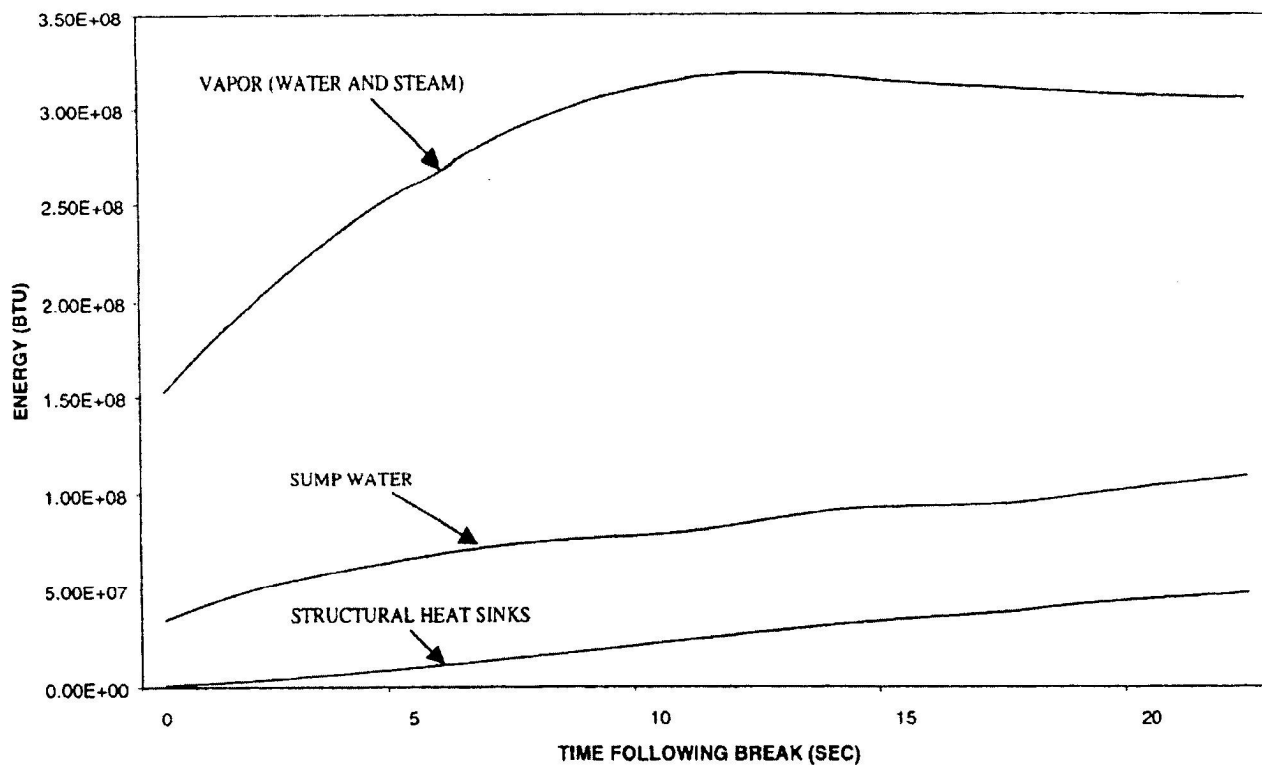
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONDENSING HEAT TRANSFER COEFFICIENT, DOUBLE-ENDED  
SUCTION LEG SLOT BREAK, MINIMUM ECCS,  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-8

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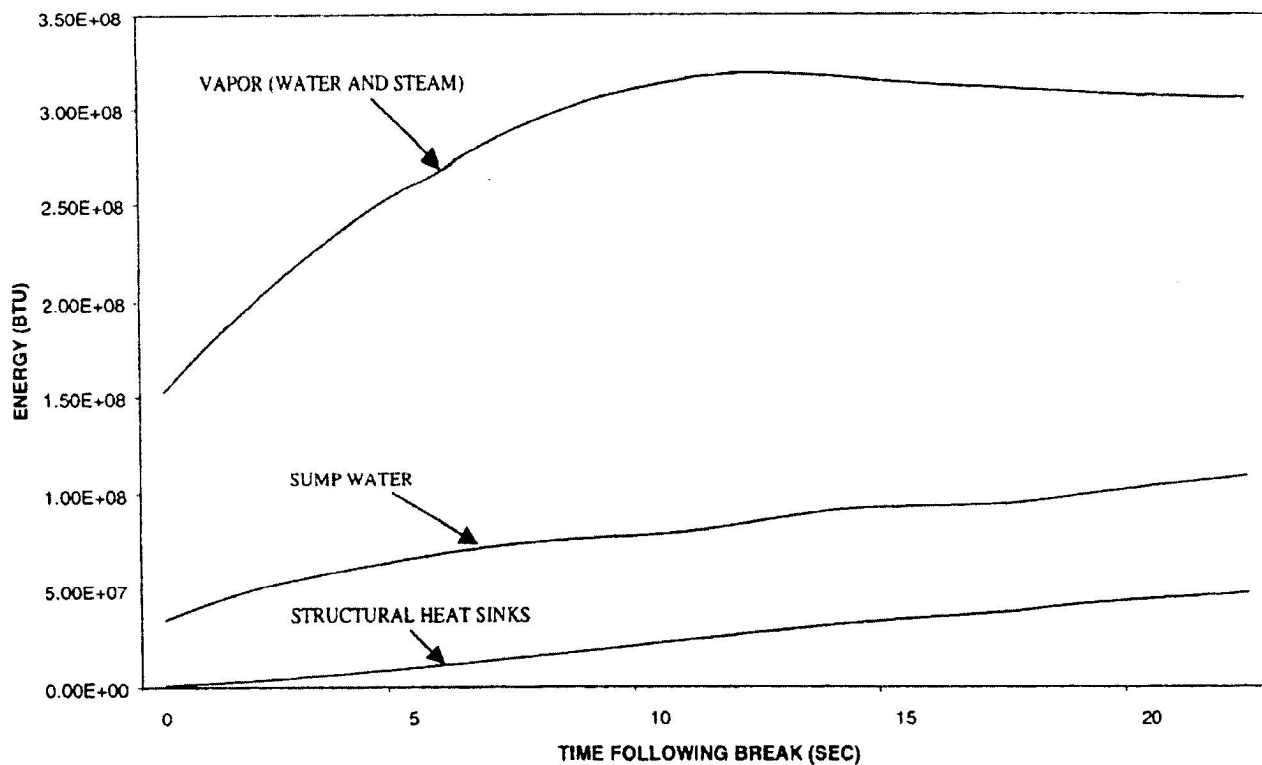
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT ENERGY INVENTORY,  
DOUBLE-ENDED DISCHARGE LEG SLOT BREAK, MAXIMUM ECCS  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-10 SHEET 1 OF 2

JUNE 2009

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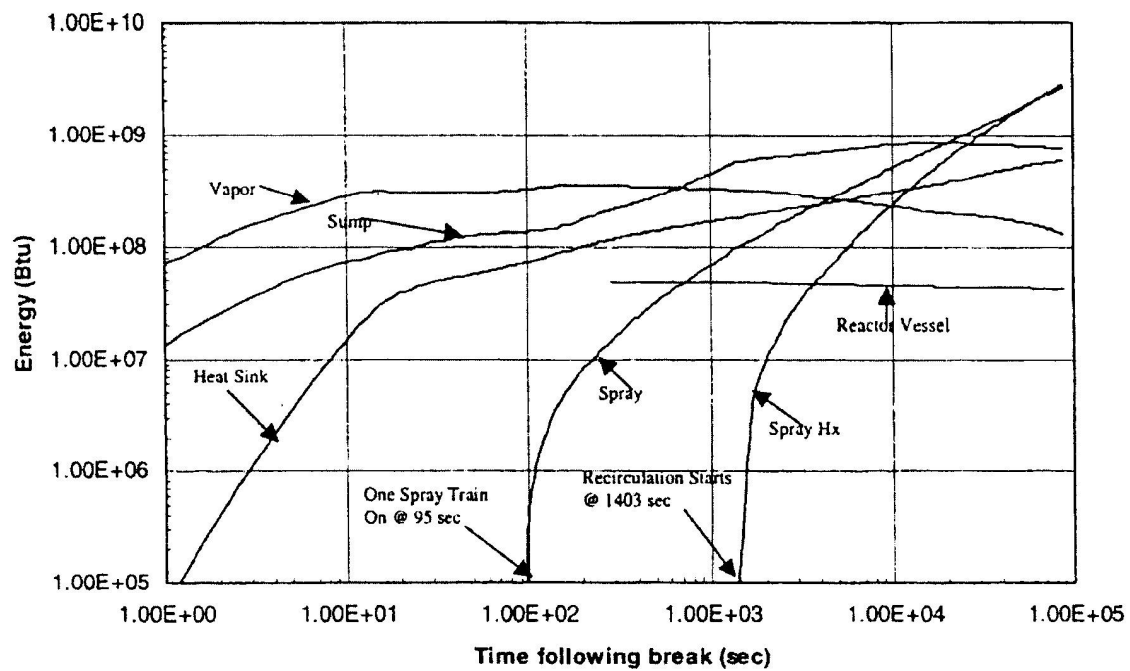
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT ENERGY INVENTORY,  
DOUBLE-ENDED DISCHARGE LEG SLOT BREAK, MAXIMUM ECCS  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-10 SHEET 1 OF 2

JUNE 2009

REVISION 15



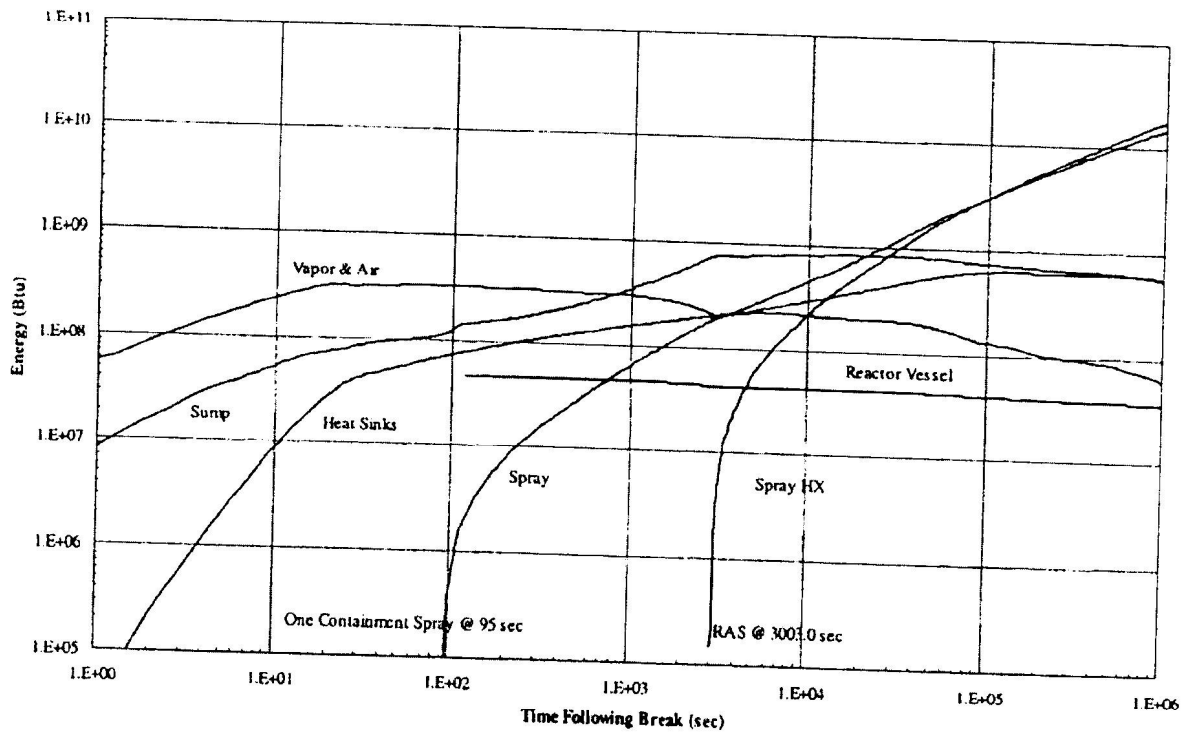
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT ENERGY INVENTORY,  
DOUBLE-ENDED DISCHARGE LEG SLOT BREAK, MAXIMUM ECCS  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-10 SHEET 2 OF 2

JUNE 2009

REVISION 15



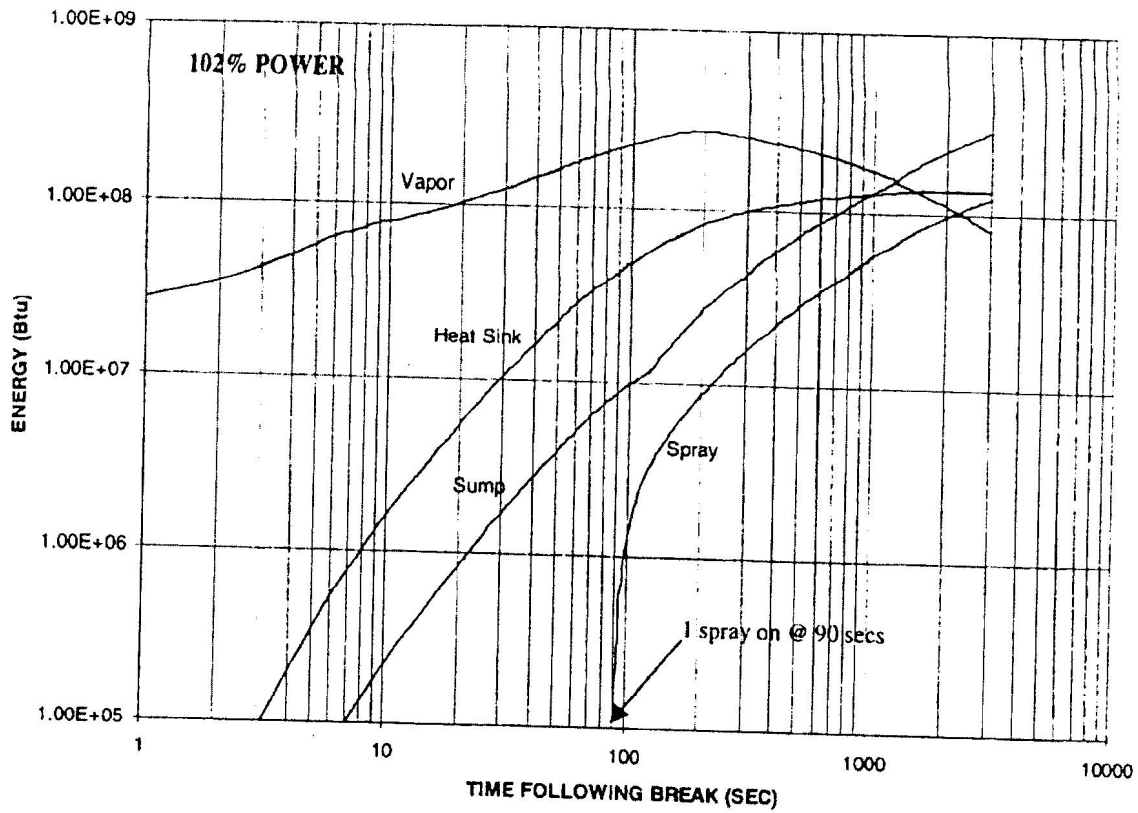
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT ENERGY INVENTORY,  
DOUBLE-ENDED SUCTION LEG SLOT BREAK, MINIMUM ECCS  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-11

JUNE 2009

REVISION 15



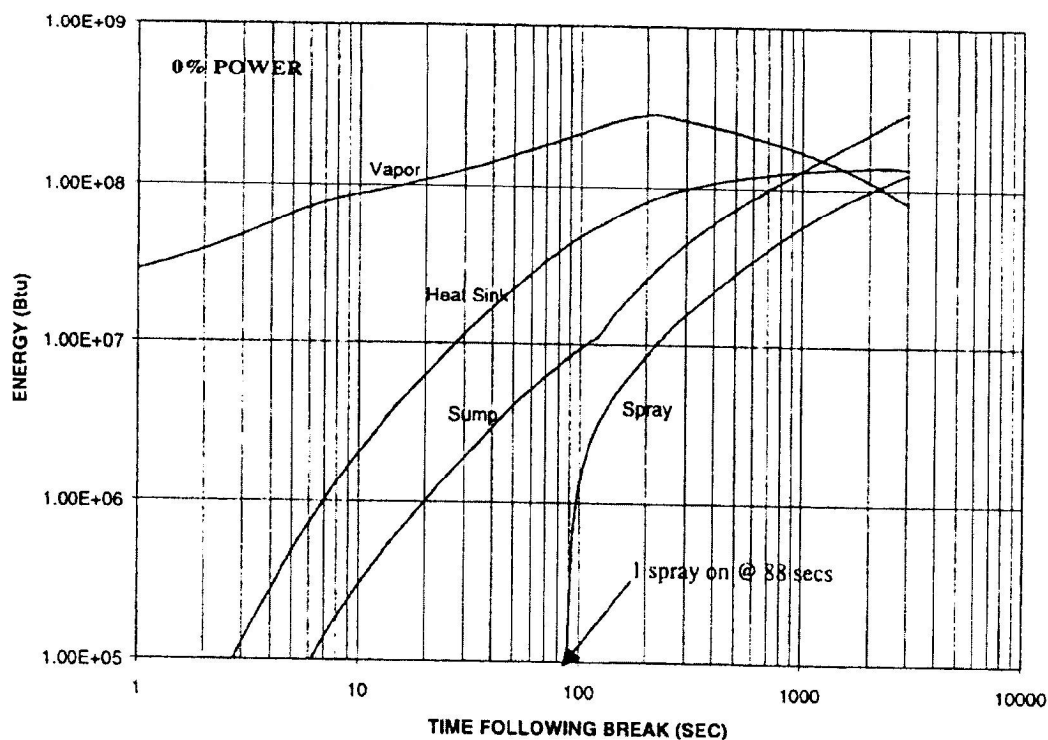
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT ENERGY DISTRIBUTION,  
MAIN STEAM LINE GUILLOTINE BREAK INSIDE CONTAINMENT  
WITH LOSS OF ONE TRAIN OF CONTAINMENT SPRAY SYSTEM  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-12 SHEET 1 OF 2

JUNE 2009

REVISION 15



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

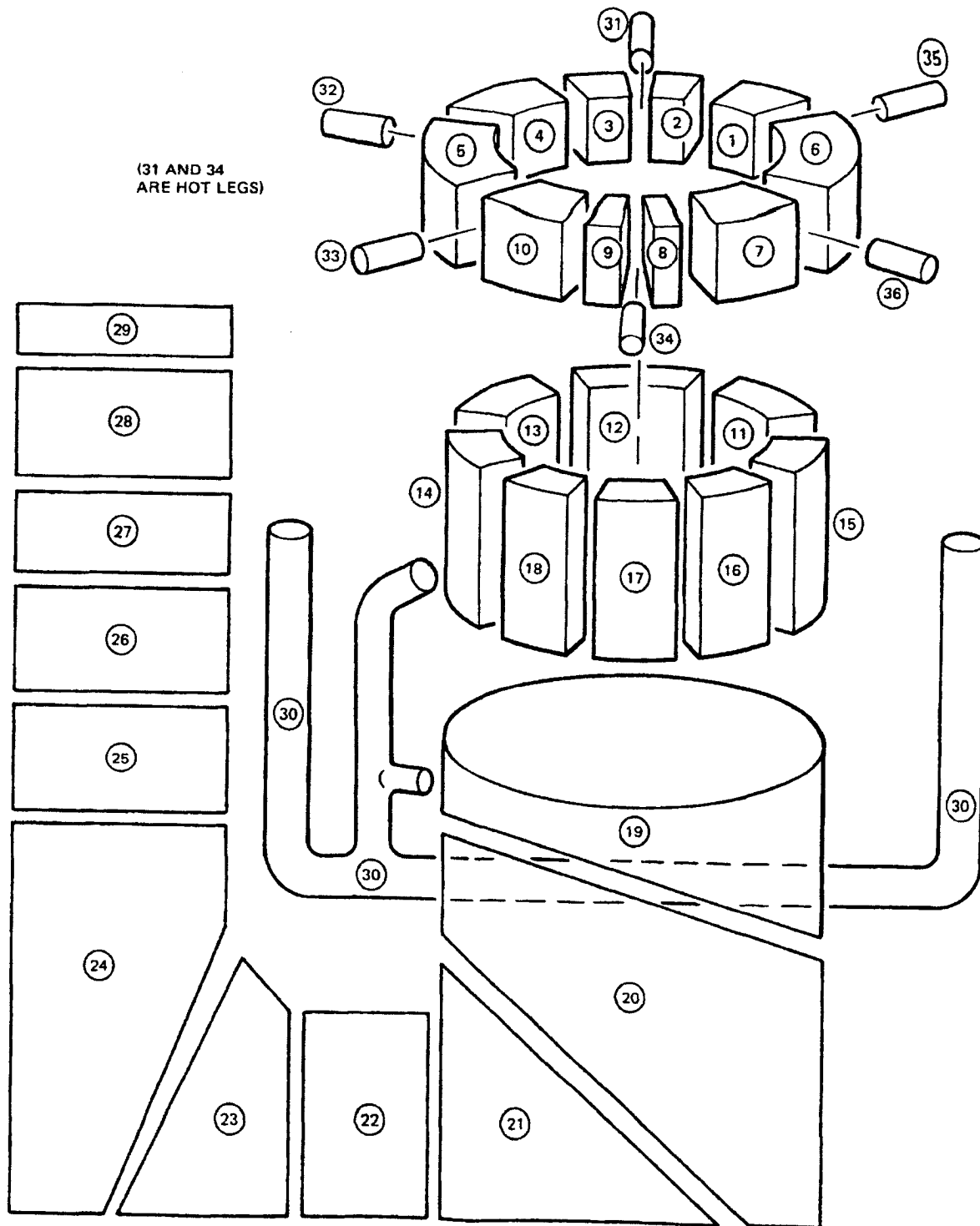
CONTAINMENT ENERGY DISTRIBUTION,  
MAIN STEAM LINE GUILLOTINE BREAK INSIDE CONTAINMENT  
WITH LOSS OF ONE TRAIN OF CONTAINMENT SPRAY SYSTEM  
CORE POWER OF 4070 MWt

FIGURE 6.2.1-12 SHEET 2 OF 2

JUNE 2009

REVISION 15





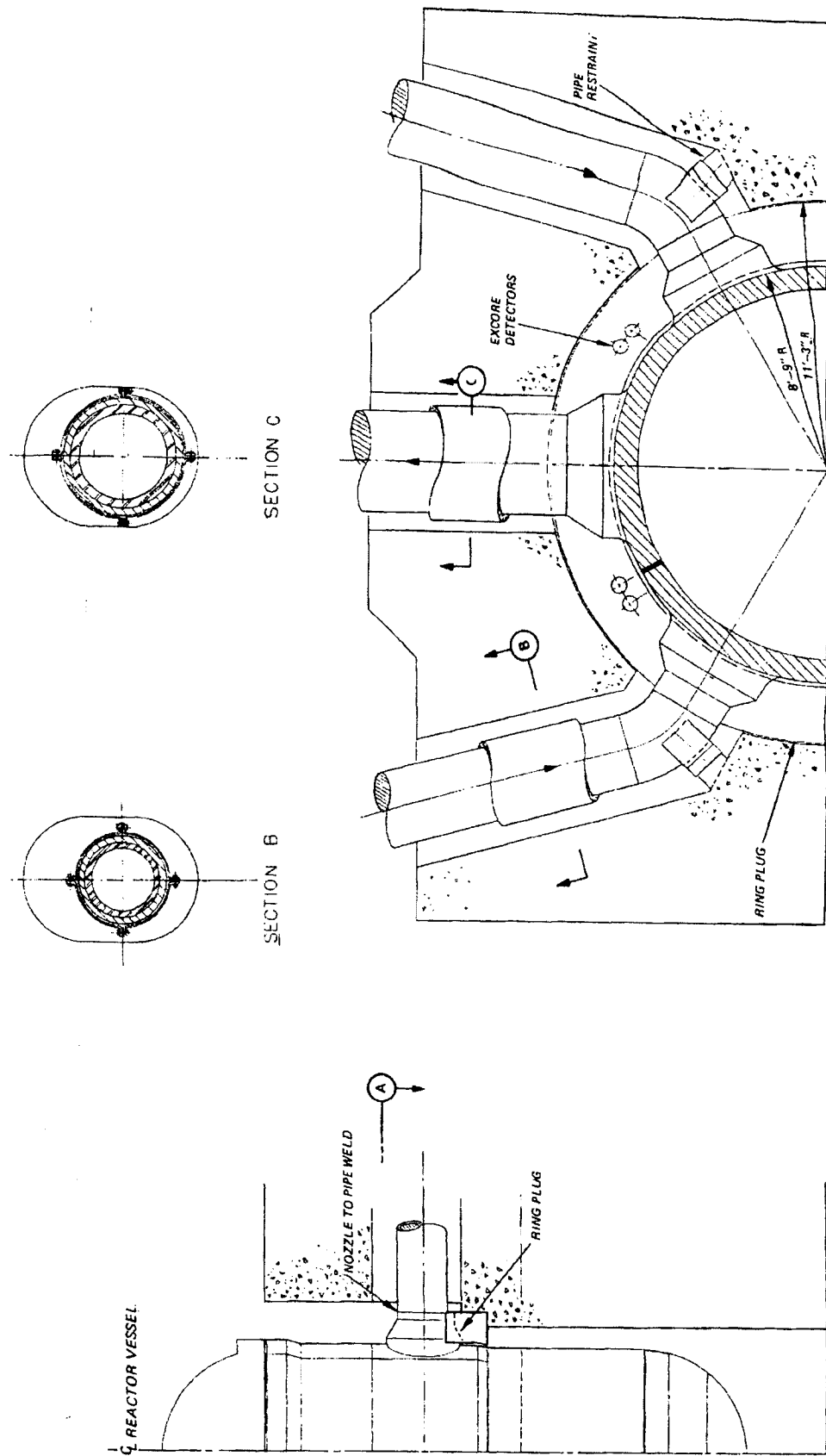
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REACTOR CAVITY NODALIZATION

FIGURE 6.2.1-13

JUNE 2001

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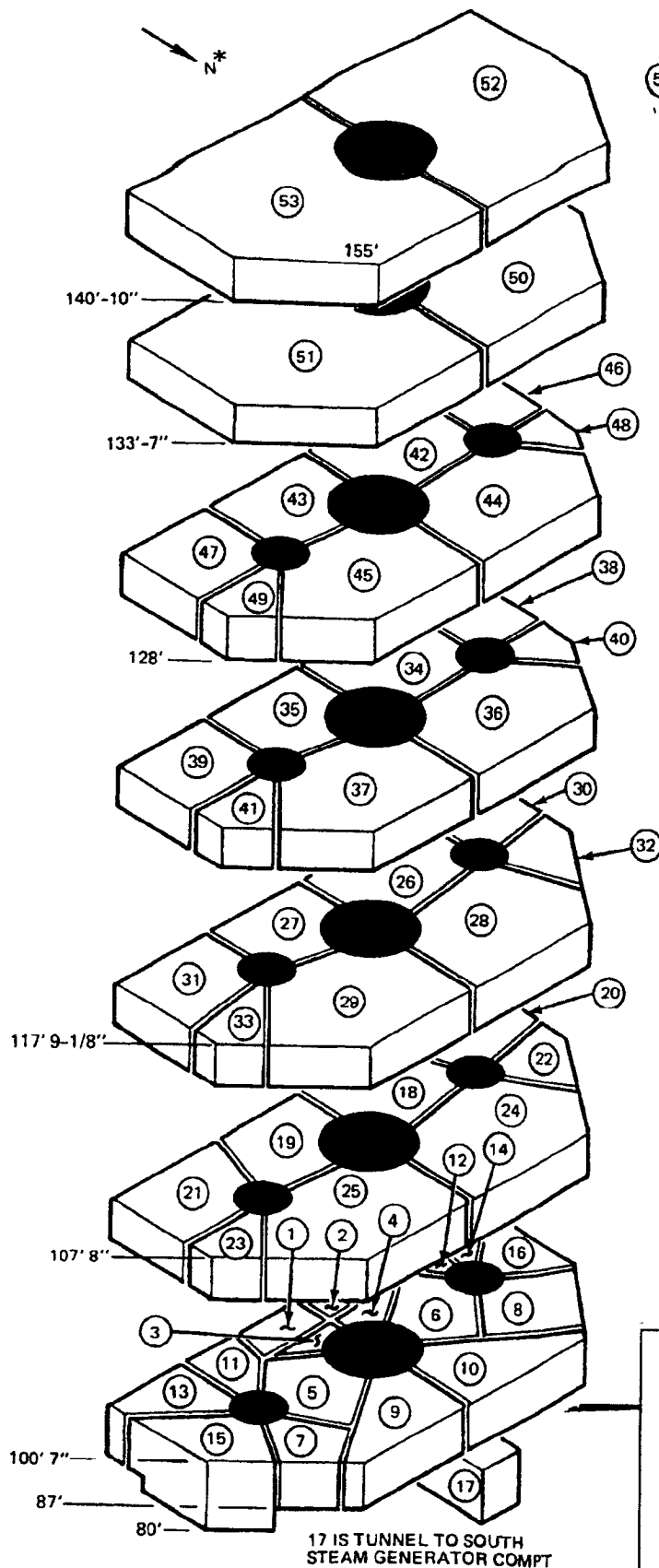
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REACTOR CAVITY FLOW NETWORK

FIGURE 6.2.1-14

JUNE 2001

REVISION 11



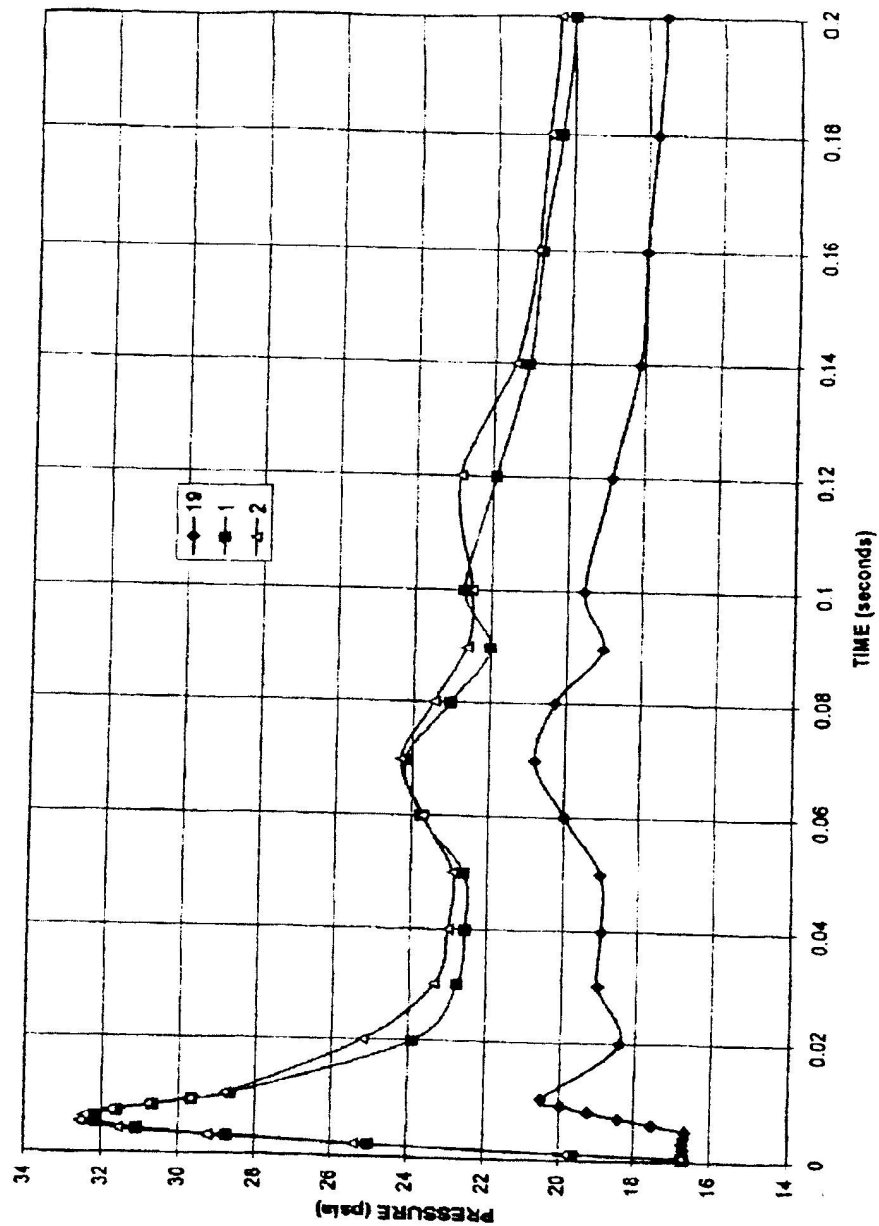
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

STEAM GENERATOR  
SUBCOMPARTMENT MODEL

FIGURE 6.2.1-15

JUNE 2001

REVISION 11



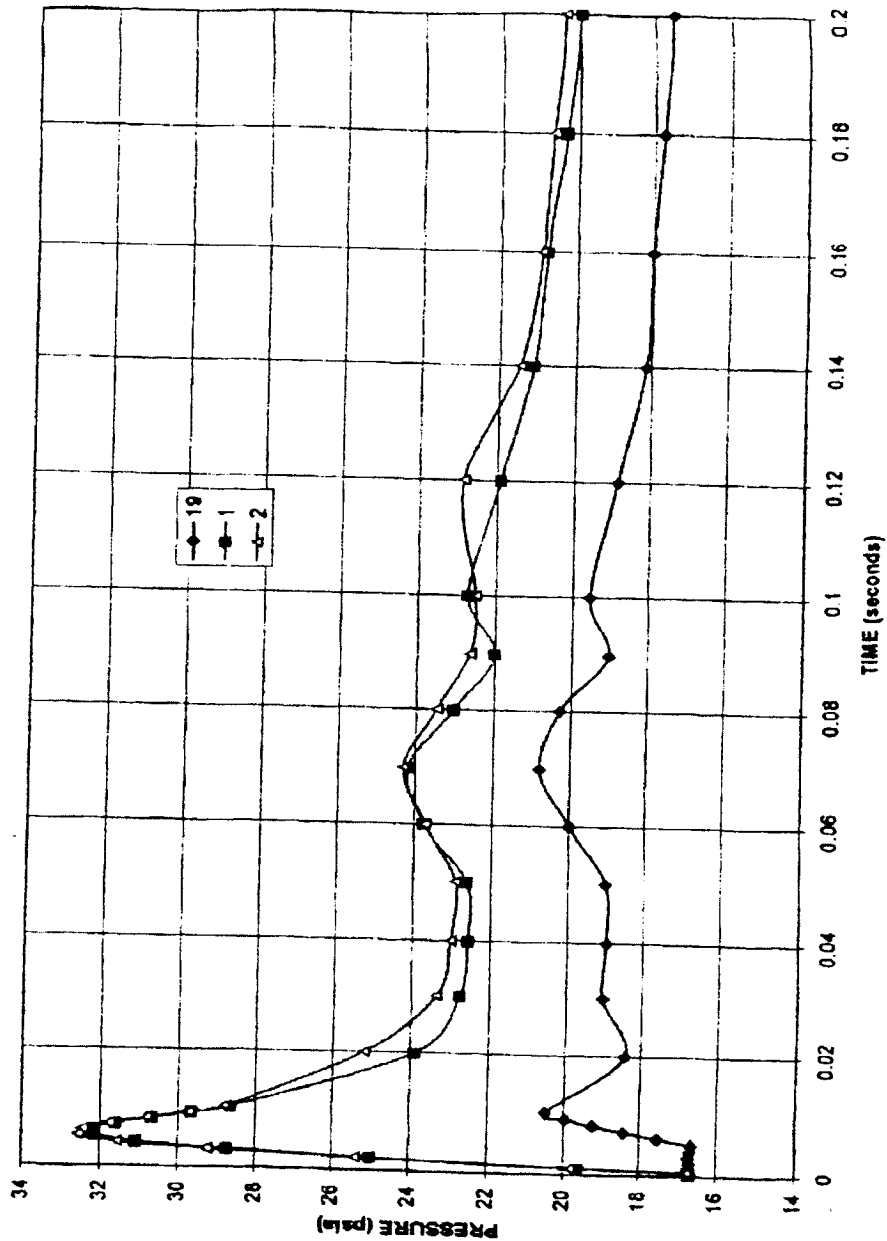
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

3990 MWt,  
STEAM GEN. COMPARTMENT MODEL, 55 NODES PRESSURE vs. TIME  
CURVES FOR 129 IN<sup>2</sup> SHUTDOWN COOLING BREAK

FIGURE 6.2.1-18

JUNE 2009

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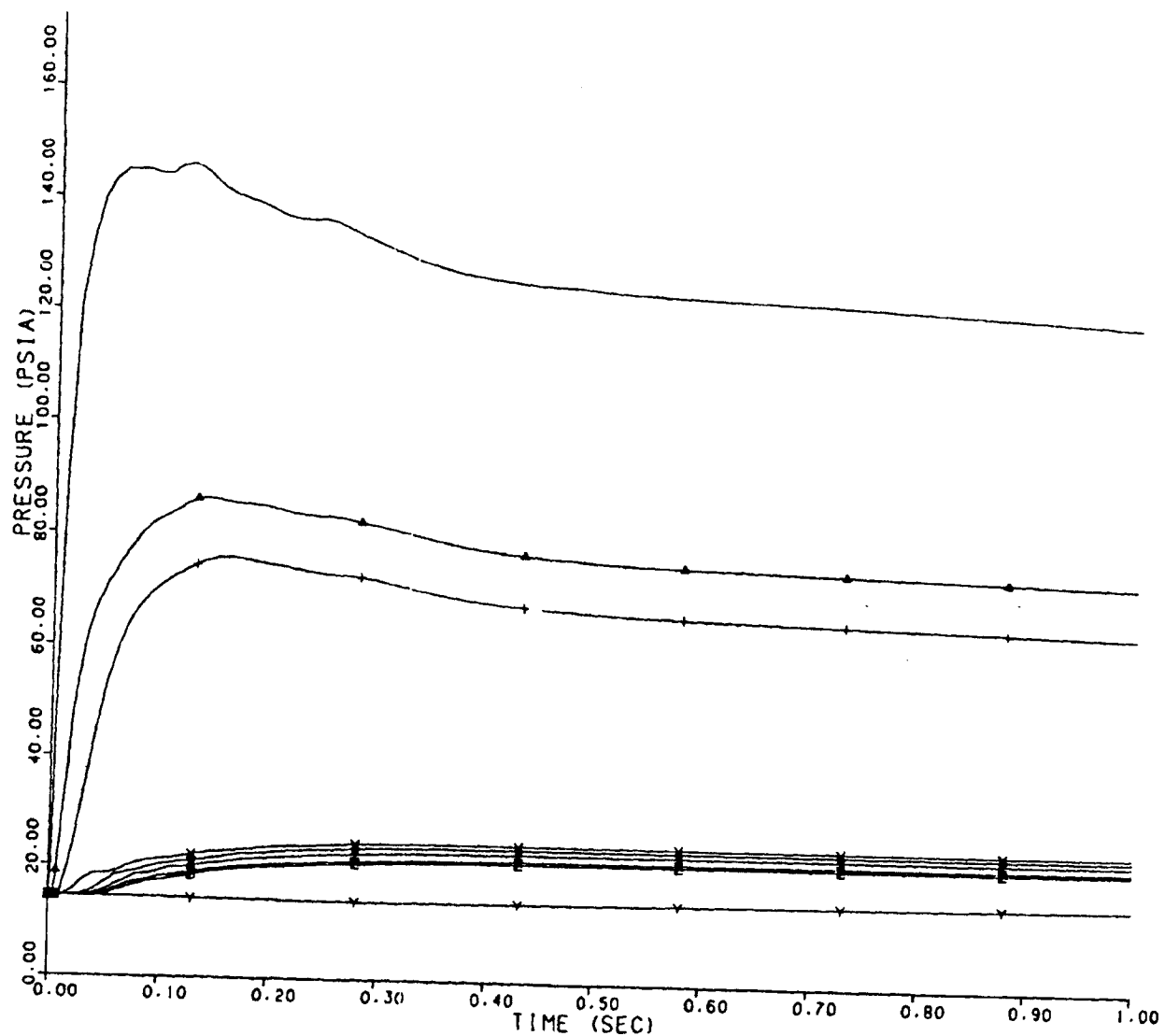
**PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR**

3990 MW/OSG CONFIGURATION  
STEAM GEN. COMPARTMENT MODEL, 55 NODES  
PRESSURE vs. TIME CURVES  
FOR 129 IN<sup>2</sup> SHUTDOWN COOLING BREAK

FIGURE 6.2.1-18A

JUNE 2007

REVISION 14



LEGEND:

- NODE 1
- NODE 2
- NODE 3
- NODE 4
- NODE 5
- NODE 6
- NODE 7
- NODE 8
- NODE 9

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PRESSURIZER COMPARTMENT MODEL, 9 NODES  
PRESSURE VS. TIME CURVES  
FOR SURGE LINE BREAK

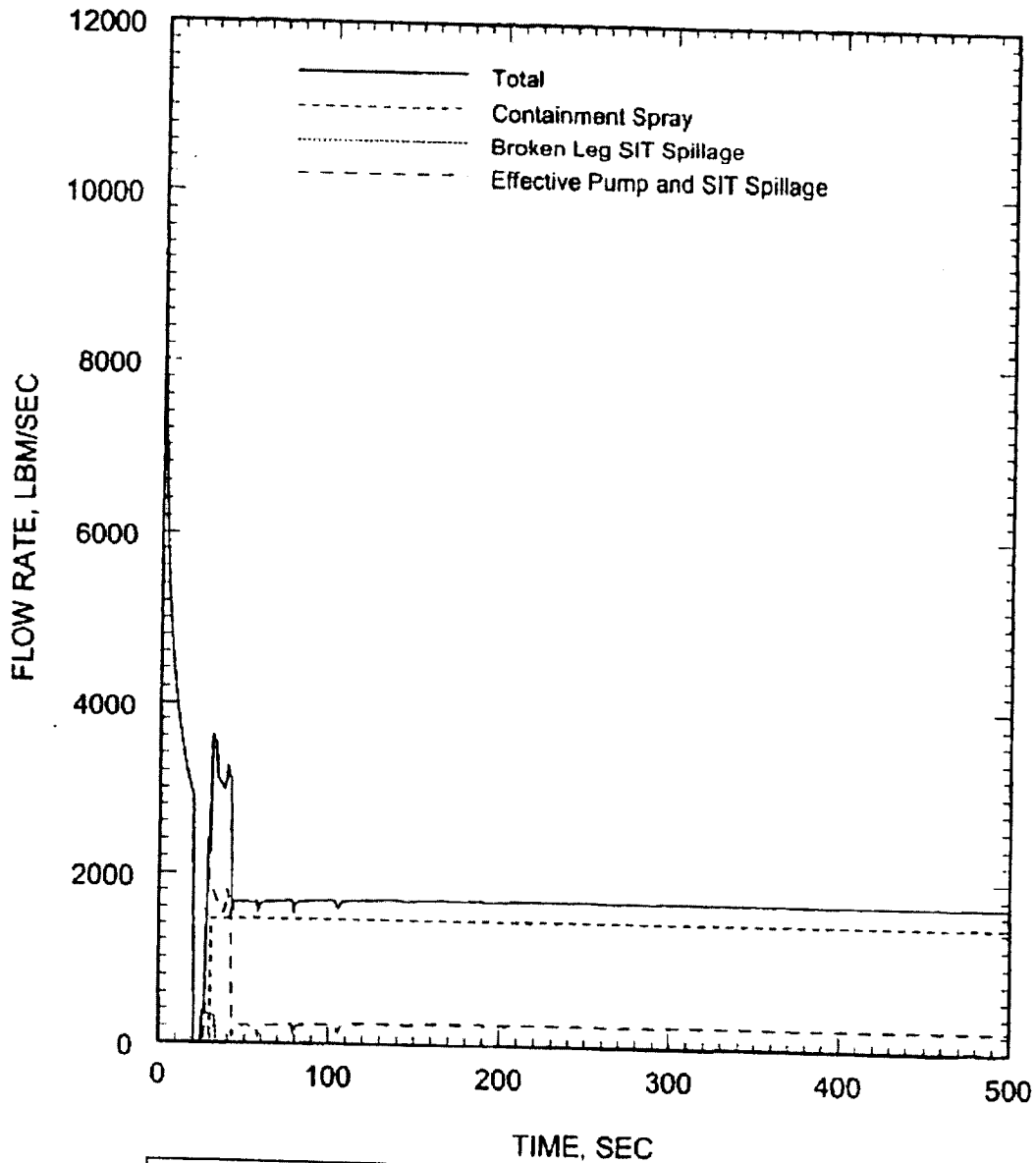
FIGURE 6.2.1-19

JUNE 2001

REVISION 11

**0.6 DOUBLE-ENDED GUILLOTINE COLD LEG BREAK  
AT PUMP DISCHARGE FOR ZIRCALOY-4 CLADDING  
CONTAINMENT SPRAY AND ECCS SPILLAGE FLOW RATE**

**Figure 6.2.1-21**



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

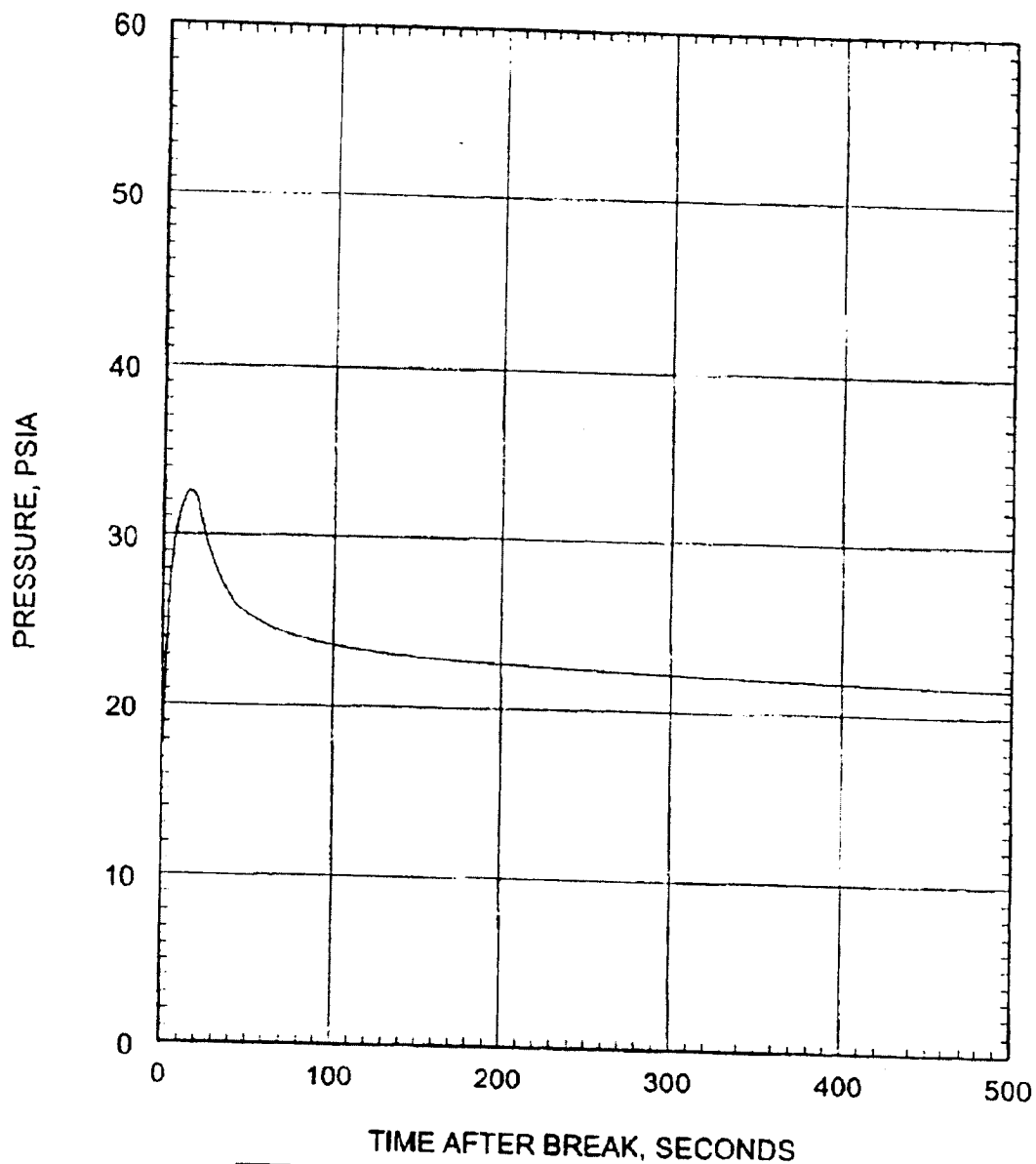
CONTAINMENT SPRAY AND ECCS SPILLAGE FLOW  
RATES USED IN THE MINIMUM CONTAINMENT

FIGURE 6.2.1-21

JUNE 2003 REVISION 12

**0.6 DOUBLE-ENDED GUILLOTINE COLD LEG BREAK  
AT PUMP DISCHARGE FOR ZIRCALOY-4 CLADDING  
CONTAINMENT PRESSURE**

**Figure 6.2.1-22**



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

MINIMUM CONTAINMENT PRESSURE FOR ECCS  
PERFORMANCE ANALYSIS 0.6 DOUBLE ENDED  
GUILLOTINE BREAK IN PUMP DISCHARGE LEG

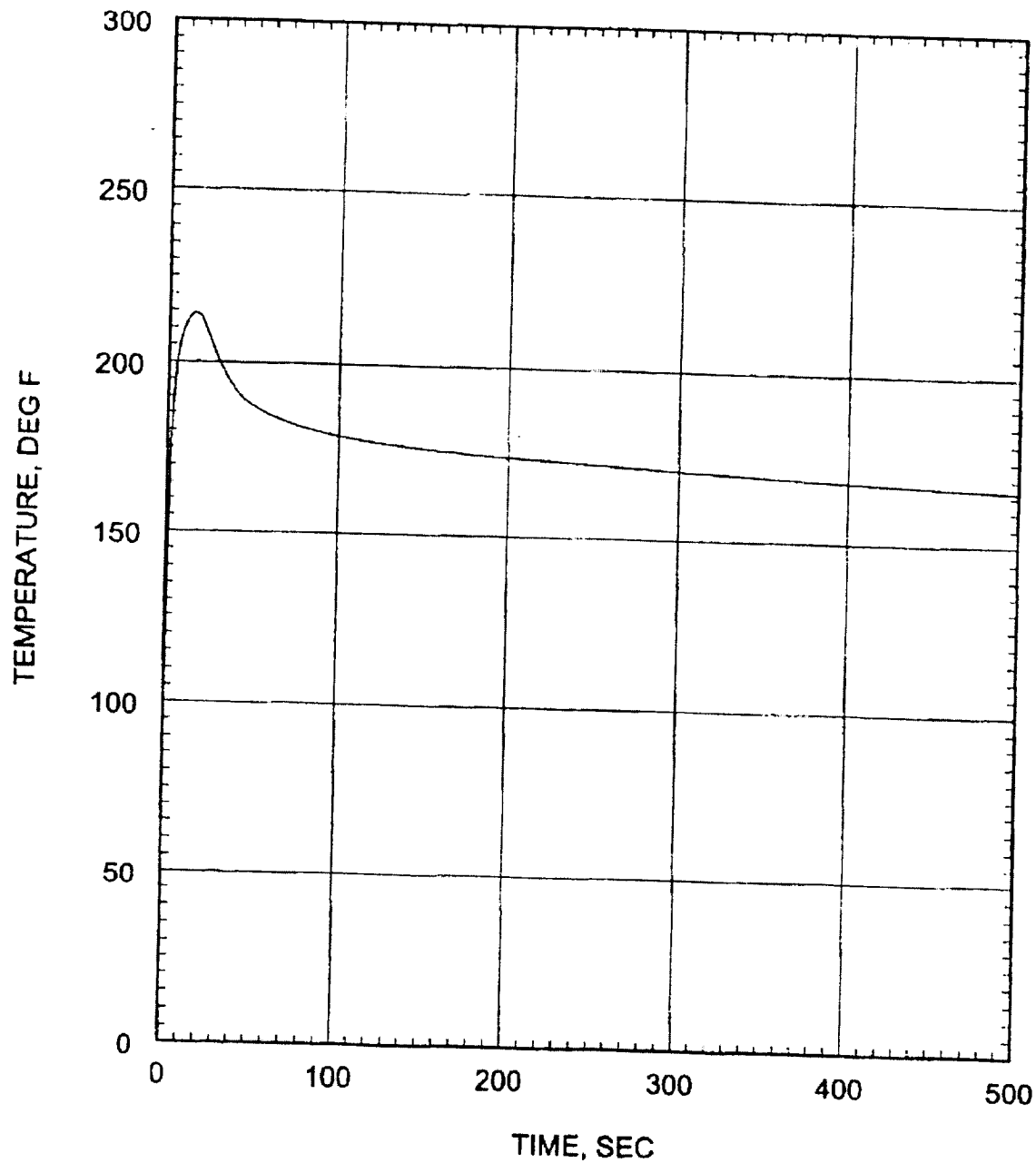
FIGURE 6.2.1-22

JUNE 2003 REVISION 12



**0.6 DOUBLE-ENDED GUILLOTINE COLD LEG BREAK  
AT PUMP DISCHARGE FOR ZIRCALOY-4 CLADDING  
CONTAINMENT ATMOSPHERE TEMPERATURE**

**Figure 6.2.1-23**



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT ATMOSPHERE TEMPERATURE  
0.6 DOUBLE ENDED GUILLOTINE BREAK IN PUMP  
DISCHARGE LEG

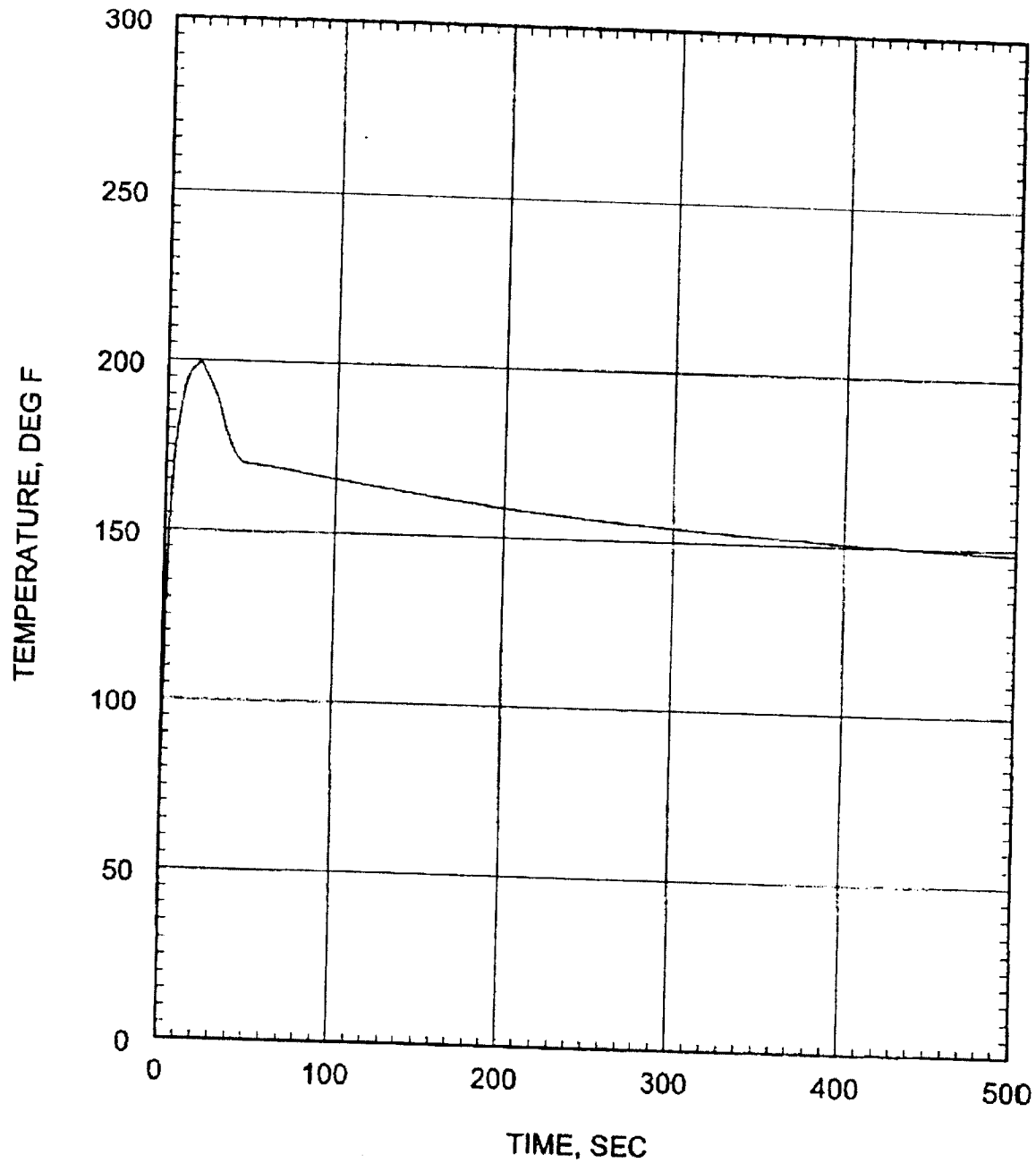
FIGURE 6.2.1-23

JUNE 2003

REVISION 12

**0.6 DOUBLE-ENDED GUILLOTINE COLD LEG BREAK  
AT PUMP DISCHARGE FOR ZIRCALOY-4 CLADDING  
CONTAINMENT SUMP TEMPERATURE**

**Figure 6.2.1-24**



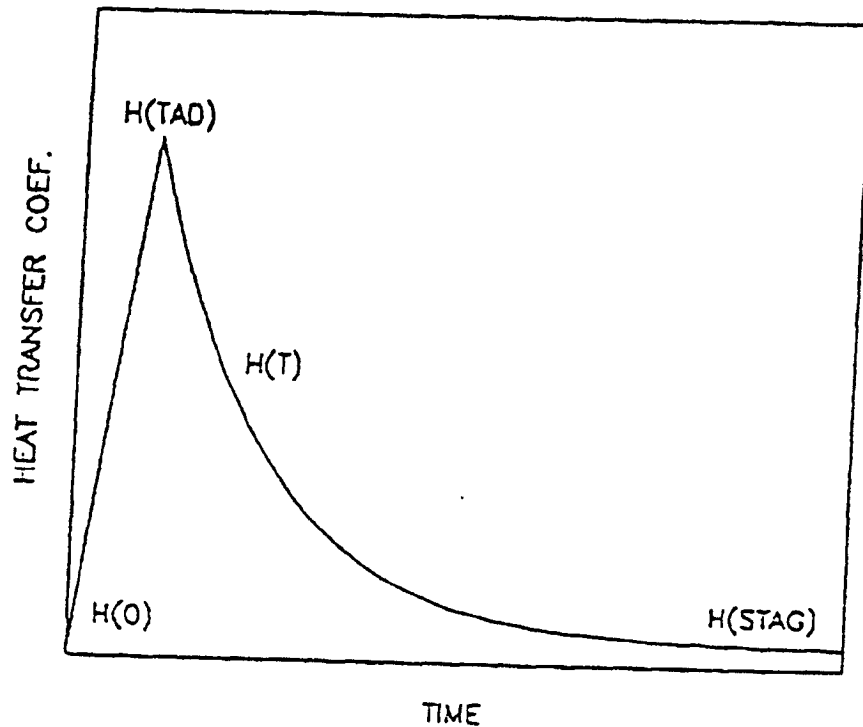
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT SUMP TEMPERATURE  
0.6 DOUBLE ENDED GUILLOTINE BREAK IN PUMP  
DISCHARGE LEG

FIGURE 6.2.1-24

JUNE 2003

REVISION 12



$$H(0) = 8 \text{ BTU/hr-ft}^2\text{-}^\circ\text{F}$$

$$H(TAD) = H_{max} = 4 * H(Tagami)$$

$$H(T) = H(STAG) + (H_{max} - H(STAG)) * e^{-0.025 * (T - TAD)}$$

$$H(STAG) = 1.2 * H(Uchida)$$

TAD = Time of Annulus Downflow

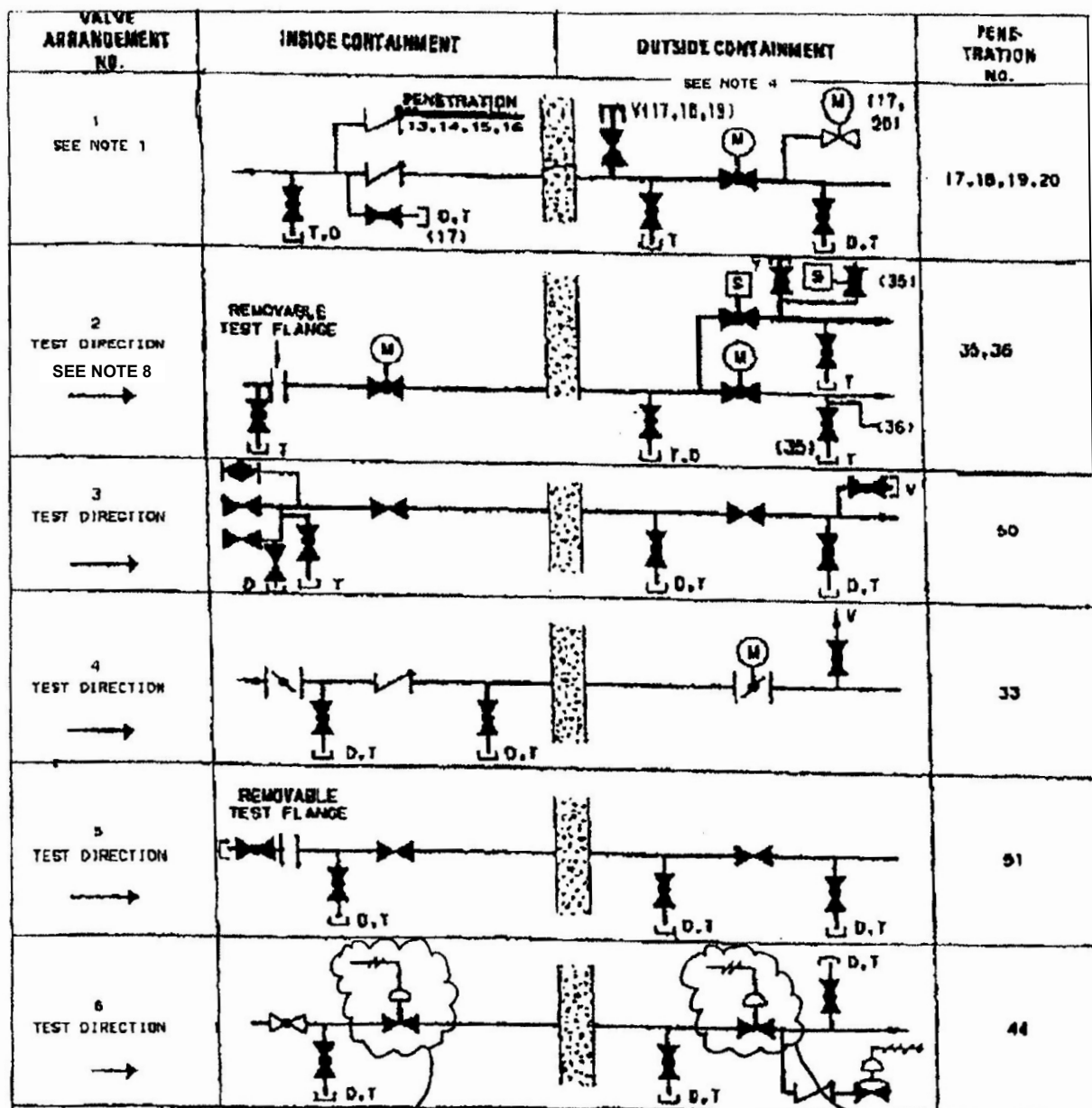
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONDENSING HEAT TRANSFER COEFFICIENT FOR PASSIVE  
HEATSINKS USED IN THE MINIMUM CONTAINMENT  
PRESSURE ANALYSIS FOR ECCS PERFORMANCE

FIGURE 6.2.1-25

JUNE 2001

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

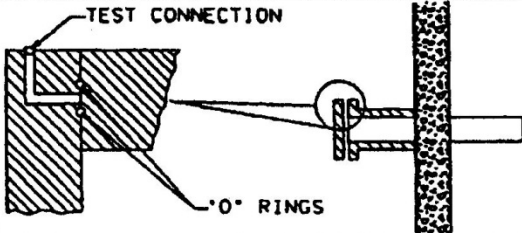
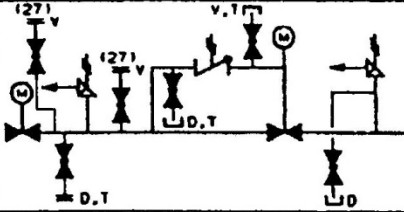
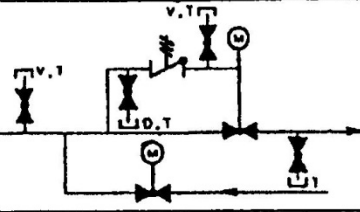
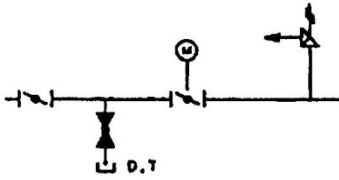
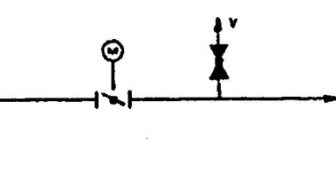
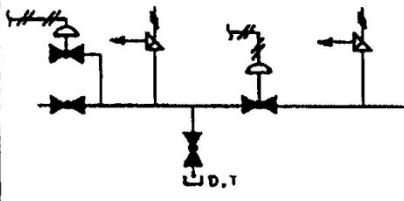
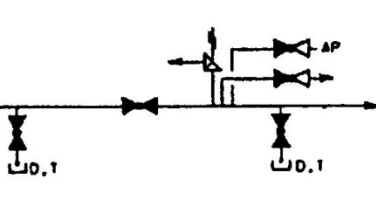
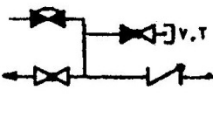
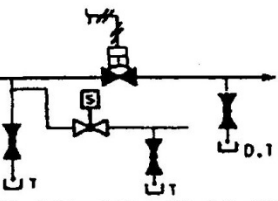
CONTAINMENT PENETRATION VALVE  
ARRANGEMENT FIGURE

FIGURE 6.2.4-1 SHEET 1 OF 10

JUNE 2015

REVISION 18

REVISION 18

VALVE ARRANGEMENT NO.	INSIDE CONTAINMENT	OUTSIDE CONTAINMENT	PENETRATION NO.
9 TEST DIRECTION →			53
10			26, 27
11 TEST DIRECTION →			34
12 TEST DIRECTION →			28
13 TEST DIRECTION → SEE NOTE 8			45

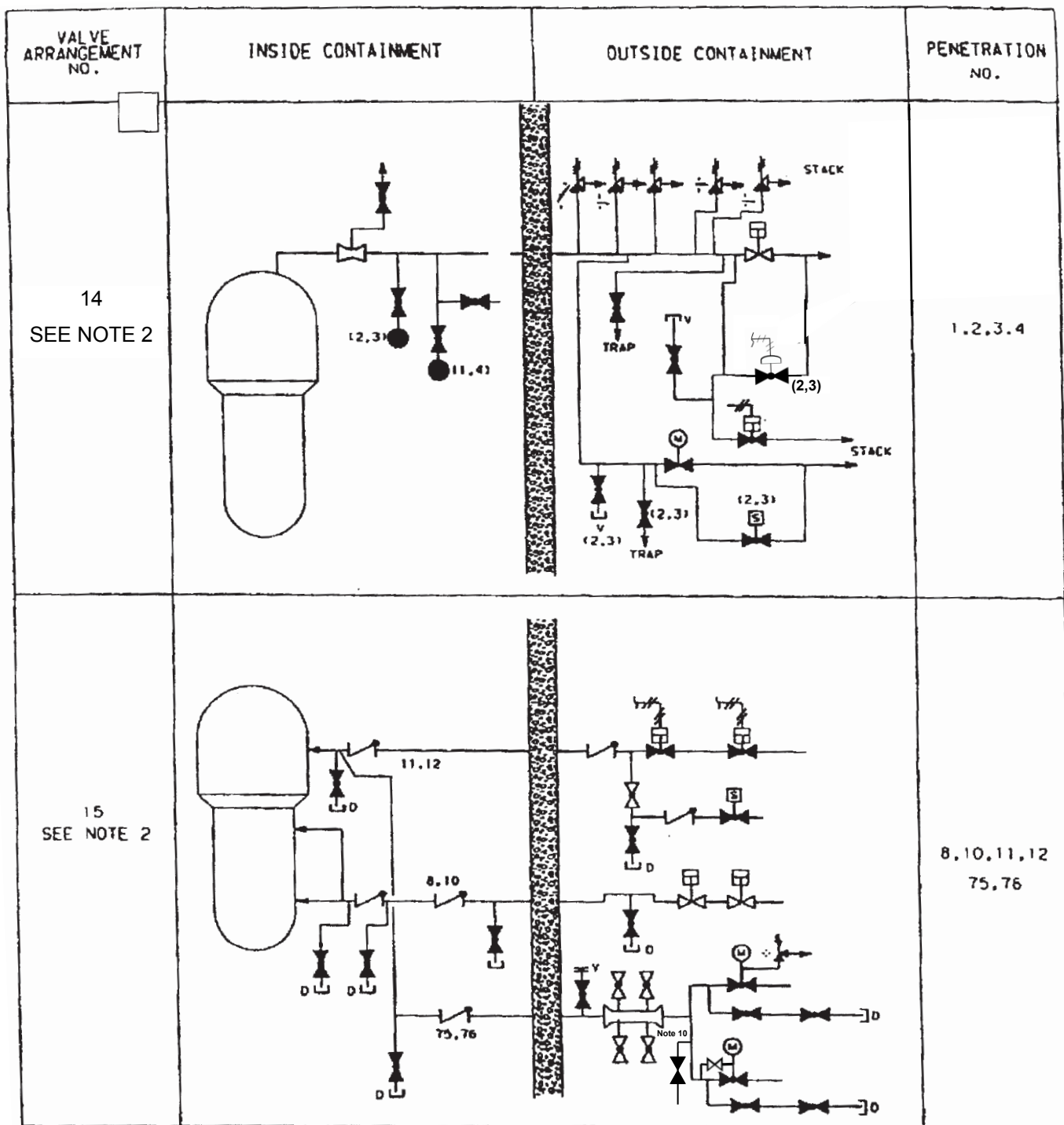
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

### CONTAINMENT PENETRATION VALVE ARRANGEMENT

FIGURE 6.2.4-1 SHEET 3 OF 10

JUNE 2015

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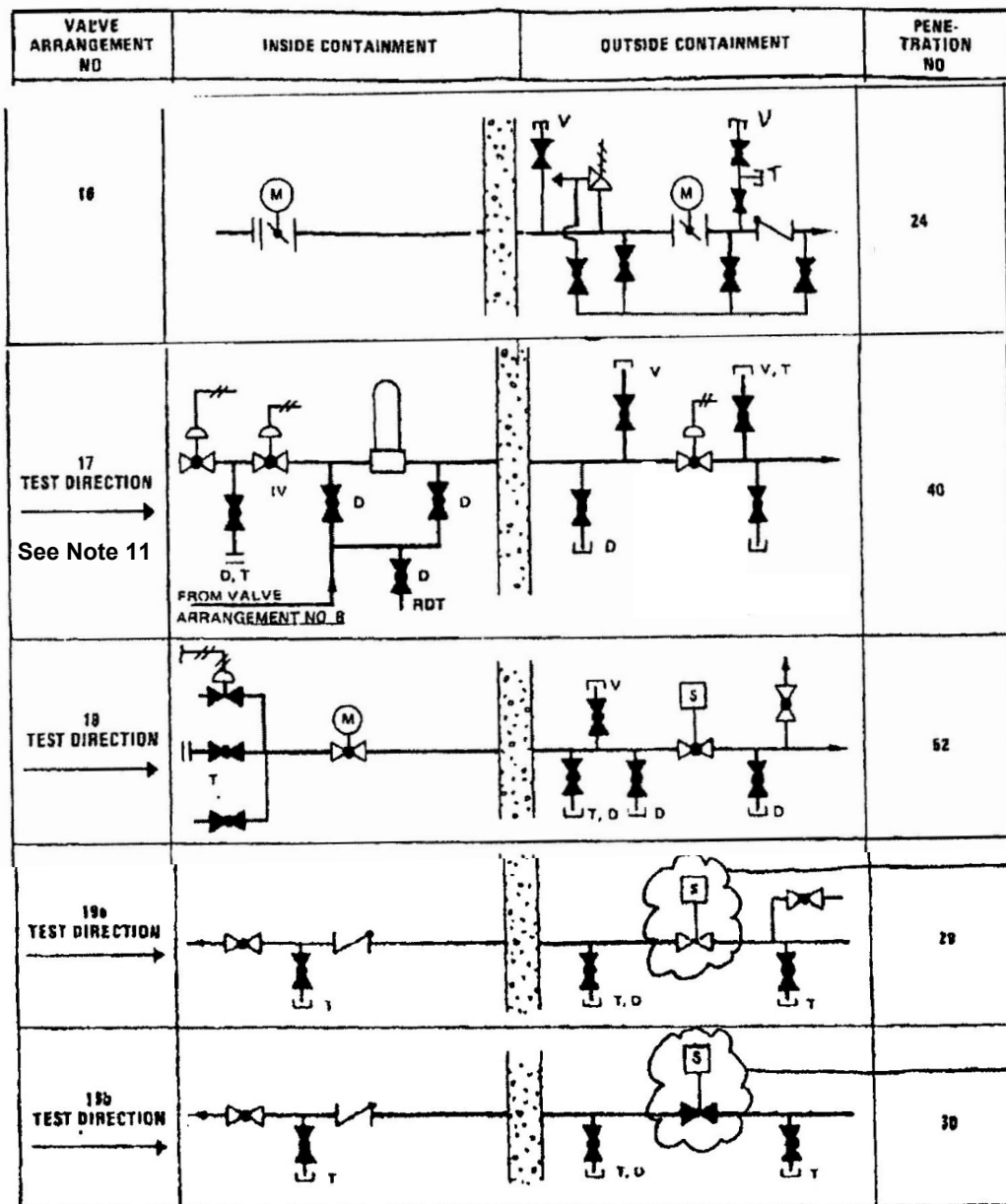
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 4 OF 10

JUNE 2015

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

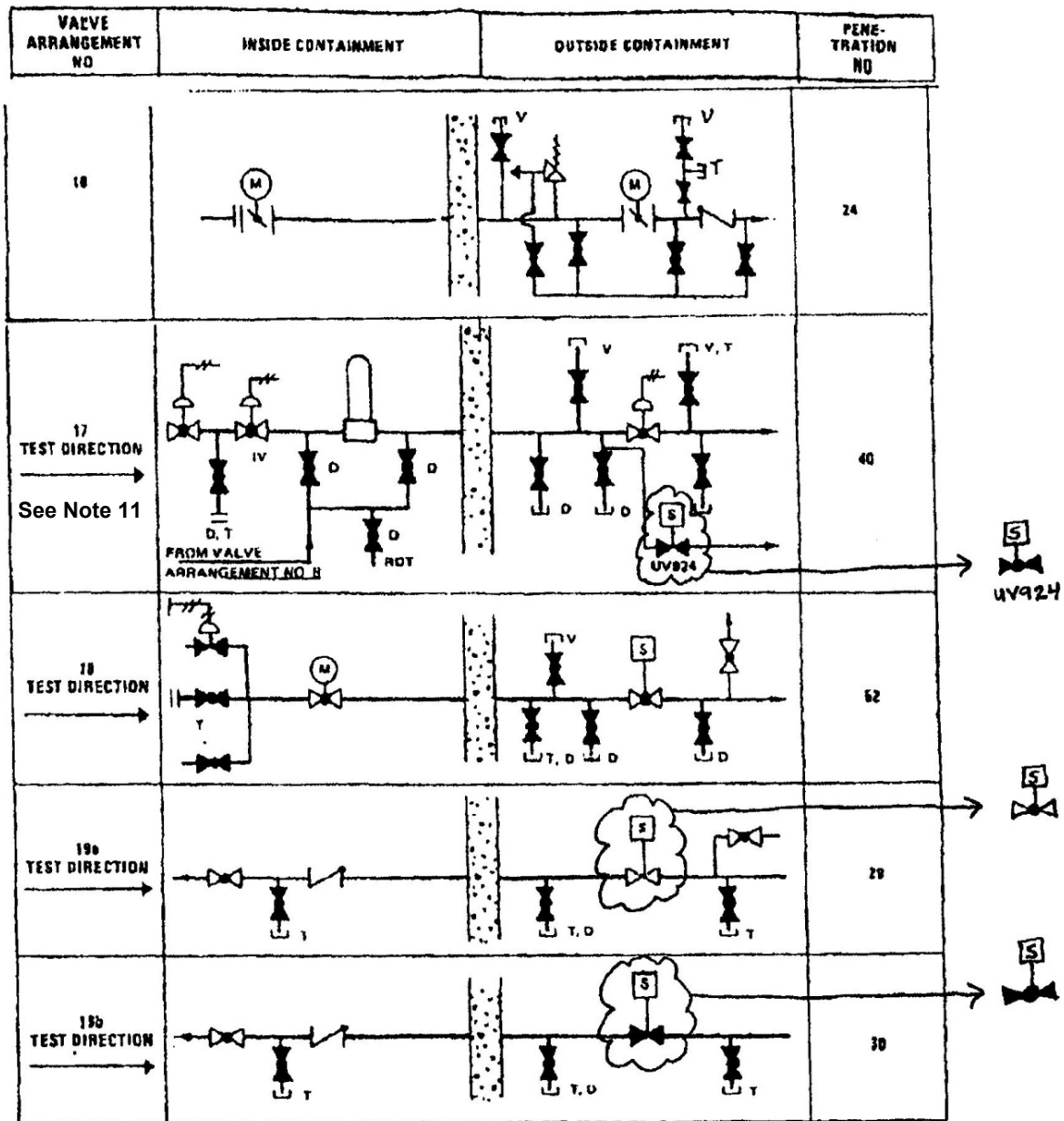
CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 5 OF 10

JUNE 2015

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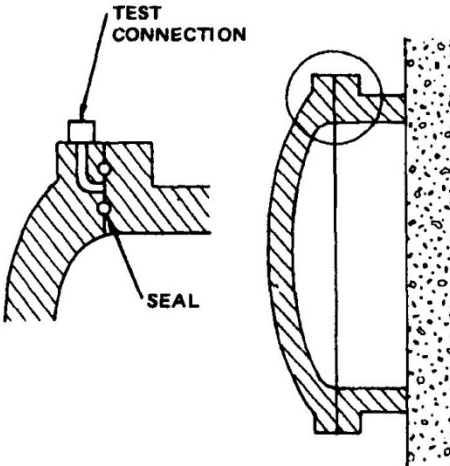
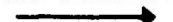
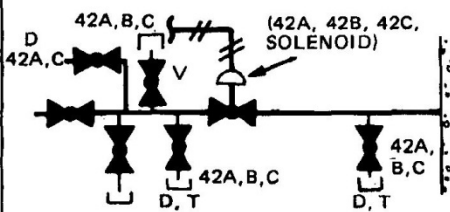
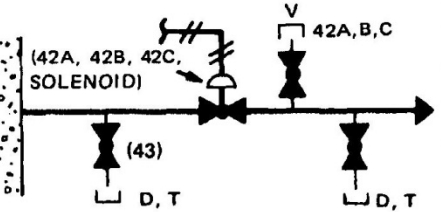

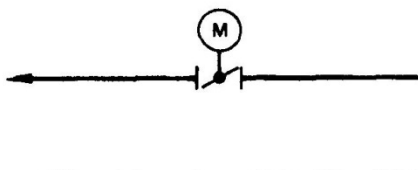
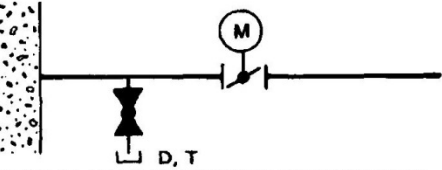
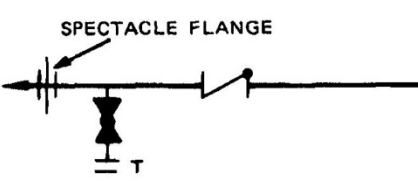
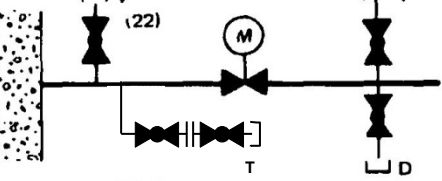

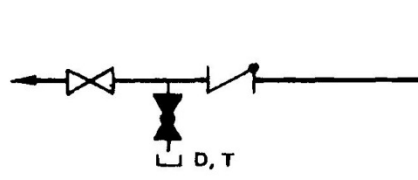
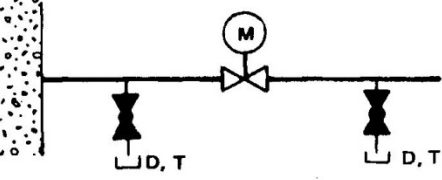
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 5A OF 10

JUNE 2015

REVISION 18

VALVE ARRANGEMENT NO.	INSIDE CONTAINMENT	OUTSIDE CONTAINMENT	PENE- TRATION NO.
<b>20</b> <b>TEST DIRECTION</b> 			<b>L-2</b>
<b>21</b> <b>TEST DIRECTION</b> 			<b>42A, 42B, 42C, 43</b>
<b>22</b> <b>TEST DIRECTION</b> 			<b>56</b>
<b>23</b> <b>SEE NOTES 1 &amp; 7</b>			<b>21, 22</b>
<b>24</b> <b>TEST DIRECTION</b> 			<b>60</b>


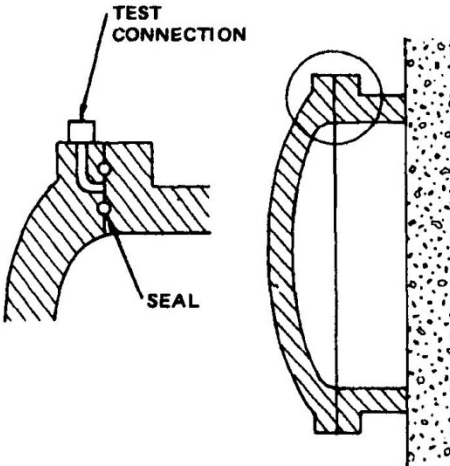
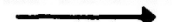
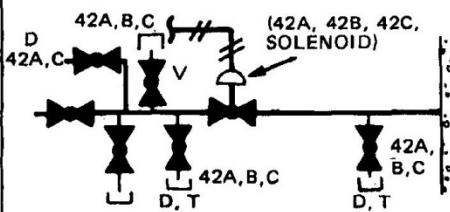
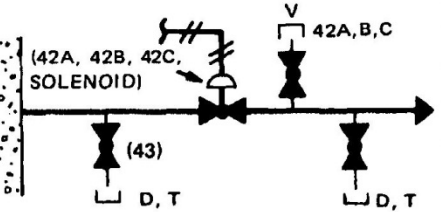

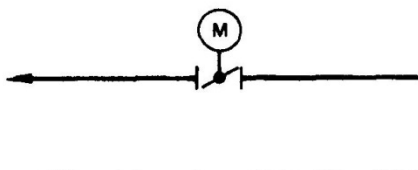
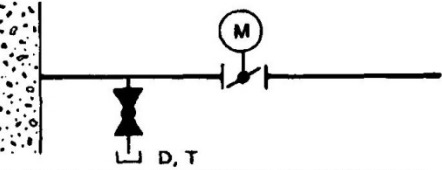
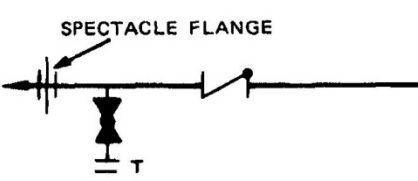
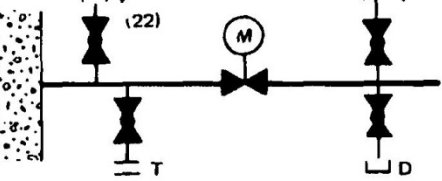

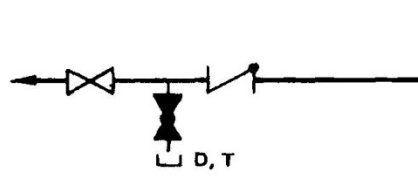
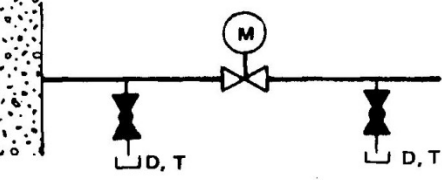
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 6 OF 10

JUNE 2015

REVISION 18

VALVE ARRANGEMENT NO.	INSIDE CONTAINMENT	OUTSIDE CONTAINMENT	PENE-TRATION NO.
<b>20</b> <b>TEST DIRECTION</b> 			<b>L-2</b>
<b>21</b> <b>TEST DIRECTION</b> 			<b>42A, 42B, 42C, 43</b>
<b>22</b> <b>TEST DIRECTION</b> 			<b>56</b>
<b>23</b> <b>SEE NOTES 1 &amp; 7</b>			<b>21, 22</b>
<b>24</b> <b>TEST DIRECTION</b> 			<b>60</b>

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 6A OF 10

JUNE 2015

REVISION 18

VALVE ARRANGEMENT NO.	INSIDE CONTAINMENT	OUTSIDE CONTAINMENT	PENE- TRATION NO.
25 TEST DIRECTION →		61	
26 TEST DIRECTION ↔		L-1, L-3	
27 TEST DIRECTION ↔		58, 62B, 62C	
28 TEST DIRECTION →		59	
29 TEST DIRECTION →		31	

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 7 OF 10

JUNE 2015

REVISION 18

VALVE ARRANGEMENT NO.	INSIDE CONTAINMENT	OUTSIDE CONTAINMENT	PENE-TRATION NO.
30 SEE NOTES 3 & 4 TEST DIRECTION ↔			57
31 TEST DIRECTION →			39
32 TEST DIRECTION → SEE NOTE 8			38
33 TEST DIRECTION →			25A, 25B
34 TEST DIRECTION →			9
35 TEST DIRECTION →			6

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 8 OF 10

JUNE 2015

REVISION 18

VALVE ARRANGEMENT NO.	INSIDE CONTAINMENT	OUTSIDE CONTAINMENT	PENETRATION
36 SEE NOTE 1  TEST DIRECTION →			66, 77
37 SEE NOTE 1			32A, 54A, 55A, 62A
 TEST DIRECTION 38			72
39			46, 47, 48, 49, 37A, 37B, 63A, 63B
40 SEE NOTE 1 SEE NOTE 12			23

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 9 OF 10

JUNE 2015

REVISION 18

VALVE ARRANGEMENT NO.	INSIDE CONTAINMENT	OUTSIDE CONTAINMENT	PENETRATION
36 SEE NOTE 1  TEST DIRECTION →			66, 77
37 SEE NOTE 1			32A, 54A, 55A, 62A
 TEST DIRECTION 38			72
39			46, 47, 48, 49, 37A, 37B, 63A, 63B
40 SEE NOTE 1 SEE NOTE 12			23

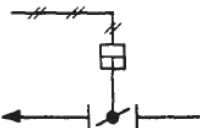
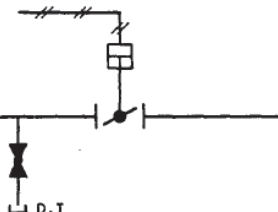
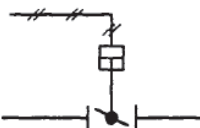
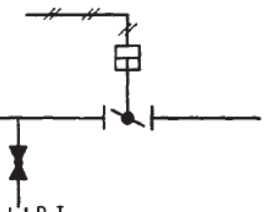
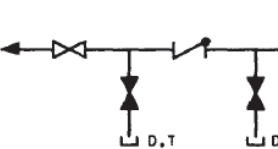
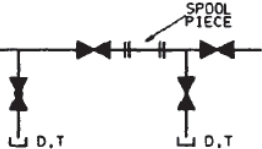
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 9A OF 10

JUNE 2015

REVISION 18

VALVE ARRANGEMENT NO.	INSIDE CONATAINMENT	OUTSIDE CONATAINMENT	PENETRATION NO.
41 SEE NOTE 3 TEST DIRECTION ←→			78
42 SEE NOTE 3 TEST DIRECTION ←→			79
43 TEST DIRECTION →			7

LEGEND:

D = DRAIN

V = VENT

T = TEST

IV = ISOLATION VALVE

NOTES:

1. VALVES ARE OPEN IN EVENT OF LOCA.
2. VALVES ARE IN THE SECONDARY SIDE OF THE STEAM GENERATOR (SG). THESE VALVES ARE NOT SUBJECTED TO TYPE C TESTS BECAUSE THEY ARE NOT DEPENDENT ON IN THE LOCA DOSE CALCULATIONS TO KEEP THE RADIOLOGICAL CONSEQUENCES OF A LOCA TO WITHIN GDC 19 AND 10 CFR 100 LIMITS. THE LOCA DOSE CALCULATIONS ASSUME A SINGLE FAILURE OF A GDC 57 VALVE OR A STUCK OPEN ADV.
3. ONE BUTTERFLY VALVE WILL BE LEAKAGE TESTED IN REVERSE DIRECTION.
4. BLIND FLANGES MAY ISOLATE PENETRATION IN PLANT OPERATING MODES 1 - 4. WHEN BLIND FLANGE IS INSTALLED, ONLY TYPE B TESTING OF THE BLIND FLANGE IS REQUIRED.
5. THIS NOTE HAS BEEN DELETED.
6. THIS NOTE HAS BEEN DELETED.
7. CONFIGURATION BEFORE (SHEET 6A OF 10) AND AFTER (SHEET 6 OF 10) IMPLEMENTATION OF DMWO 3234780.
8. IN UNITS WHERE DMWO 2529758 HAS BEEN IMPLEMENTED, VALVE CHA-UV-715 IS REMOVED AND VALVES HPA-UV-023 & HPA-UV-024 ARE DE-TERMINATED WITH UPSTREAM PIPING CUT AND CAPPED AS THE NEW CONTAINMENT BOUNDARY.
9. ALTERNATE RC MAKEUP CONNECTIONS APPLY ONLY TO PENETRATIONS 14 AND 16. EFFECTIVE FOR UNITS WHERE DMWO 4304156 HAS BEEN IMPLEMENTED.
10. LOCATION FOR ALTERNATE SG MAKEUP IS SHOWN FOR PENETRATION 76. PRIMARY SG MAKEUP AT PENETRATION 75 IS SIMILAR BUT IS LOCATED DOWNSTREAM OF FLOW ELEMENT OUTSIDE CONTAINMENT. EFFECTIVE FOR UNITS WHERE DMWO 4345882 HAS BEEN IMPLEMENTED.
11. CONFIGURATION BEFORE (SHEET 5A OF 10) AND AFTER (SHEET 5 OF 10) VALVE (JCHBUV0924) HAS BEEN REMOVED AND REPLACED WITH A SOCKET WELD CAP IN UNITS WHERE DMWO 2778159 HAS BEEN IMPLEMENTED.
12. CONFIGURATION BEFORE (SHEET 9A OF 10) AND AFTER (SHEET 9 OF 10) VALVE (JSIAUV0708) AND DOWNSTREAM DRAIN VALVE (PSSNV082) HAVE BEEN REMOVED AND REPLACED WITH A SOCKET WELD CAP IN UNITS WHERE DMWO 2778159 HAS BEEN IMPLEMENTED.

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

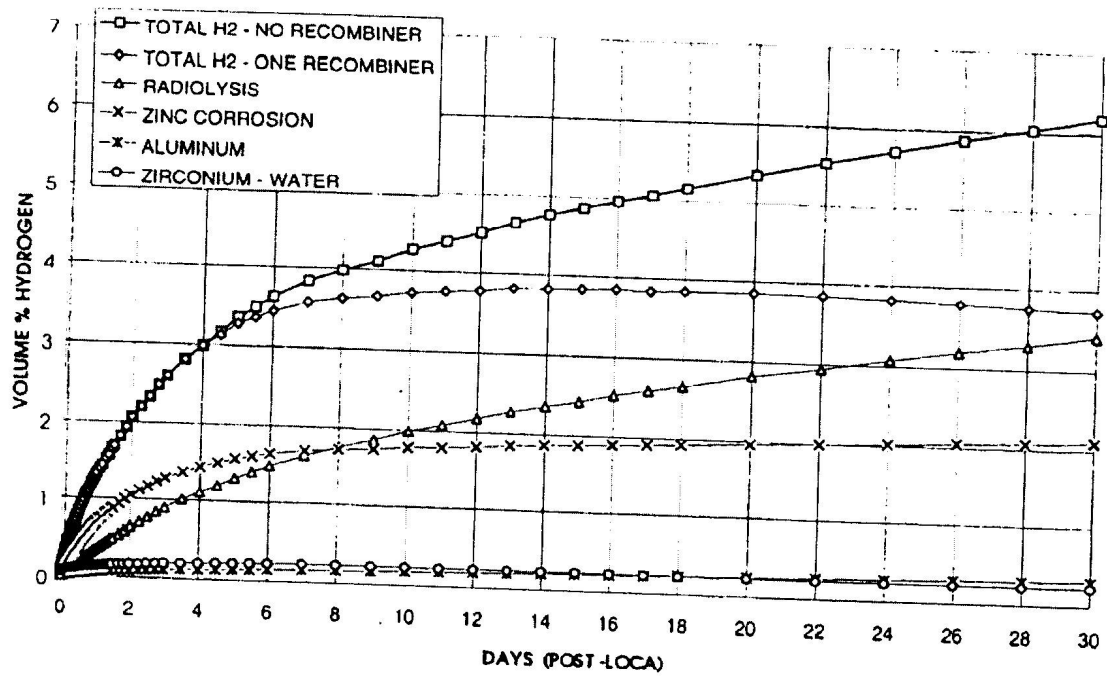
CONTAINMENT PENETRATION VALVE  
ARRANGEMENT

FIGURE 6.2.4-1 SHEET 10 OF 10

JUNE 2015

REVISION 18





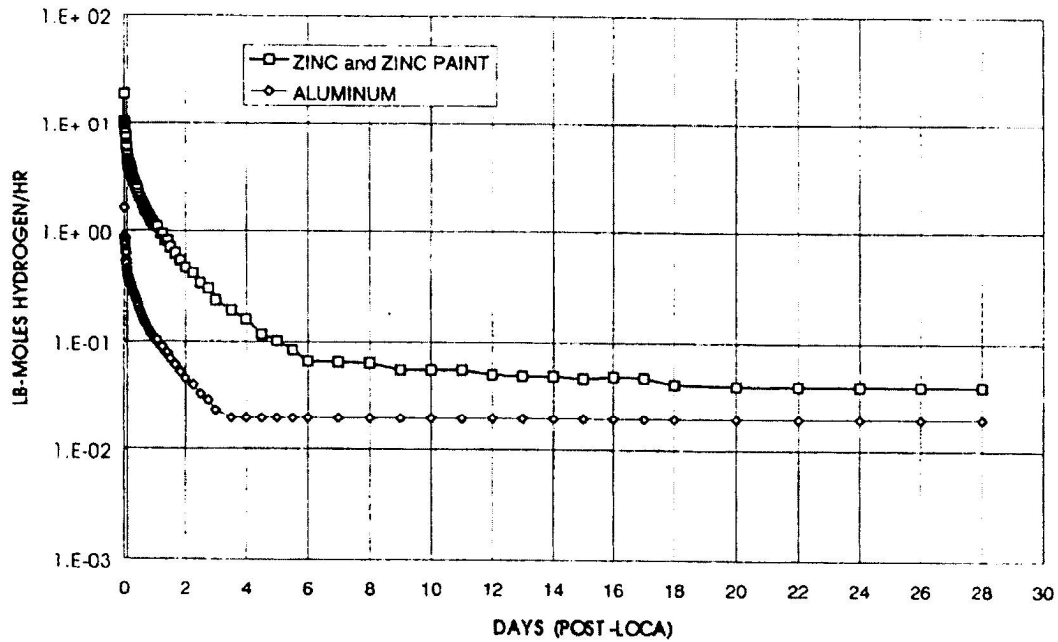
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

POST-LOCA H<sub>2</sub> BUILDUP  
CORE POWER 4070 MWt

FIGURE 6.2.5-1

JUNE 2009

REVISION 15



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

H<sub>2</sub> PRODUCTION RATES vs. TIME  
CORE POWER 4070 MWt

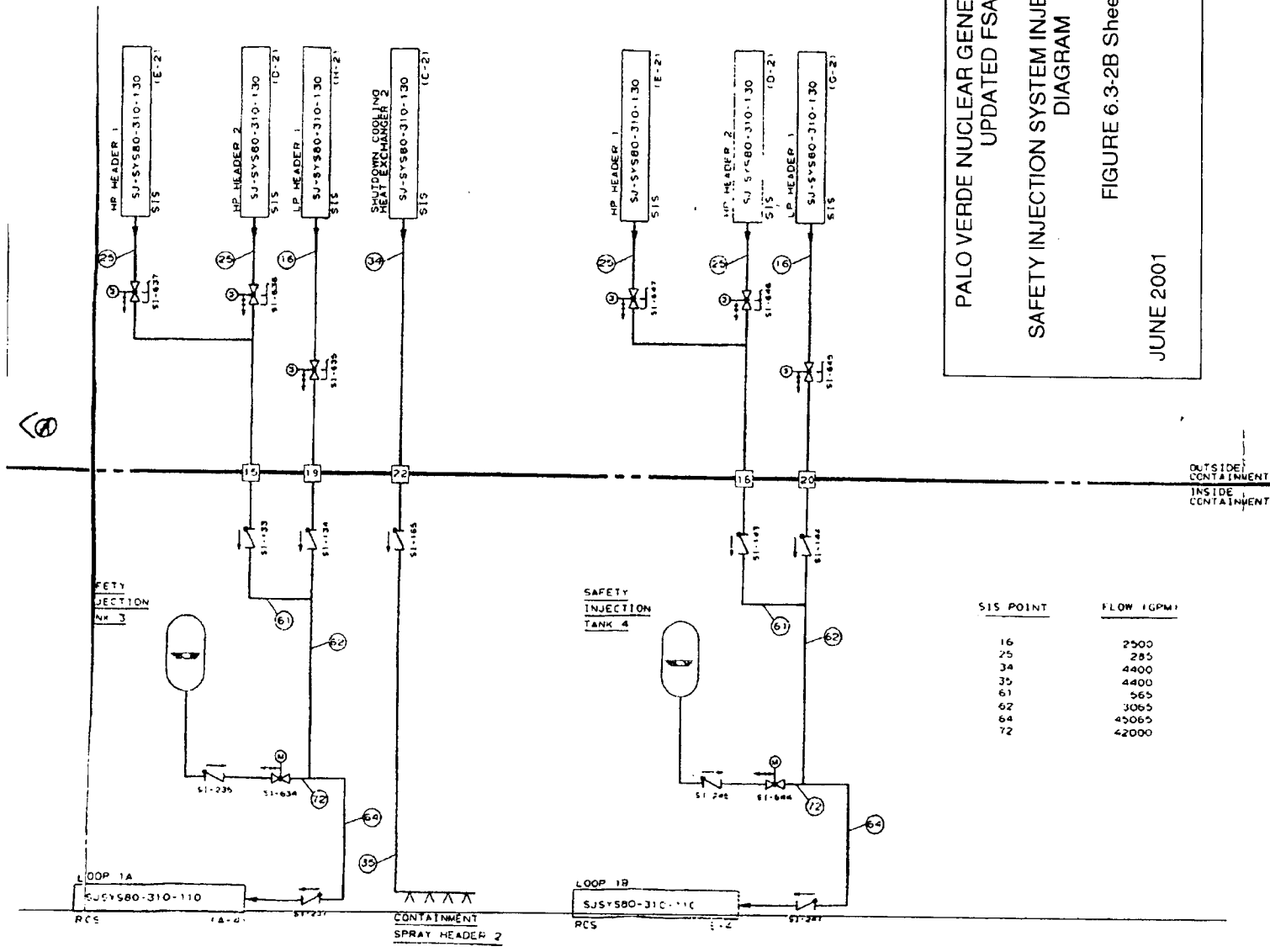
FIGURE 6.2.5-2

JUNE 2009

REVISION 15







PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 SAFETY INJECTION SYSTEM INJECTION MODE FLOW  
 DIAGRAM  
 FIGURE 6.3-2B Sheet 1 of 2  
 JUNE 2001  
 REVISION 11

SIS POINT	FLOW (GPM)
16	2500
25	285
34	4400
35	4400
61	565
62	3065
64	45065
72	42000

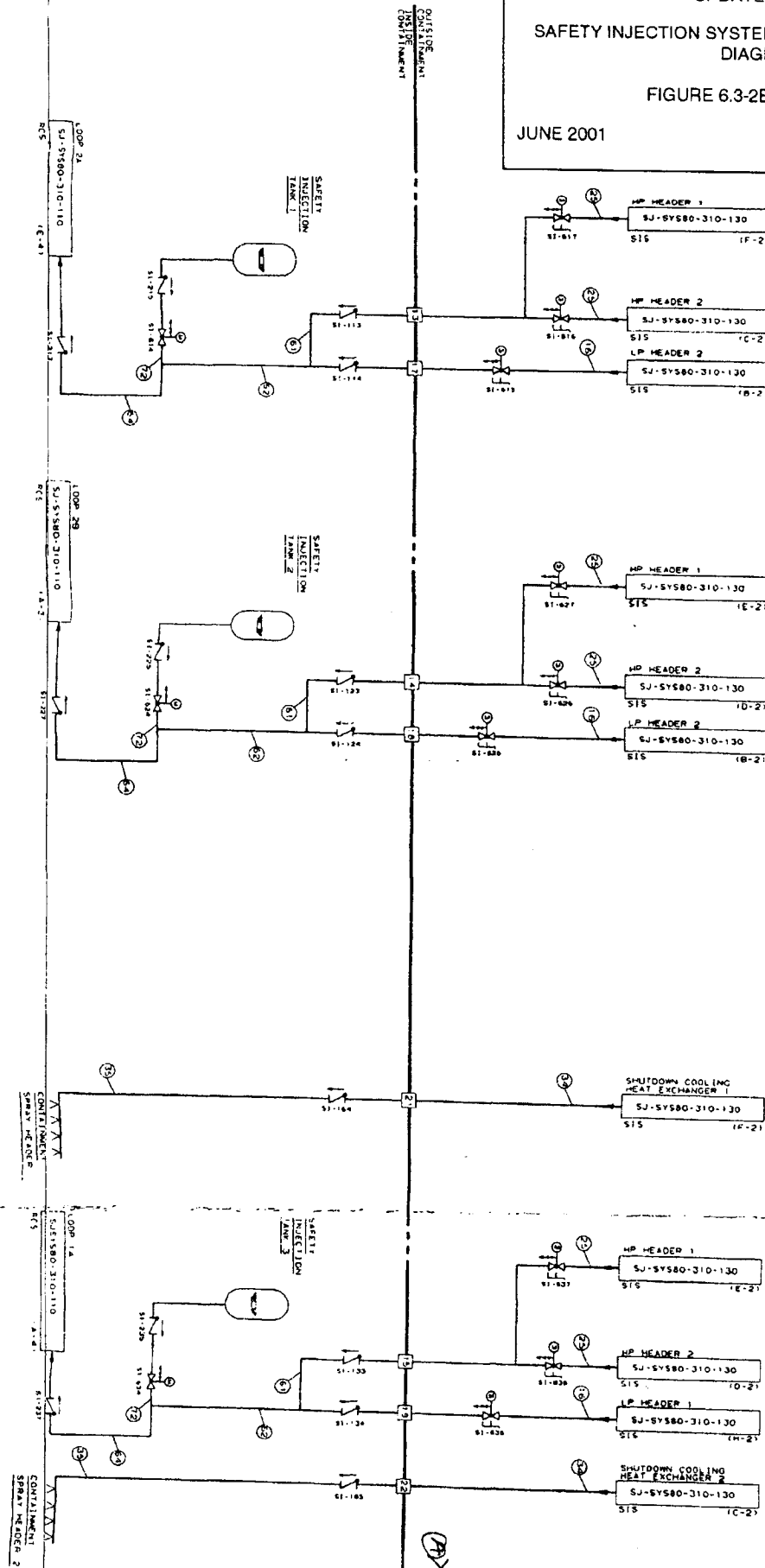
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY INJECTION SYSTEM INJECTION MODE FLOW  
DIAGRAM

FIGURE 6.3-2B Sheet 2 of 2

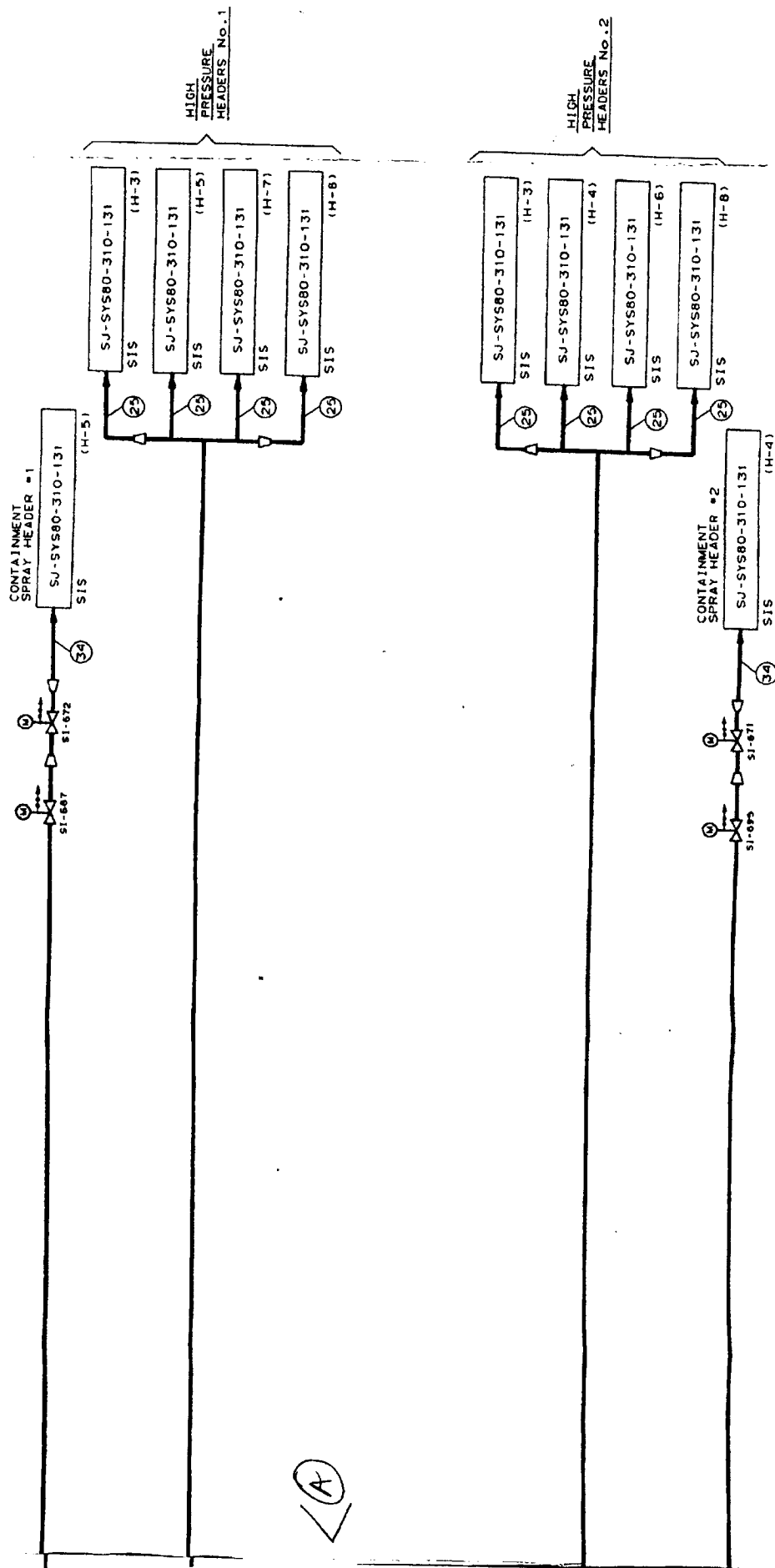
JUNE 2001

REVISION 11



SIS POINT FLOW (GPM)

1	5715
17	1165
25	290
26	4550
34	4550



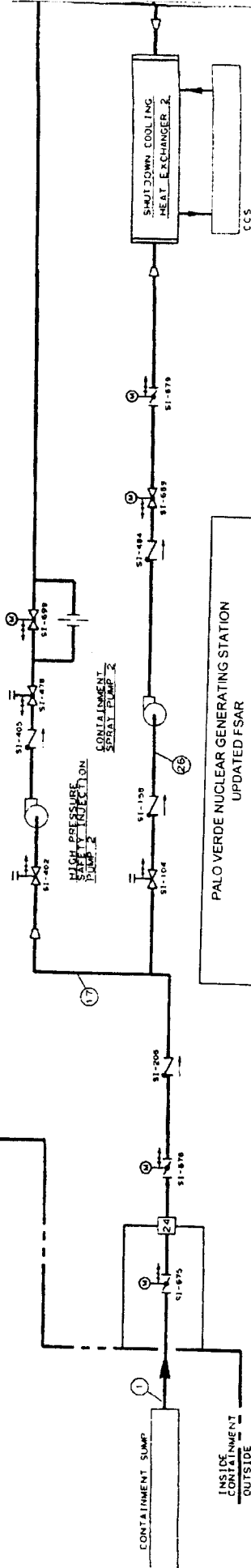
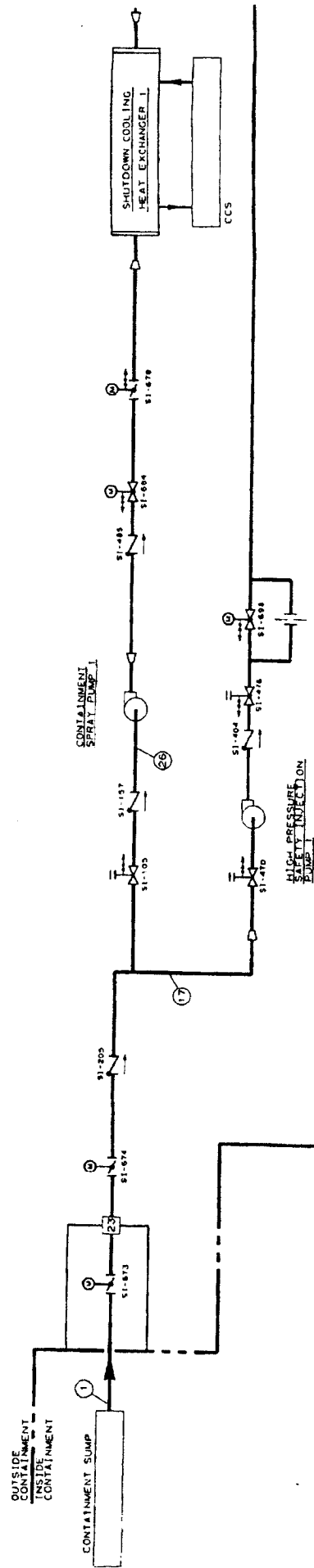
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY INJECTION SYSTEM  
FLOW DIAGRAM  
SHORT TERM RECIRCULATION MODE

FIGURE 6.3-2C Sheet 1 of 2

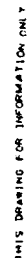
JUNE 2001

REVISION 11

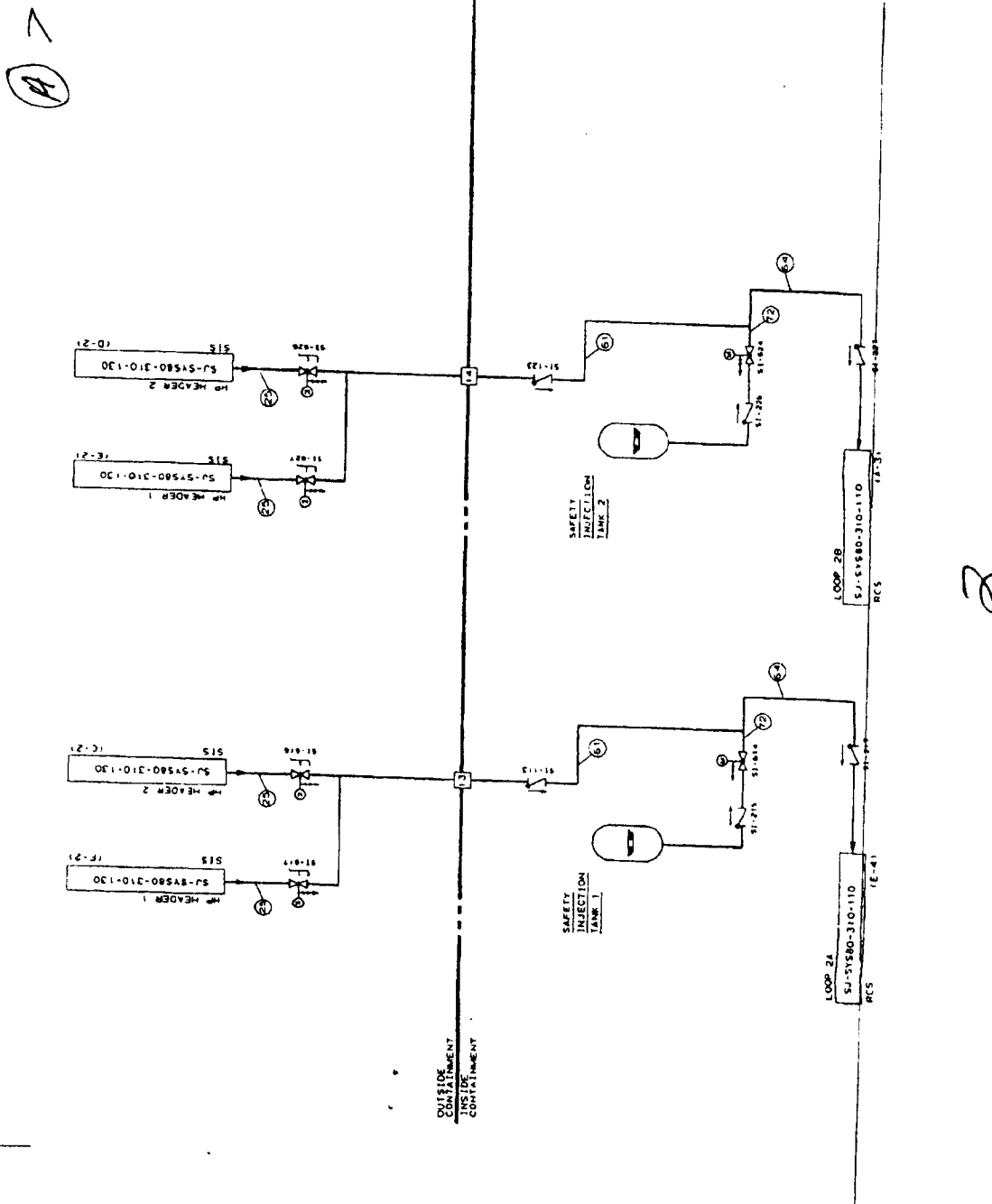


PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 SAFETY INJECTION SYSTEM  
 FLOW DIAGRAM  
 SHORT TERM RECIRCULATION MODE  
 FIGURE 6.3-2C Sheet 2 of 2  
 JUNE 2001  
 REVISION 11





REVISION 11



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY INJECTION SYSTEM  
FLOW DIAGRAM  
SHORT TERM RECIRCULATION MODE

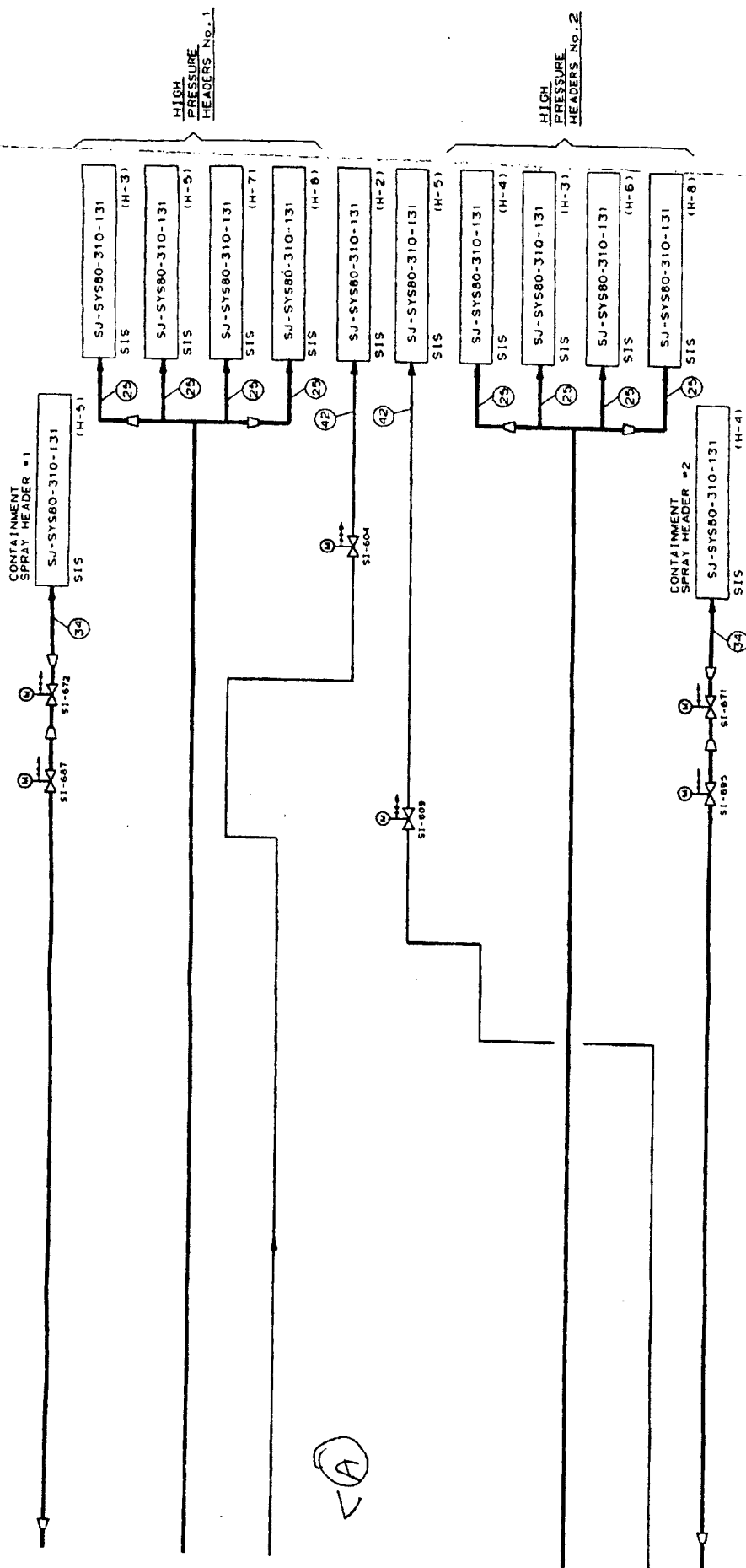
FIGURE 6.3-2D Sheet 2 of 2

JUNE 2001

REVISION 11

SIS POINT FLOW (GPM)

1	5715
17	1165
24	585
25	150
26	4550
34	4550
42	585



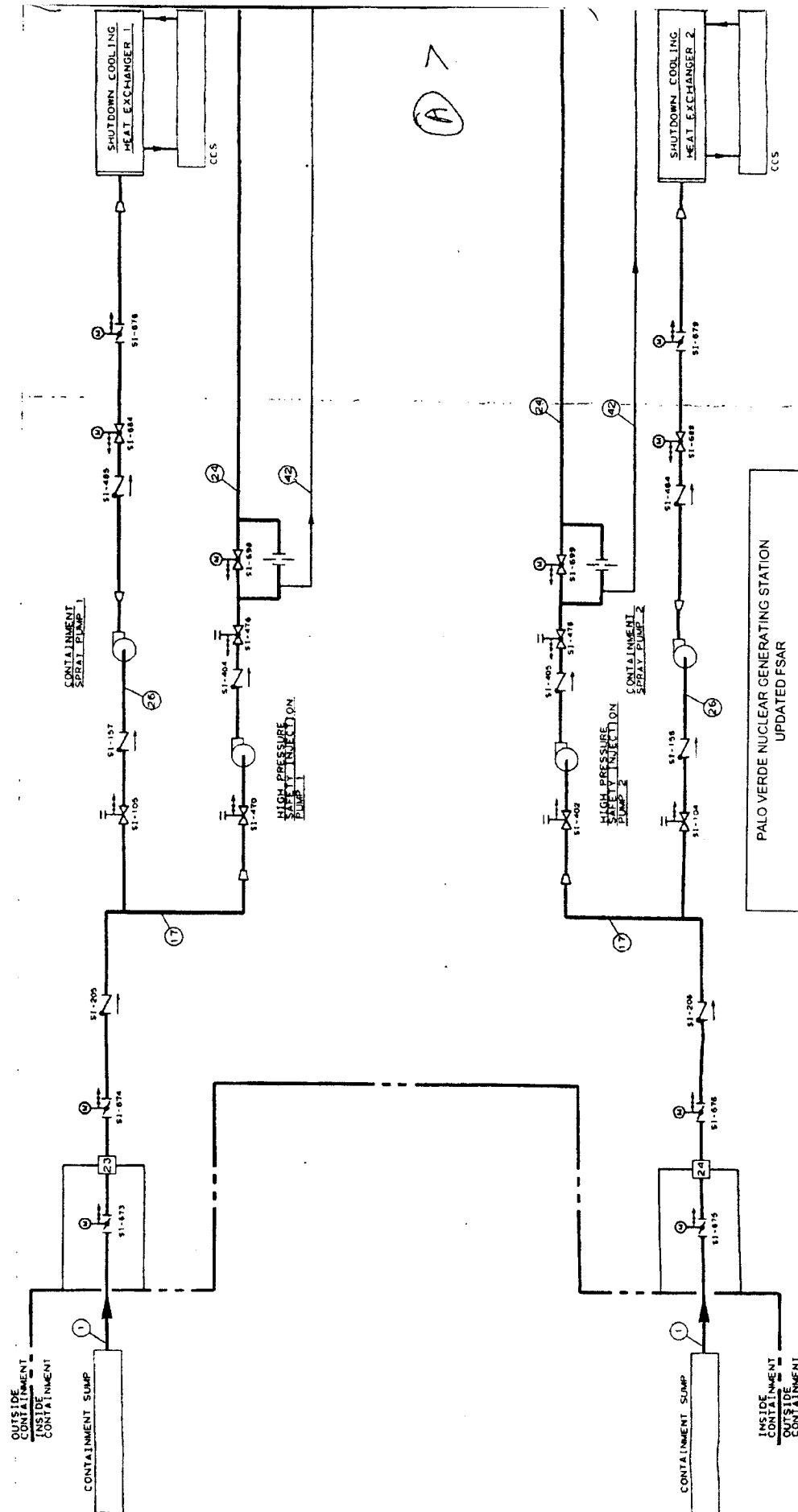
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY INJECTION SYSTEM  
FLOW DIAGRAM  
SHORT TERM RECIRCULATION MODE

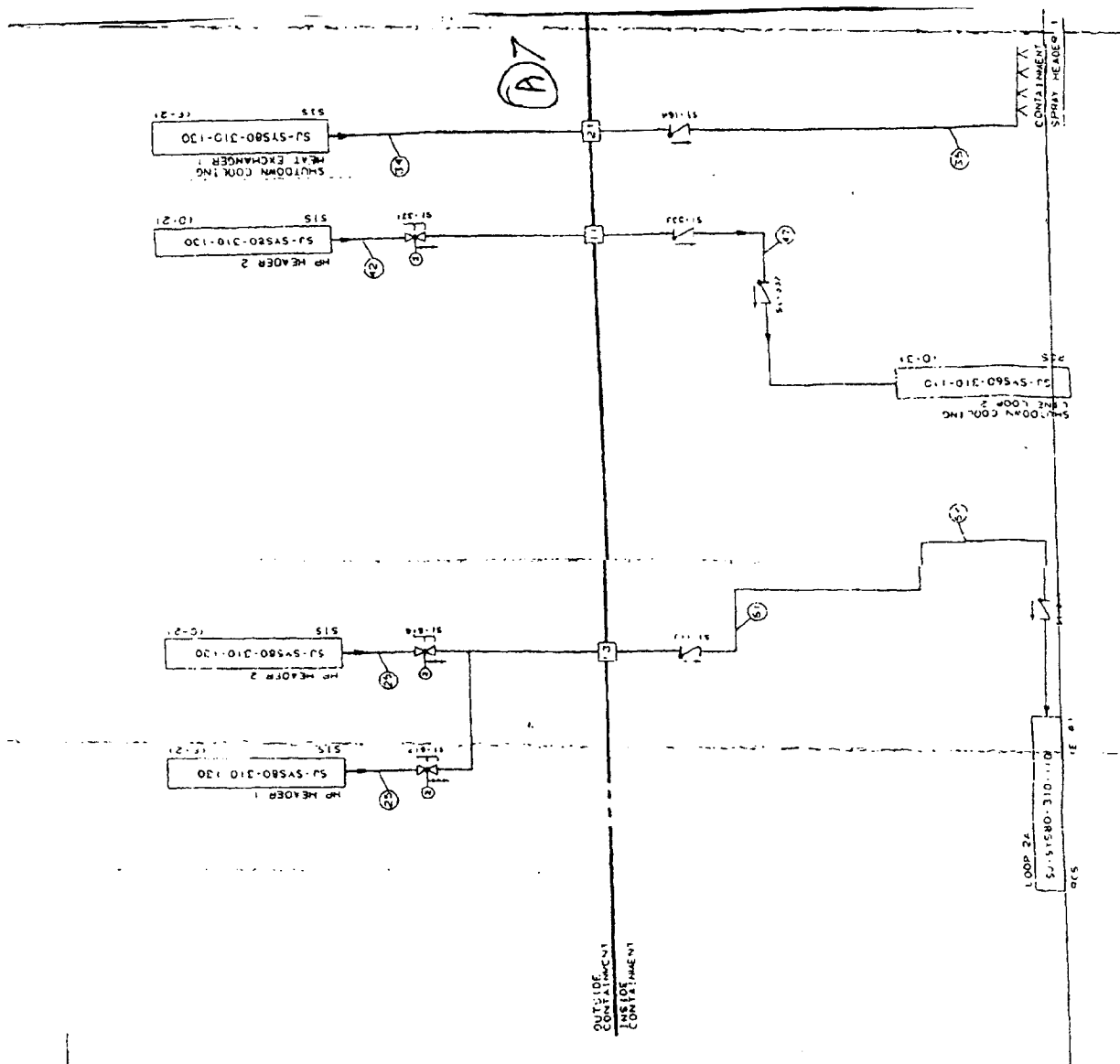
FIGURE 6.3-2E Sheet 1 of 2

JUNE 2001

REVISION 11



PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 SAFETY INJECTION SYSTEM  
 FLOW DIAGRAM  
 SHORT TERM RECIRCULATION MODE  
 FIGURE 6.3-2E Sheet 2 of 2  
 JUNE 2001  
 REVISION 11



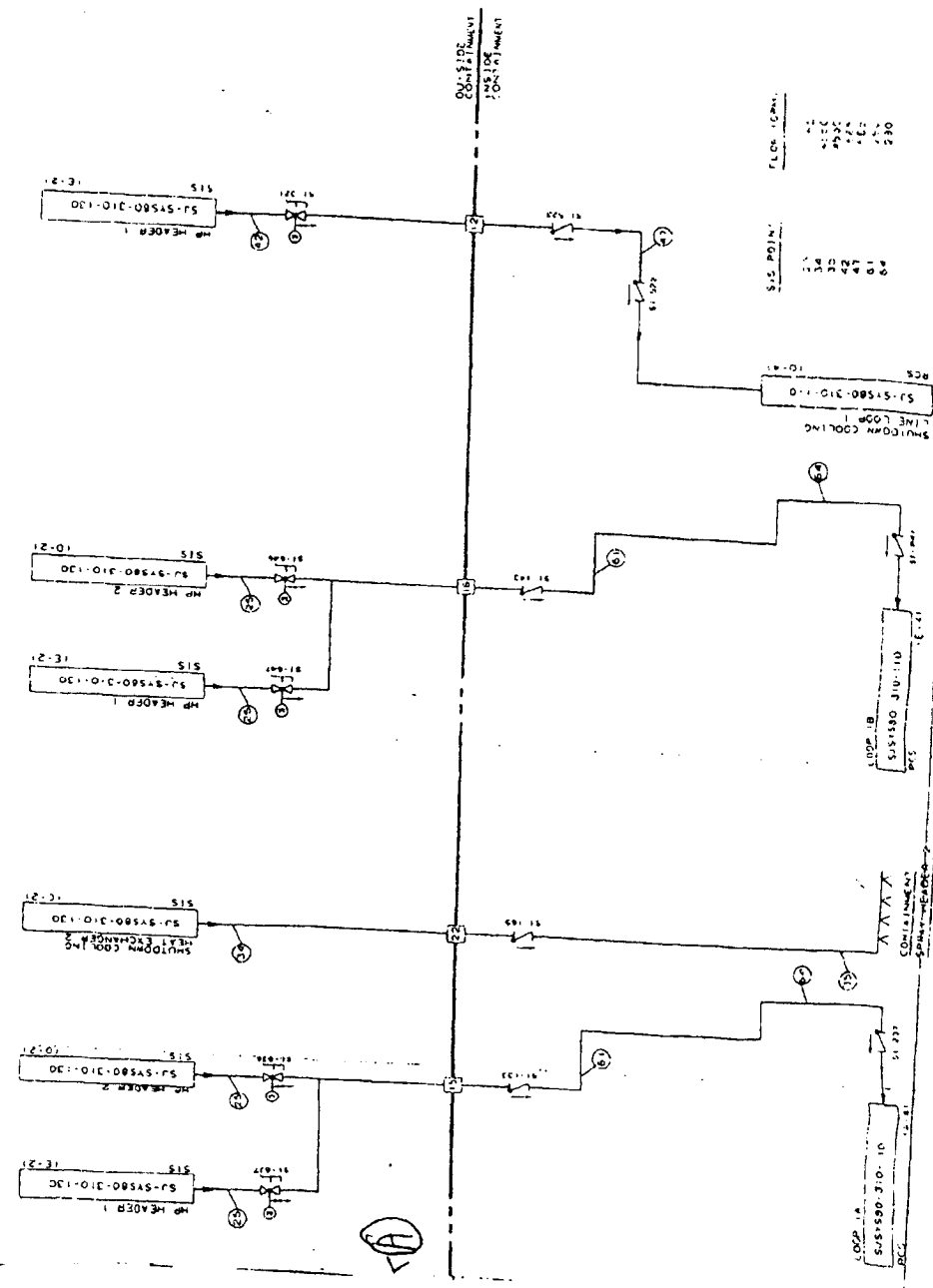
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY INJECTION SYSTEM  
FLOW DIAGRAM  
SHORT TERM RECIRCULATION MODE

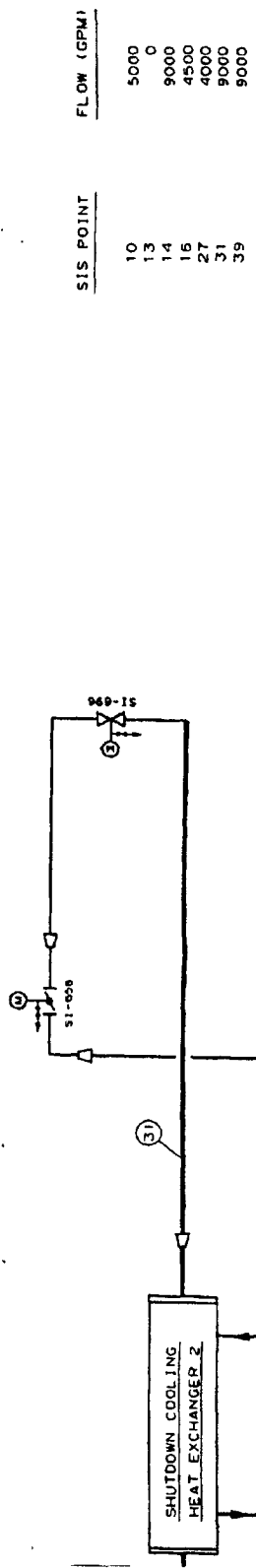
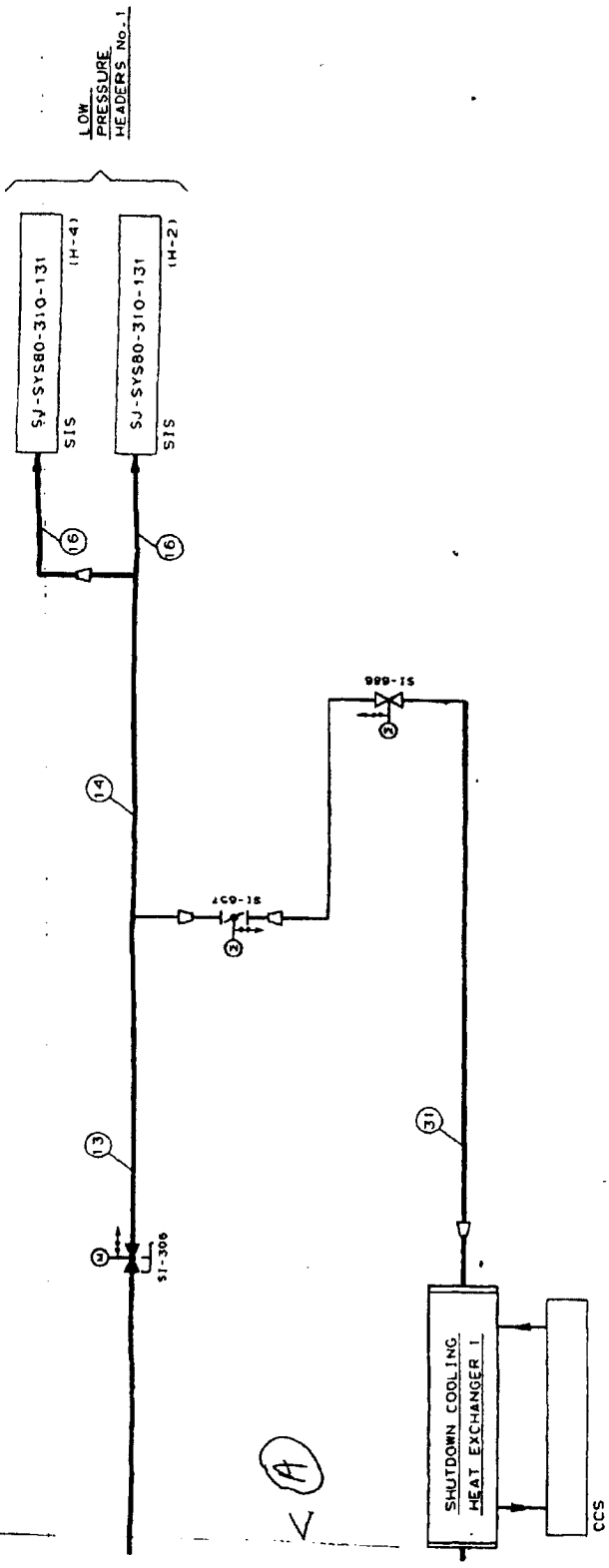
FIGURE 6.3-2F Sheet 1 of 2

JUNE 2001

REVISION 11



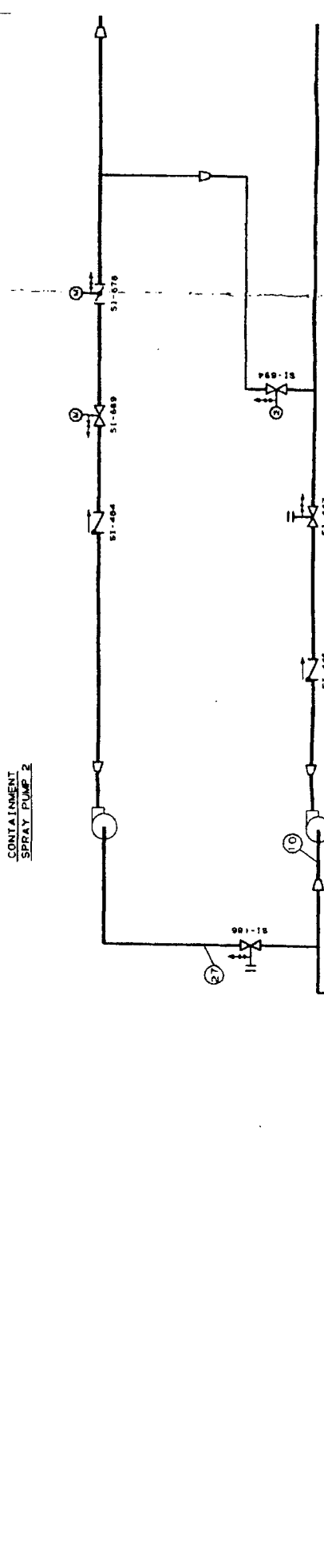
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 SAFETY INJECTION SYSTEM  
 FLOW DIAGRAM  
 SHORT TERM RECIRCULATION MODE  
 FIGURE 6.3-2F Sheet 2 of 2  
 JUNE 2001  
 REVISION 11



SIS POINT	FLOW (GPM)
10	5000
13	0
14	9000
16	4500
27	4000
31	9000
39	9000

PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 SAFETY INJECTION SYSTEM FLOW DIAGRAM  
 SHUTDOWN COOLING MODE  
 (<200°F <250 PSIG)  
 JUNE 2001  
 FIGURE 6.3-2G Sheet 1 of 2  
 REVISION 11

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SHUTDOWN COOLING  
LINE LOOP 2

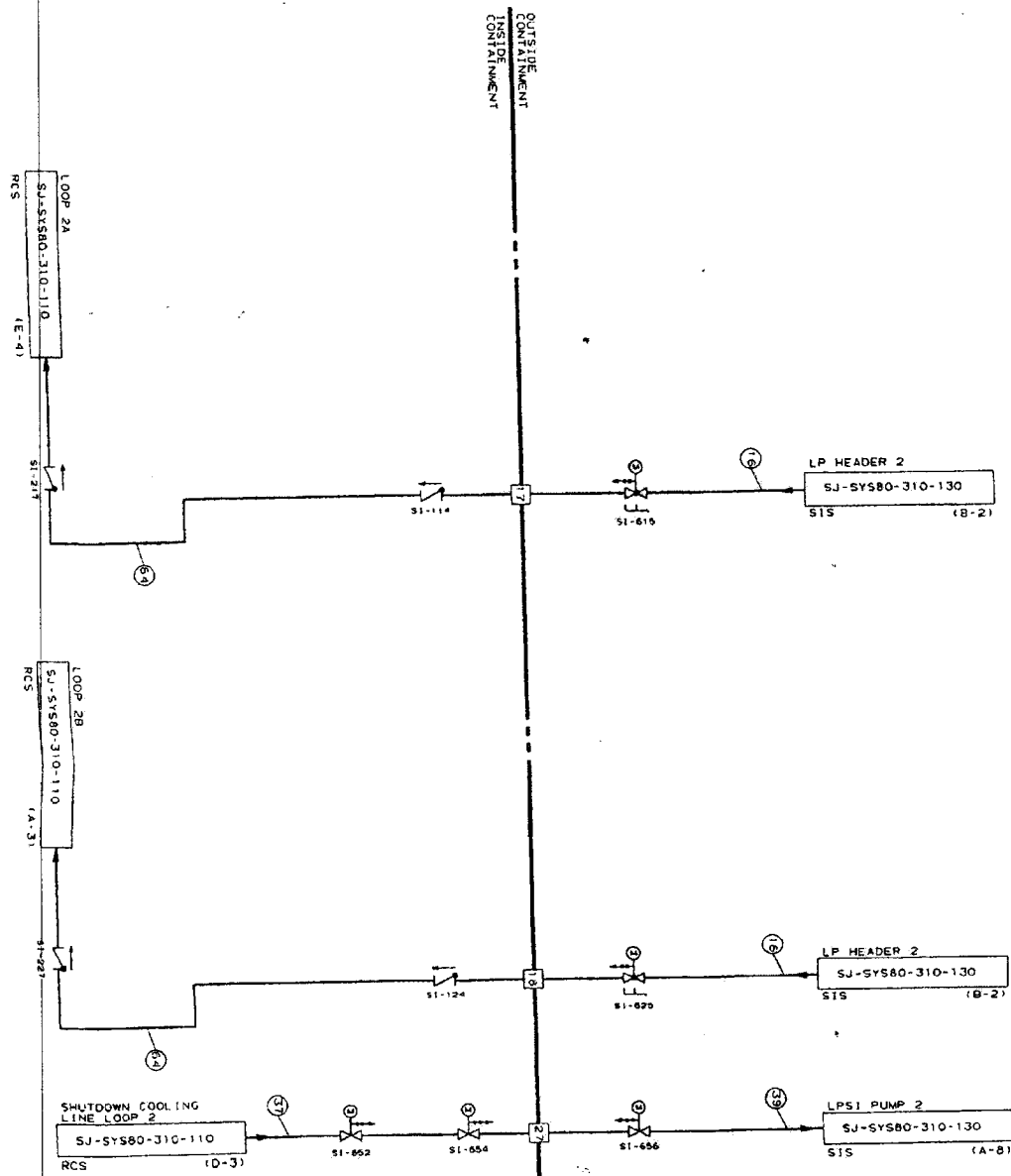
SJ-SYS80-310-131  
(H-61)

LOW PRESSURE  
SAFETY INJECTION  
PUMP 2

59







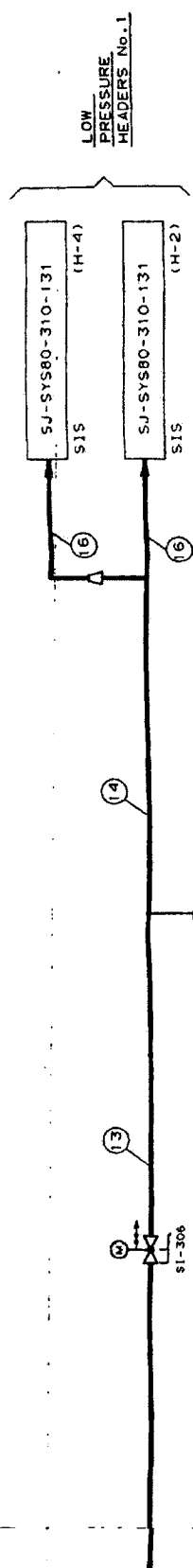
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY INJECTION SYSTEM FLOW DIAGRAM  
SHUTDOWN COOLING MODE  
(<200°F <250 PSIG)

FIGURE 6.3-2H Sheet 2 of 2

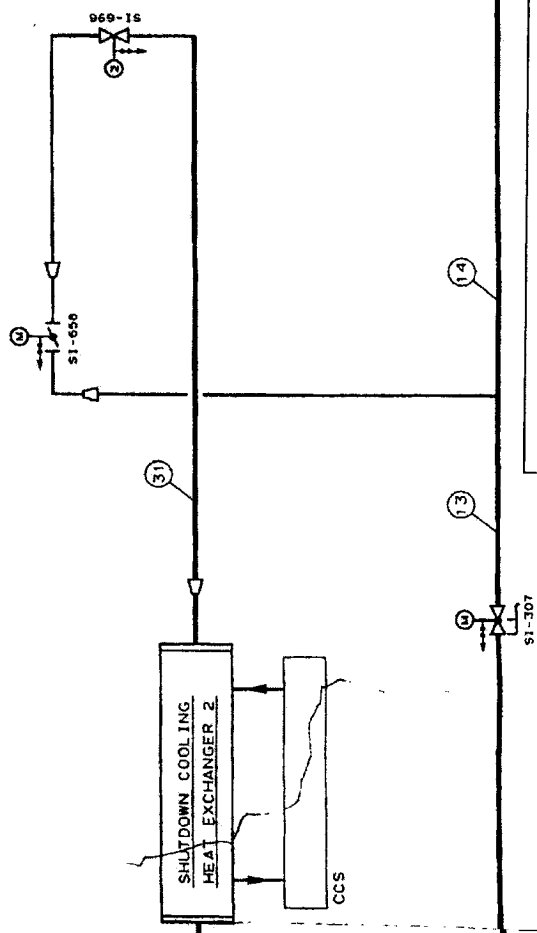
JUNE 2001

REVISION 11



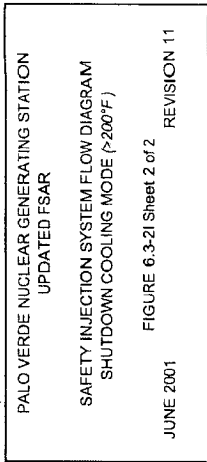
①A

SIS POINT	FLOW (GPM)
10	5000
13	NOTE 1
14	5000
16	5000
31	25000
39	NOTE 1
	5000

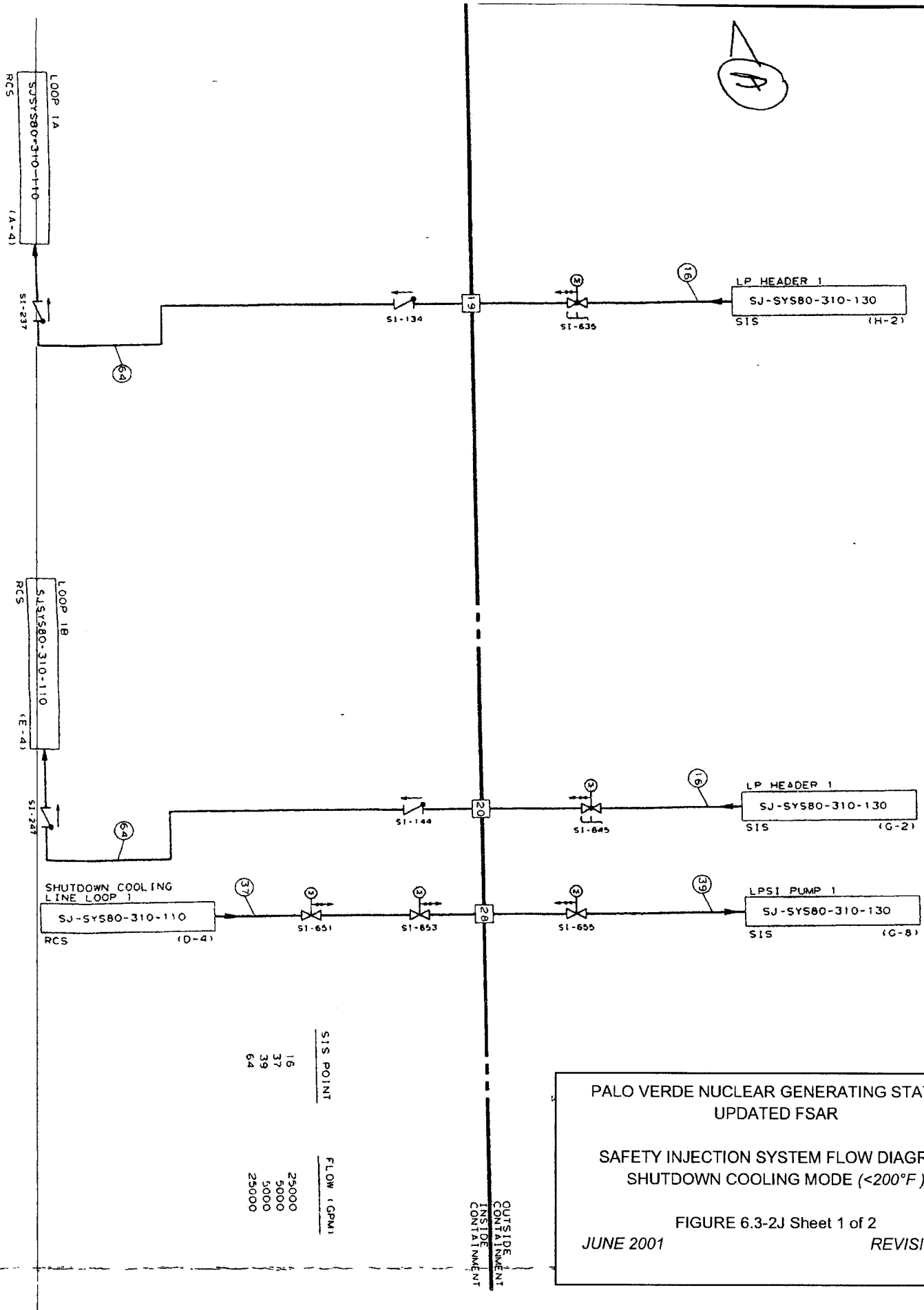


NOTES:  
1. A FLOW TO 5000 GPM IS SPLIT BETWEEN POINTS 13 AND 31 TO MAINTAIN THE RCS COOLDOWN RATE AT 75°F/HR OR LESS.

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR  
SAFETY INJECTION SYSTEM FLOW DIAGRAM  
SHUTDOWN COOLING MODE (>200°F)  
JUNE 2001  
FIGURE 6.3-2I Sheet 1 of 2  
REVISION 11



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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY INJECTION SYSTEM FLOW DIAGRAM  
SHUTDOWN COOLING MODE (<200°F)

FIGURE 6.3-2J Sheet 1 of 2  
JUNE 2001

REVISION 11

THIS DRAWING FOR INFORMATION ONLY

LOOP 2A  
SJ-SYS80-310-110  
RCS  
(E-4)

LOOP 2B  
SJ-SYS80-310-110  
RCS  
(A-3)

SHUTDOWN COOLING  
LINE LOOP 2

SJ-SYS80-310-110  
RCS  
(D-3)

OUTSIDE  
CONTAINMENT  
INSIDE  
CONTAINMENT

SI-114

SI-615

LP HEADER 2

SJ-SYS80-310-130

SIS

(B-2)

SI-124

SI-625

LP HEADER 2

SJ-SYS80-310-130

SIS

(B-2)

SI-652

SI-654

SI-656

LP SI PUMP 2

SJ-SYS80-310-130

SIS

(A-8)

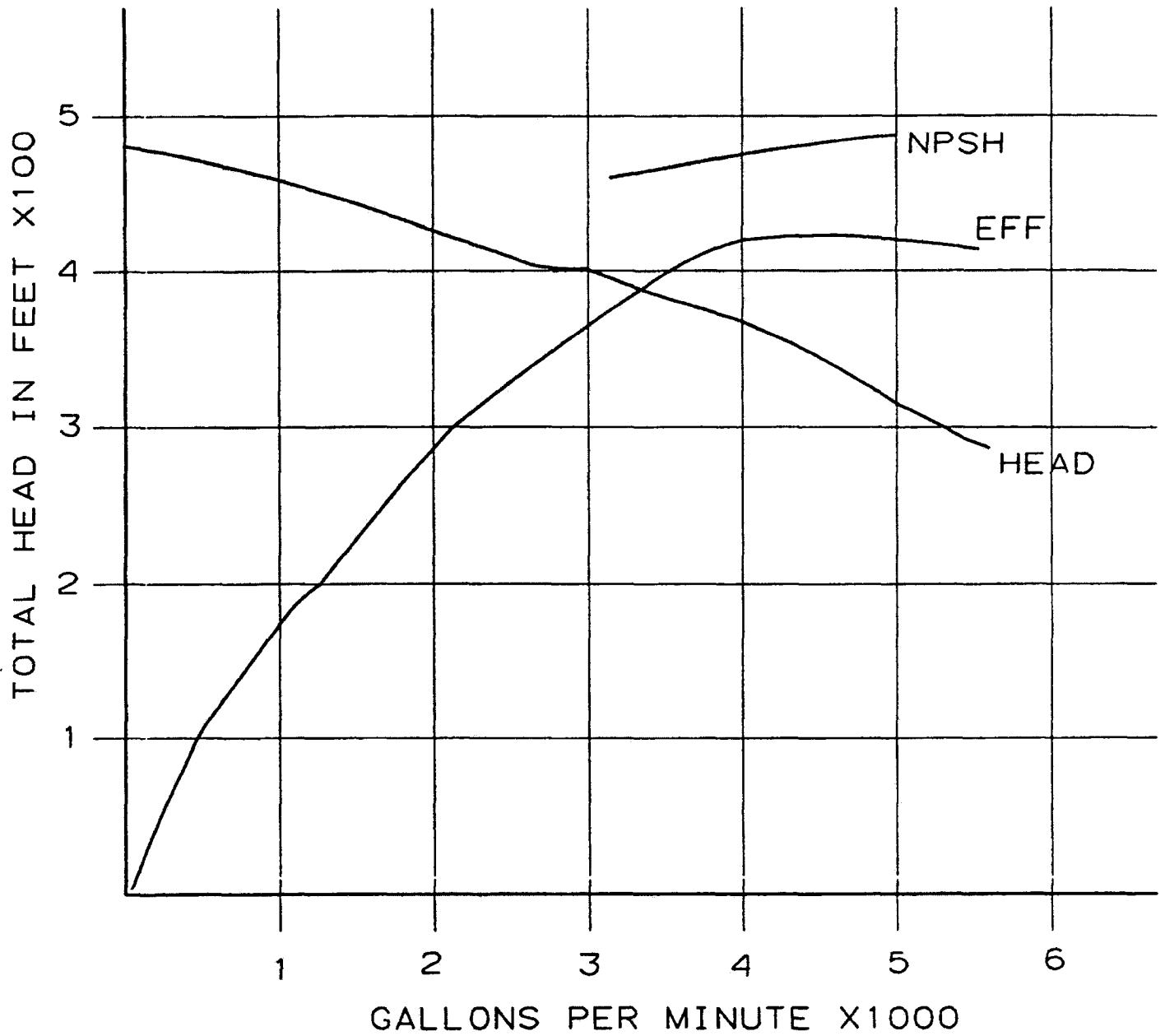
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY INJECTION SYSTEM FLOW DIAGRAM  
SHUTDOWN COOLING MODE (<200°F)

FIGURE 6.3-2J Sheet 2 of 2  
JUNE 2001

REVISION 11





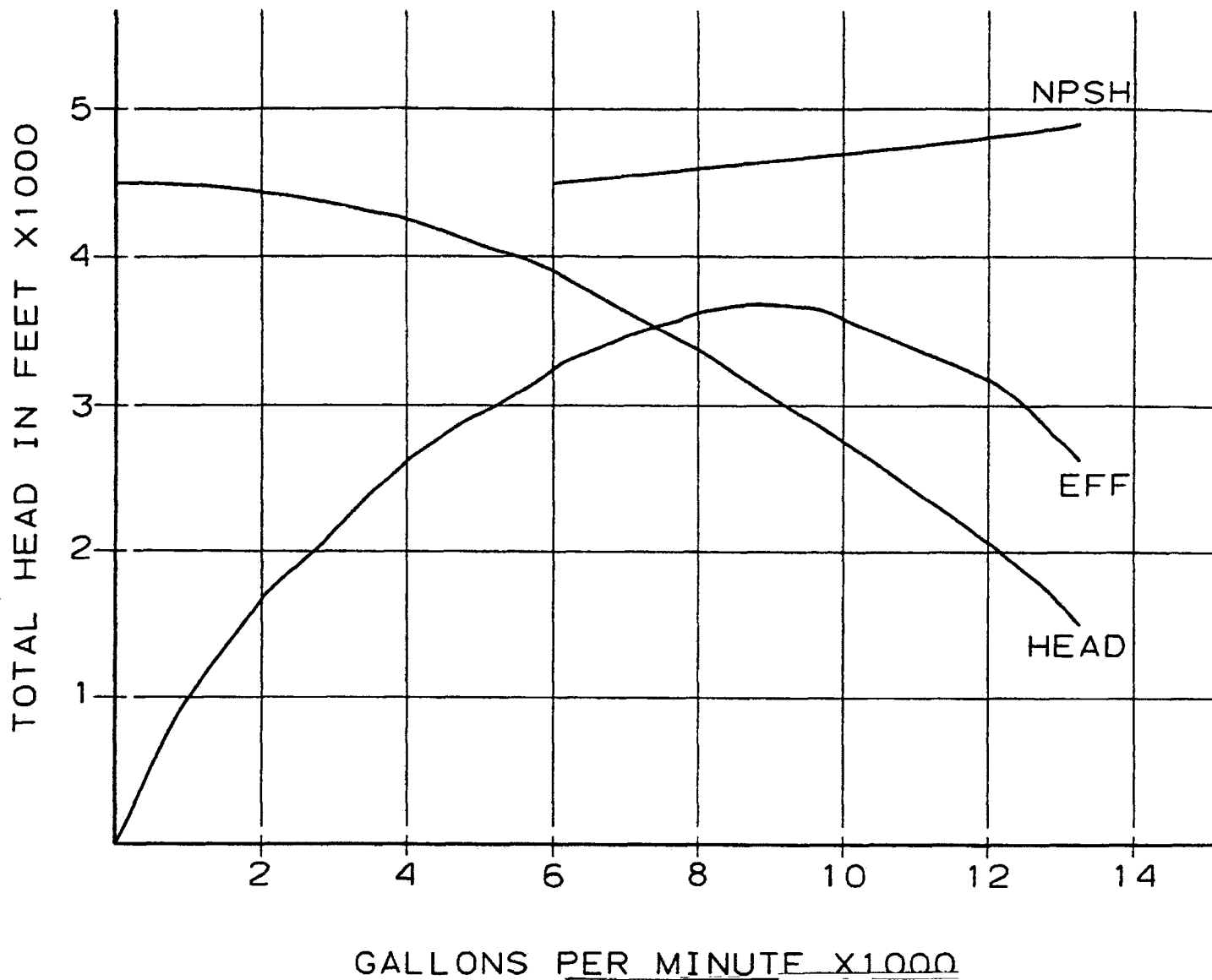
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LOW PRESSURE SAFETY INJECTION PUMP  
HEAD CURVES AND NPSH (TYPICAL)

FIGURE 6.3.2-2

JUNE 2001

REVISION 11



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

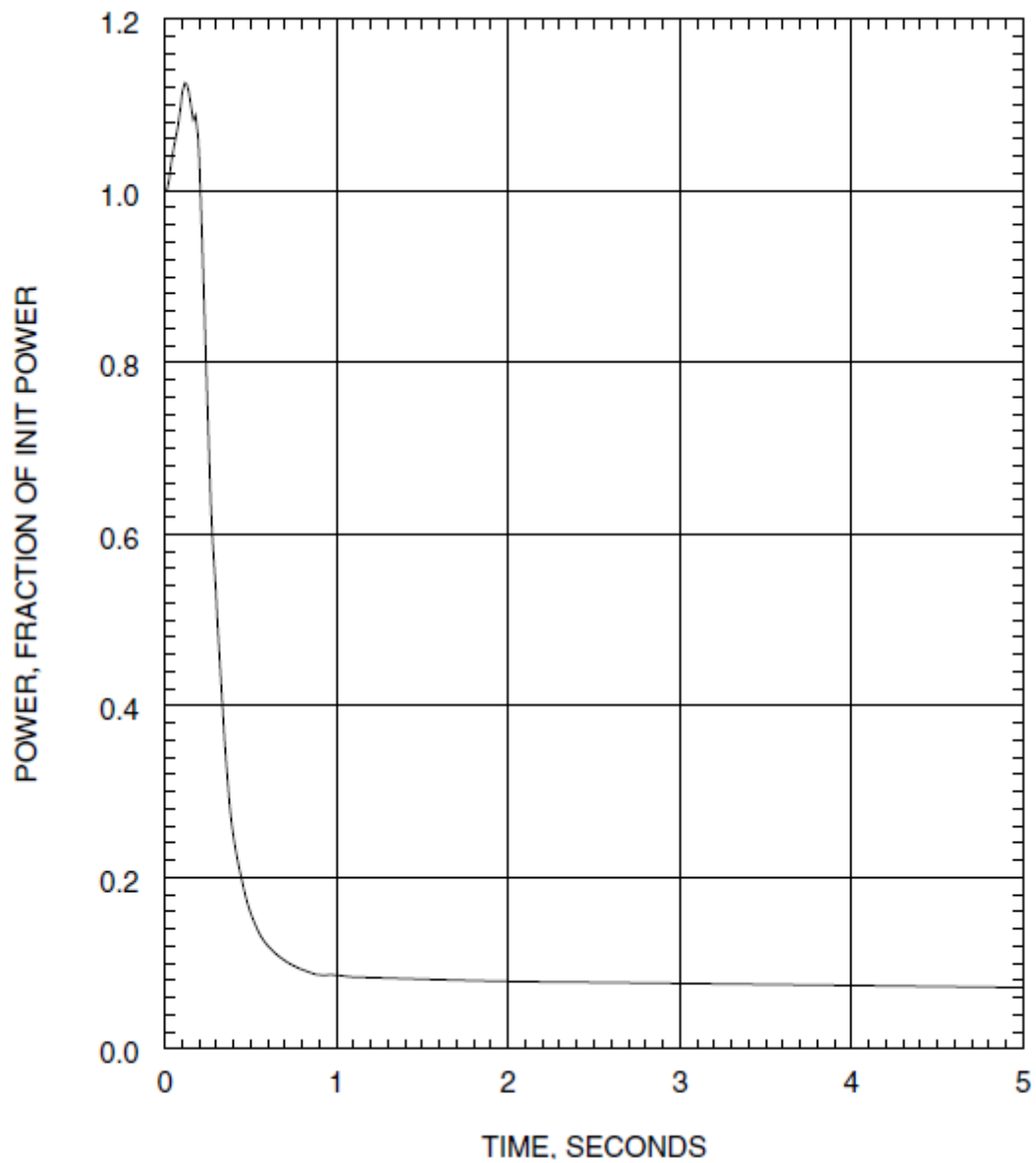
HIGH PRESSURE SAFETY INJECTION PUMP  
HEAD AND NPSH CURVES (TYPICAL)

FIGURE 6.3.2-3

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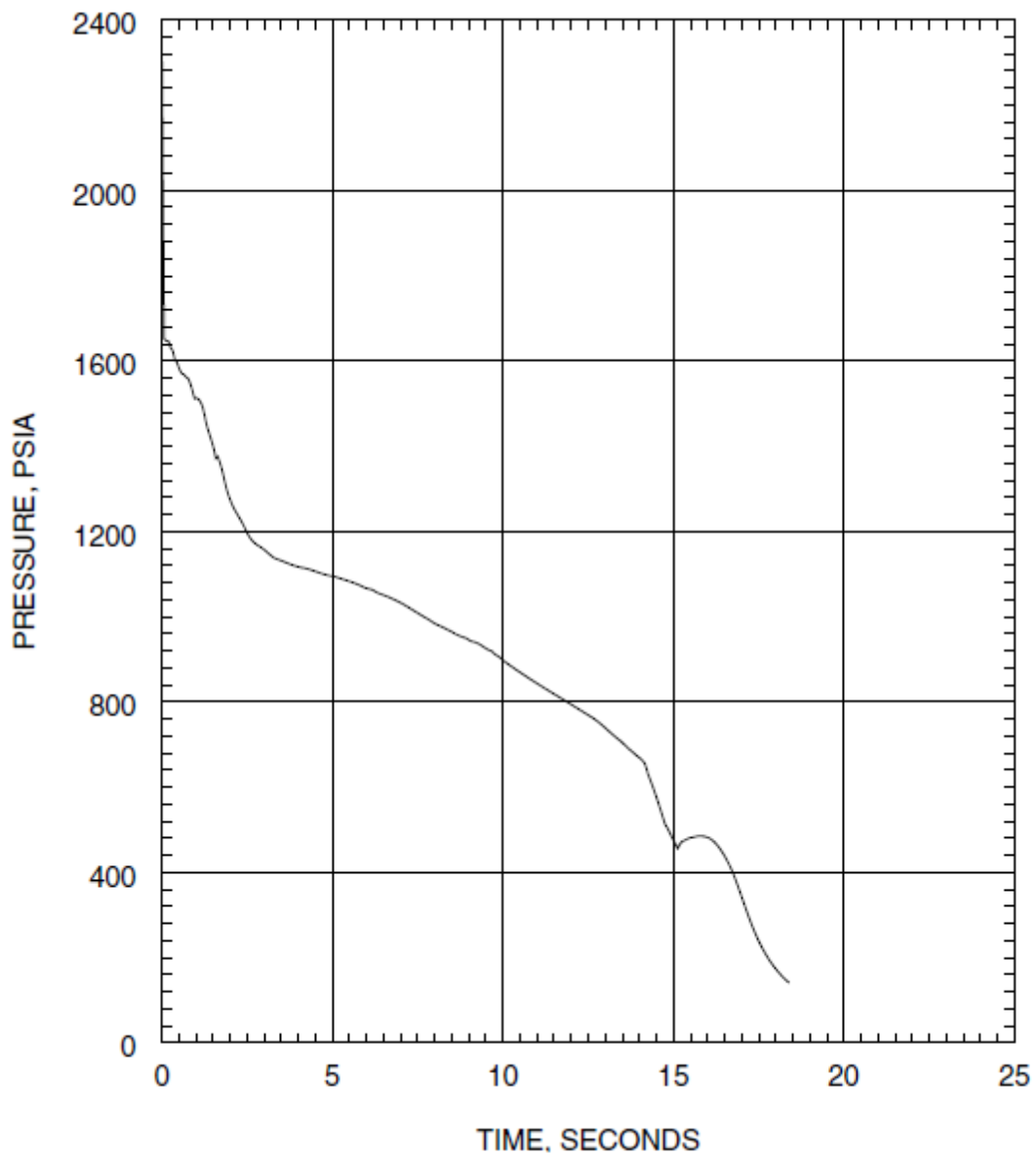
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
1.0 DEG/PD BREAK  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.2-1A

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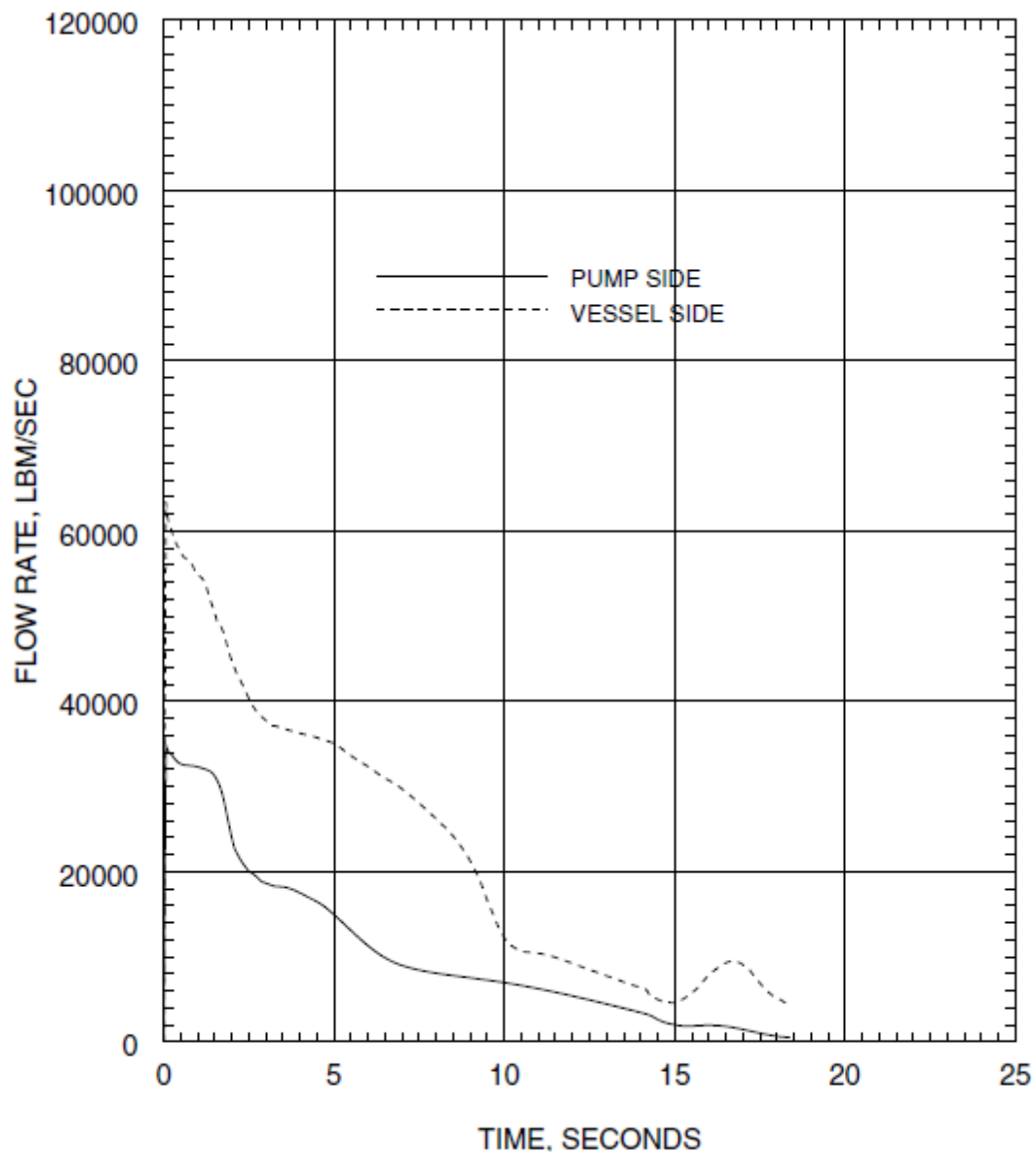
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
1.0 DEG/PD BREAK  
PRESSURE IN CENTER HOT ASSEMBLY NODE

FIGURE 6.3.3.2-1B

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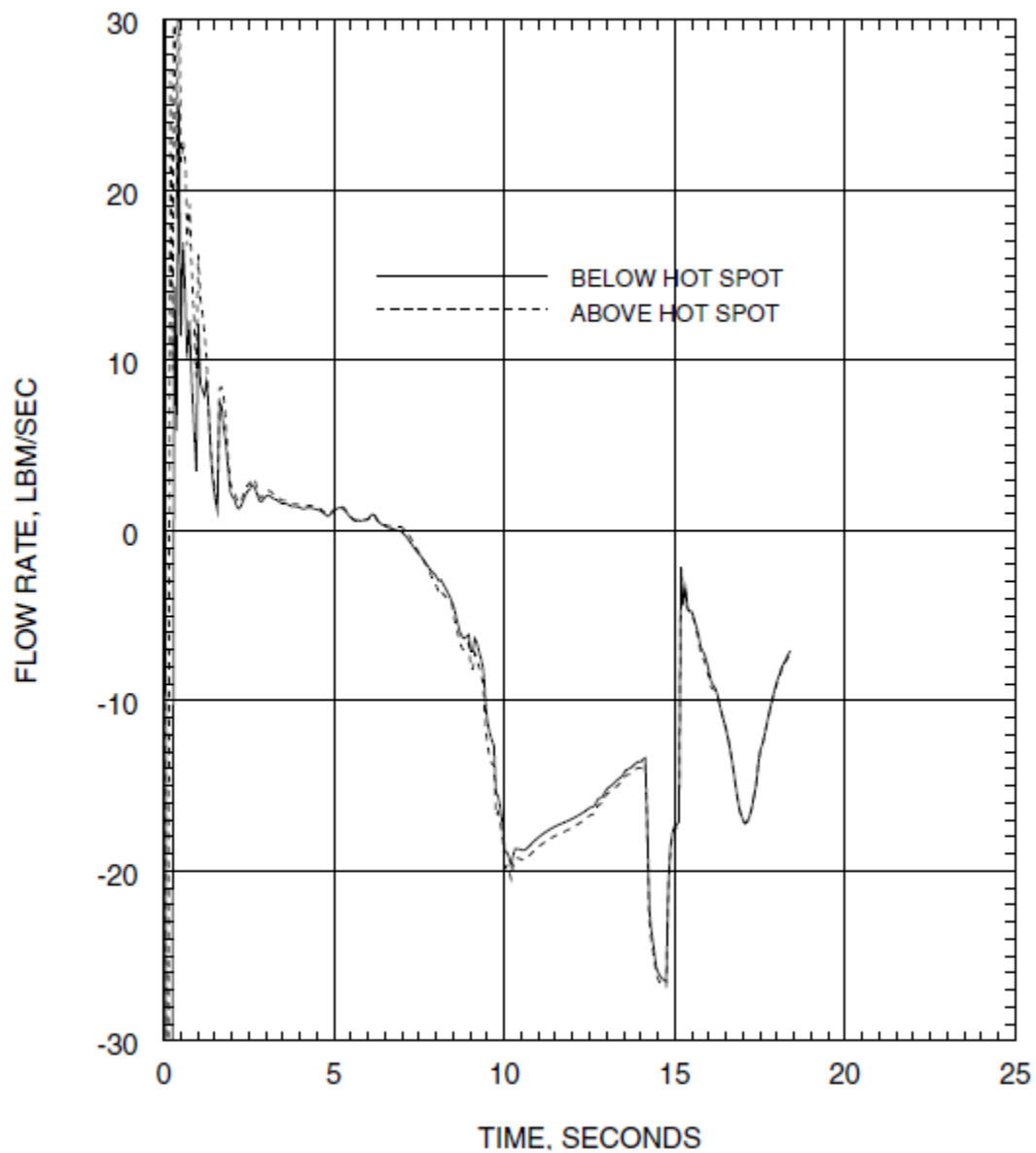
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
1.0 DEG/PD BREAK  
LEAK FLOW RATE

FIGURE 6.3.3.2-1C

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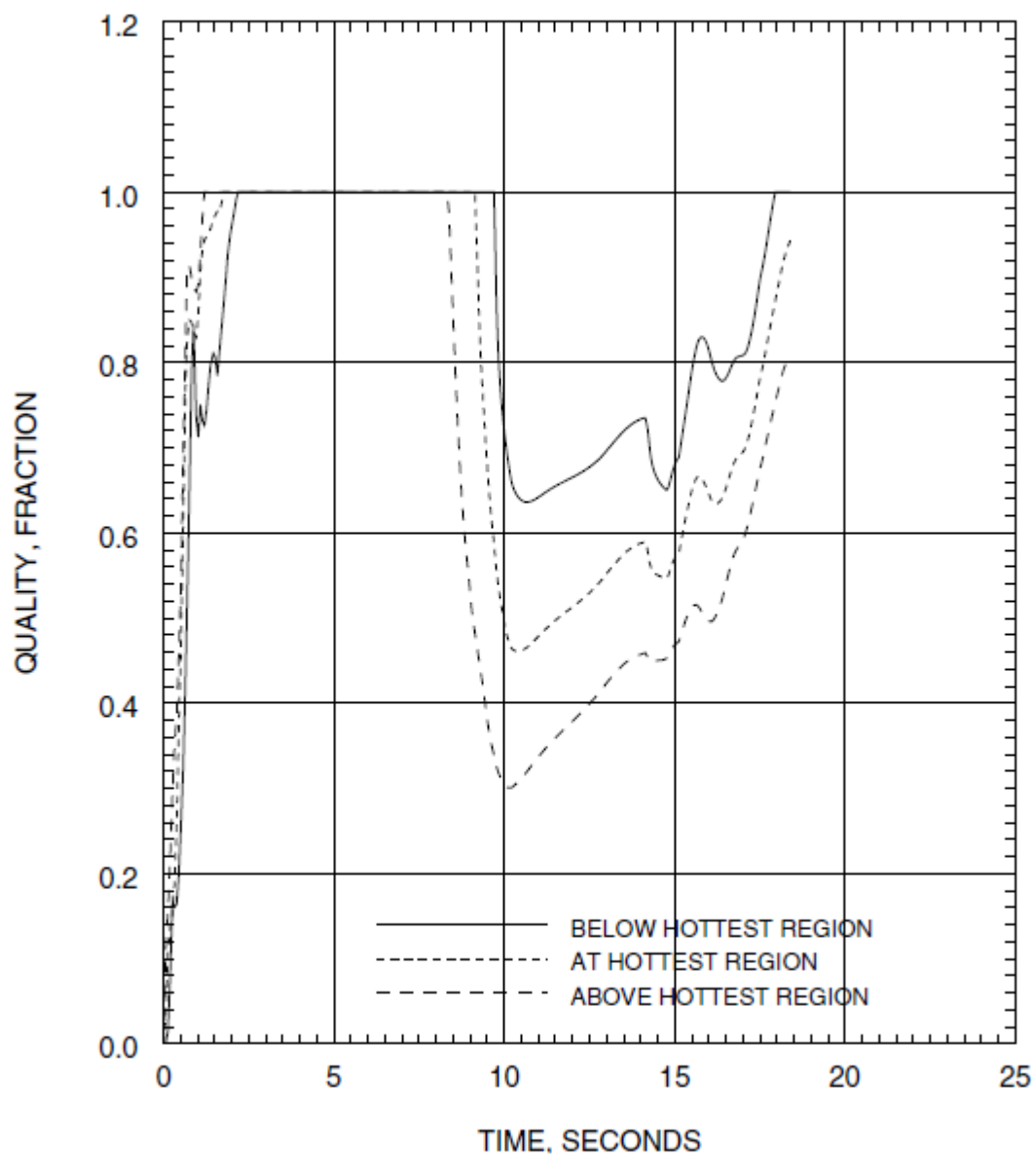
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
1.0 DEG/PD BREAK  
HOT ASSEMBLY FLOW RATE

FIGURE 6.3.3.2-1D

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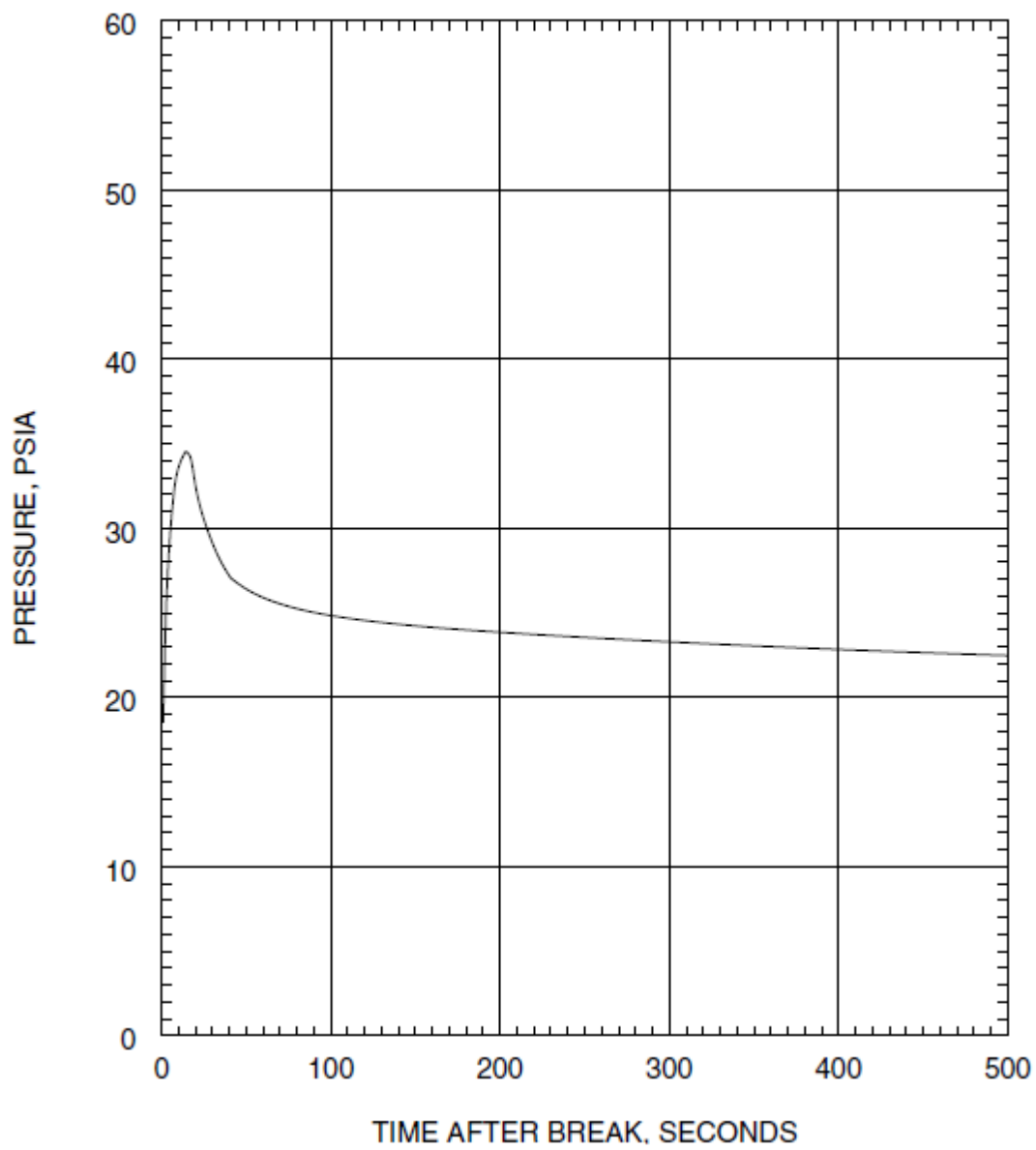
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
1.0 DEG/PD BREAK  
HOT ASSEMBLY QUALITY

FIGURE 6.3.3.2-1E

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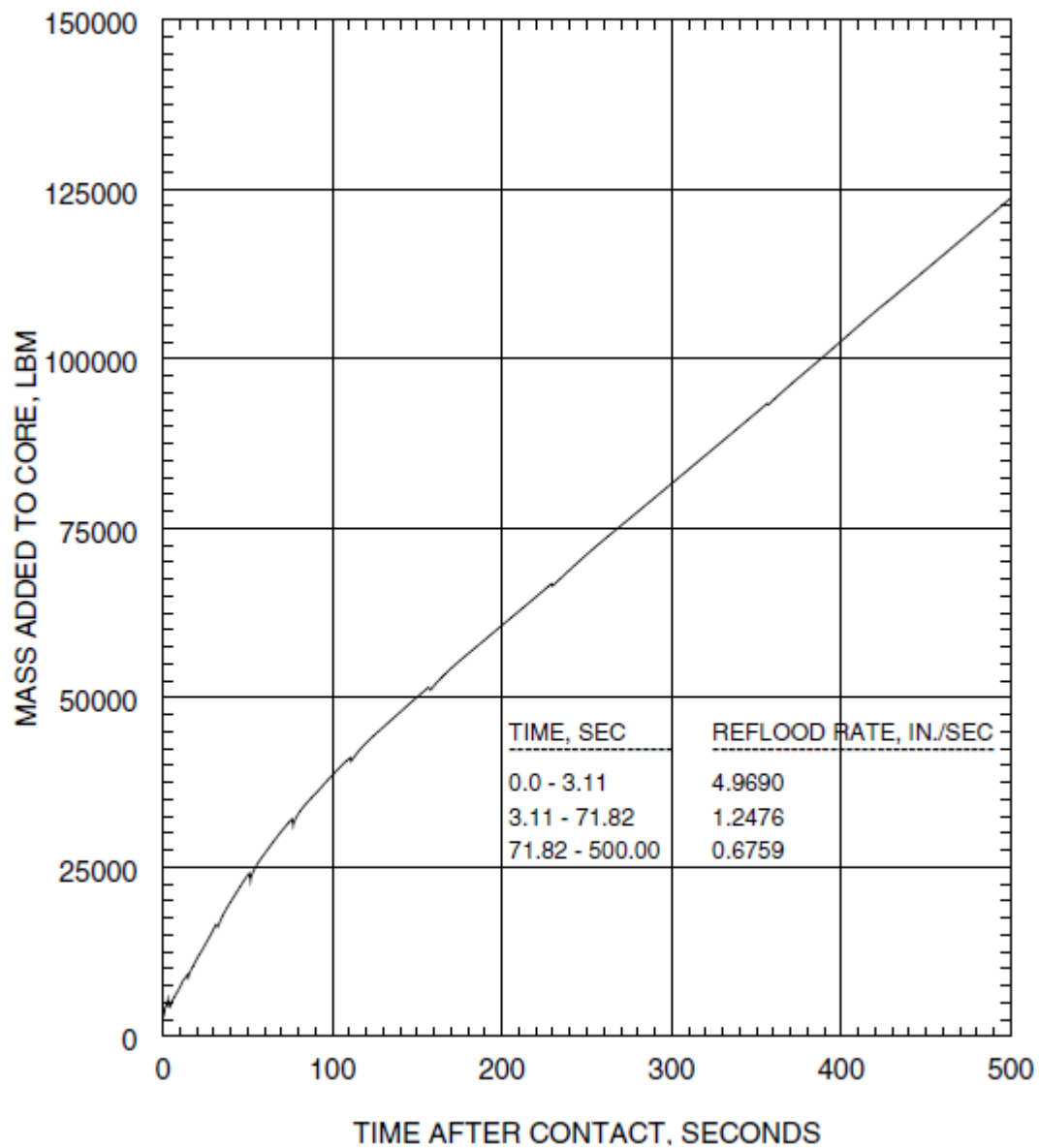
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
1.0 DEG/PD BREAK  
CONTAINMENT PRESSURE

FIGURE 6.3.3.2-1F

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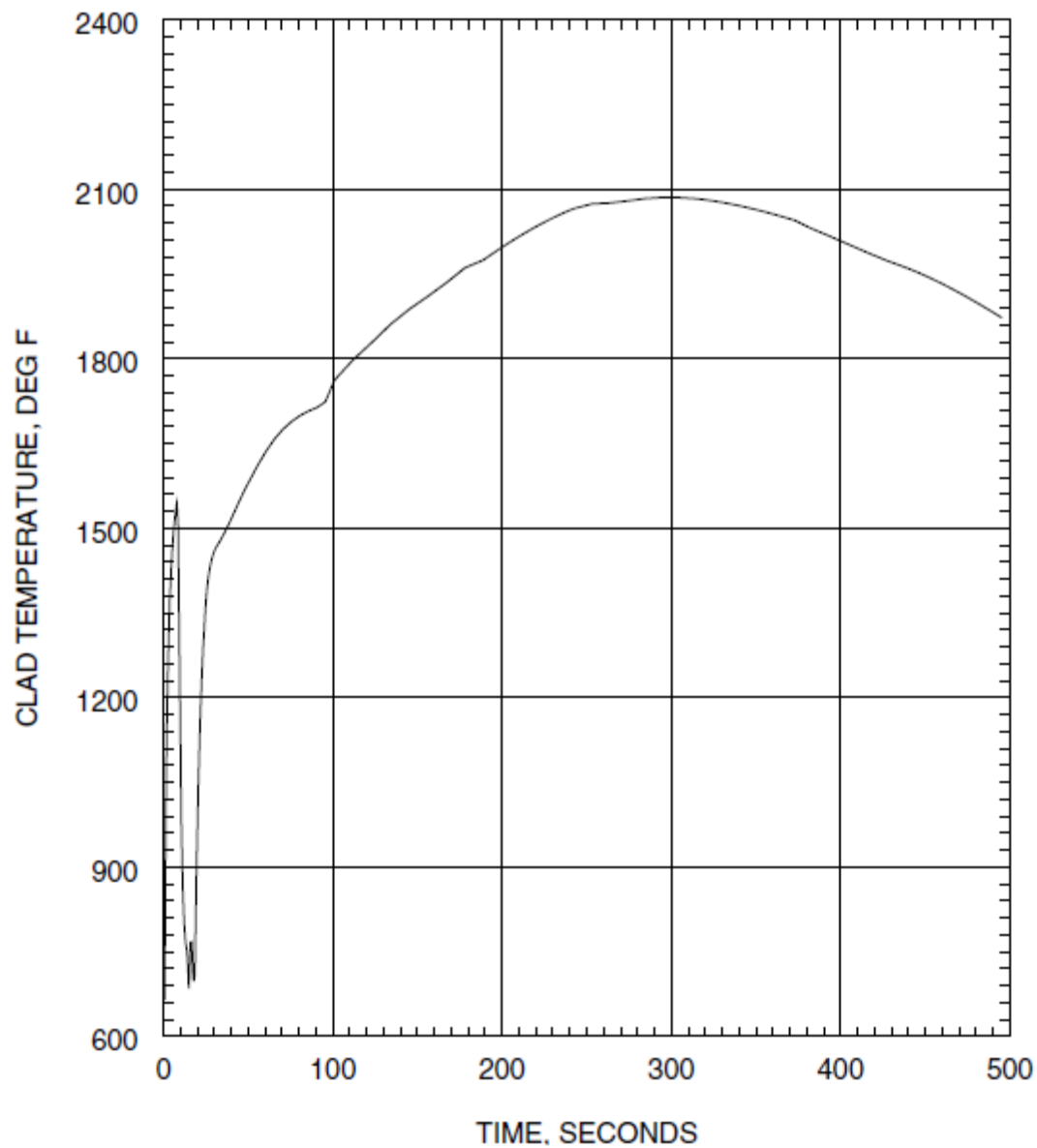
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
1.0 DEG/PD BREAK  
MASS ADDED TO CORE DURING REFLOOD

FIGURE 6.3.3.2-1G

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

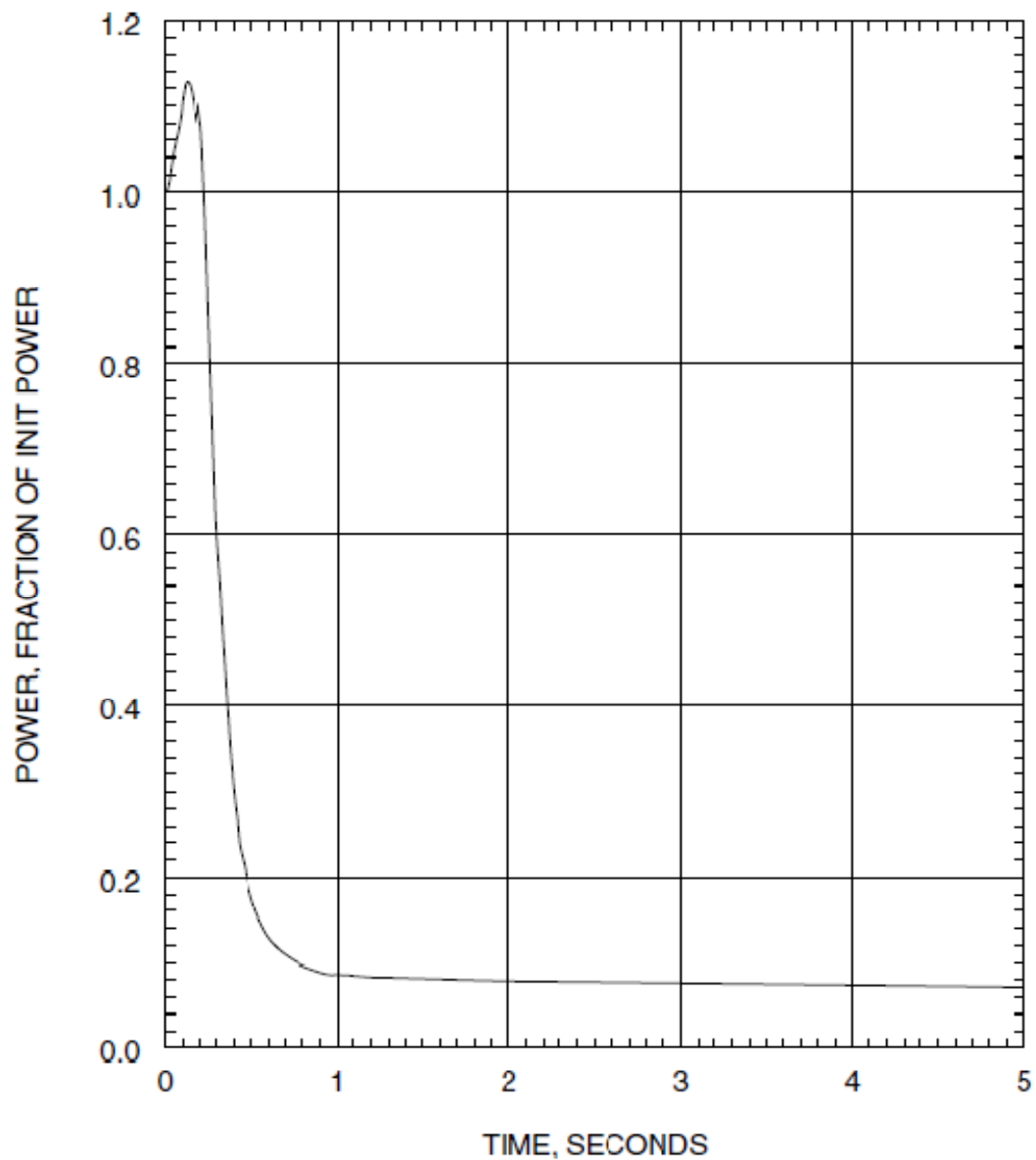
LBLOCA ECCS PERFORMANCE ANALYSIS  
1.0 DEG/PD BREAK  
PEAK CLADDING TEMPERATURE

FIGURE 6.3.3.2-1H

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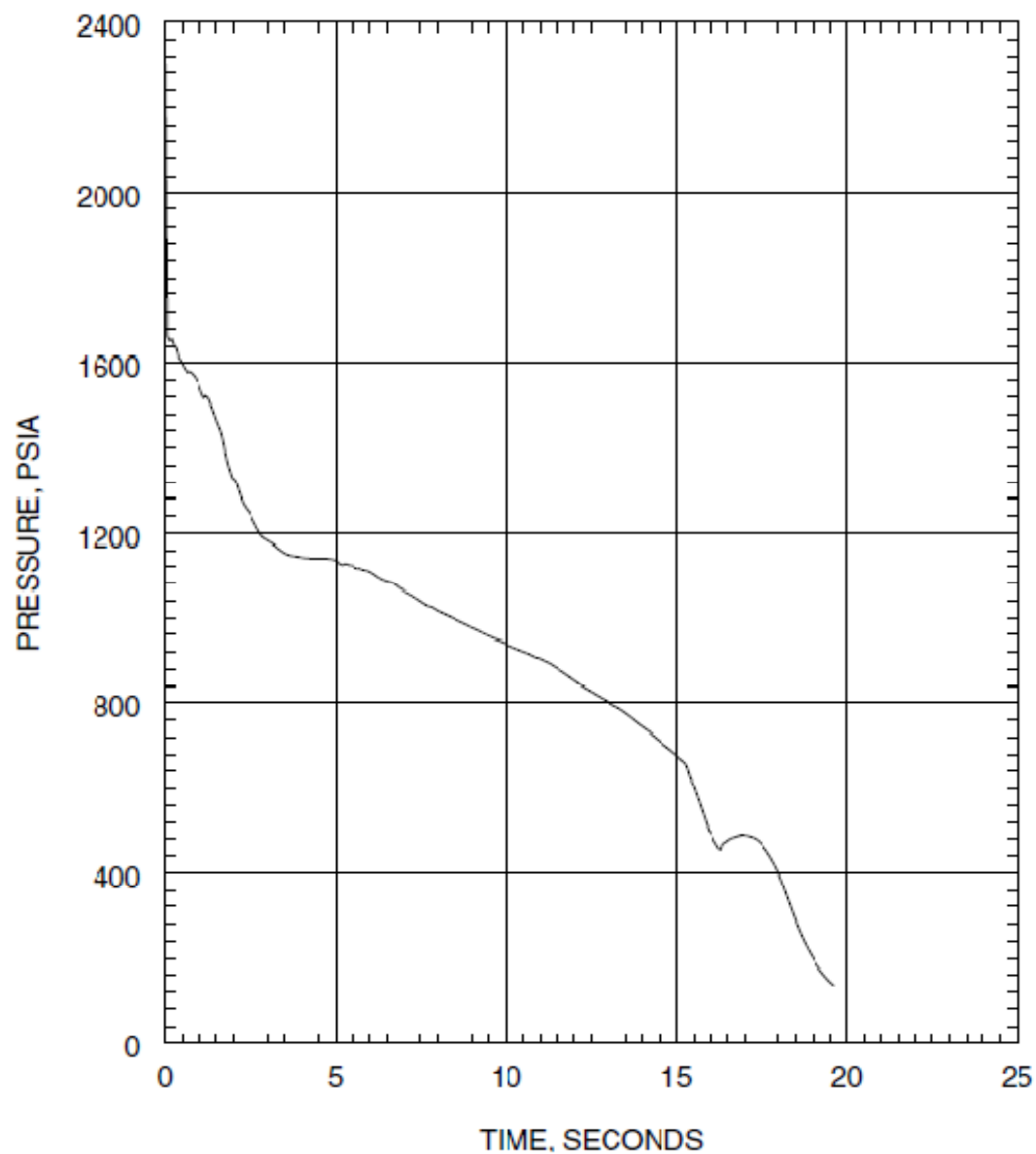
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.8 DEG/PD BREAK  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.2-2A

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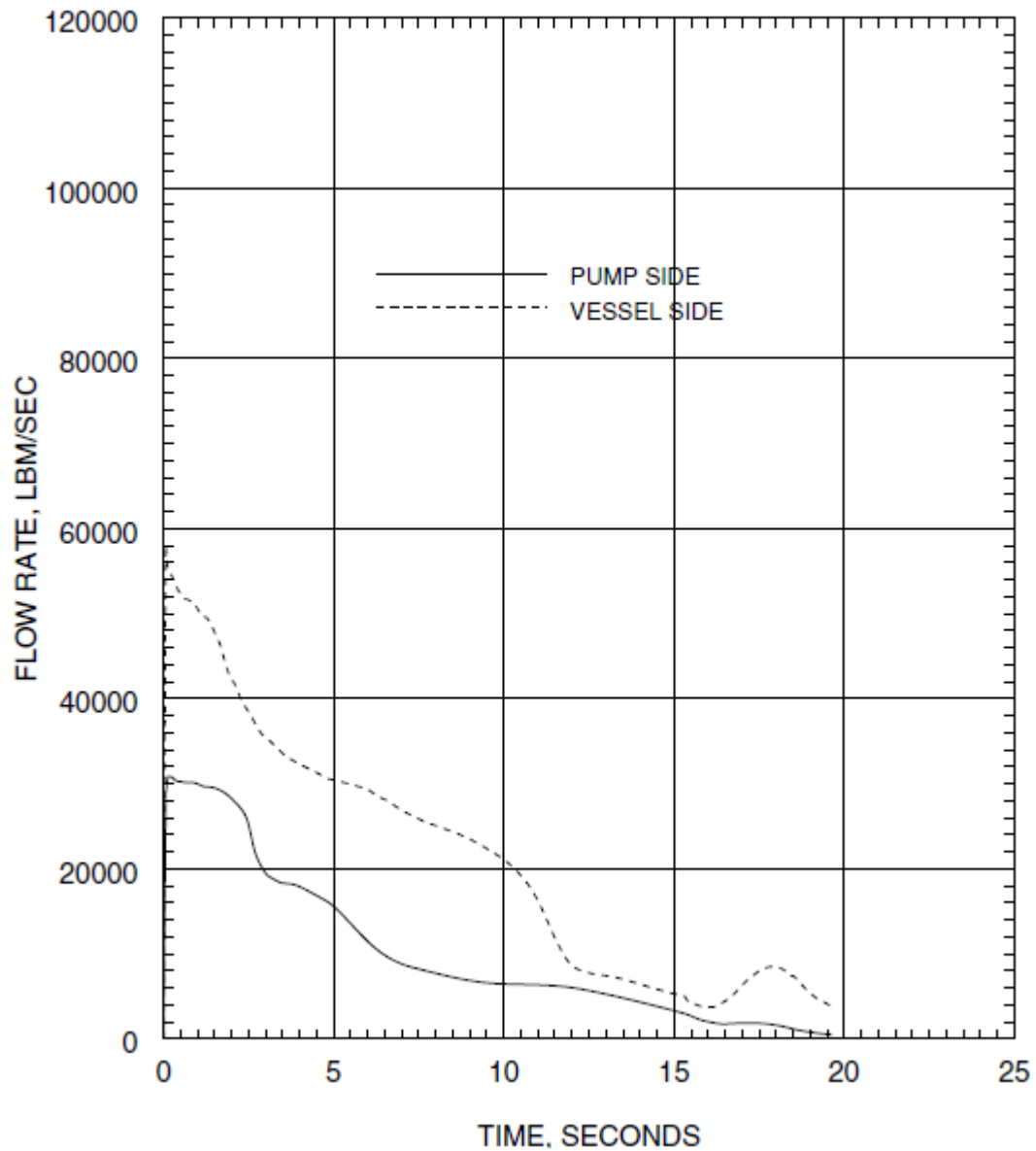
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.8 DEG/PD BREAK  
PRESSURE IN CENTER HOT ASSEMBLY NODE

FIGURE 6.3.3.2-2B

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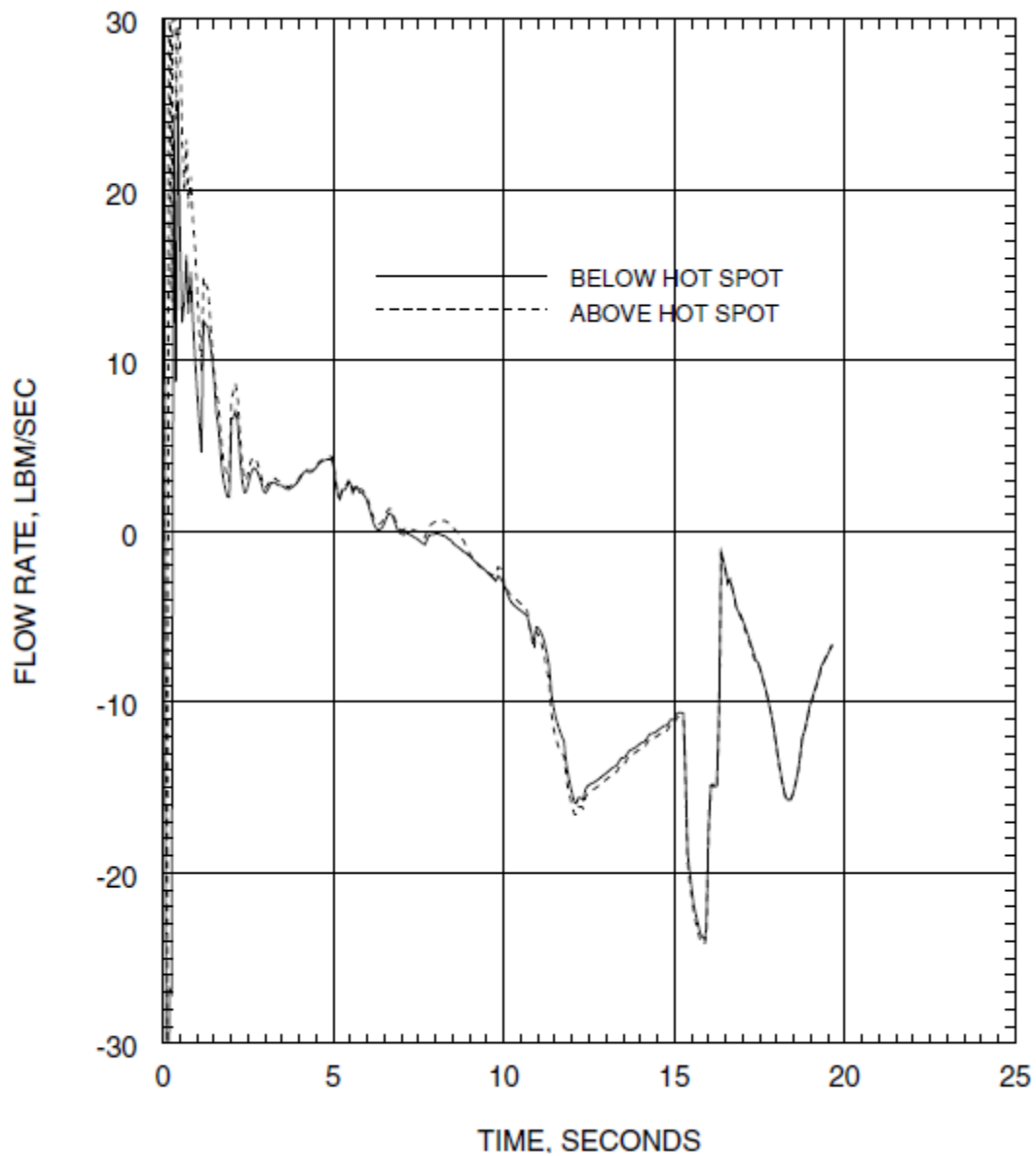
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.8 DEG/PD BREAK  
LEAK FLOW RATE

FIGURE 6.3.3.2-2C

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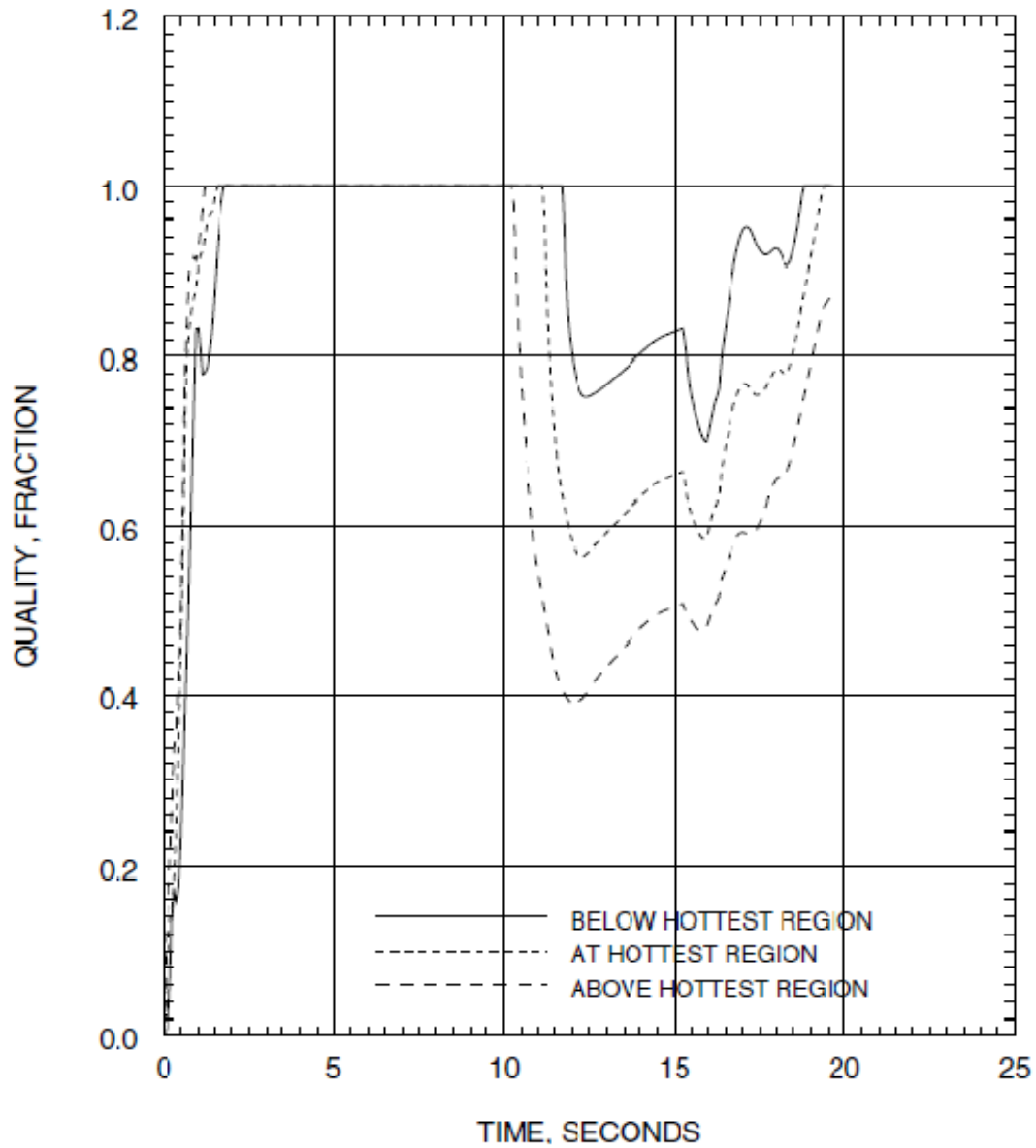
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.8 DEG/PD BREAK  
HOT ASSEMBLY FLOW RATE

FIGURE 6.3.3.2-2D

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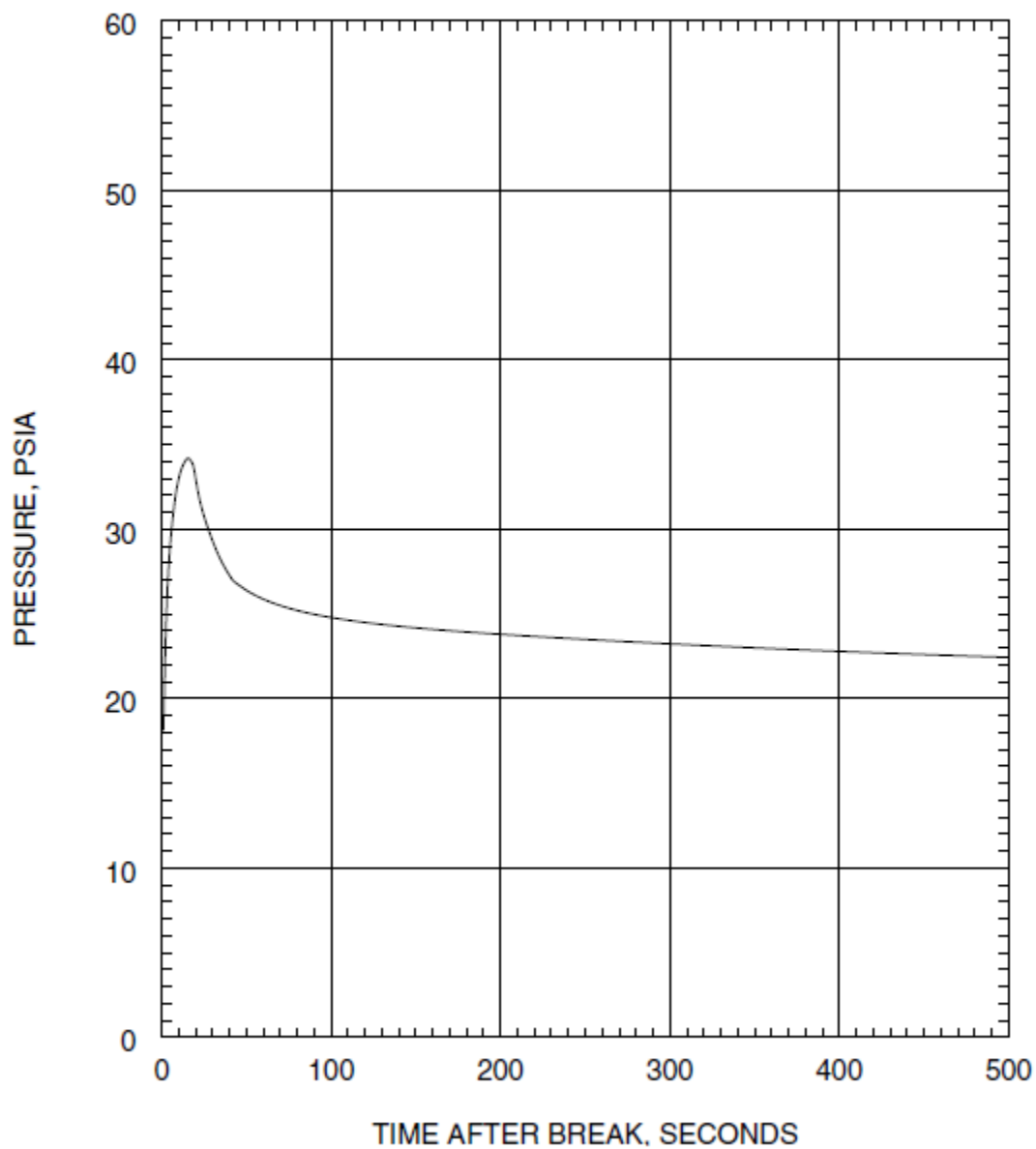
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.8 DEG/PD BREAK  
HOT ASSEMBLY QUALITY

FIGURE 6.3.3.2-2E

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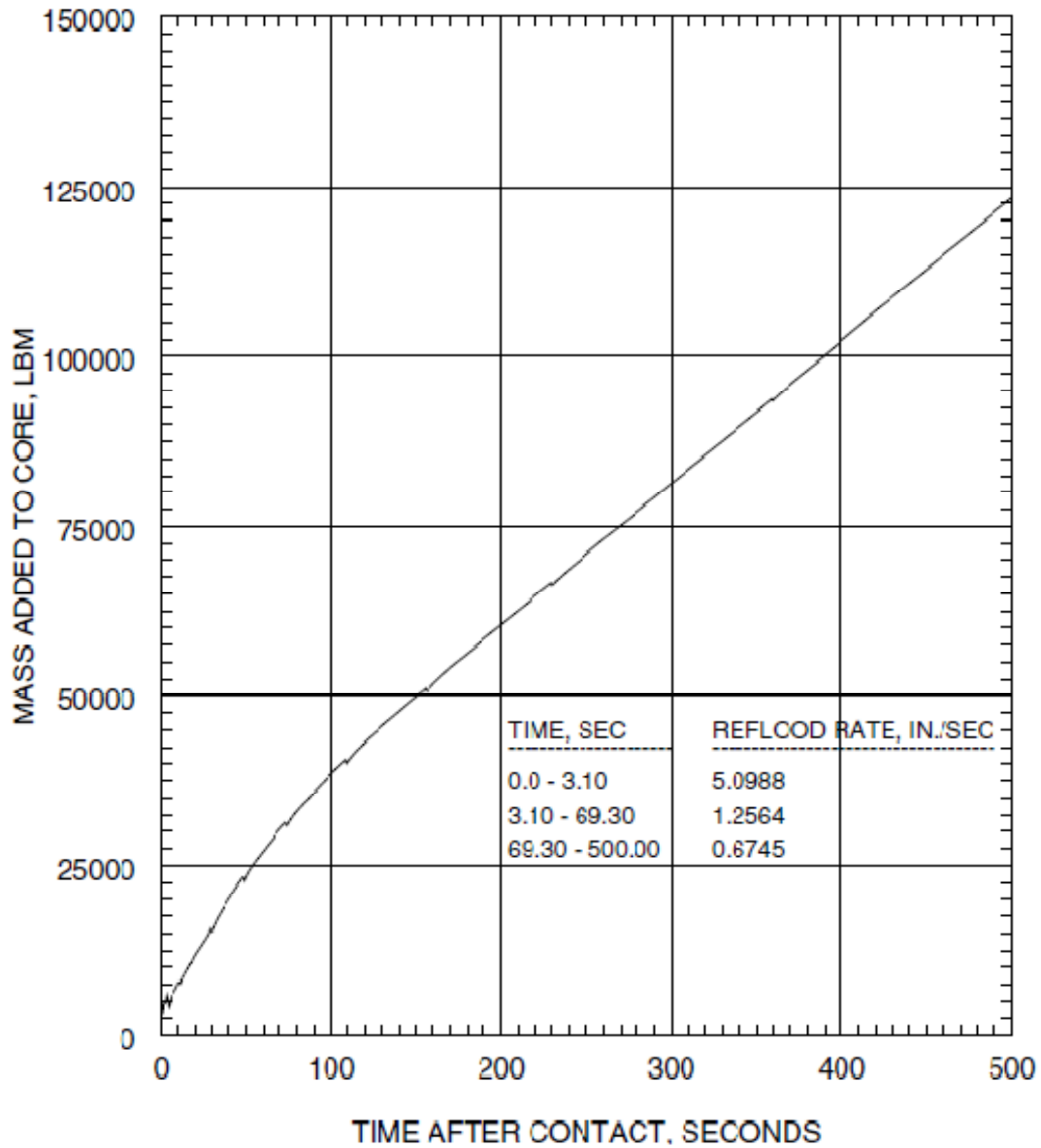
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.8 DEG/PD BREAK  
CONTAINMENT PRESSURE

FIGURE 6.3.3.2-2F

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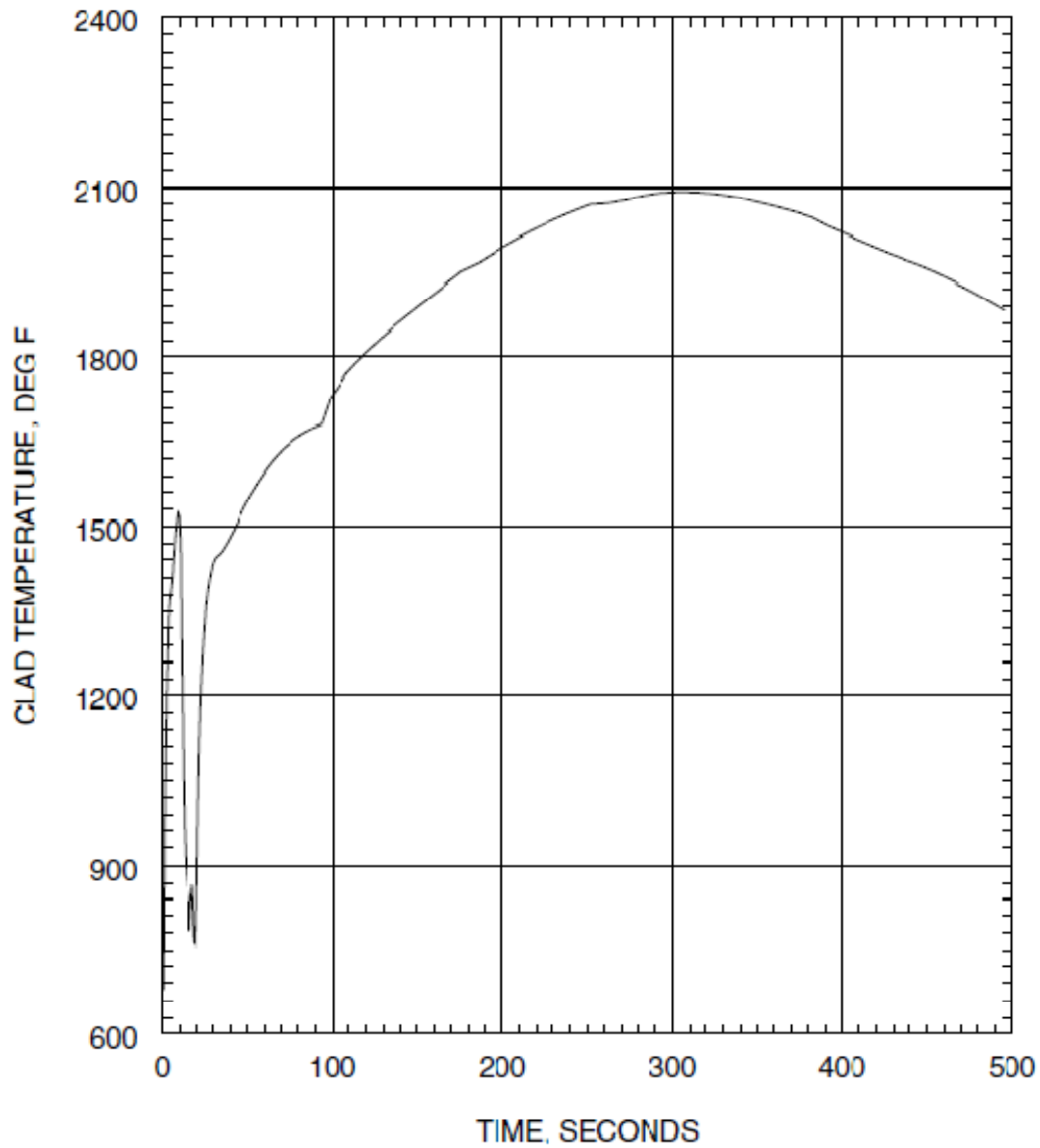
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.8 DEG/PD BREAK  
MASS ADDED TO CORE DURING REFLOOD

FIGURE 6.3.3.2-2G

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

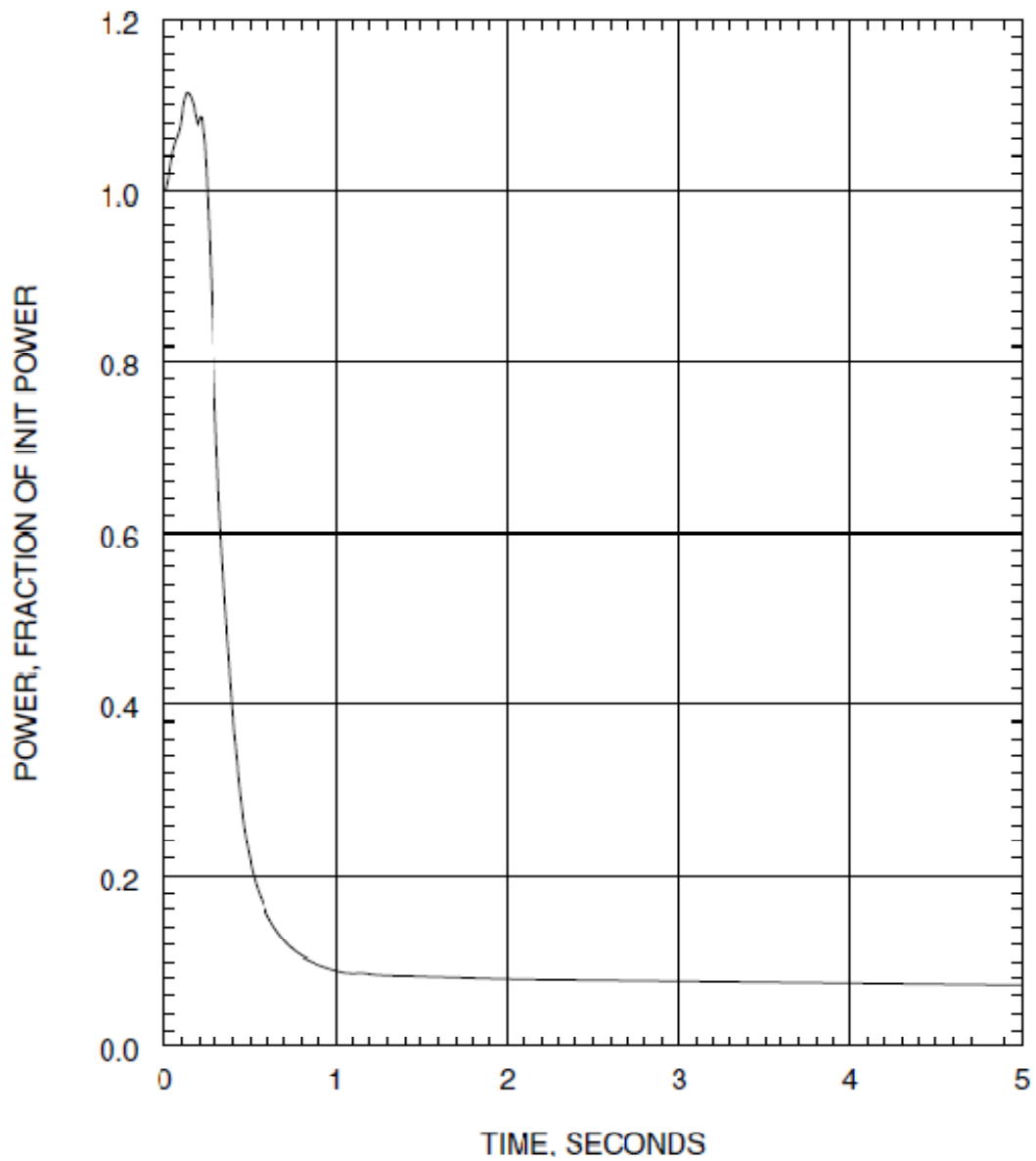
LBLOCA ECCS PERFORMANCE ANALYSIS  
0.8 DEG/PD BREAK  
PEAK CLADDING TEMPERATURE

FIGURE 6.3.3.2-2H

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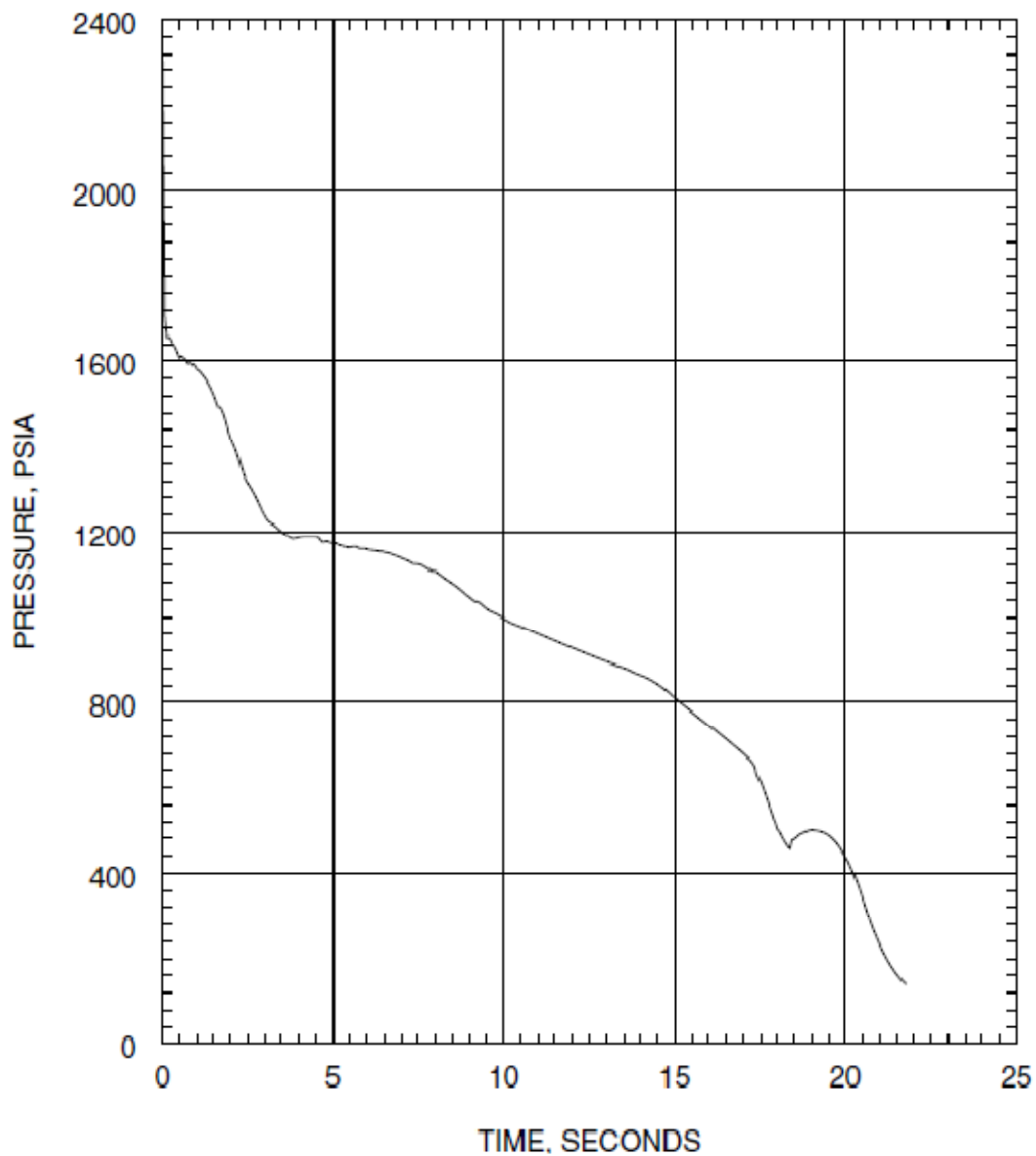
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.2-3A

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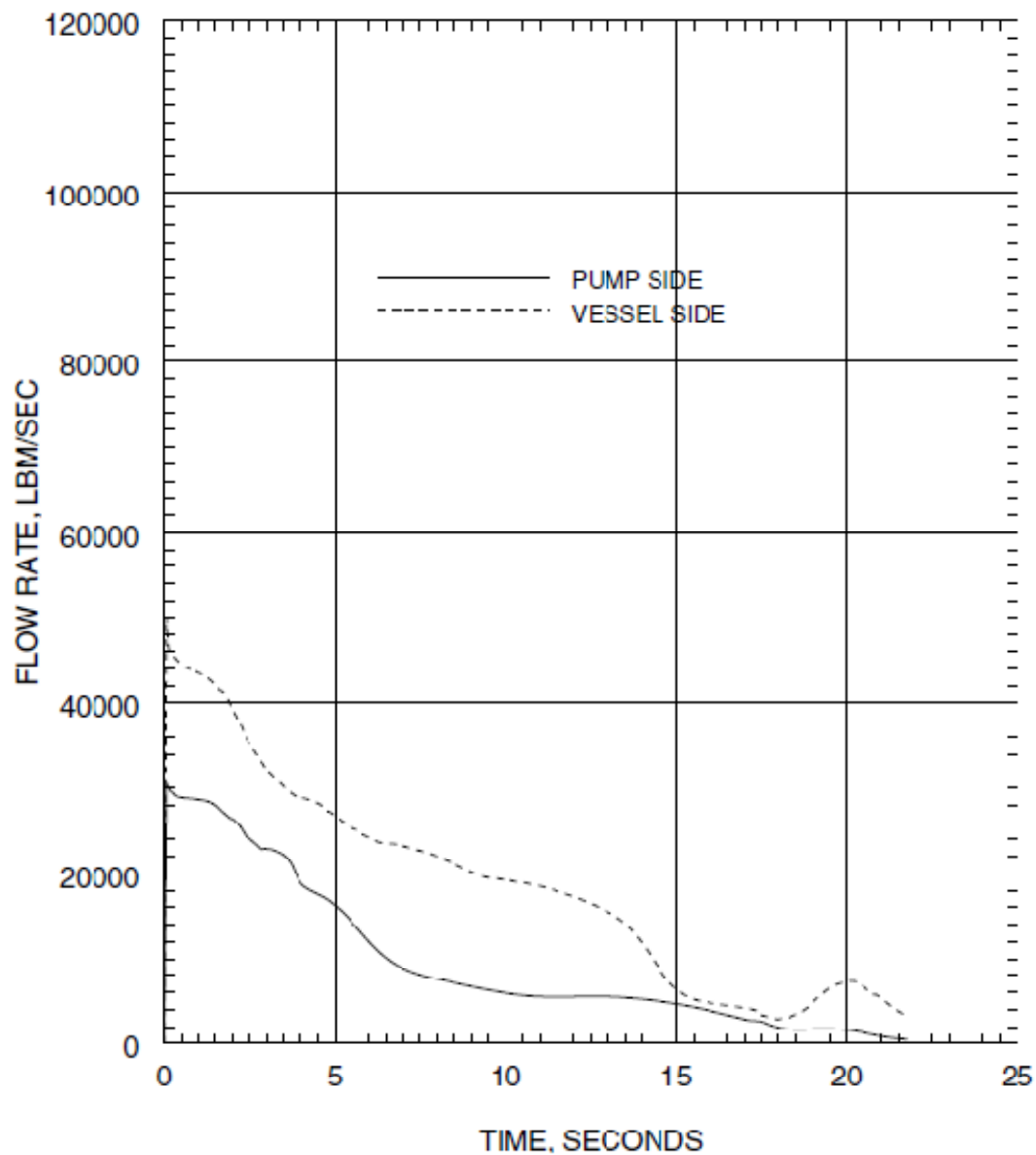
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
PRESSURE IN CENTER HOT ASSEMBLY NODE

FIGURE 6.3.3.2-3B

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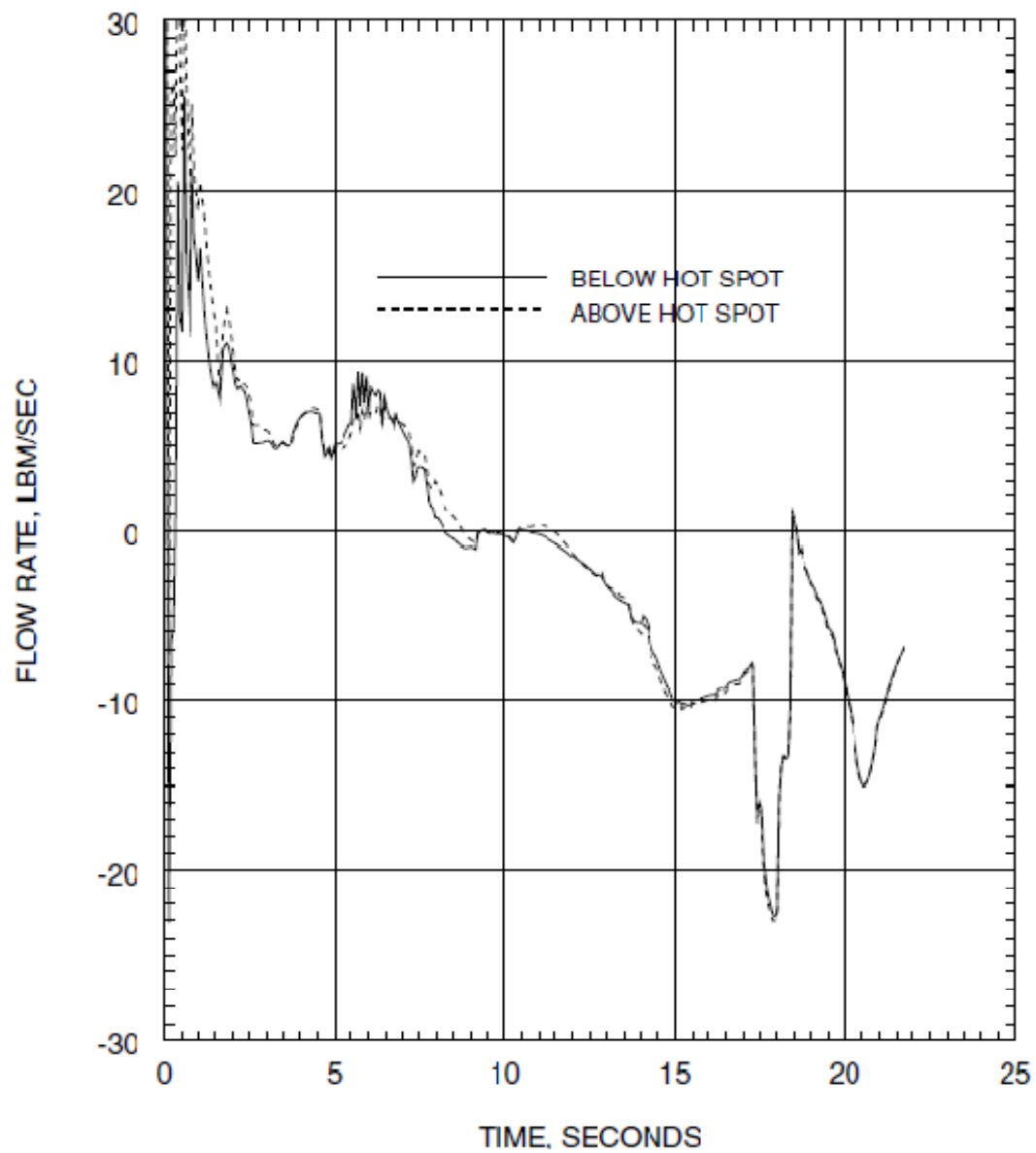
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
LEAK FLOW RATE

FIGURE 6.3.3.2-3C

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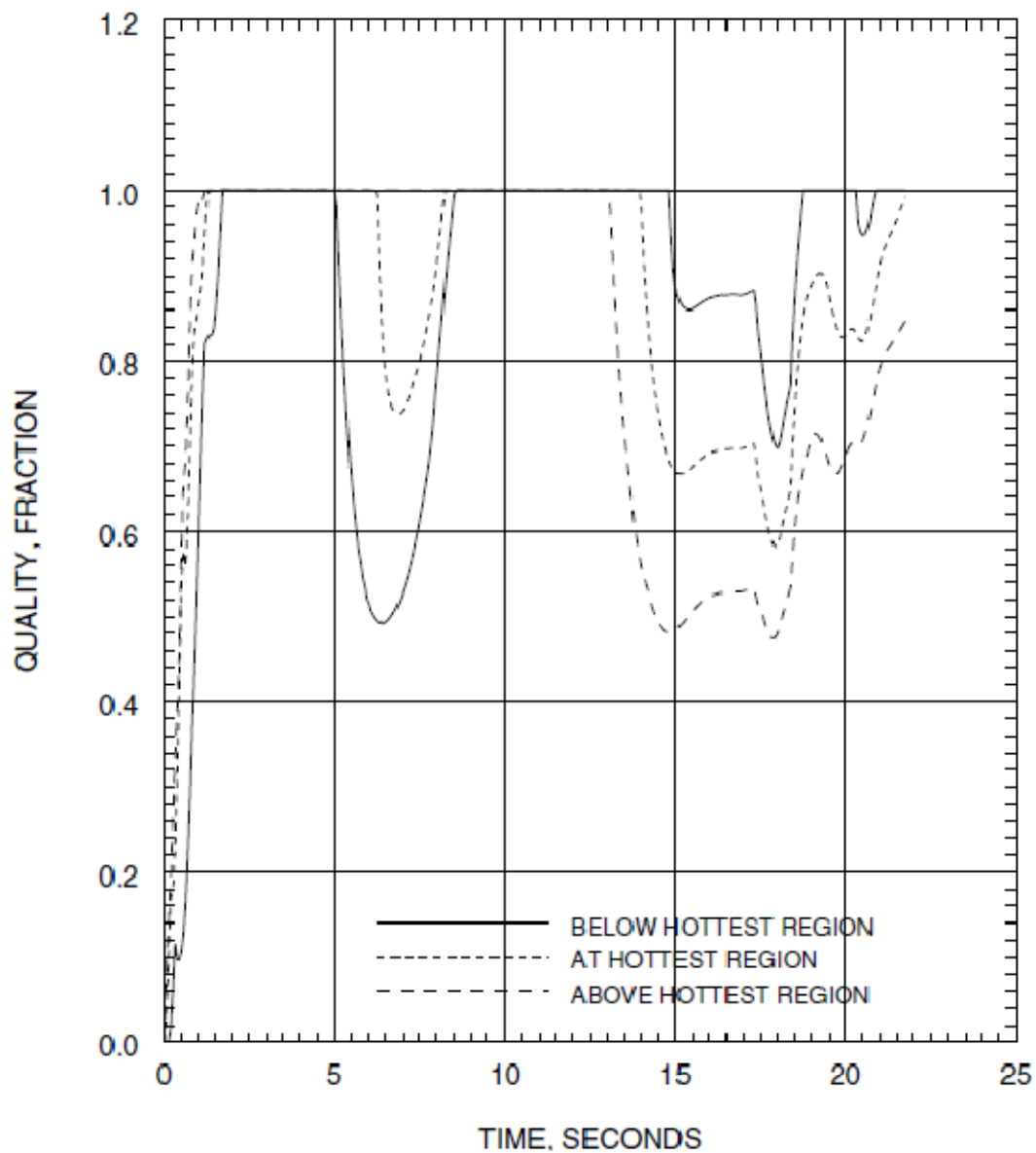
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
06 DEG/PD BREAK  
HOT ASSEMBLY FLOW RATE

FIGURE 6.3.3.2-3D

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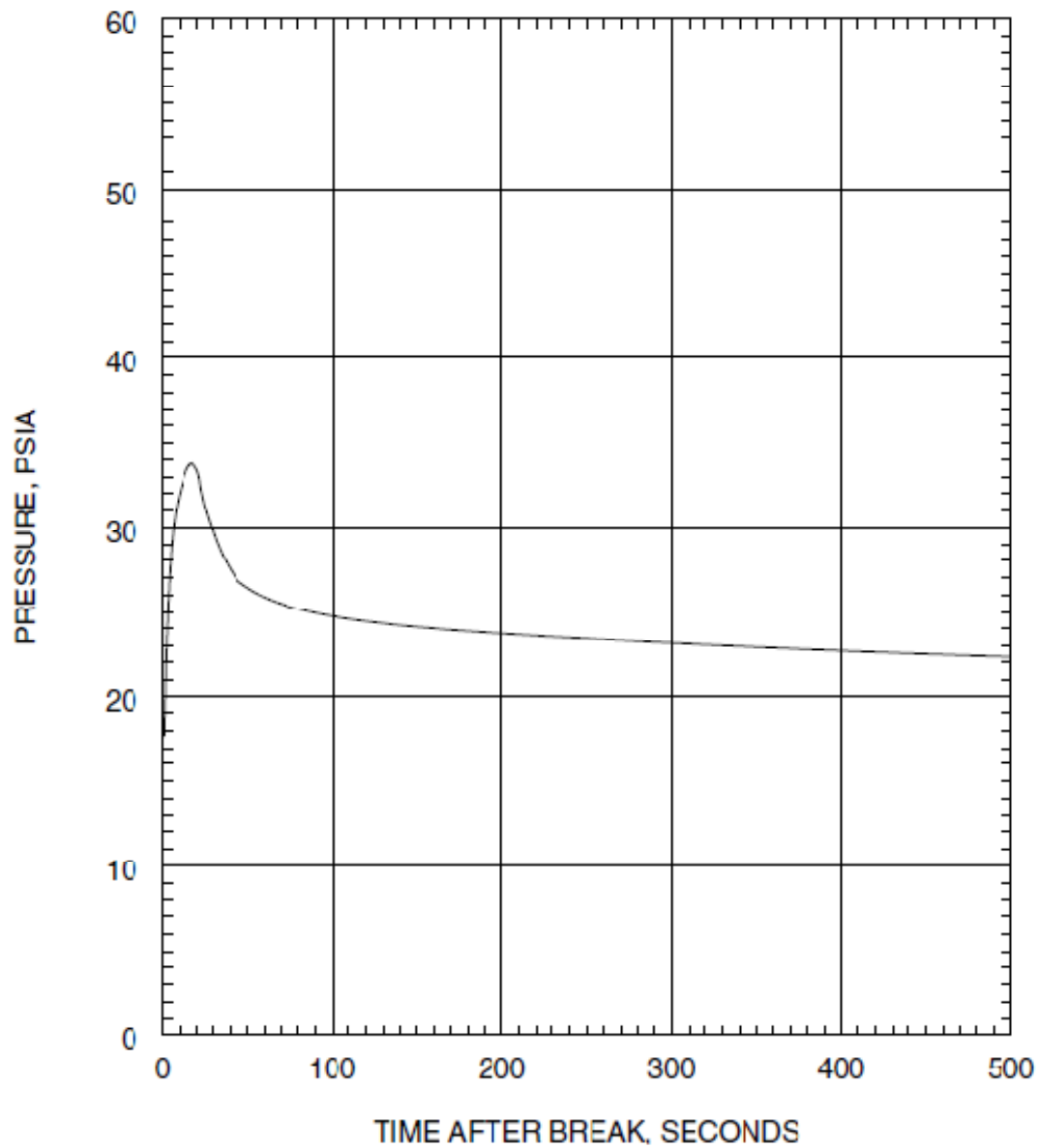
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
HOT ASSEMBLY QUALITY

FIGURE 6.3.3.2-3E

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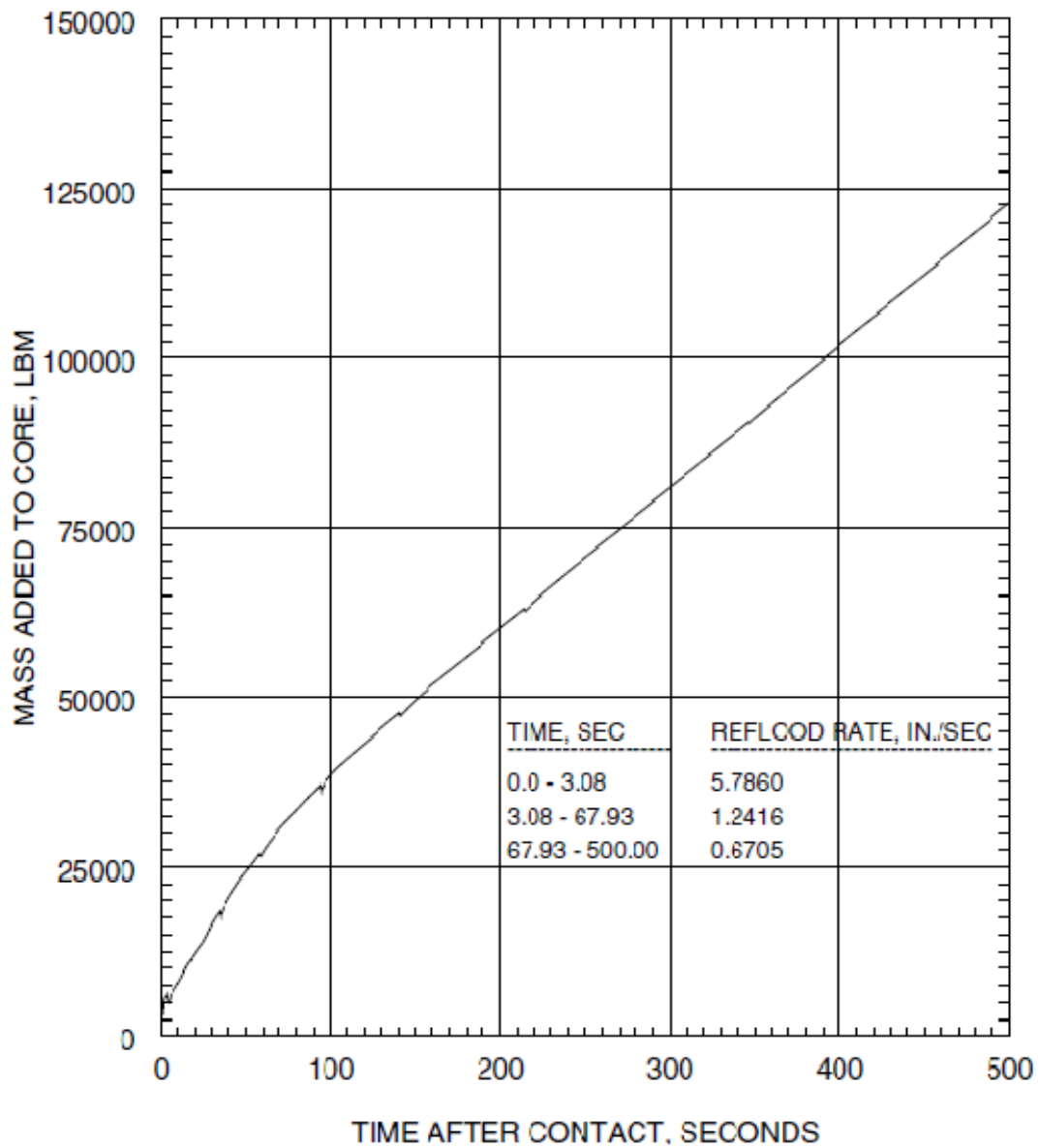
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
CONTAINMENT PRESSURE

FIGURE 6.3.3.2-3F

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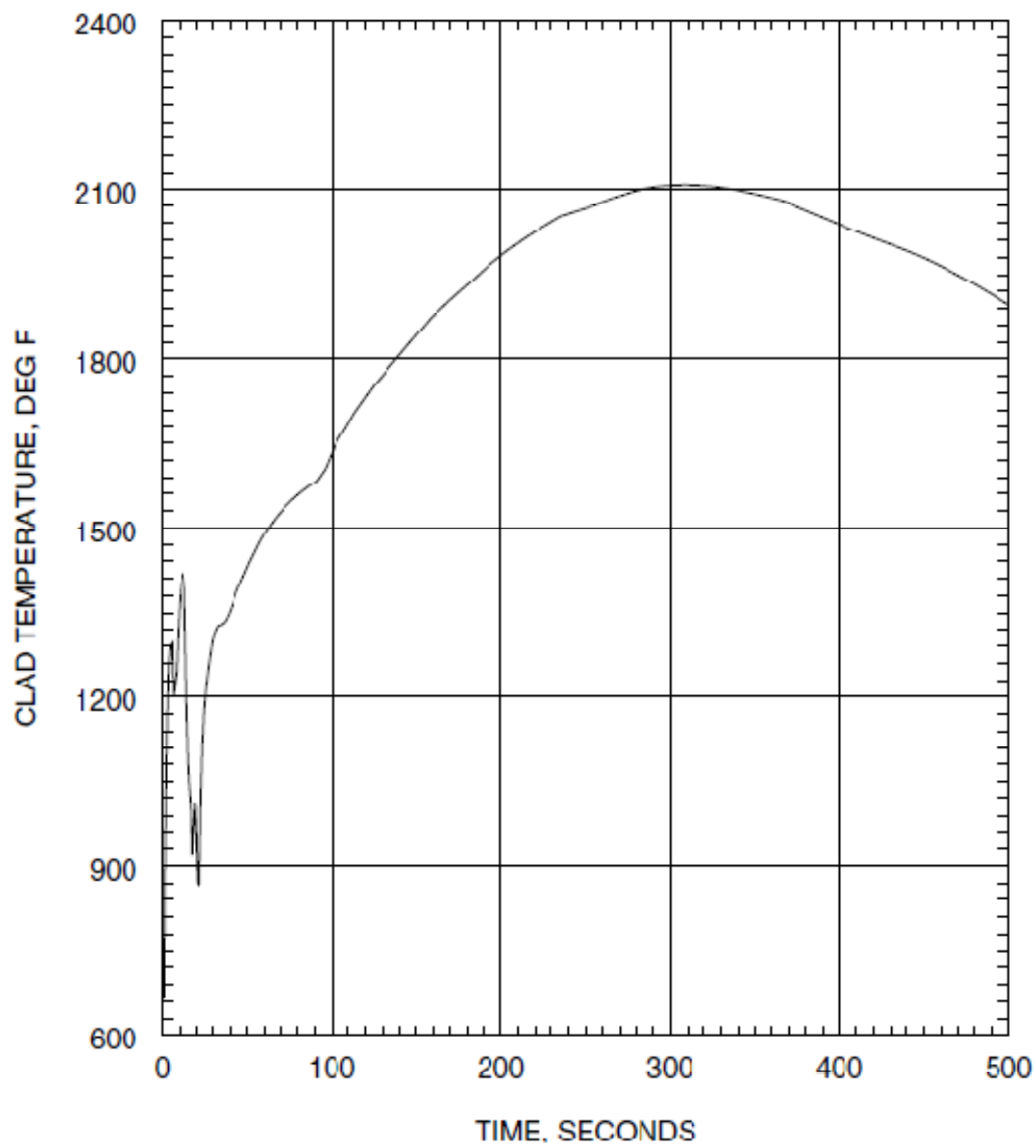
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
MASS ADDED TO CORE DURING REFLOOD

Figure 6.3.3.2-3G

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

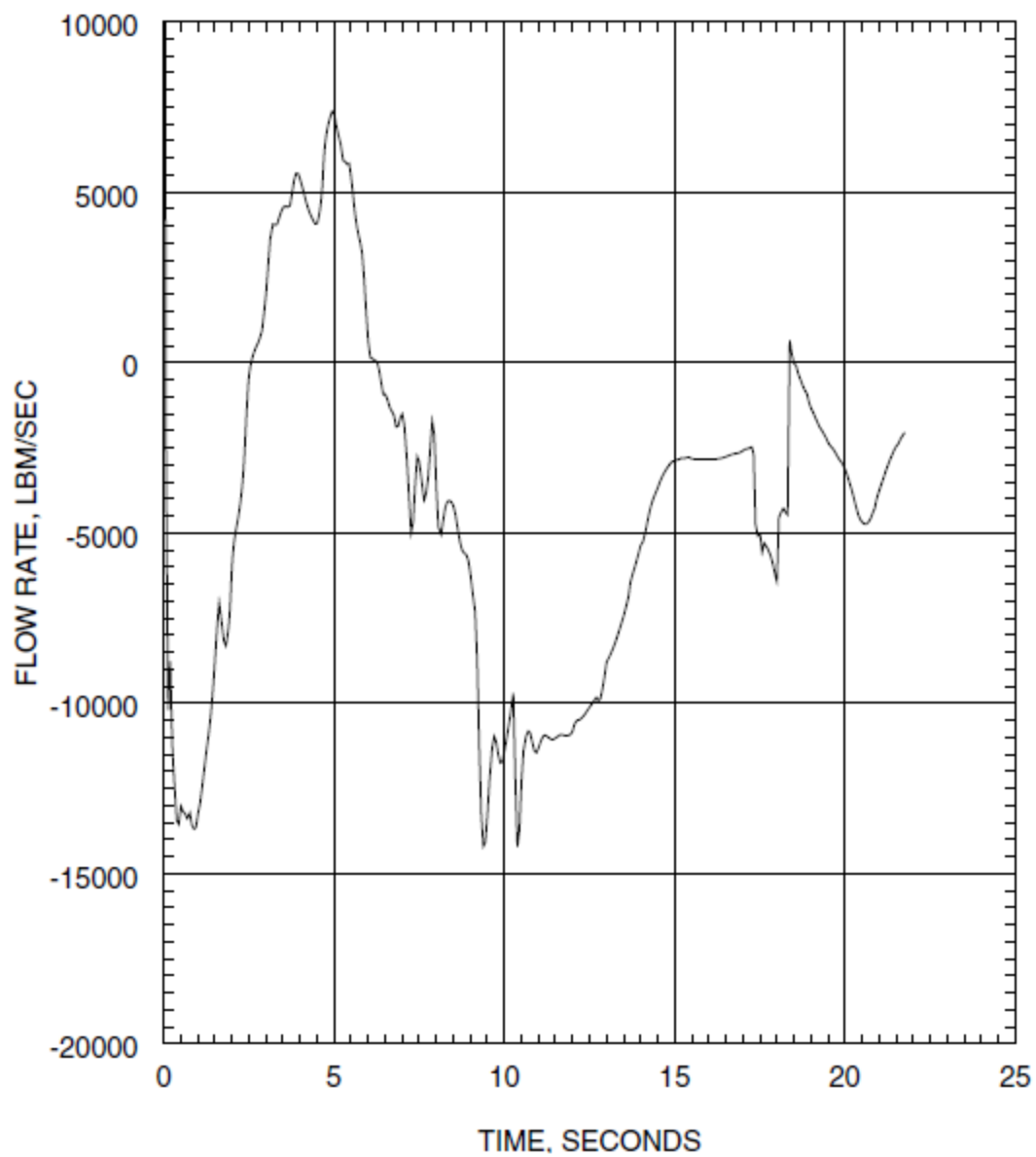
LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
PEAK CLADDING TEMPERATURE

Figure 6.3.3.2-3H

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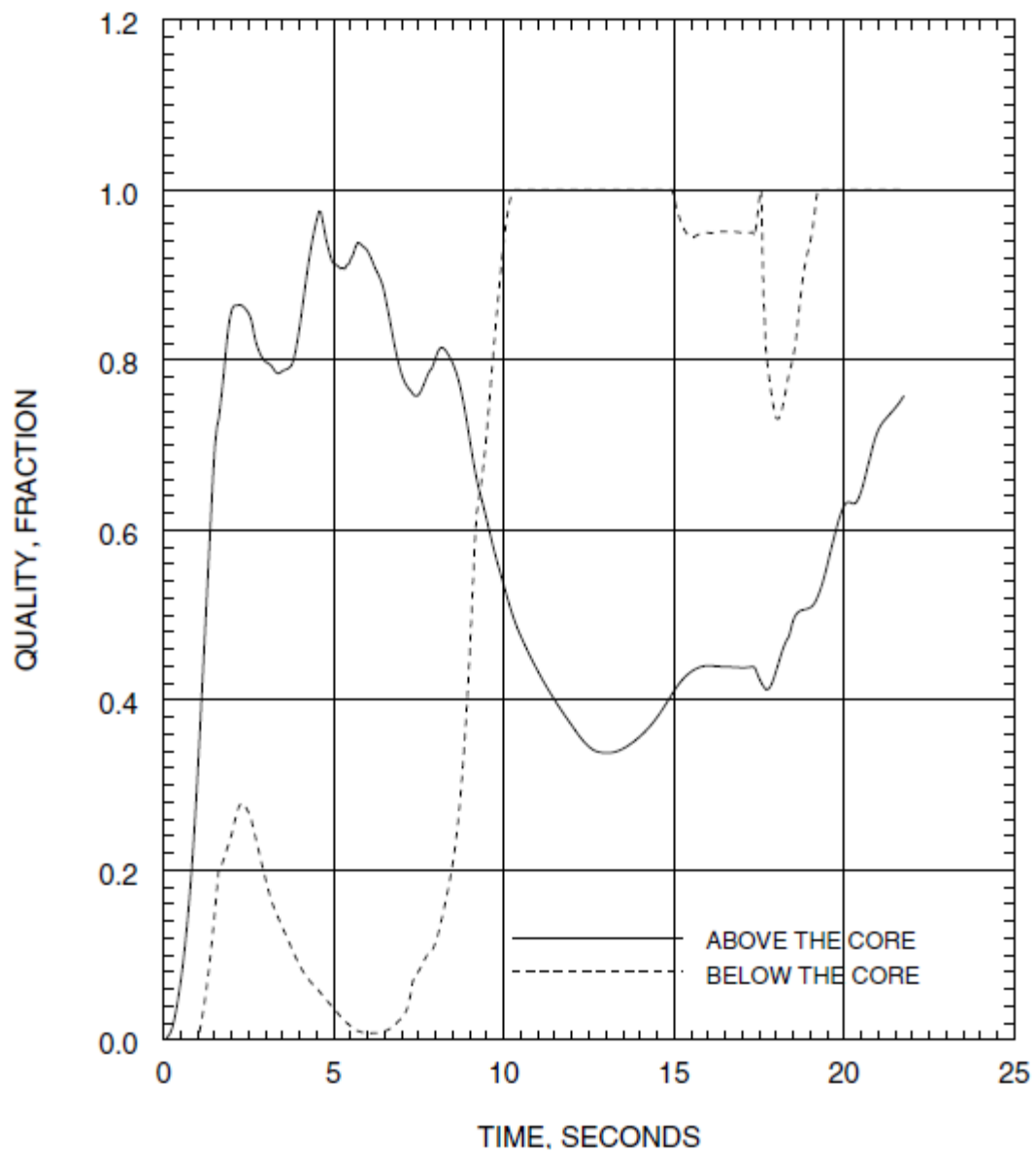
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
MID ANNULUS FLOW RATE

Figure 6.3.3.2-3I

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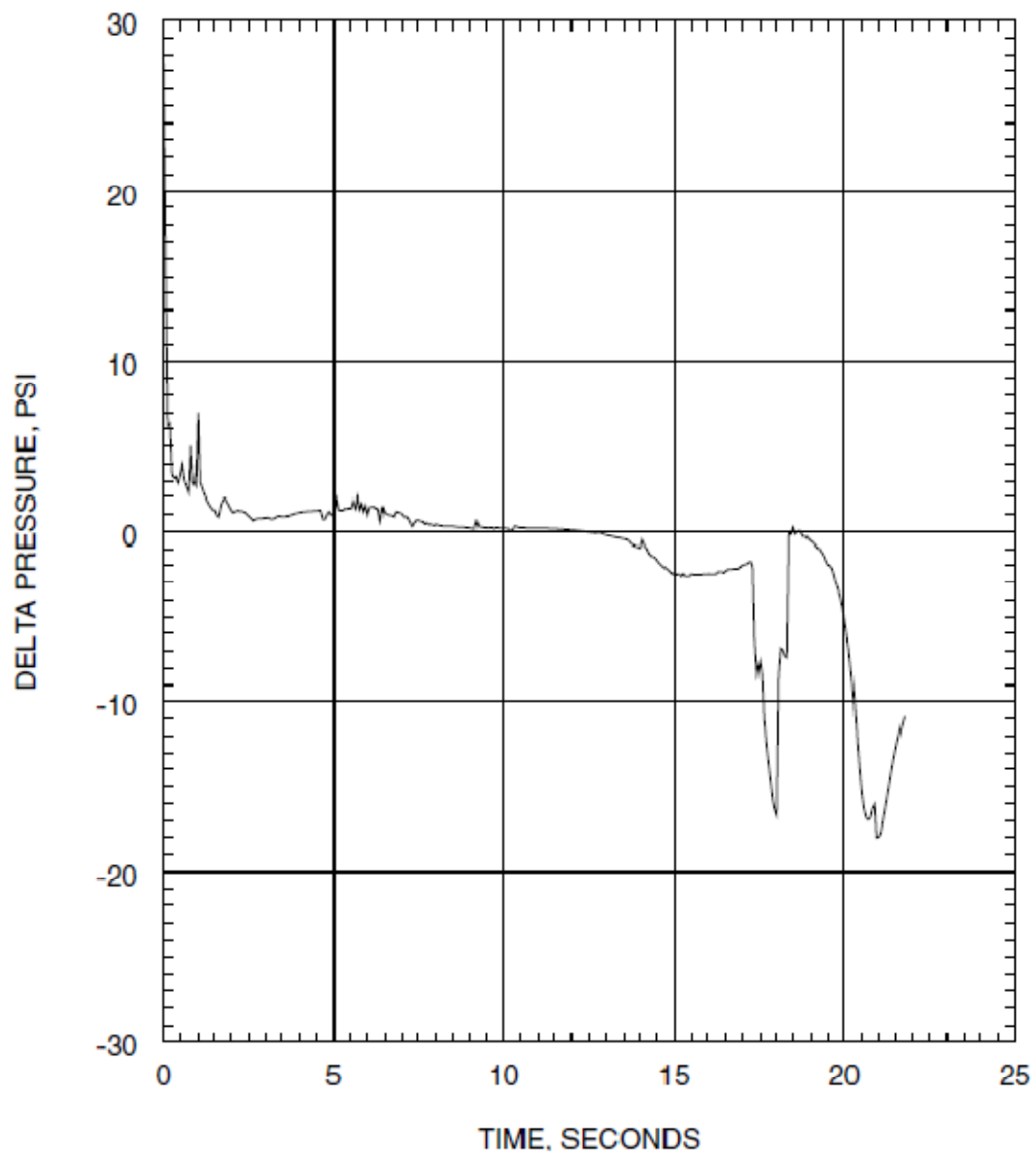
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
QUALITY ABOVE AND BELOW THE CORE

Figure 6.3.3.2-3J

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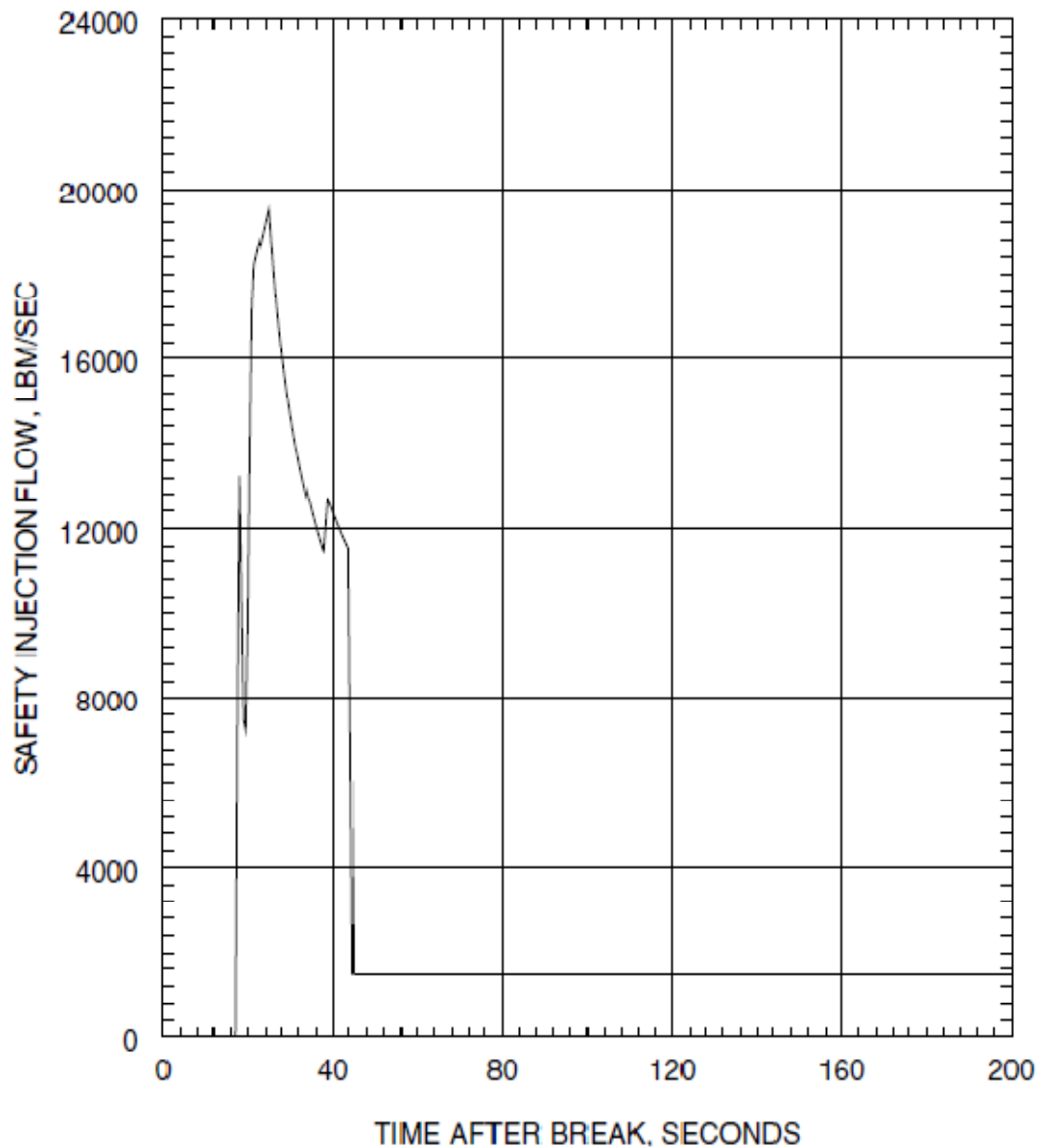
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
CORE PRESSURE DROP

Figure 6.3.3.2-3K

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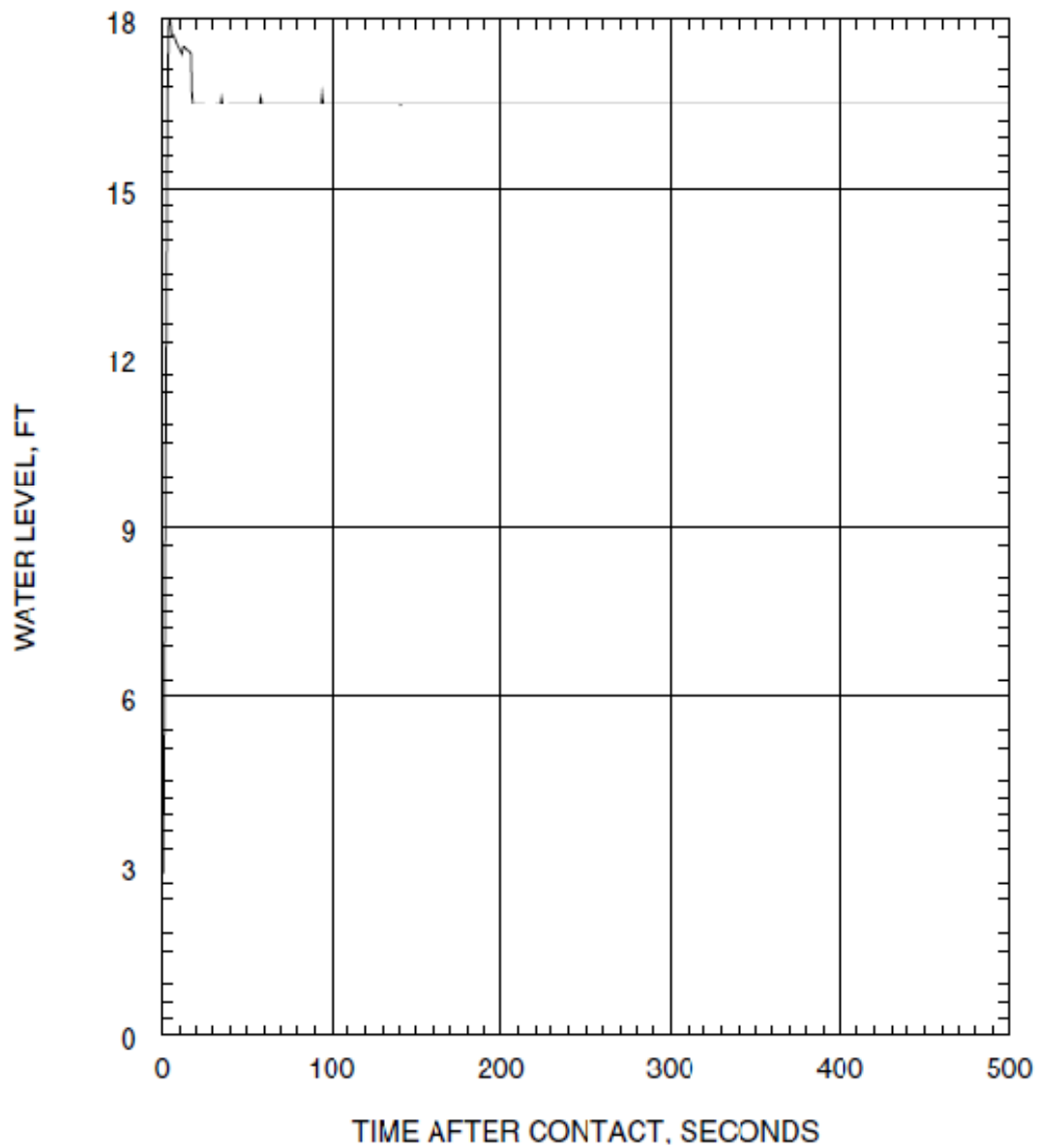
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
SAFETY INJECTION FLOW RATE  
INTO INTACT DISCHARGE LEG

Figure 6.3.3.2-3L

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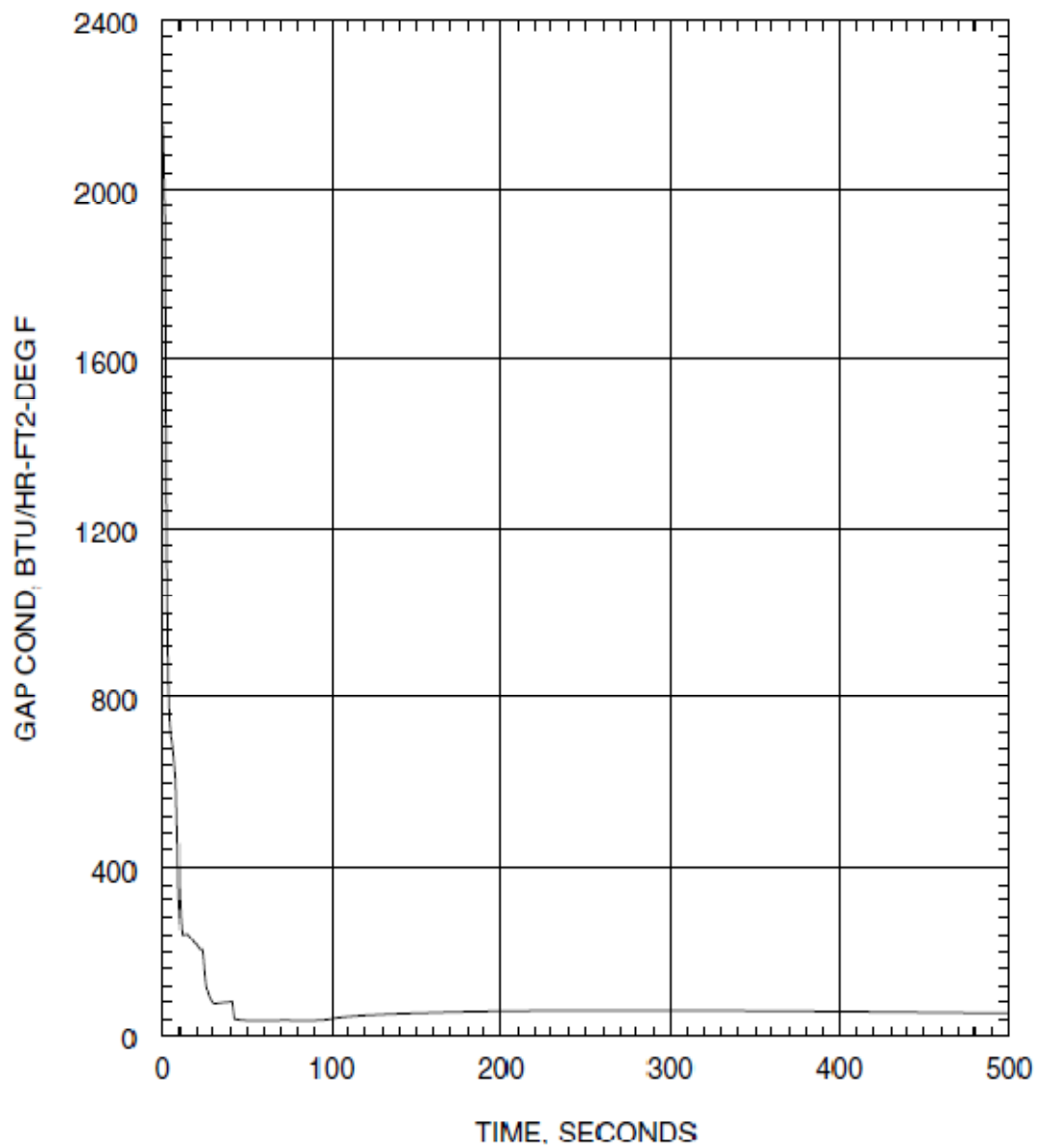
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
WATER LEVEL IN DOWNCOMER  
DURING REFLOOD

Figure 6.3.3.2-3M

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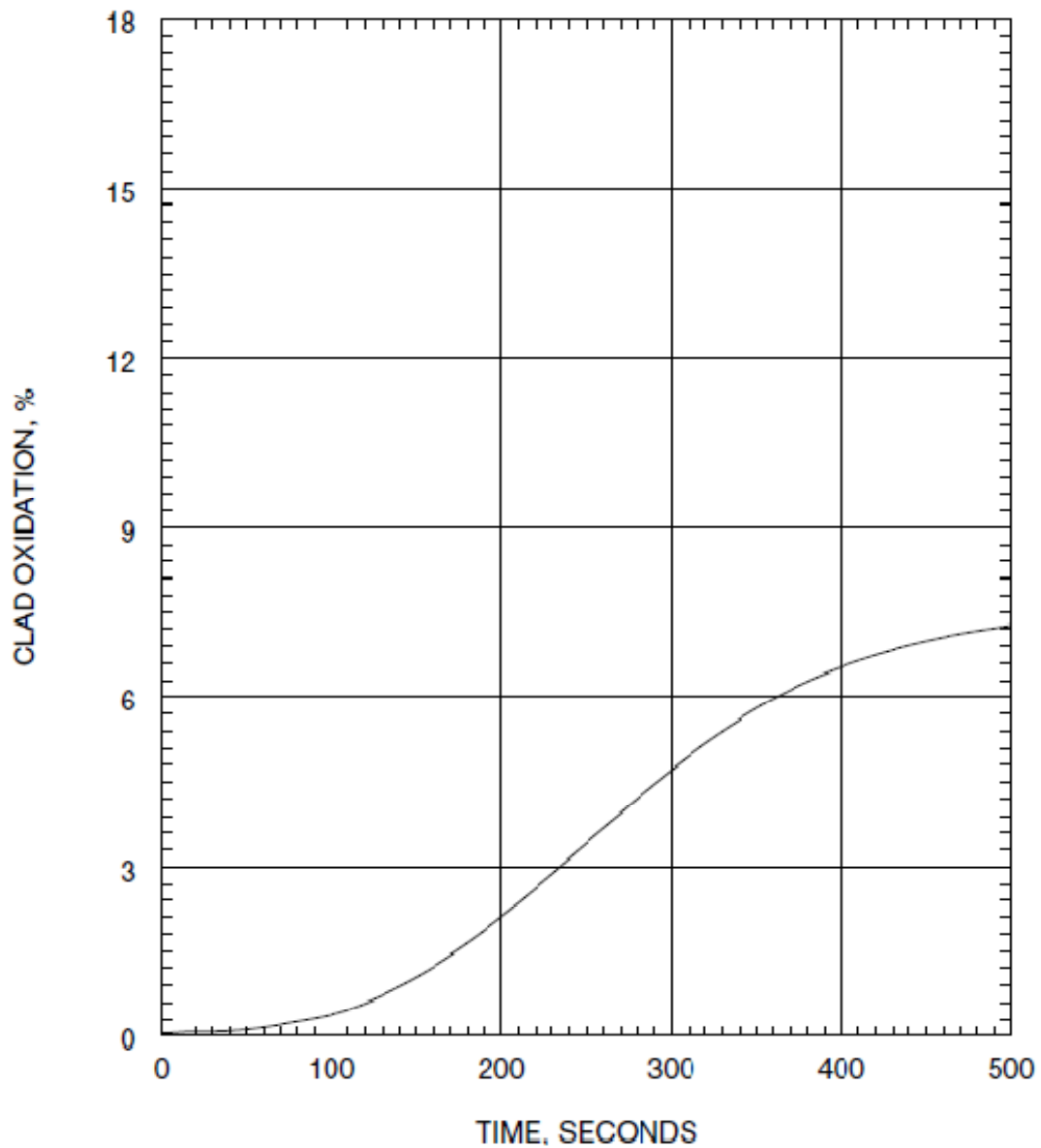
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
HOT SPOT GAP CONDUCTANCE

Figure 6.3.3.2-3N

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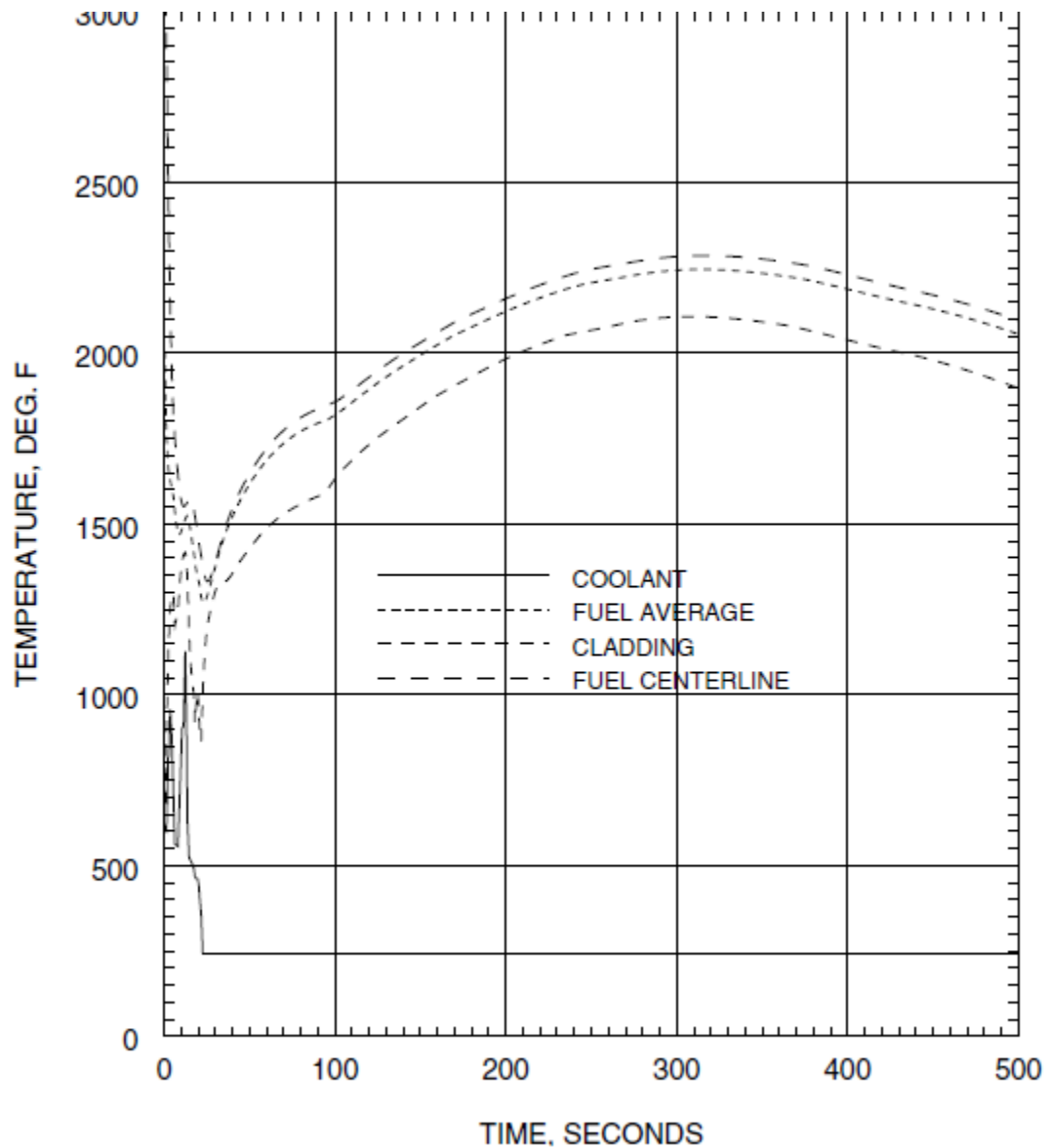
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
LOCAL CLADDING OXIDATION PERCENTAGE

Figure 6.3.3.2-30

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

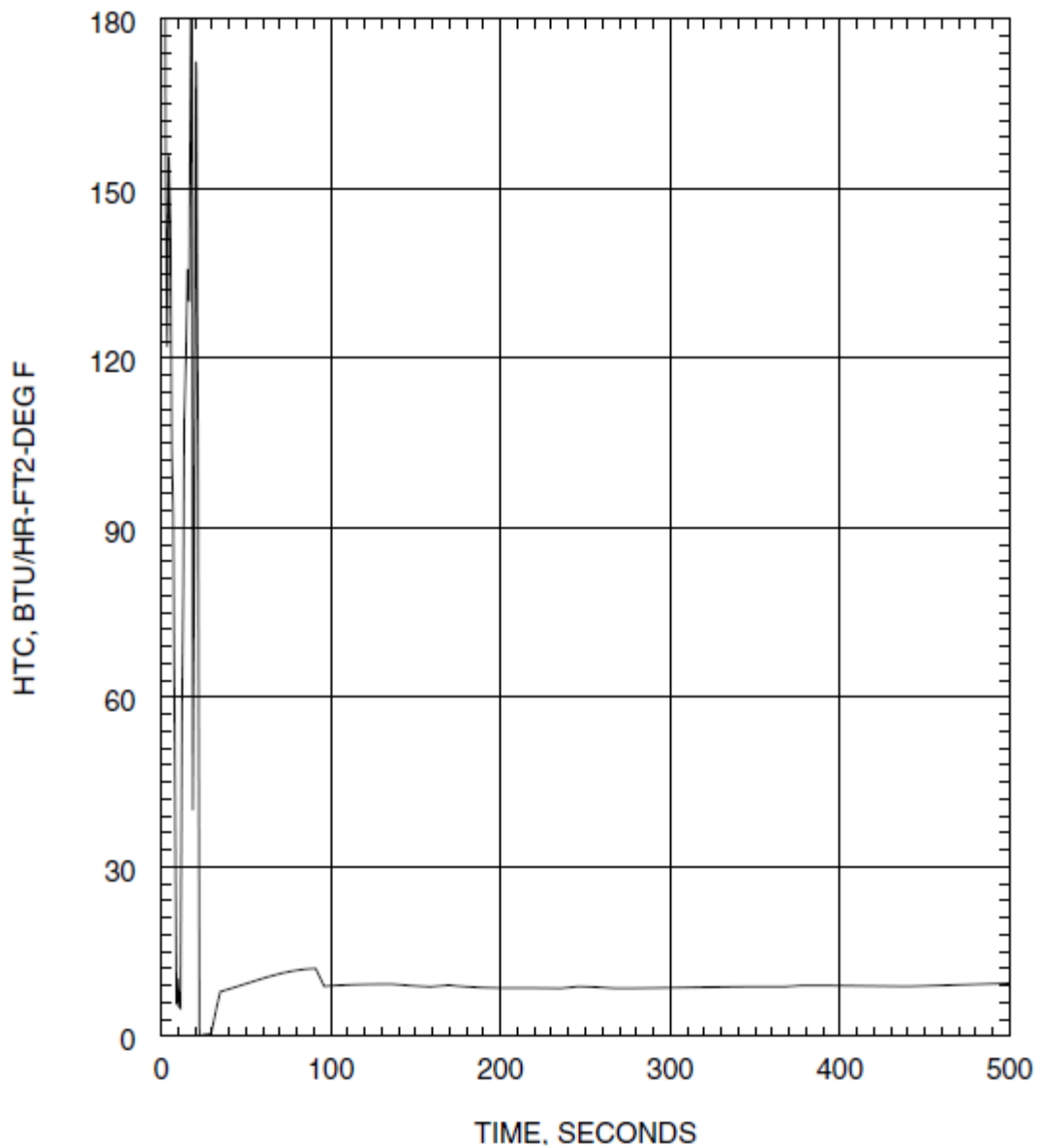
LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
FUEL CL & AVE., CLAD, COOLANT  
TEMPS AT THE HOT SPOT

Figure 6.3.3.2-3P

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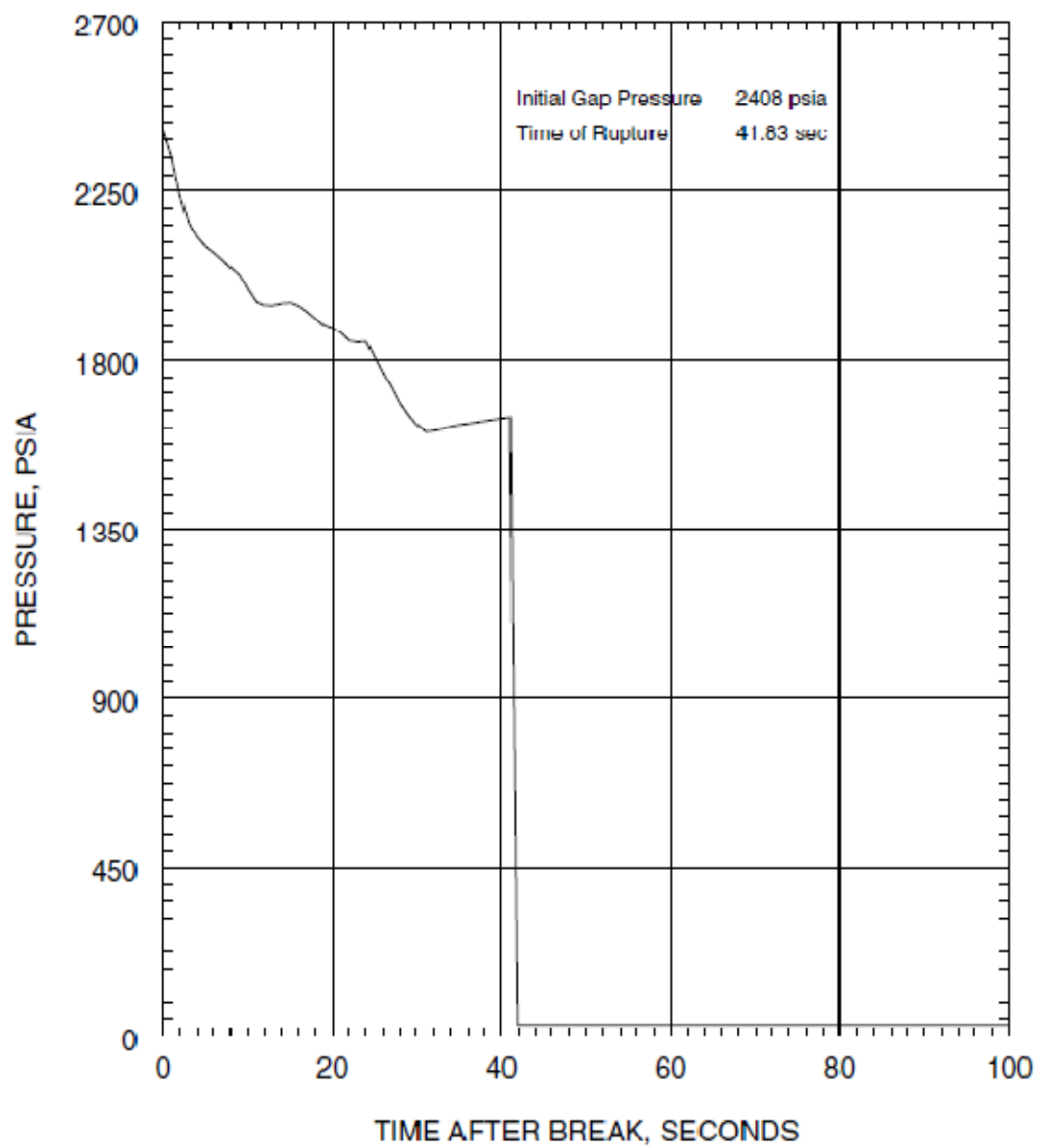
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
HOT SPOT HEAT TRANSFER COEFFICIENT

Figure 6.3.3.2-3Q

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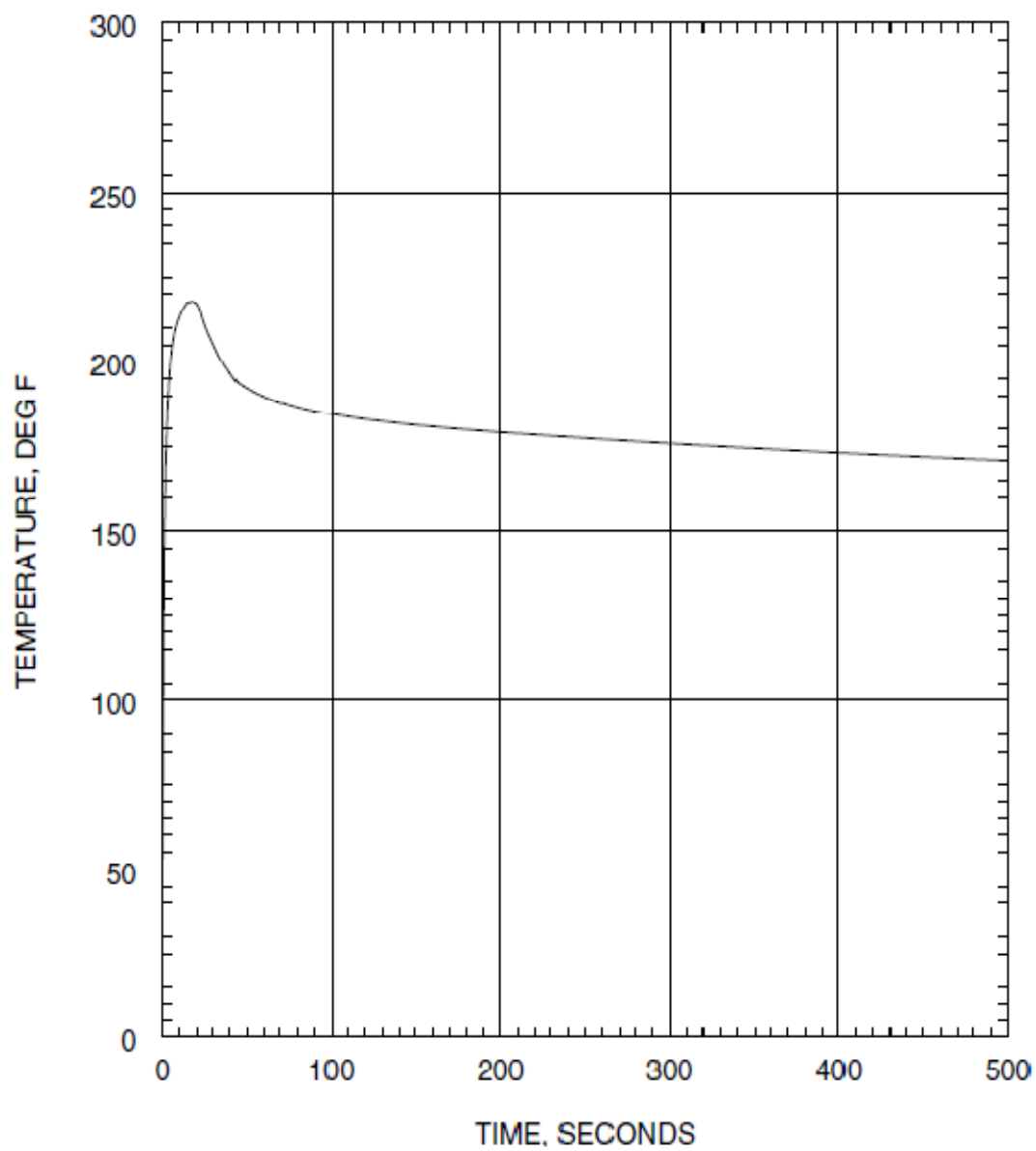
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
HOT PIN PRESSURE

Figure 6.3.3.2-3R

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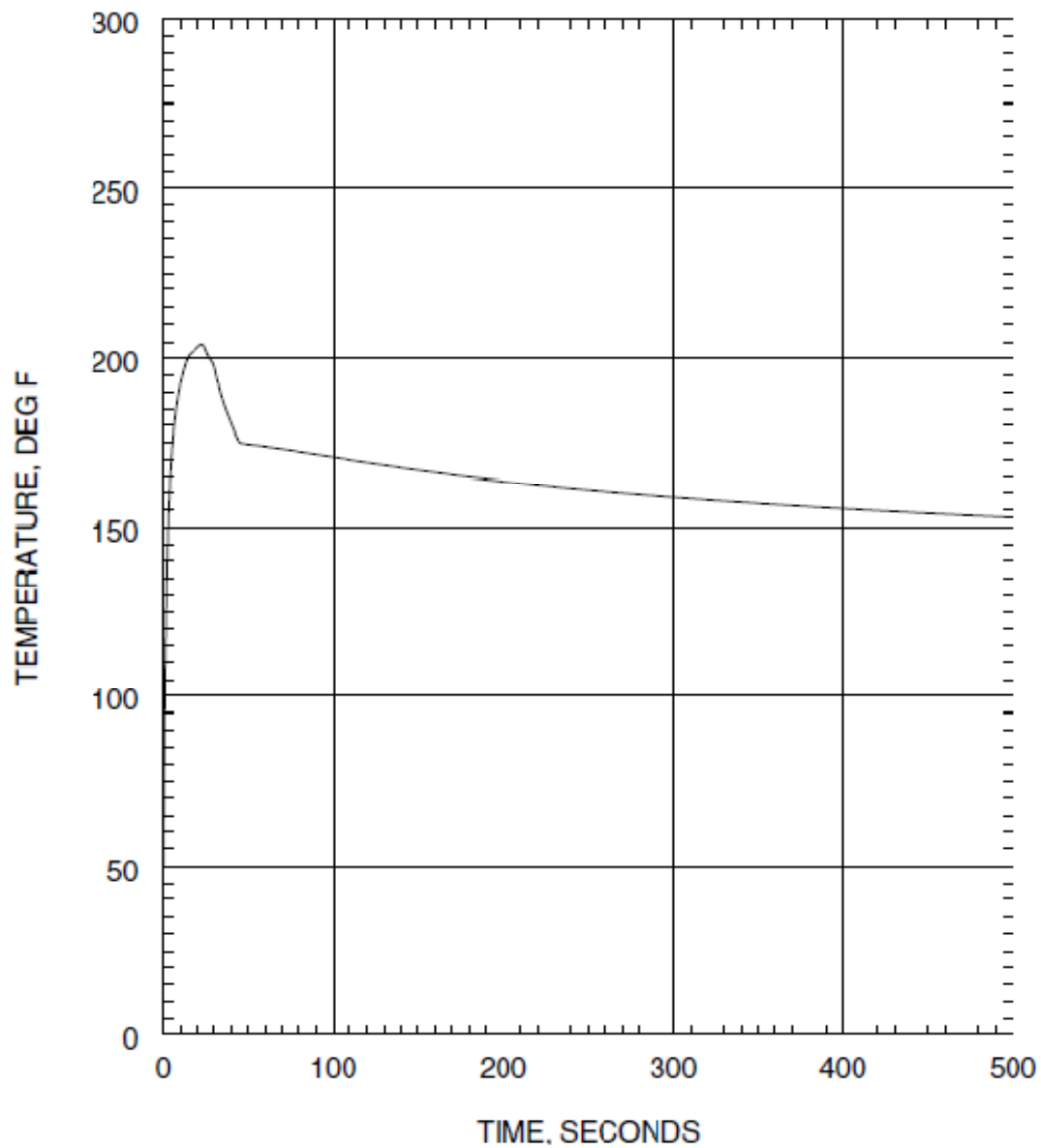
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
CONTAINMENT ATMOSPHERE TEMPERATURE

Figure 6.3.3.2-3S

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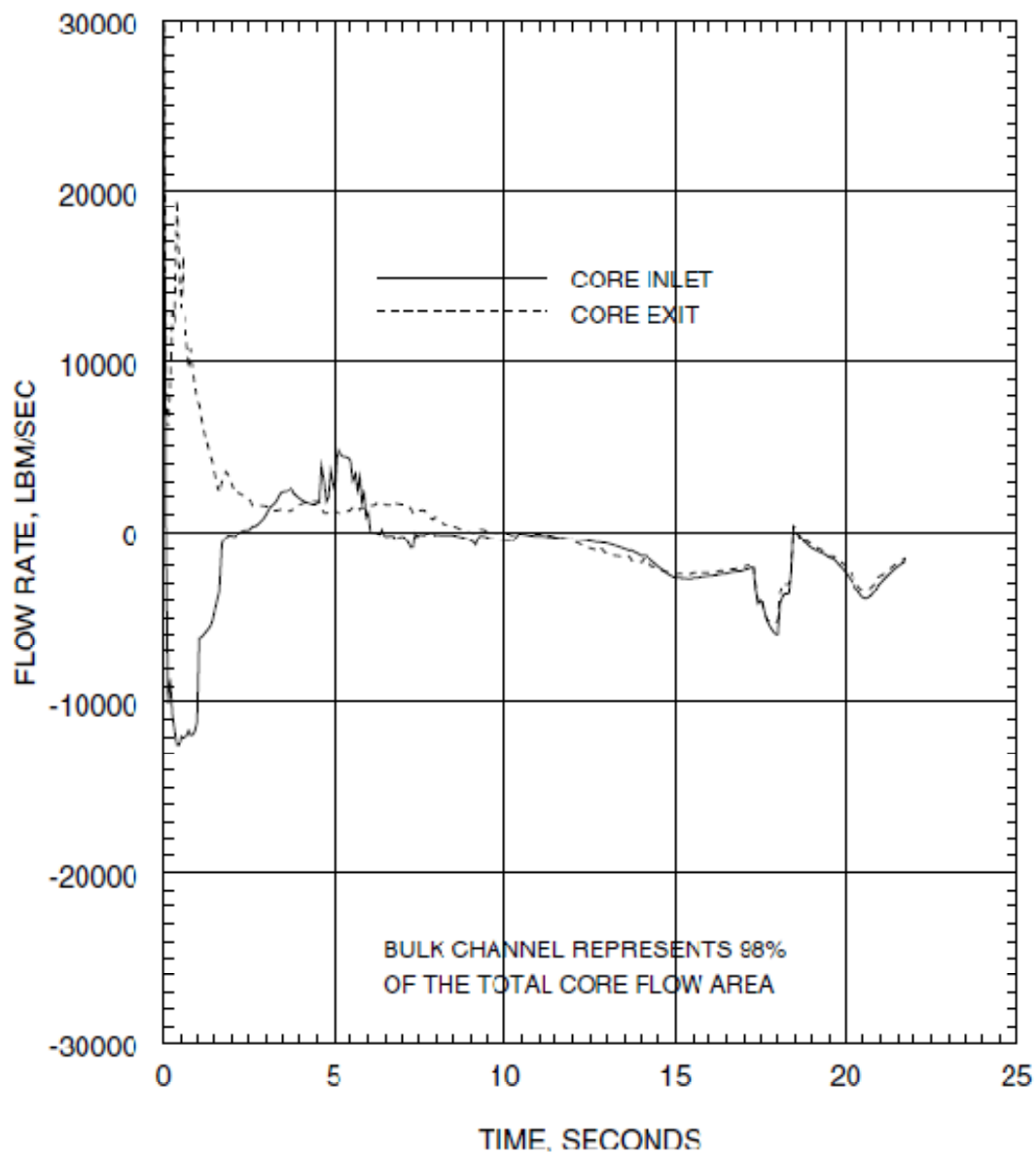
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
CONTAINMENT SUMP TEMPERATURE

Figure 6.3.3.2-3T

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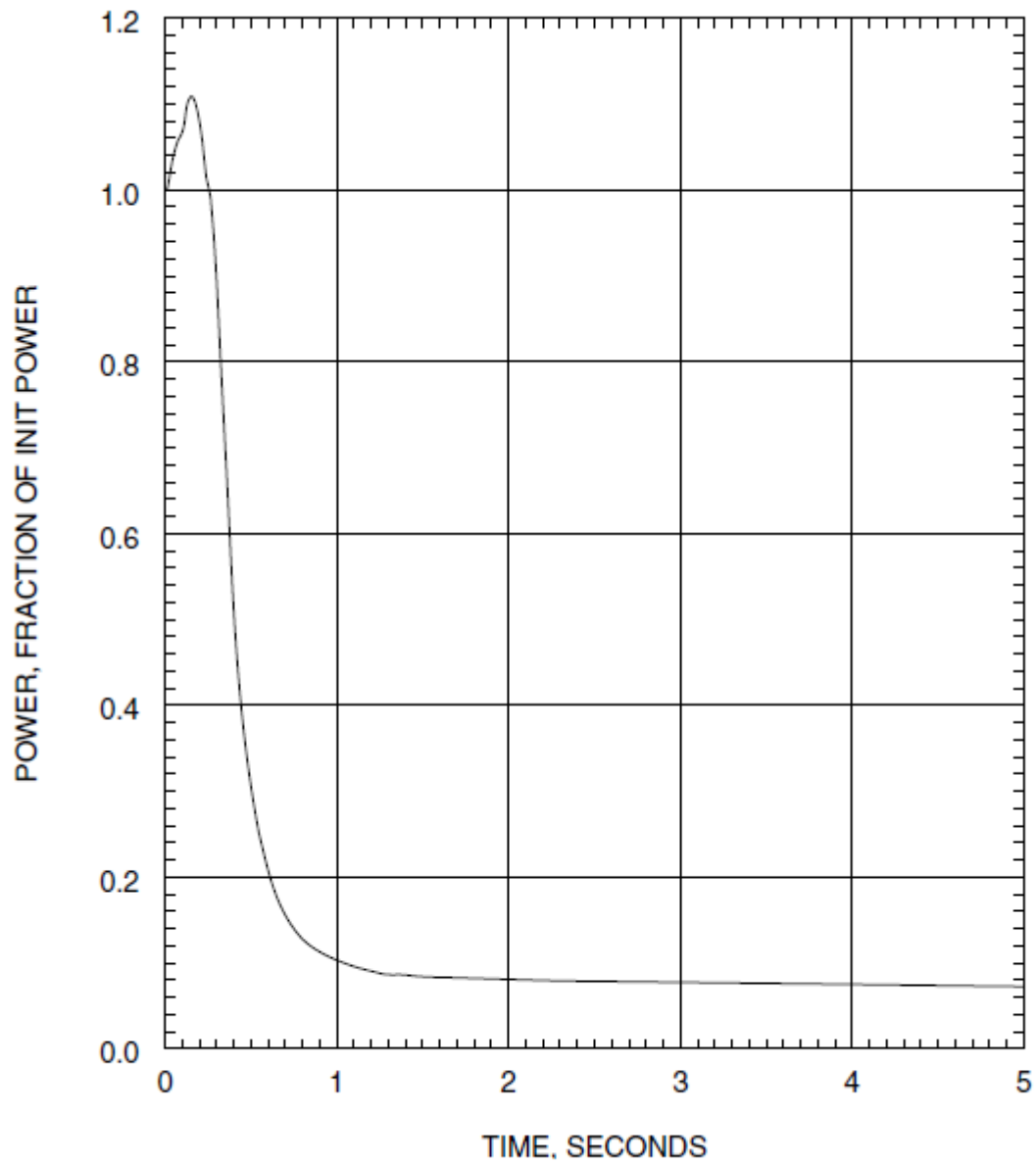
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.6 DEG/PD BREAK  
CORE BULK CHANNEL FLOW RATE

Figure 6.3.3.2-3U

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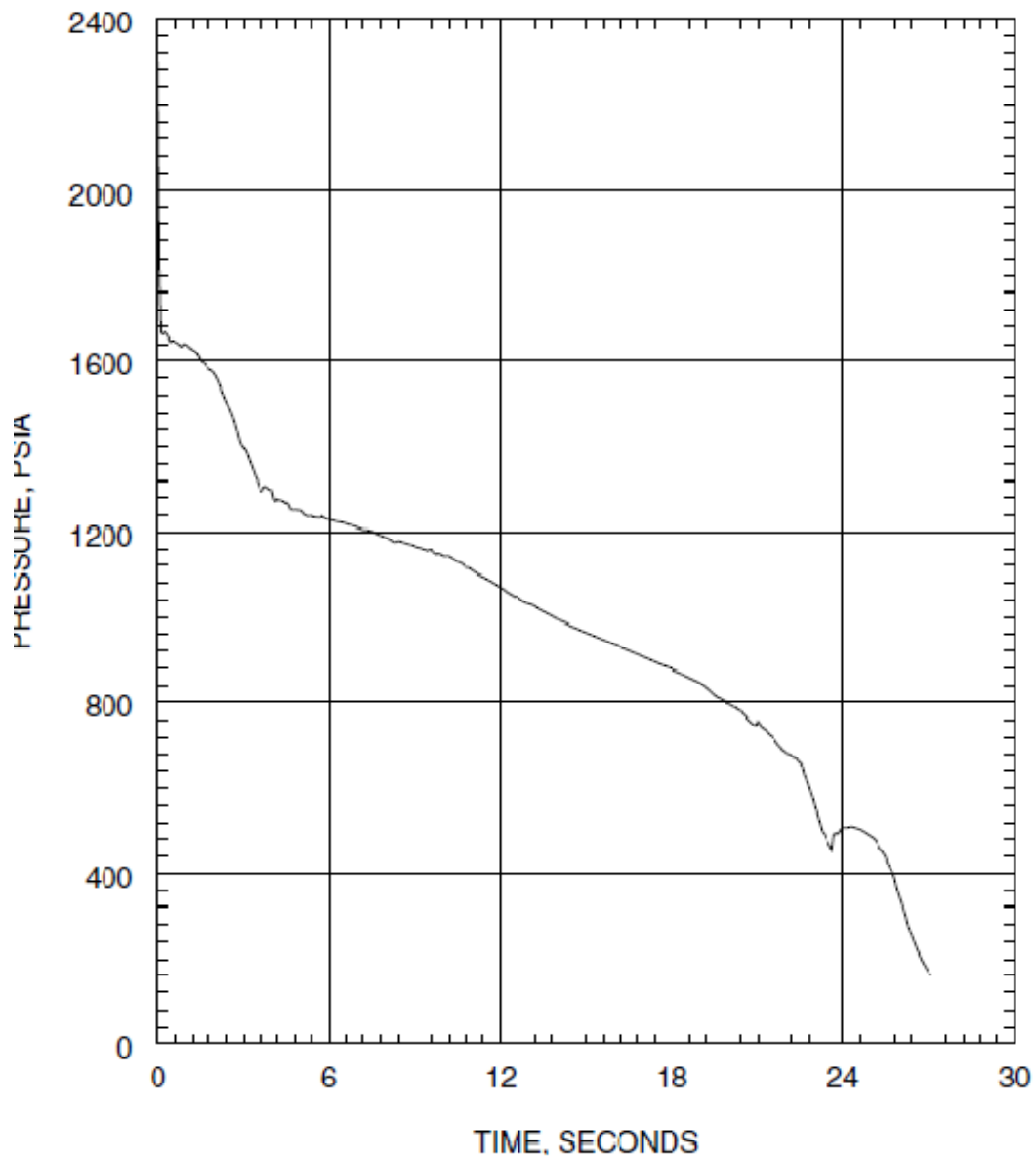
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.4 DEG/PD BREAK  
NORMALIZED TOTAL CORE POWER

Figure 6.3.3.2-4A

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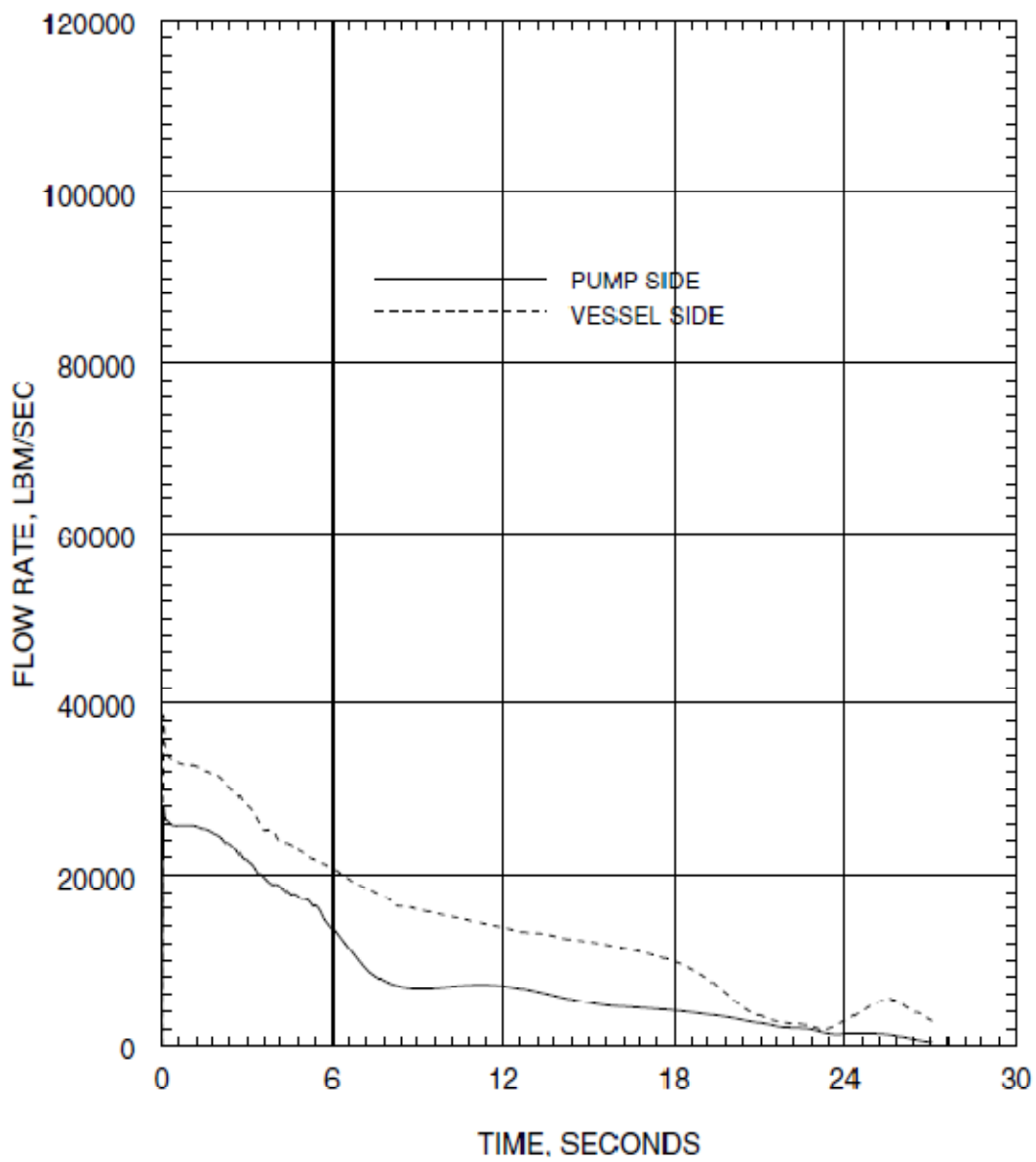
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.4 DEG/PD BREAK  
PRESSURE IN CENTER HOT ASSEMBLY NODE

Figure 6.3.3.2-4B

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

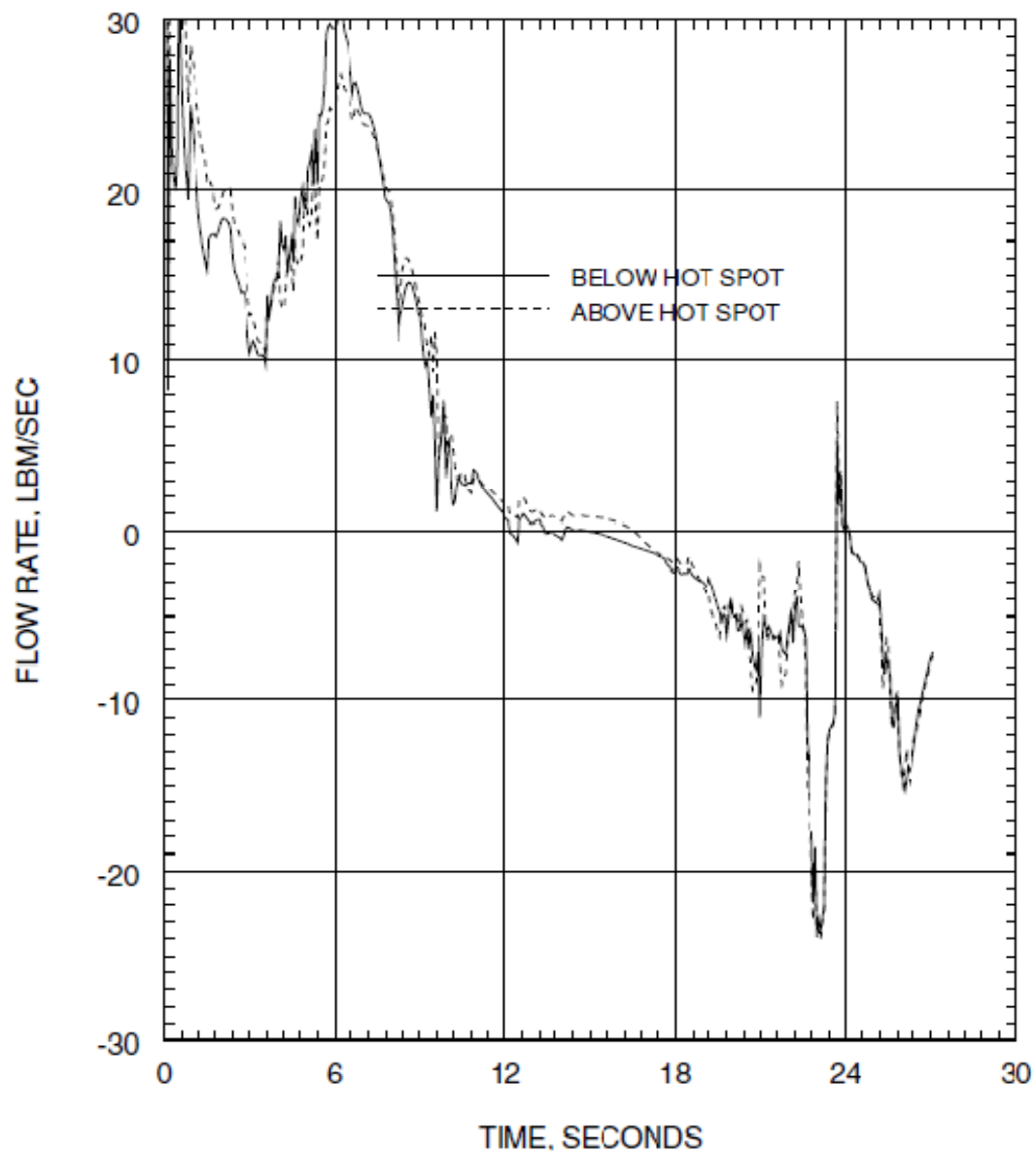
LBLOCA ECCS PERFORMANCE ANALYSIS  
0.4 DEG/PD BREAK  
LEAK FLOW RATE

Figure 6.3.3.2-4C

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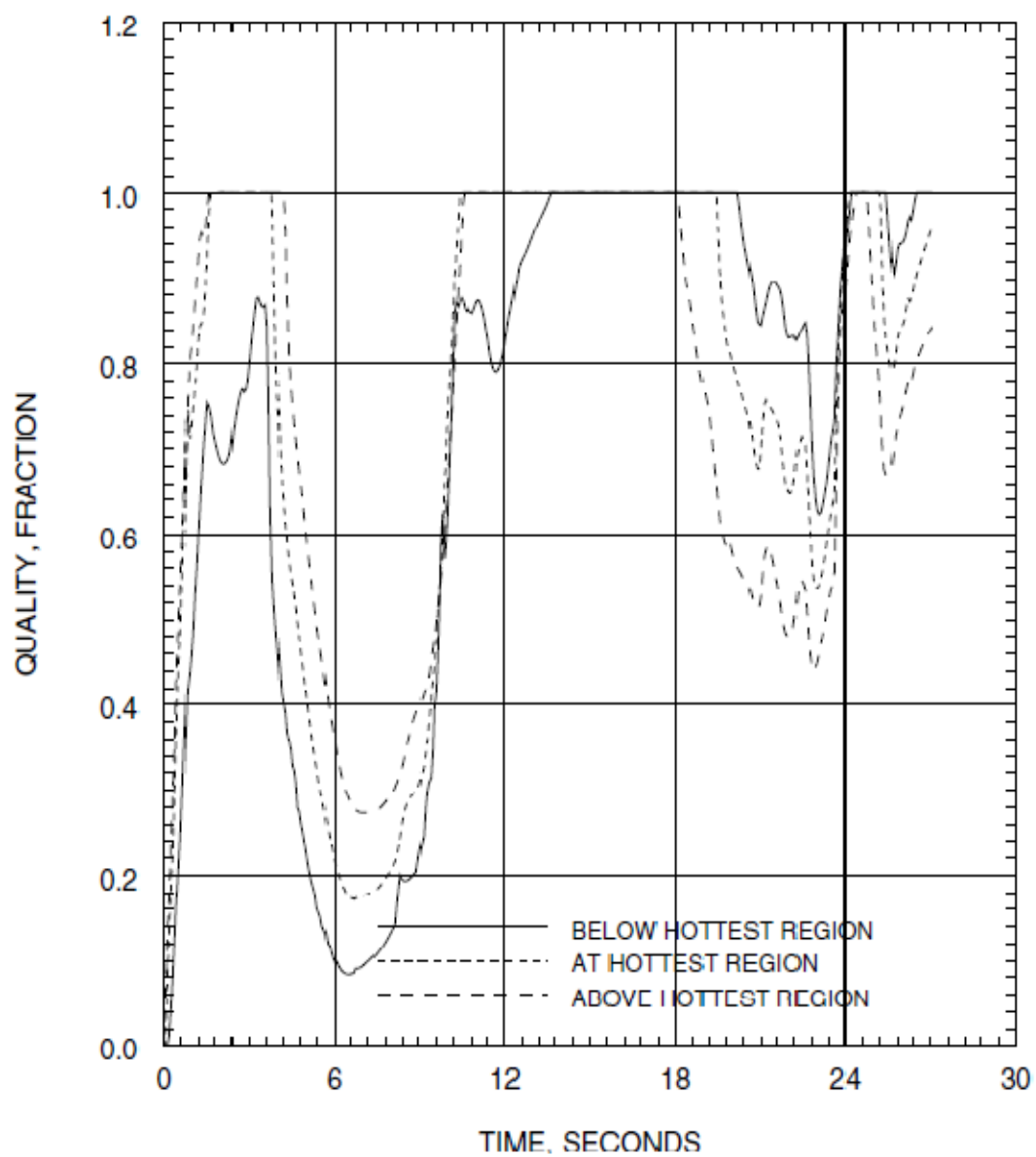
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.4 DEG/PD BREAK  
HOT ASSEMBLY FLOW RATE

Figure 6.3.3.2-4D

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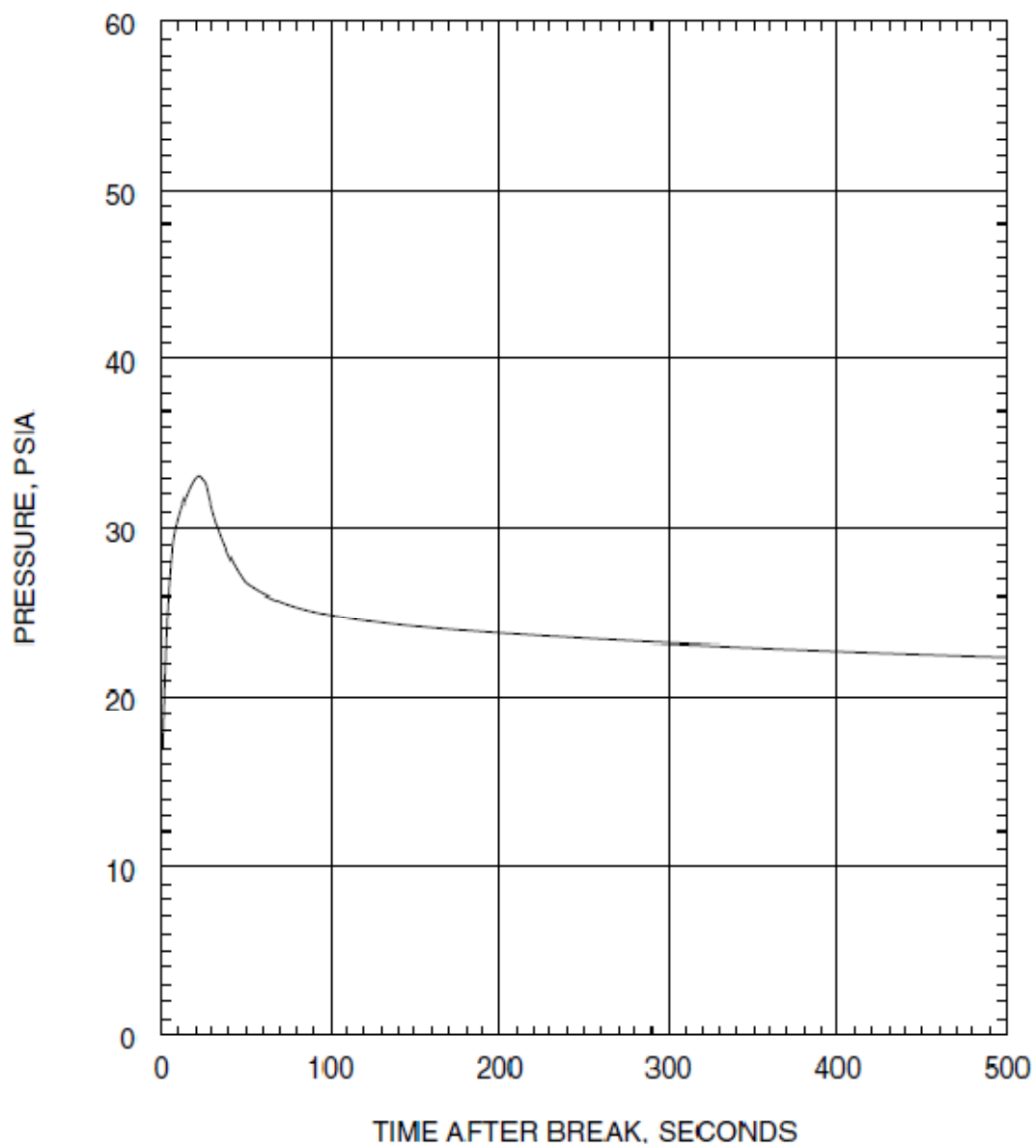
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.4 DEG/PD BREAK  
HOT ASSEMBLY QUALITY

Figure 6.3.3.2-4E

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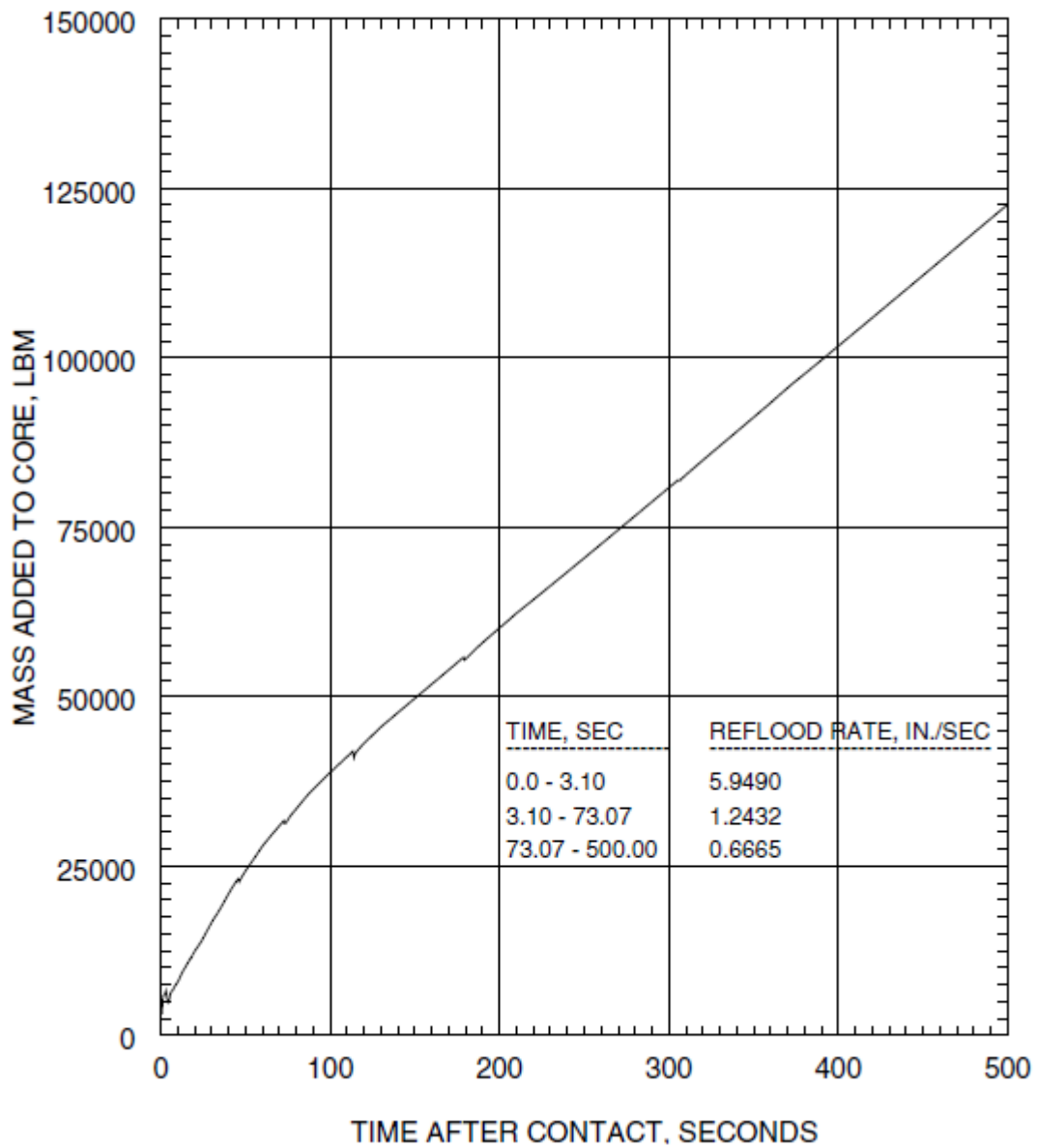
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.4 DEG/PD BREAK  
CONTAINMENT PRESSURE

Figure 6.3.3.2-4F

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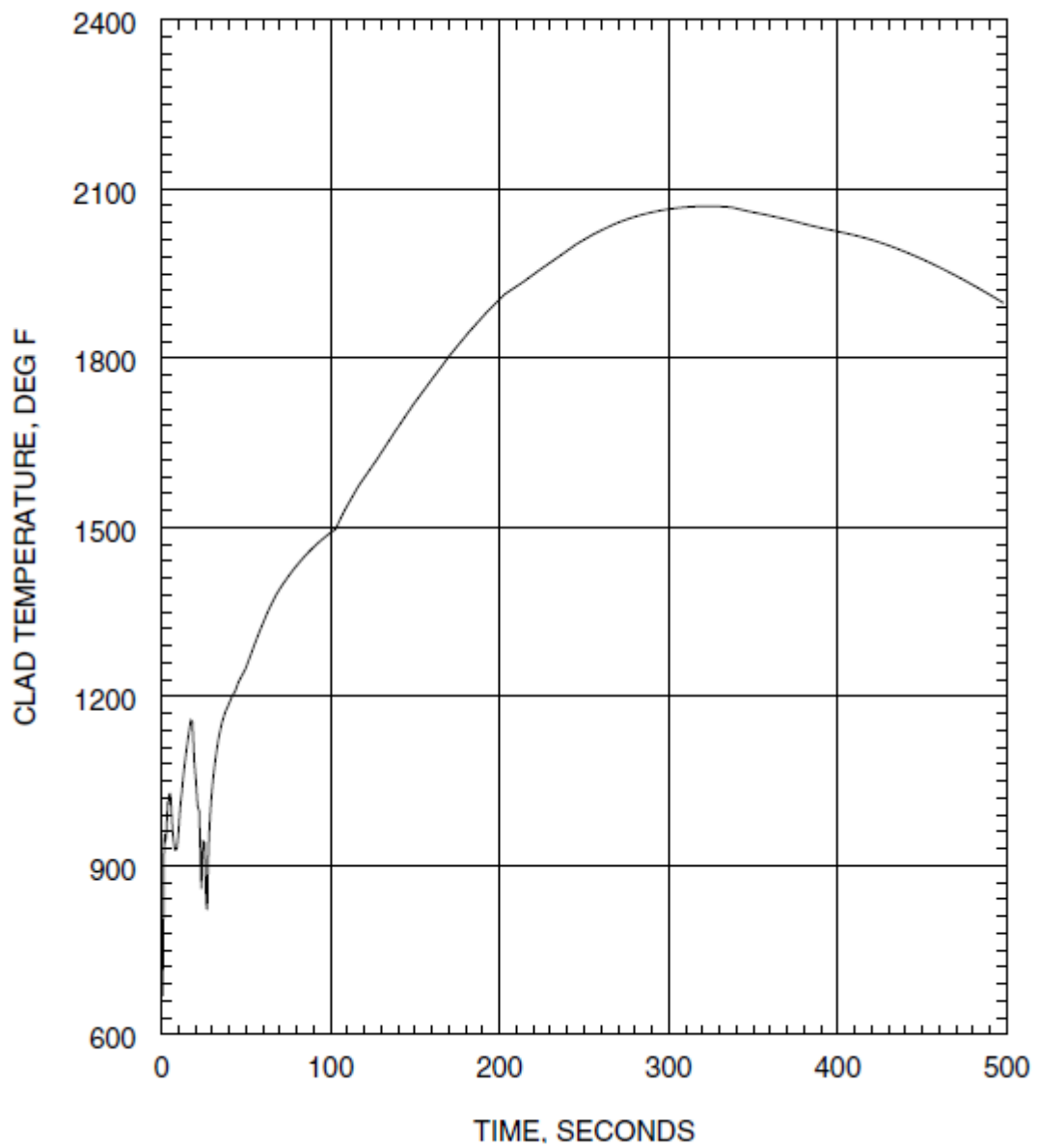
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.4 DEG/PD BREAK  
MASS ADDED TO CORE DURING REFLOOD

Figure 6.3.3.2-4G

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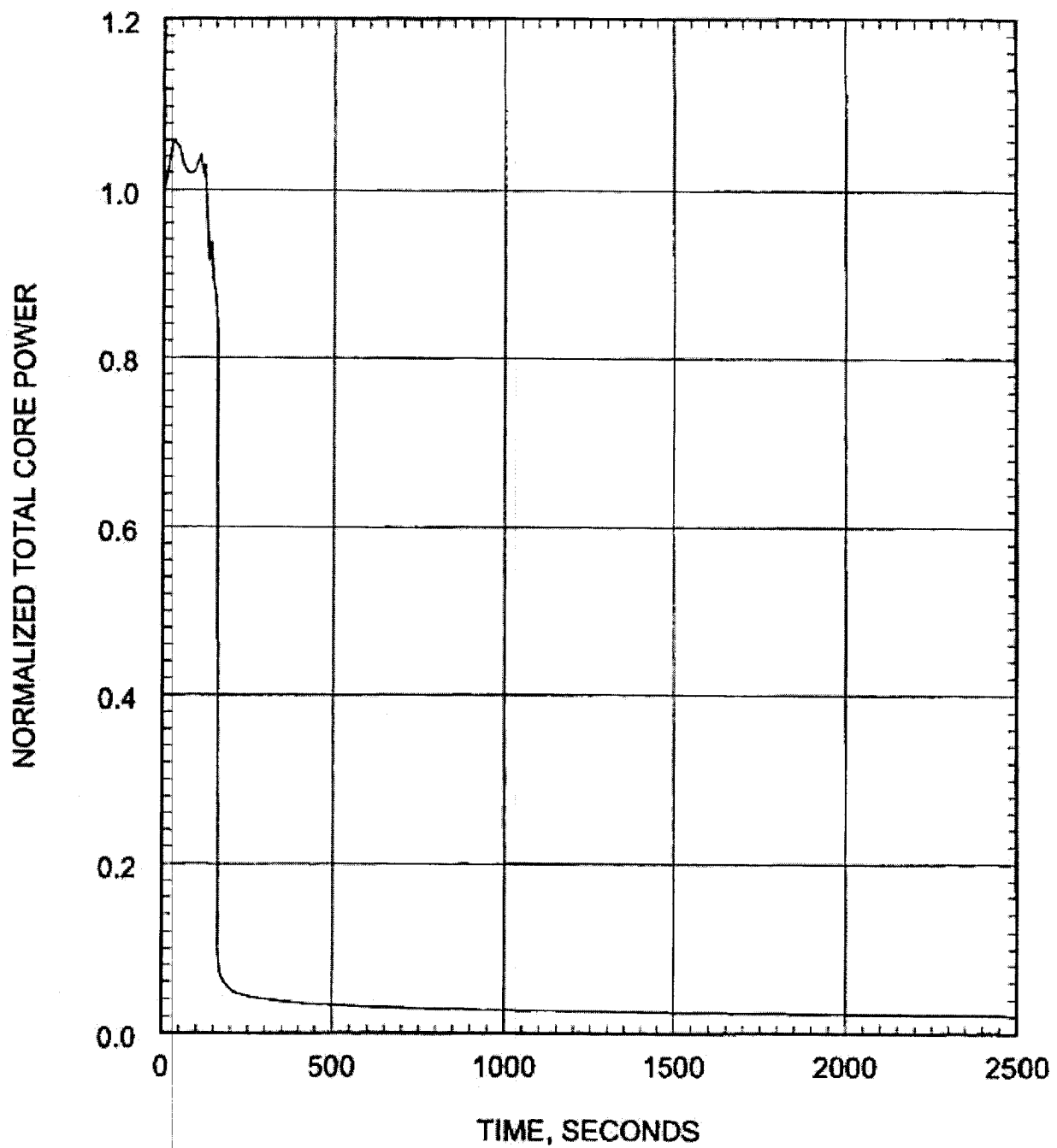
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LBLOCA ECCS PERFORMANCE ANALYSIS  
0.4 DEG/PD BREAK  
PEAK CLADDING TEMPERATURE

Figure 6.3.3.2-4H

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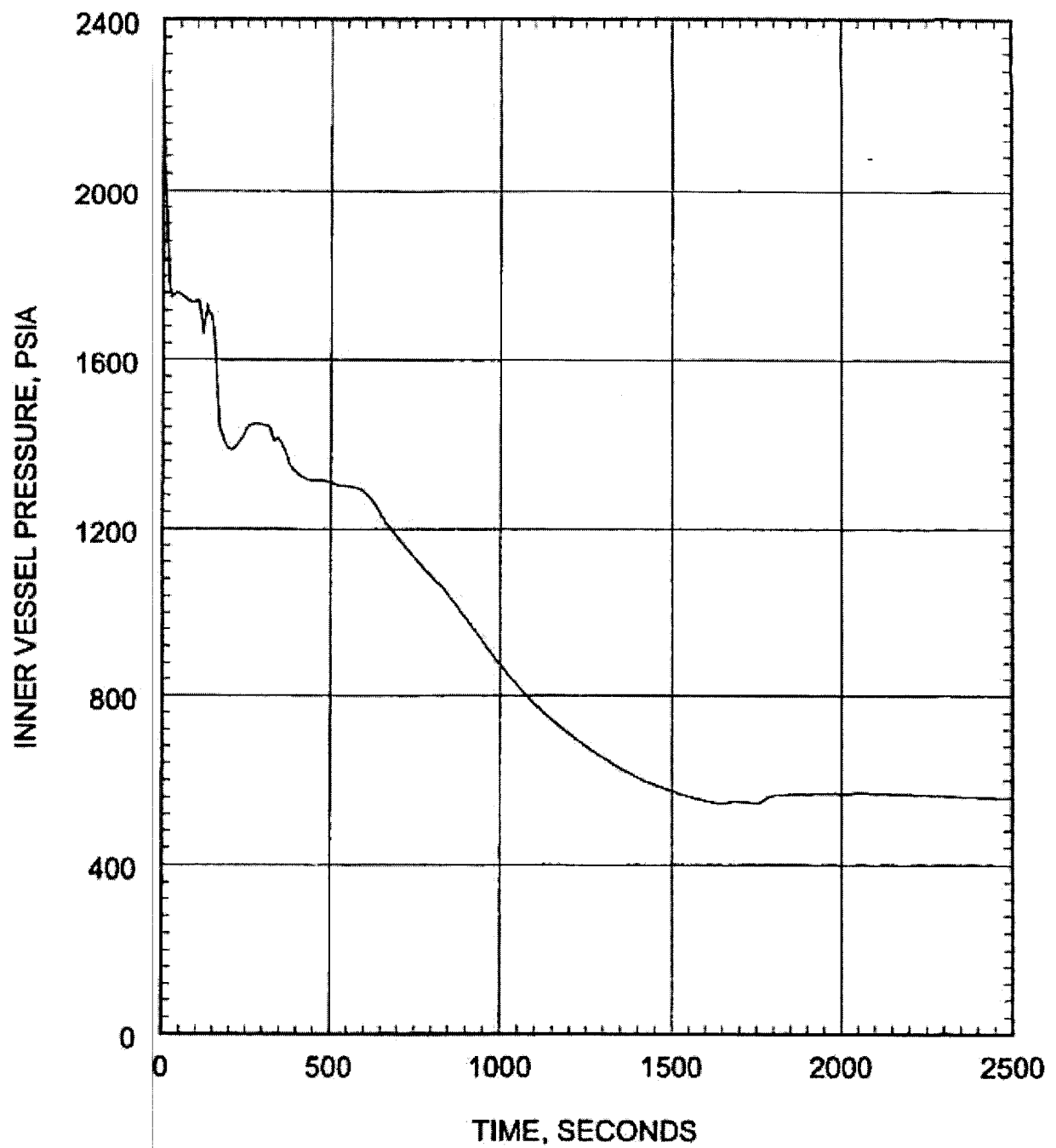
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.07 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.3-1A

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

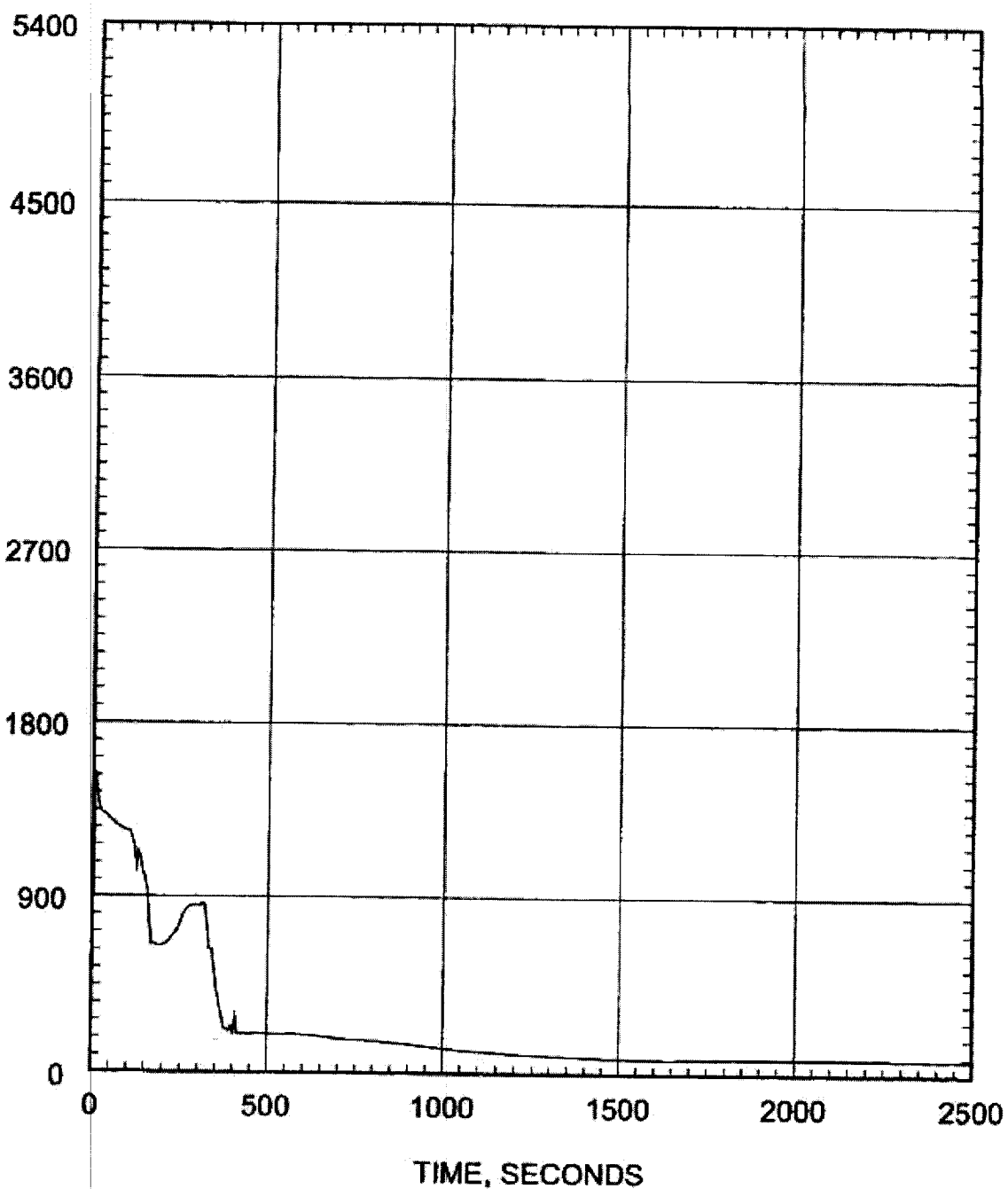
0.07 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL PRESSURE

FIGURE 6.3.3.3-1B

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BREAK FLOW RATE, LBM/SEC



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

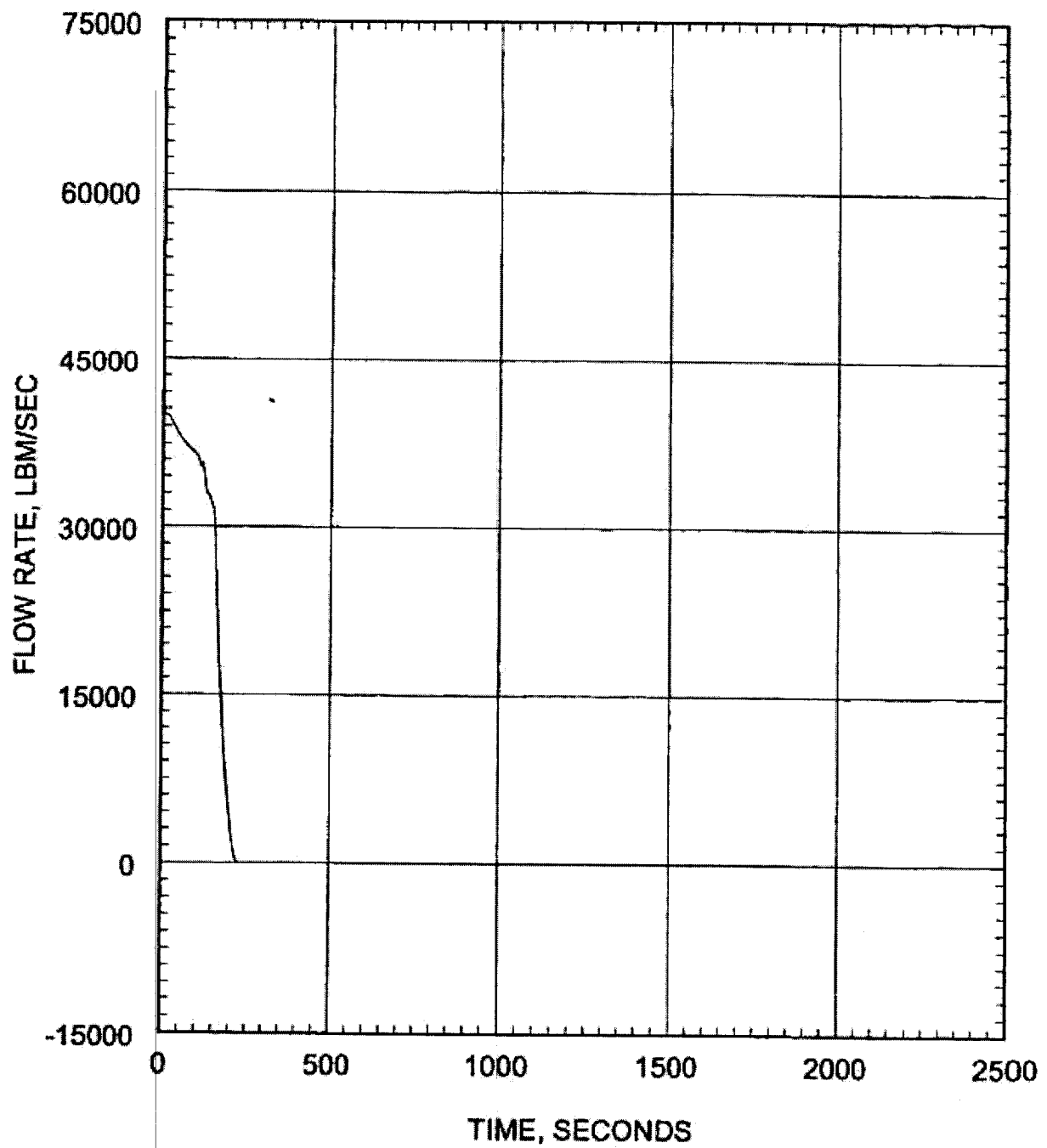
0.07 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
BREAK FLOW RATE

FIGURE 6.3.3.3-1C

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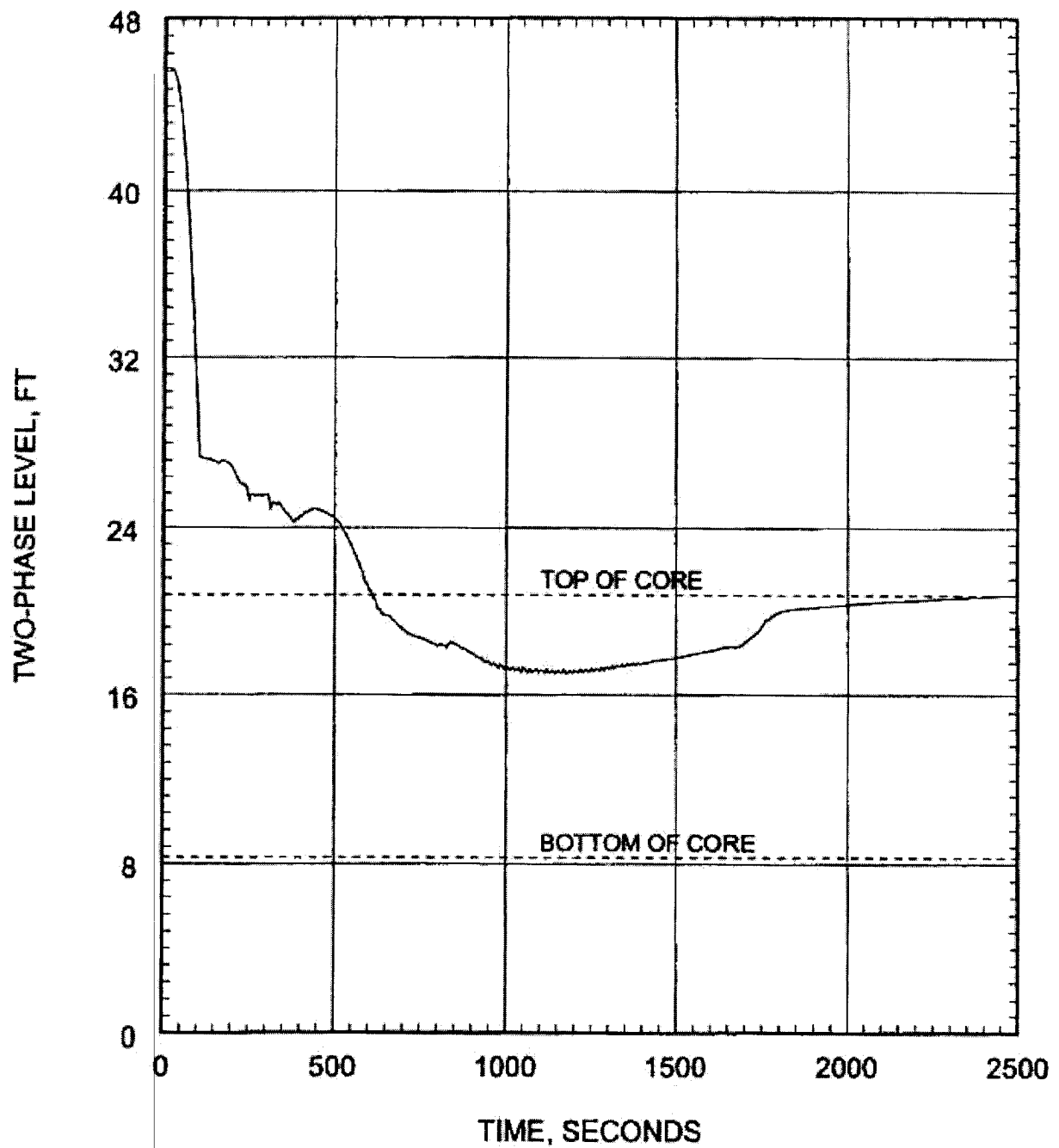
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.07 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL INLET FLOW RATE

FIGURE 6.3.3.3-1D

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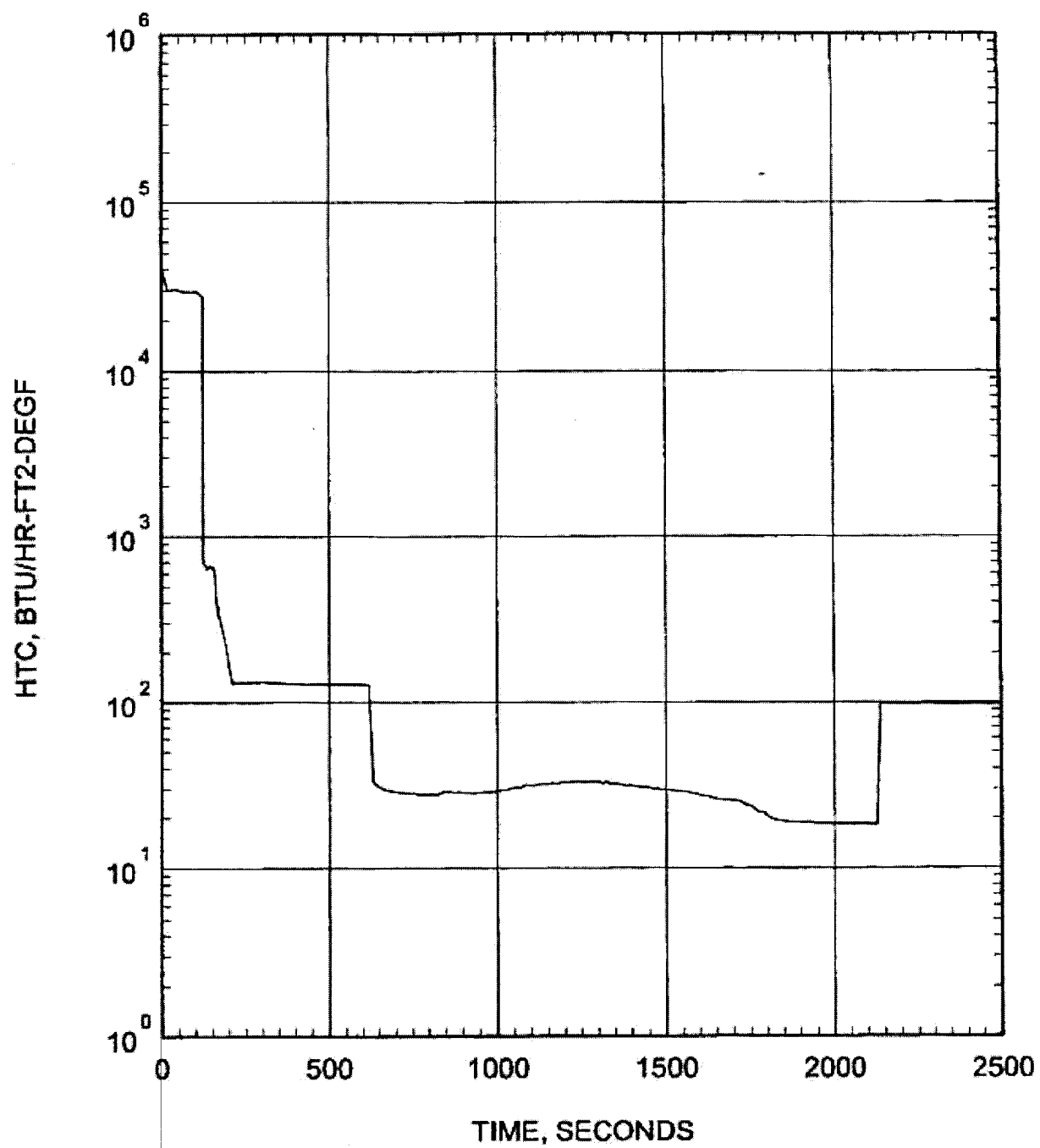
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.07 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL TWO-PHASE MIXTURE LEVEL

FIGURE 6.3.3.3-1E

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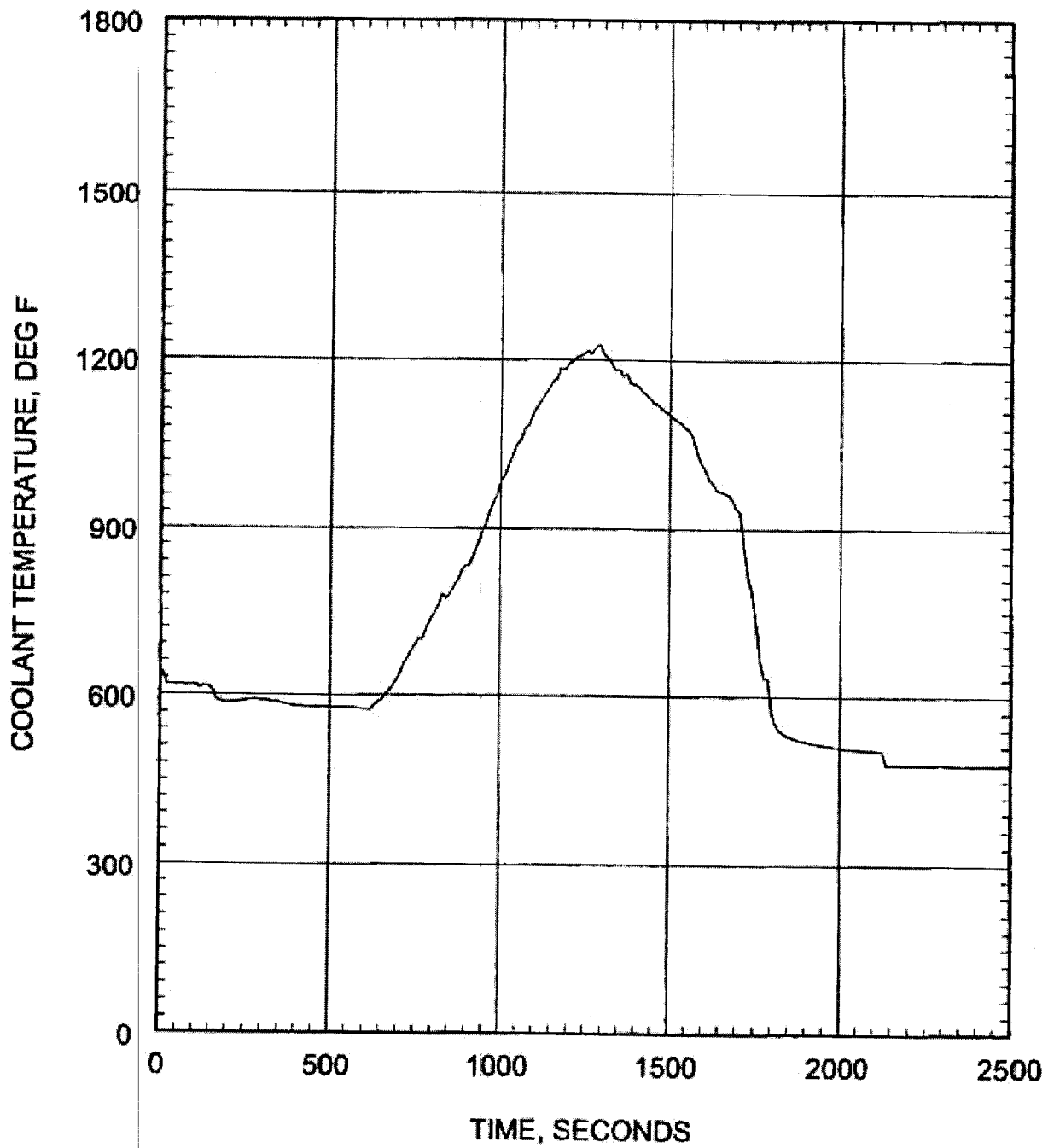
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.07 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
HEAT TRANSFER COEFFICIENT AT HOT SPOT

FIGURE 6.3.3.3-1F

JUNE 2003

REVISION 12



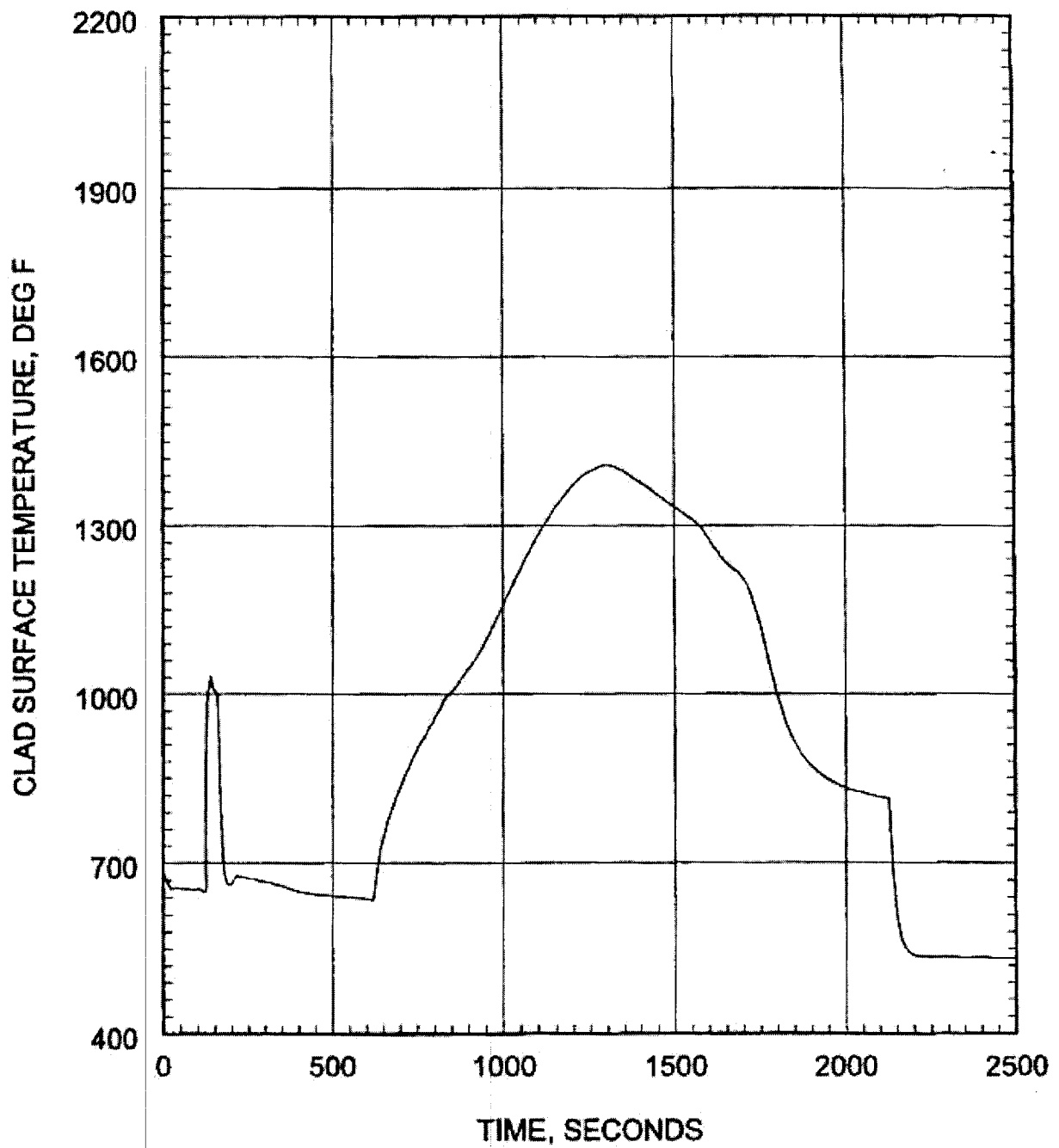
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.07 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
COOLANT TEMPERATURE AT HOT SPOT

FIGURE 6.3.3.3-1G

JUNE 2003

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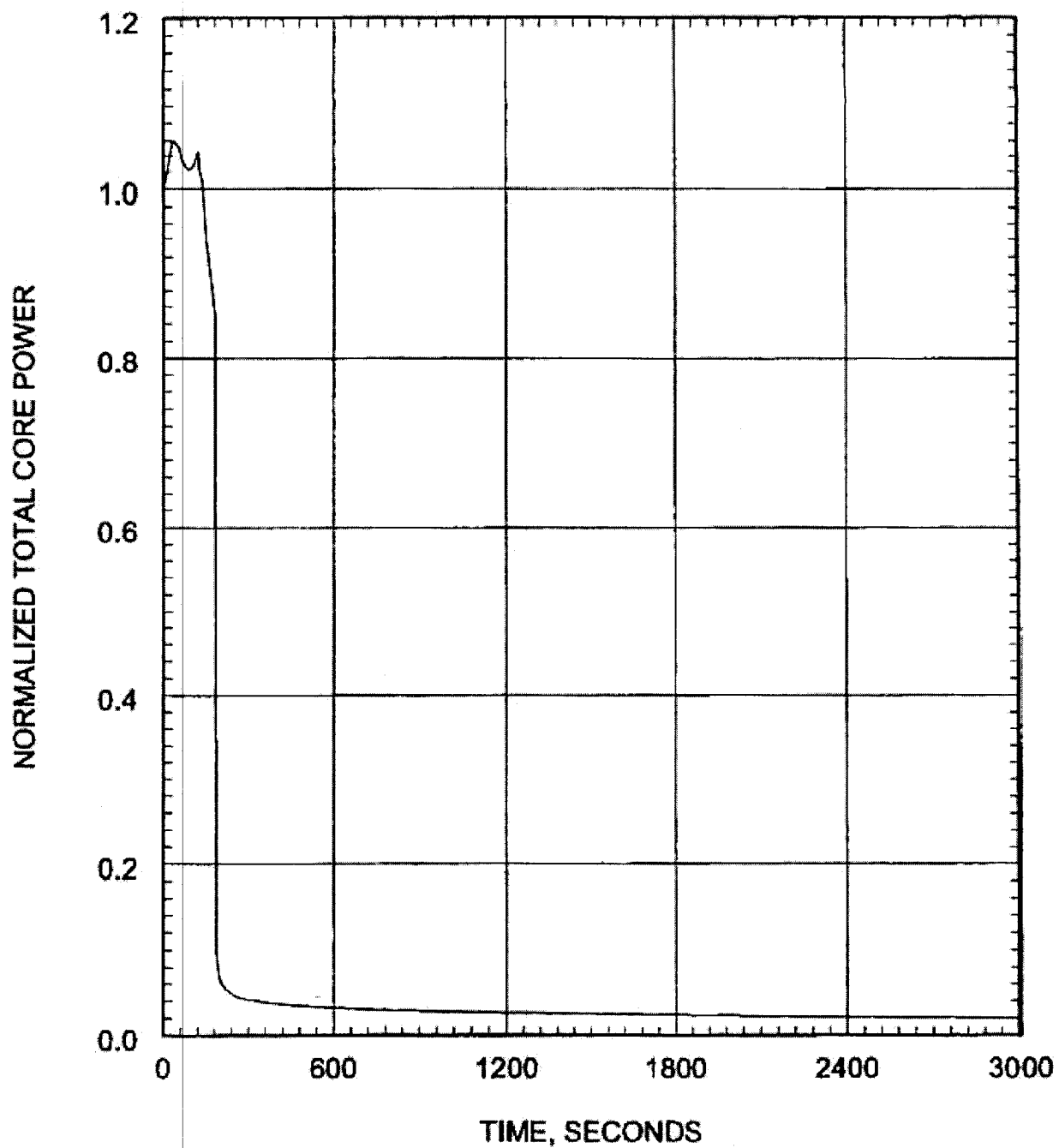
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.07 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
HOT SPOT CLAD SURFACE TEMPERATURE

FIGURE 6.3.3.3-1H

JUNE 2003

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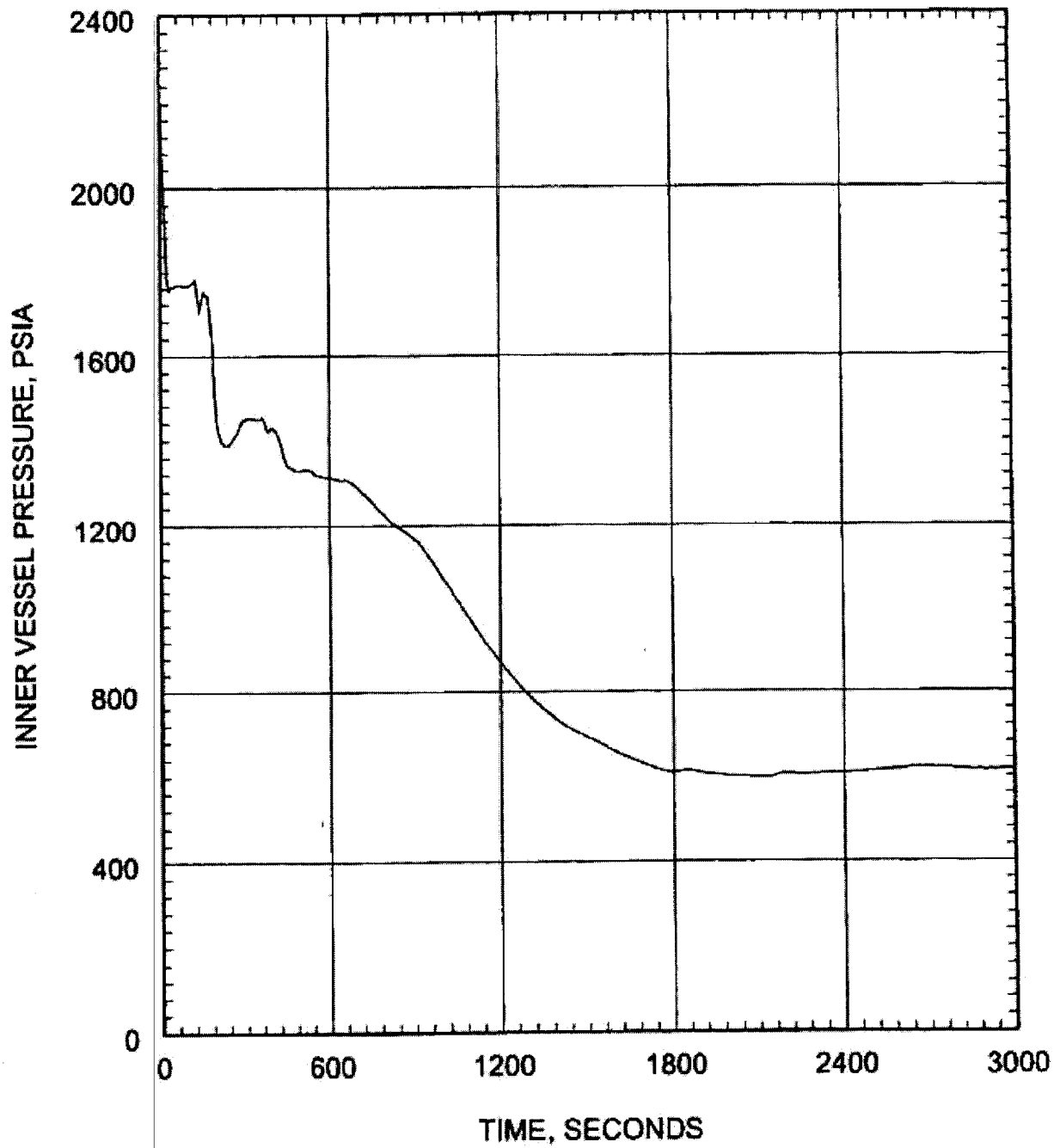
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.06 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.3-2A

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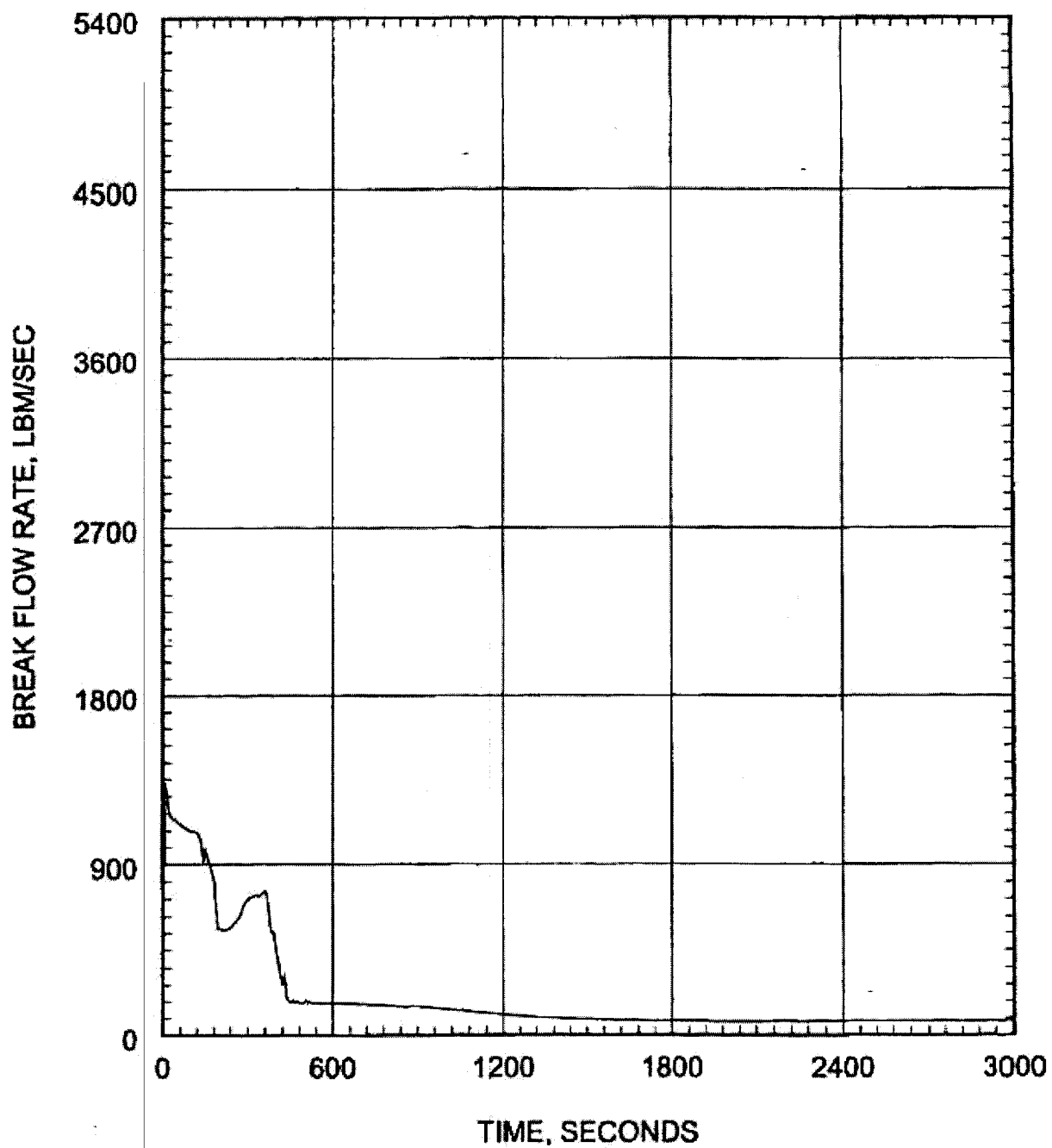
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.06 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL PRESSURE

FIGURE 6.3.3.3-2B

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

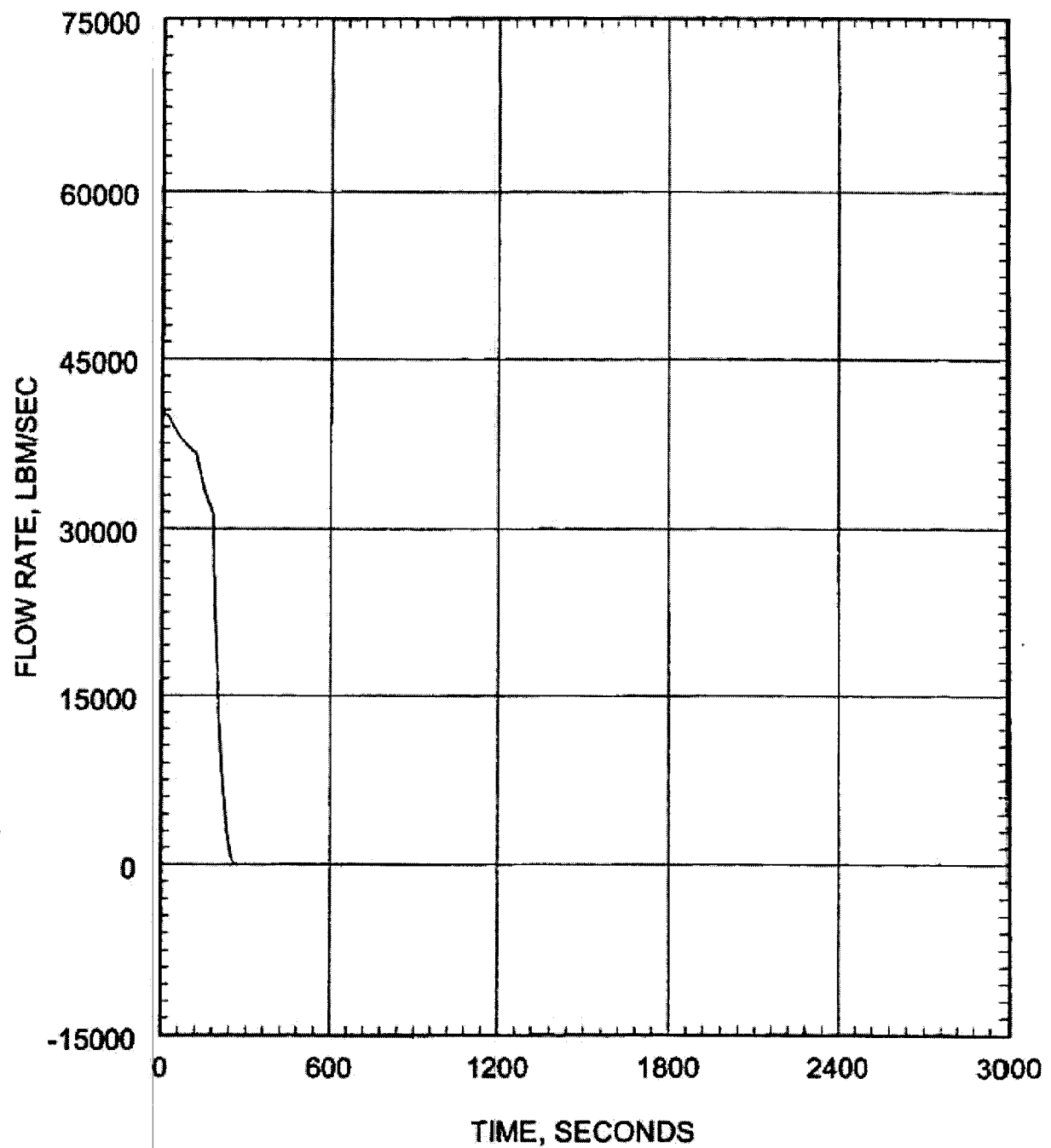
0.06 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
BREAK FLOW RATE

FIGURE 6.3.3.3-2C

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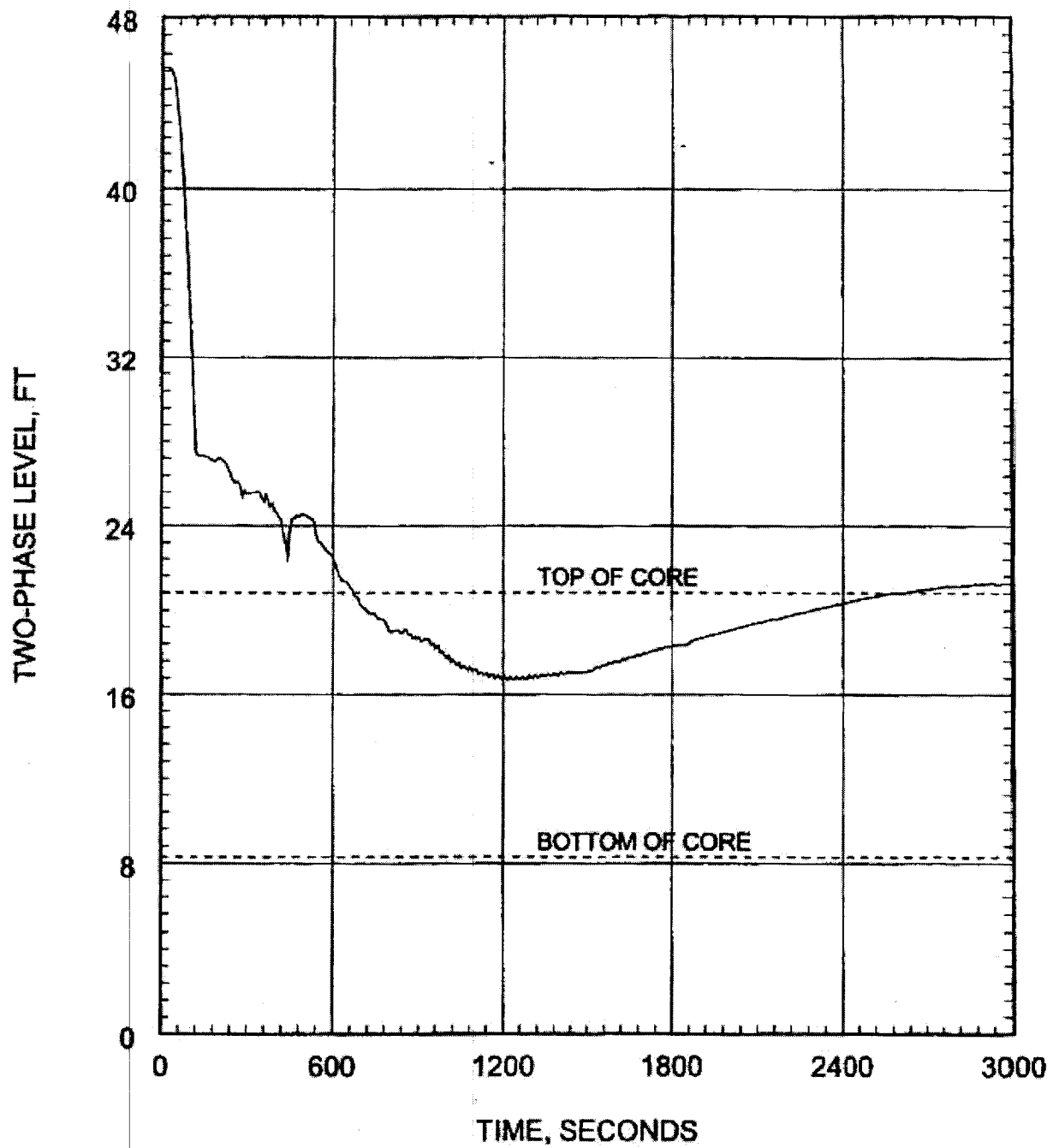
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.06 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL INLET FLOW RATE

FIGURE 6.3.3.3-2D

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

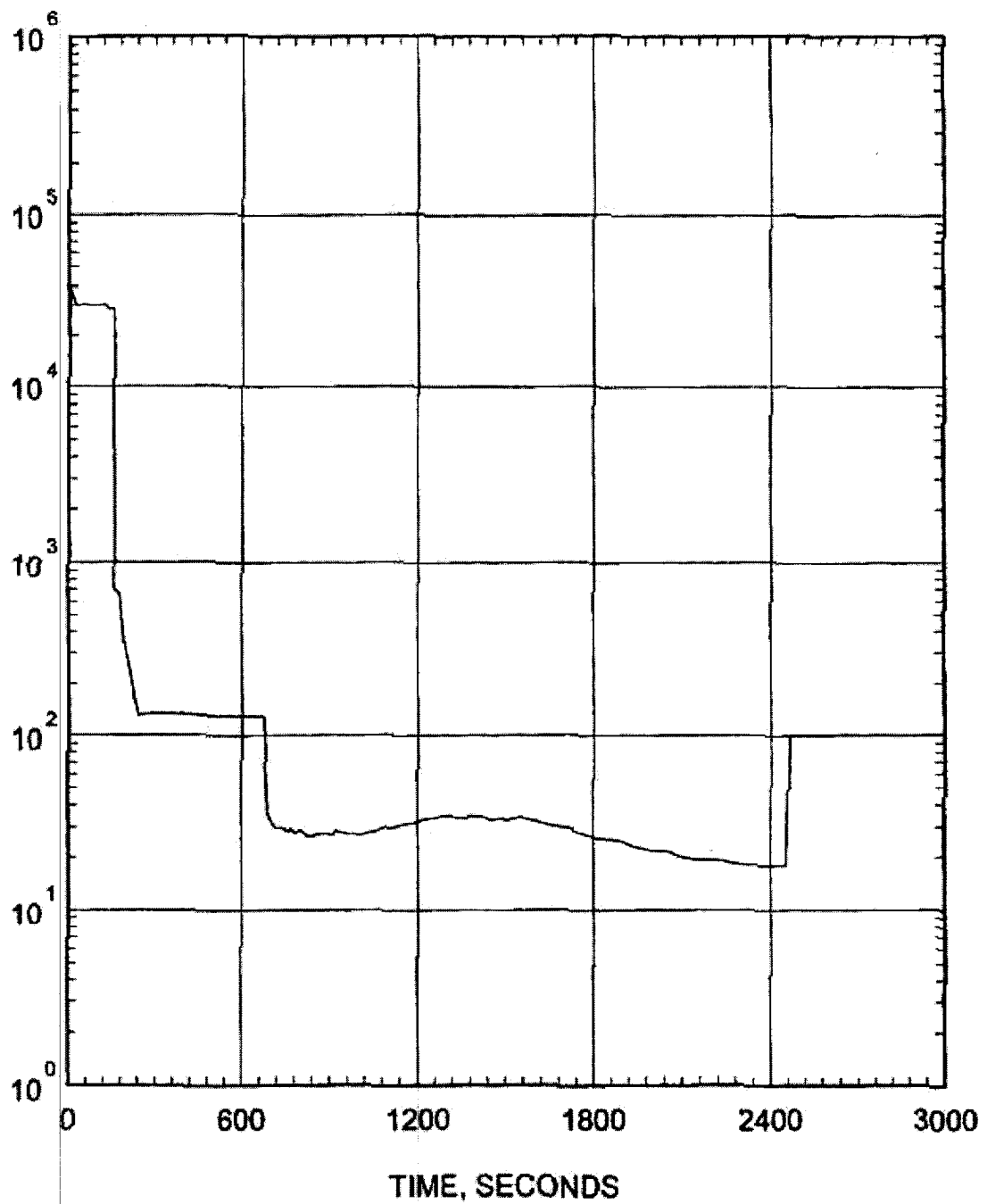
0.06 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL TWO-PHASE MIXTURE LEVEL

FIGURE 6.3.3.3-2E

JUNE 2003

REVISION 12

HTC, BTU/HR-FT<sup>2</sup>-DEGF



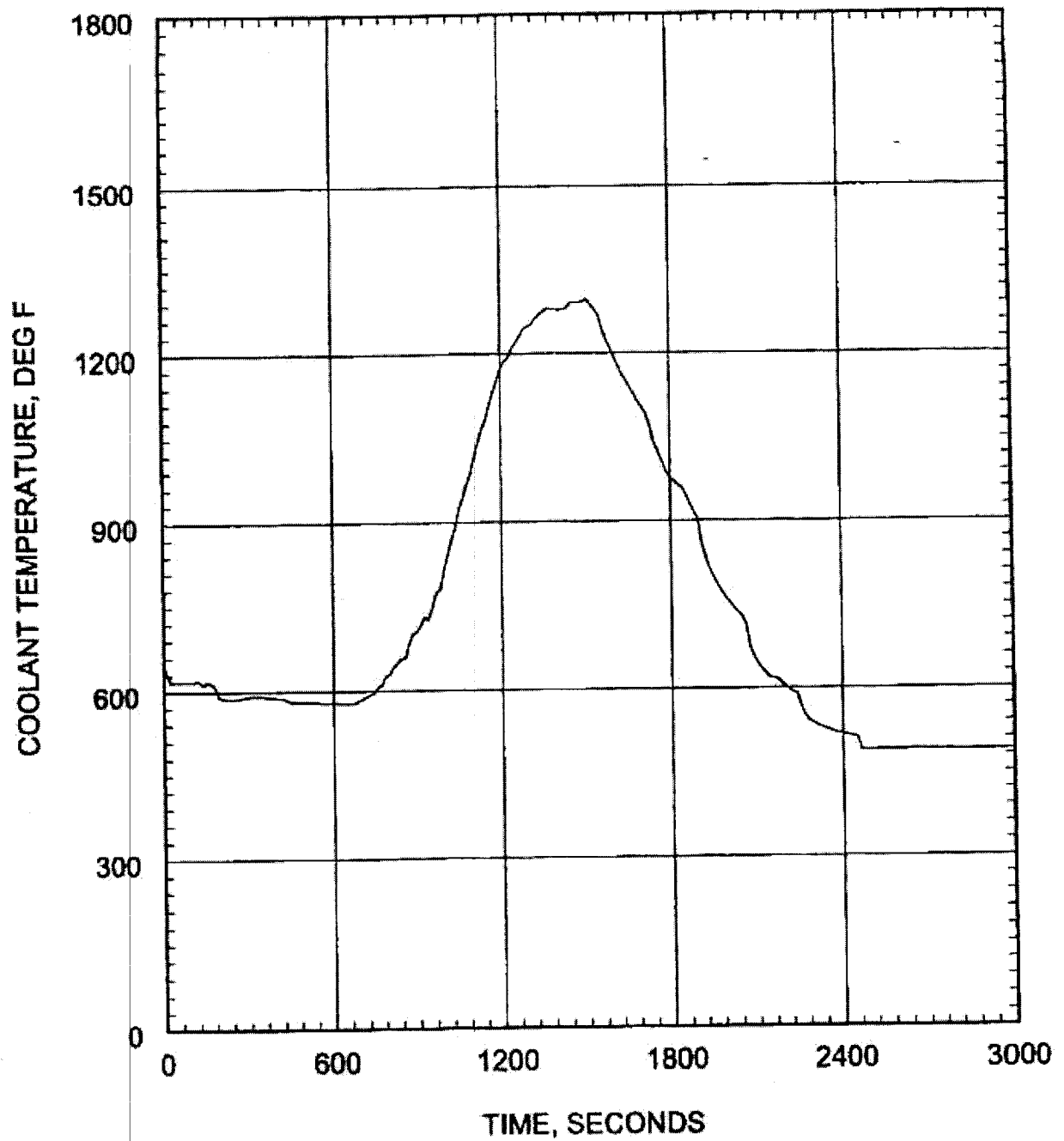
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.06 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
HEAT TRANSFER COEFFICIENT AT HOT SPOT

FIGURE 6.3.3.3-2F

JUNE 2003

REVISION 12



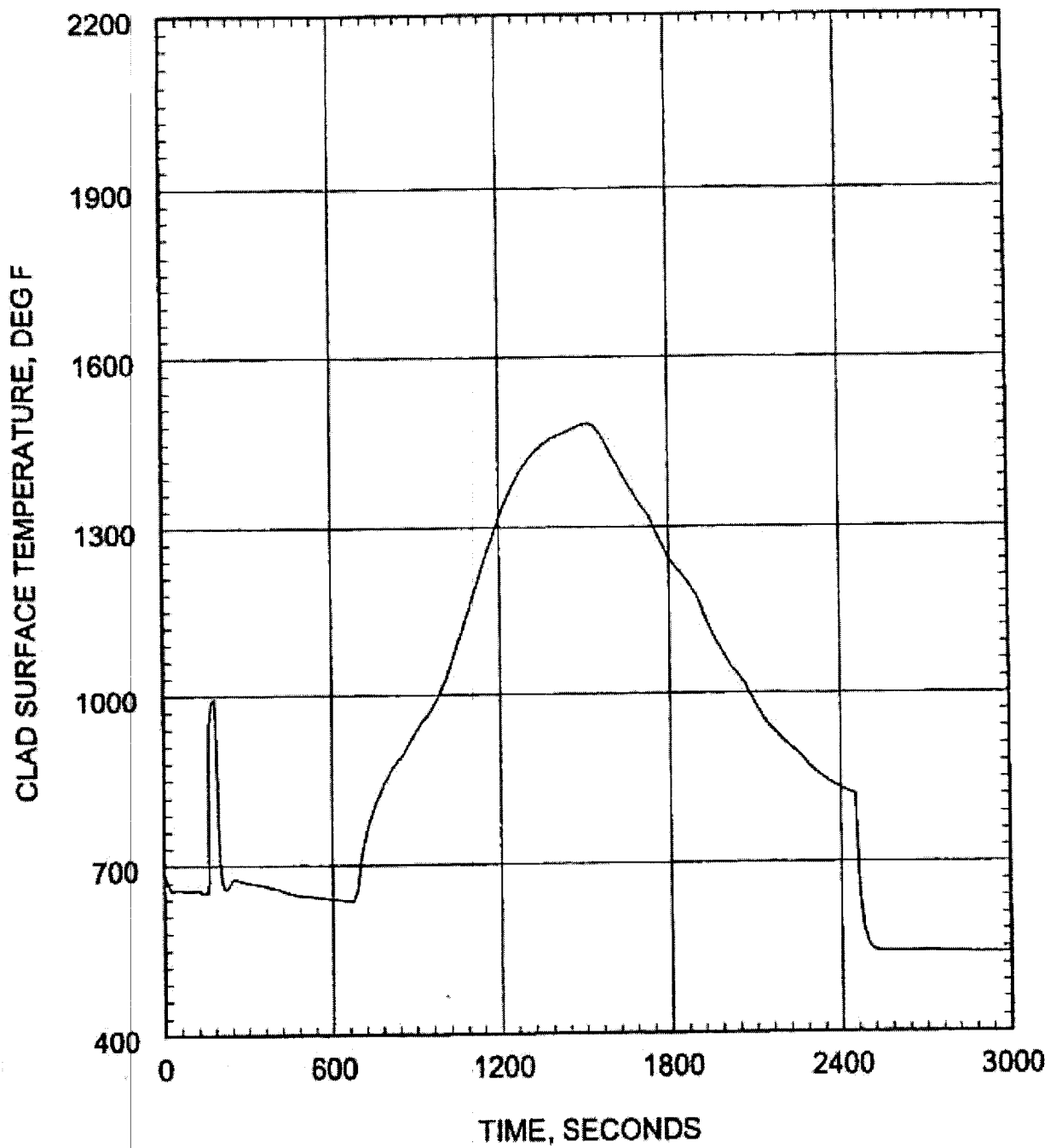
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.06 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
COOLANT TEMPERATURE AT HOT SPOT

FIGURE 6.3.3.3-2G

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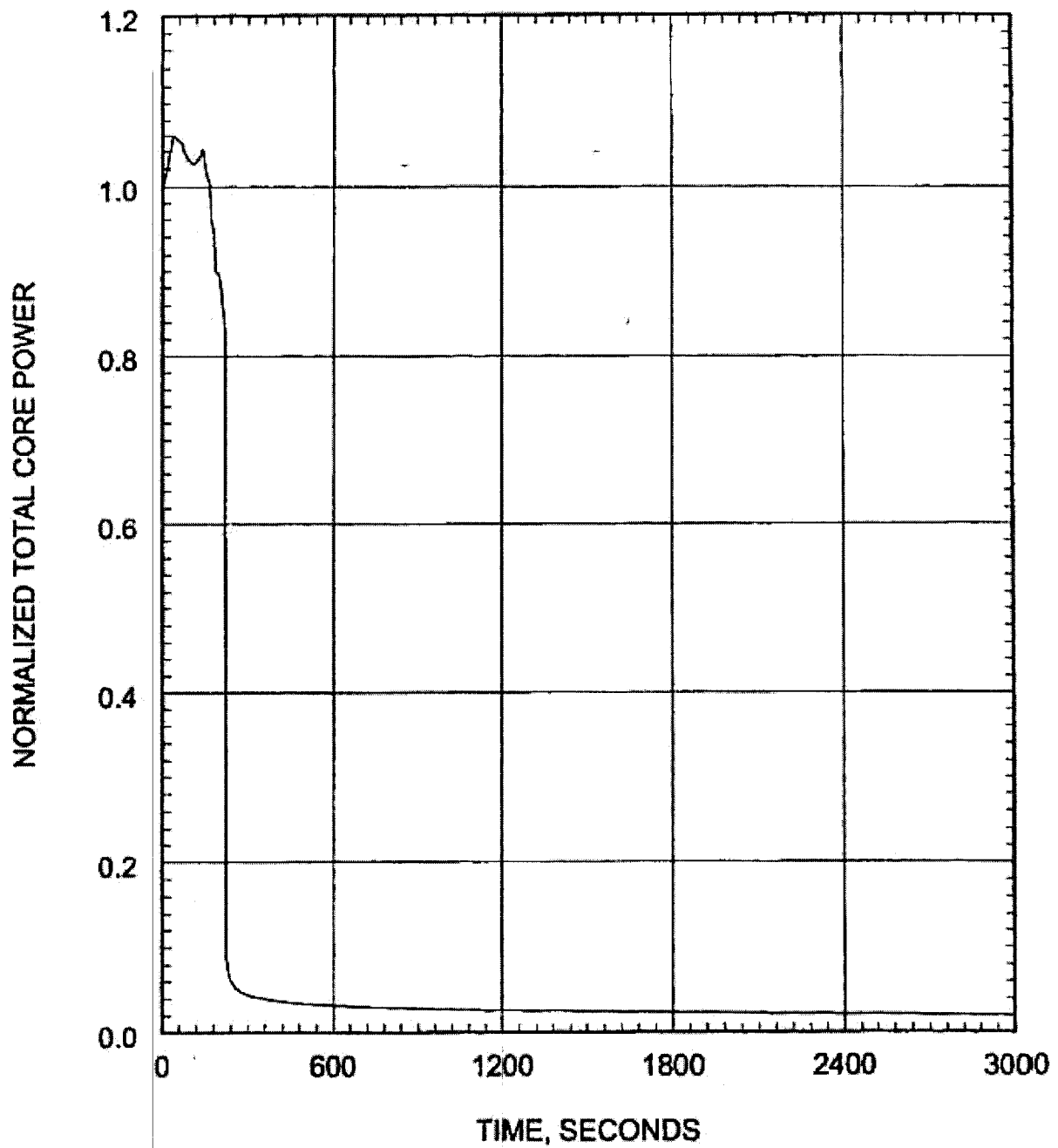
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.06 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
HOT SPOT CLAD SURFACE TEMPERATURE

FIGURE 6.3.3.3-2H

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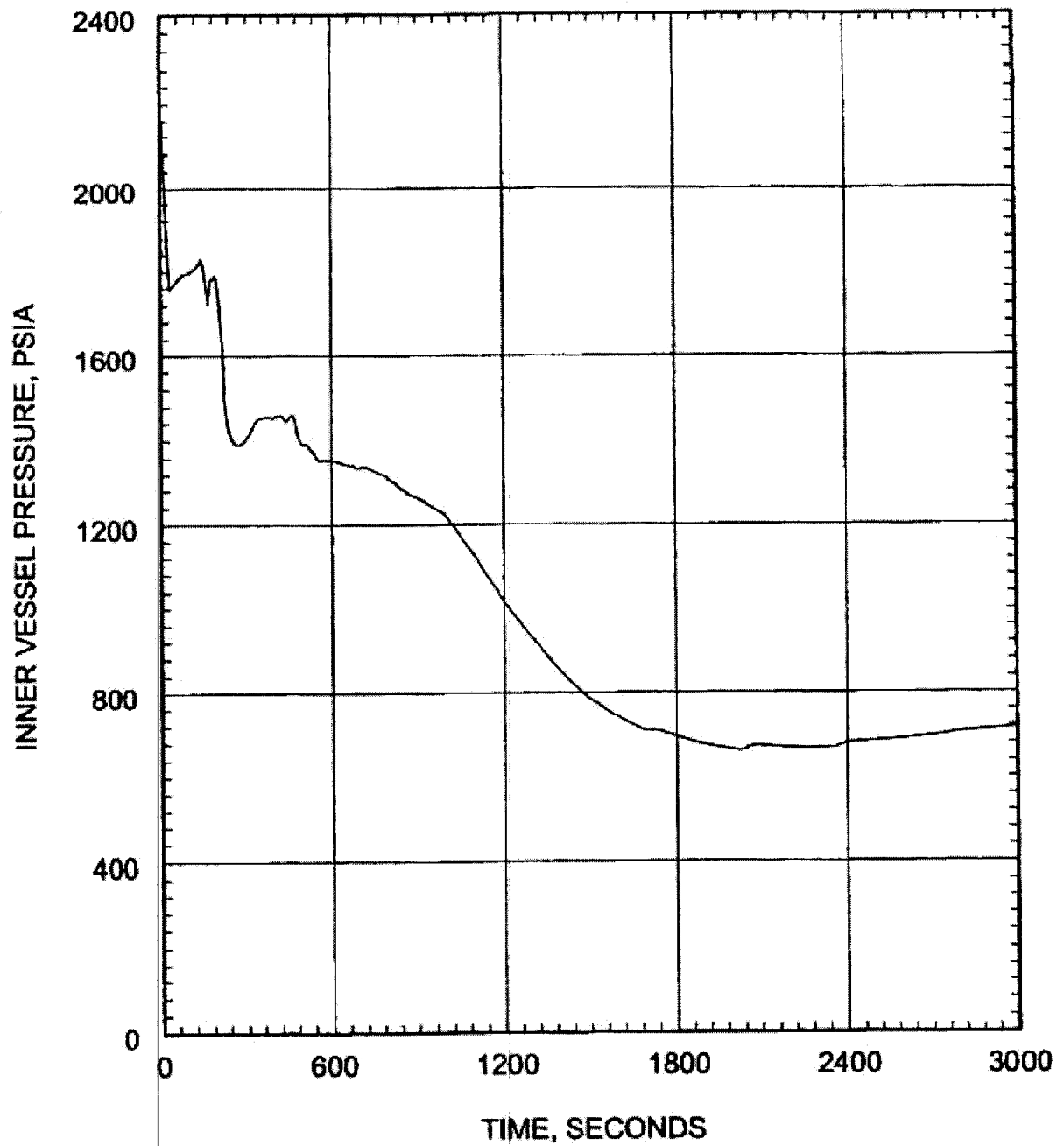
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.05 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.3-3A

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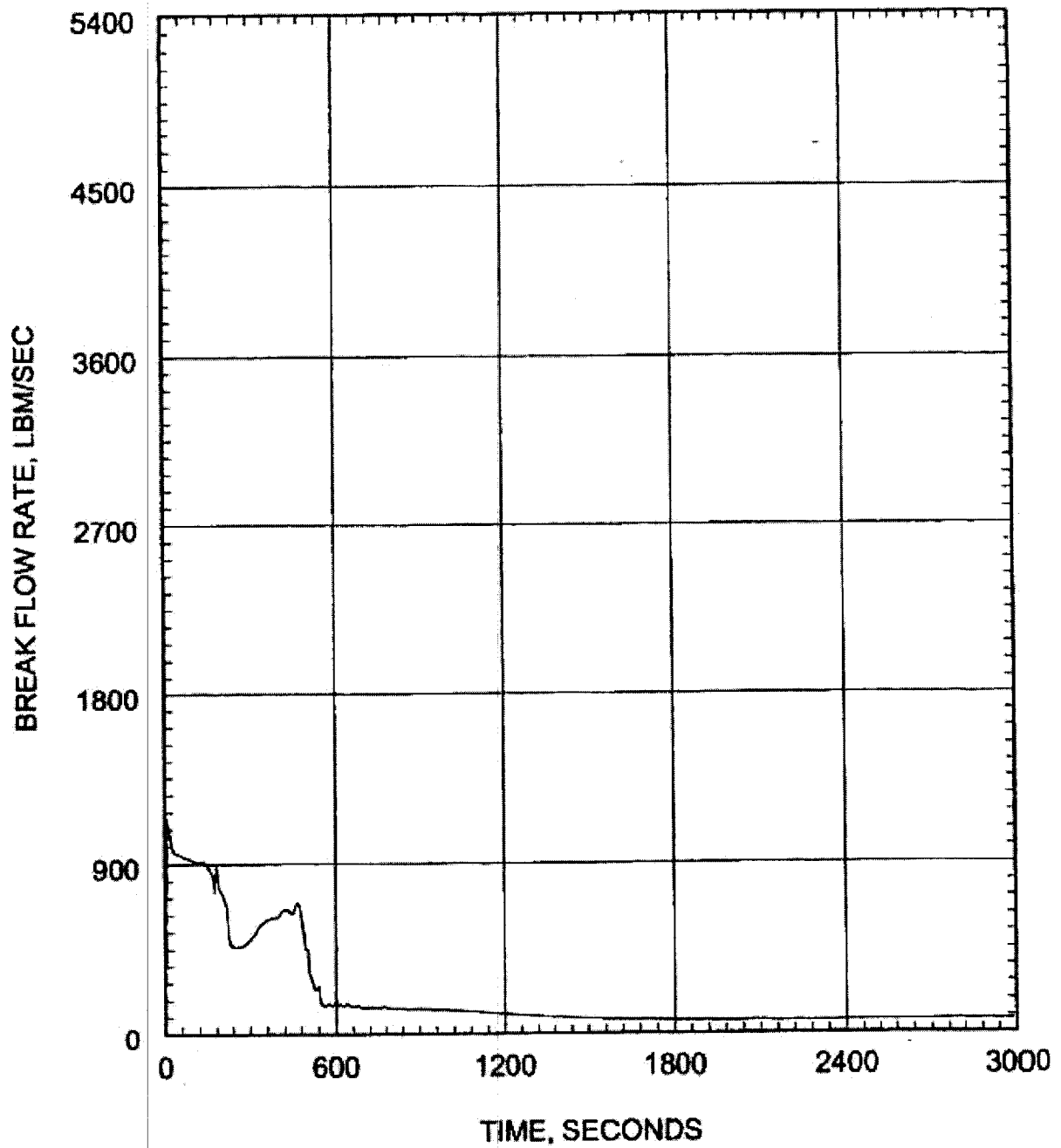
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.05 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL PRESSURE

FIGURE 6.3.3.3-3B

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

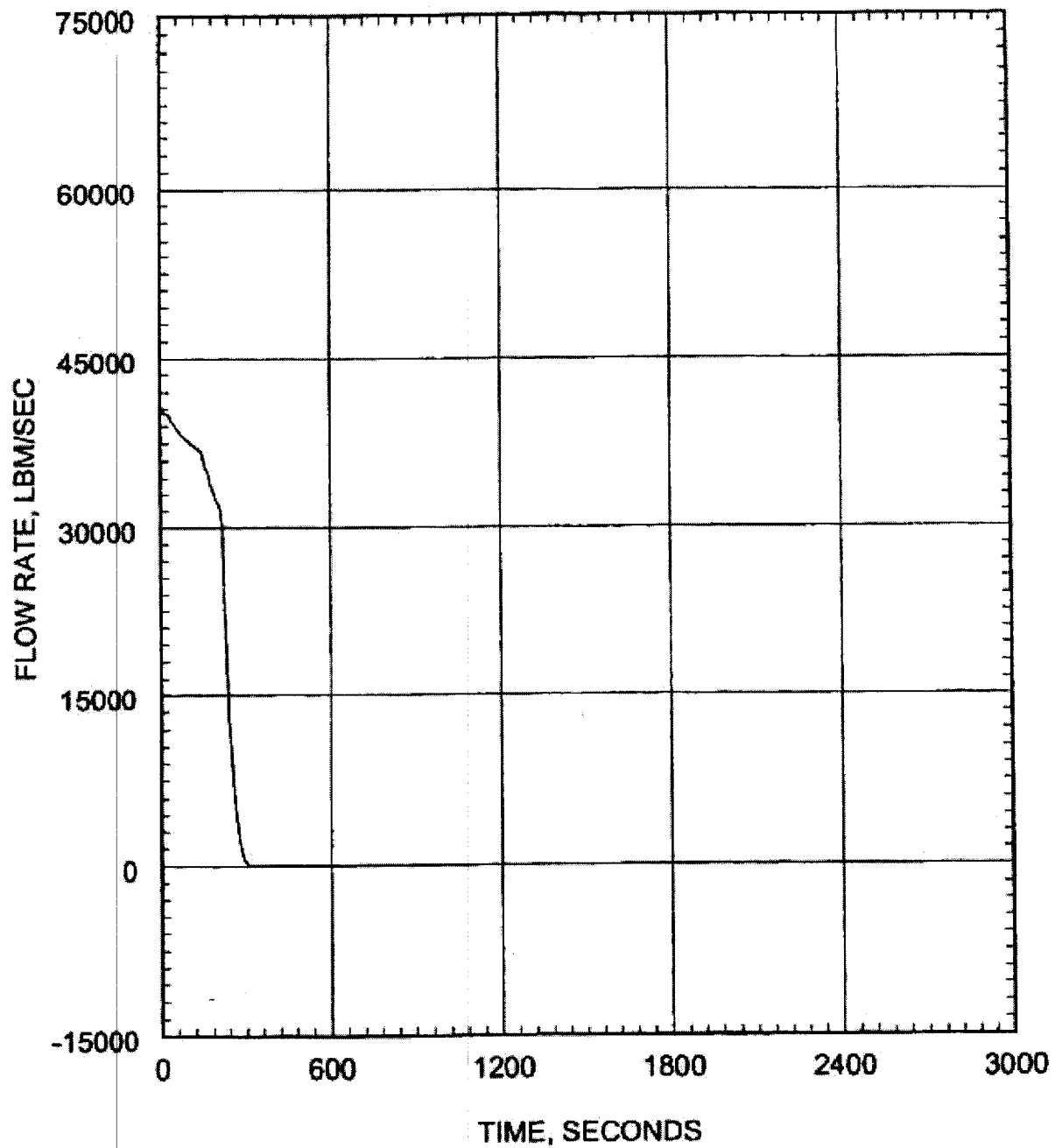
0.05 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
BREAK FLOW RATE

FIGURE 6.3.3.3-3C

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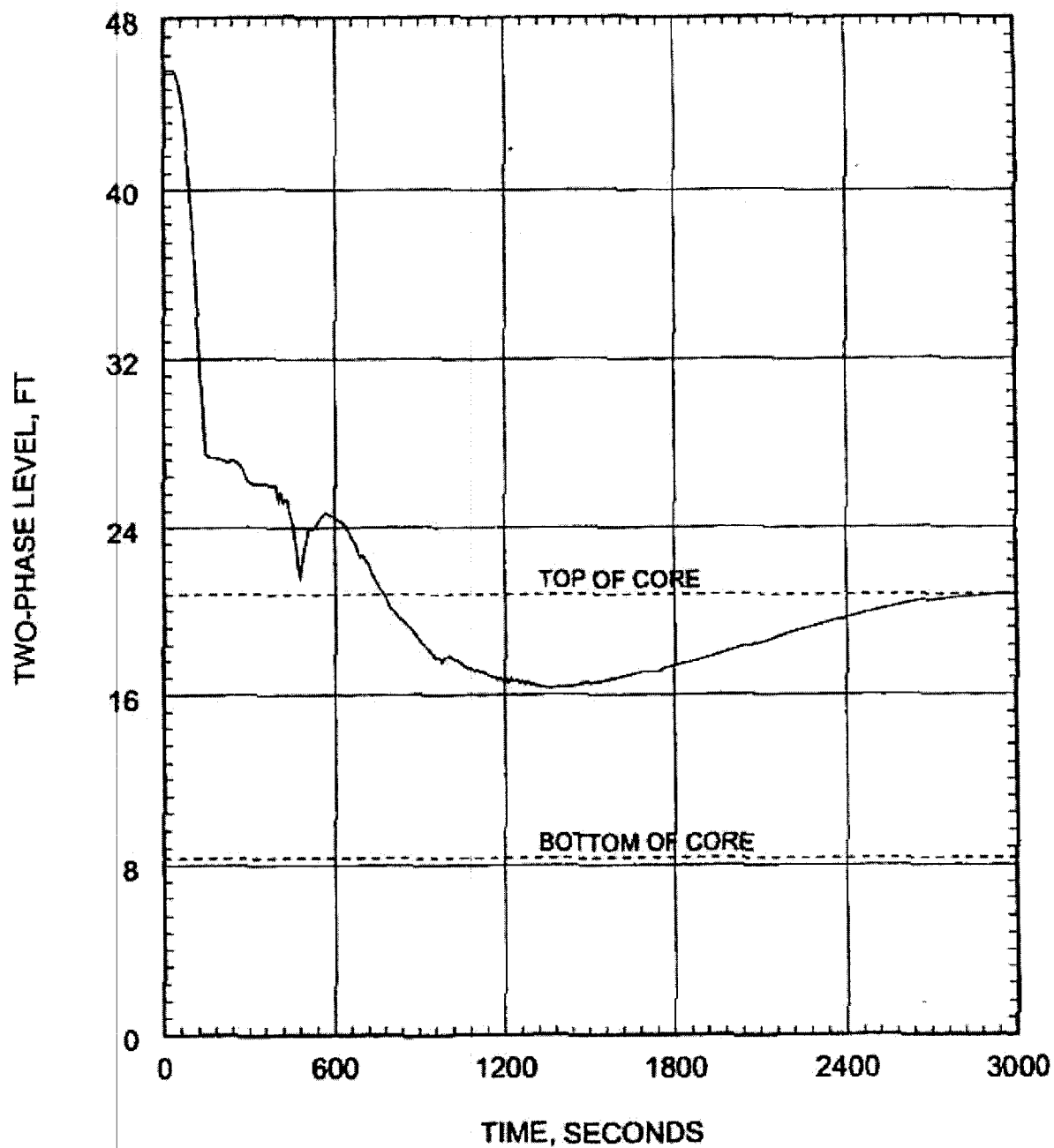
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.05 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL INLET FLOW RATE

FIGURE 6.3.3.3-3D

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

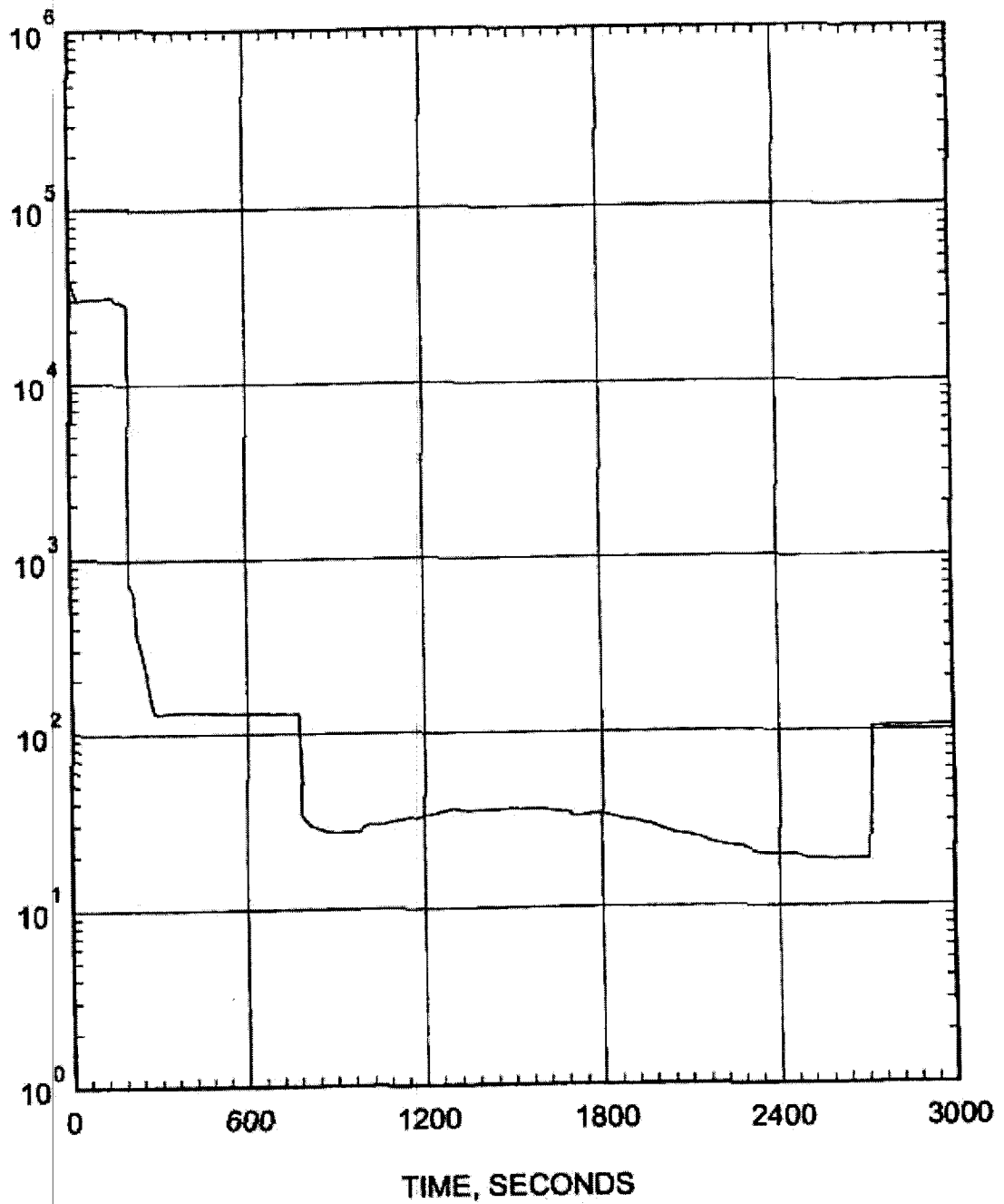
0.05 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL TWO-PHASE MIXTURE LEVEL

FIGURE 6.3.3.3-3E

JUNE 2003

REVISION 12

HTC, BTU/HR-FT<sup>2</sup>-DEGF



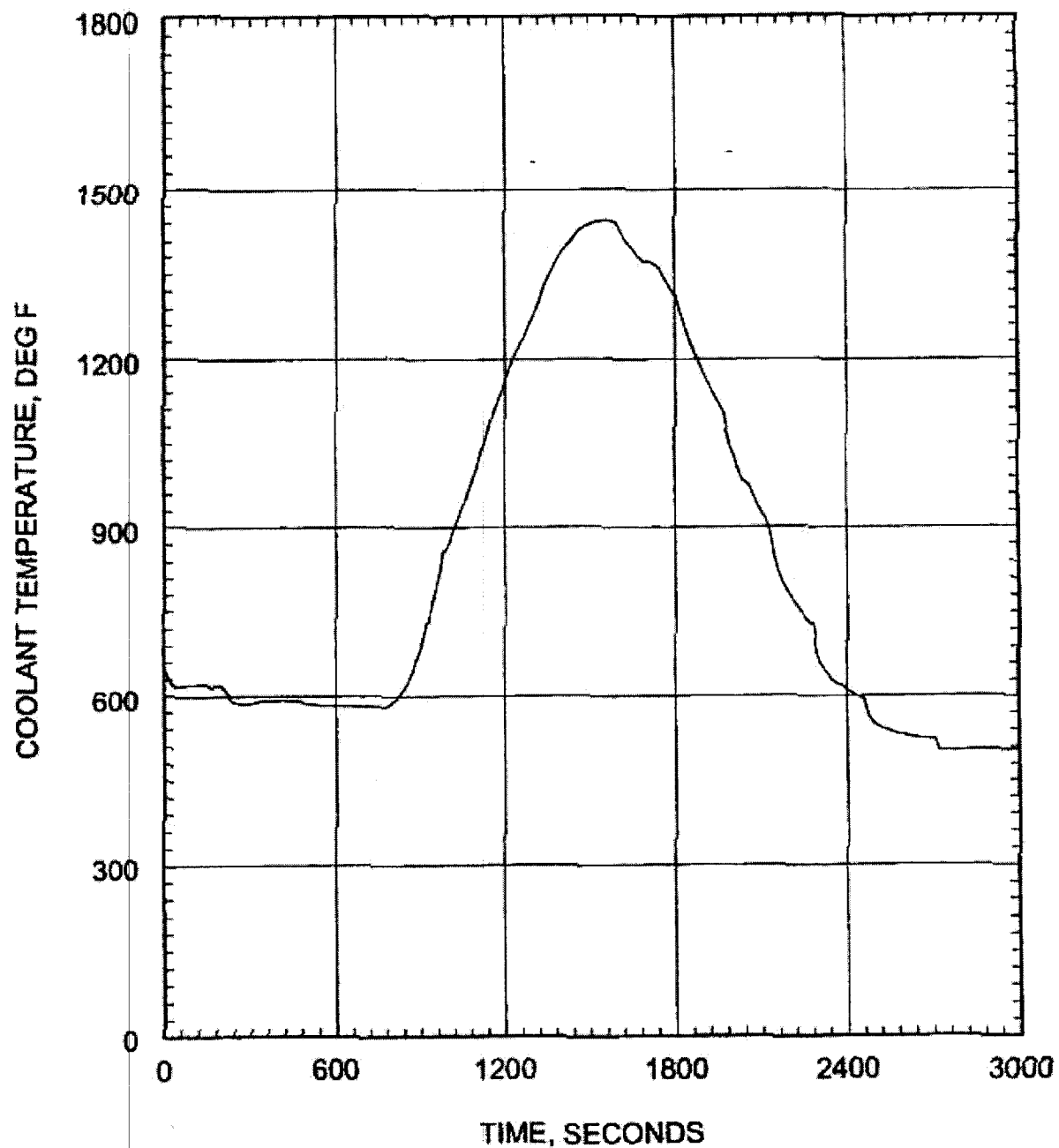
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.05 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
HEAT TRANSFER COEFFICIENT AT HOT SPOT

FIGURE 6.3.3.3-3F

JUNE 2003

REVISION 12



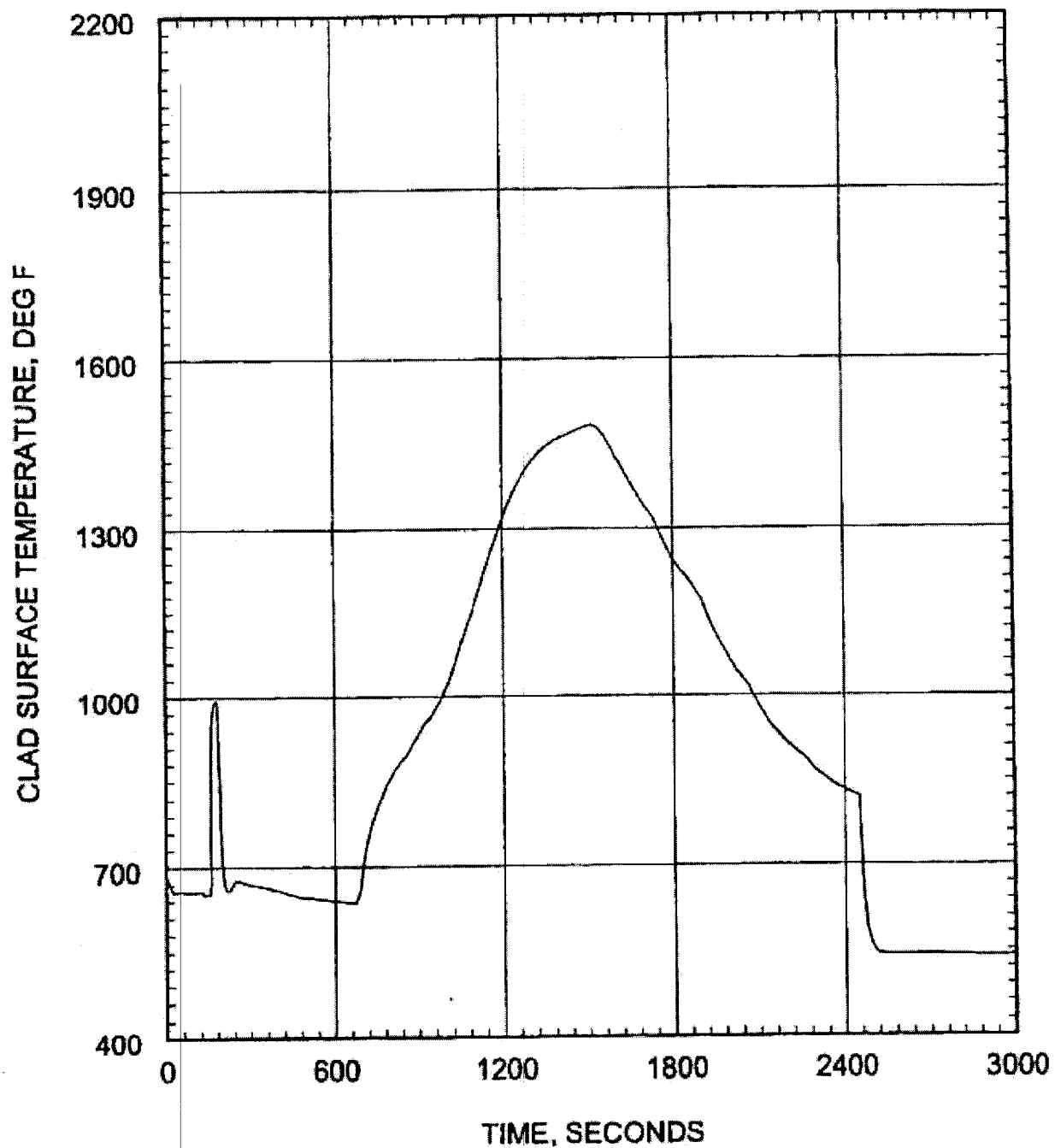
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.05 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
COOLANT TEMPERATURE AT HOT SPOT

FIGURE 6.3.3.3-3G

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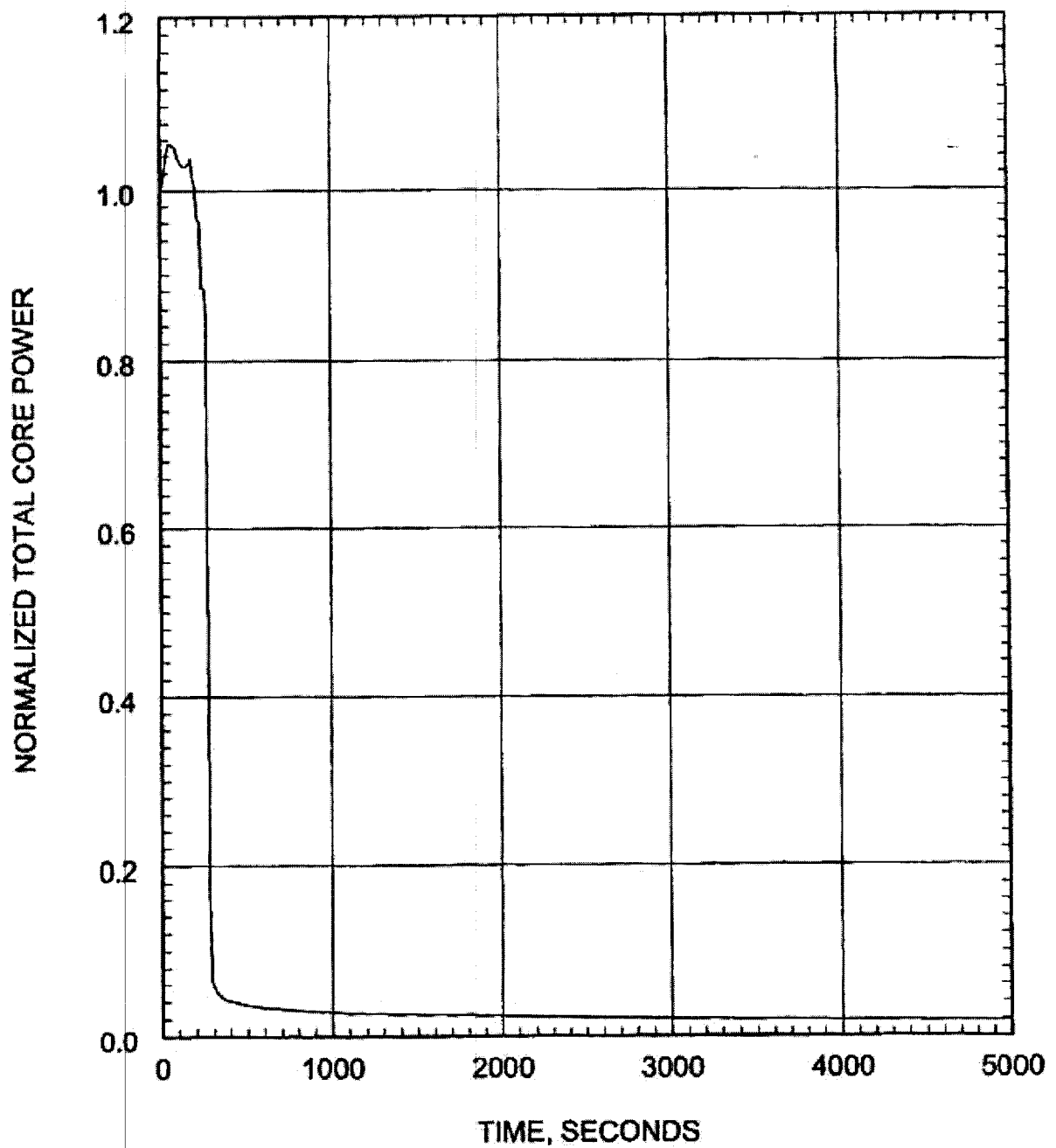
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.05 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
HOT SPOT CLAD SURFACE TEMPERATURE

FIGURE 6.3.3.3-3H

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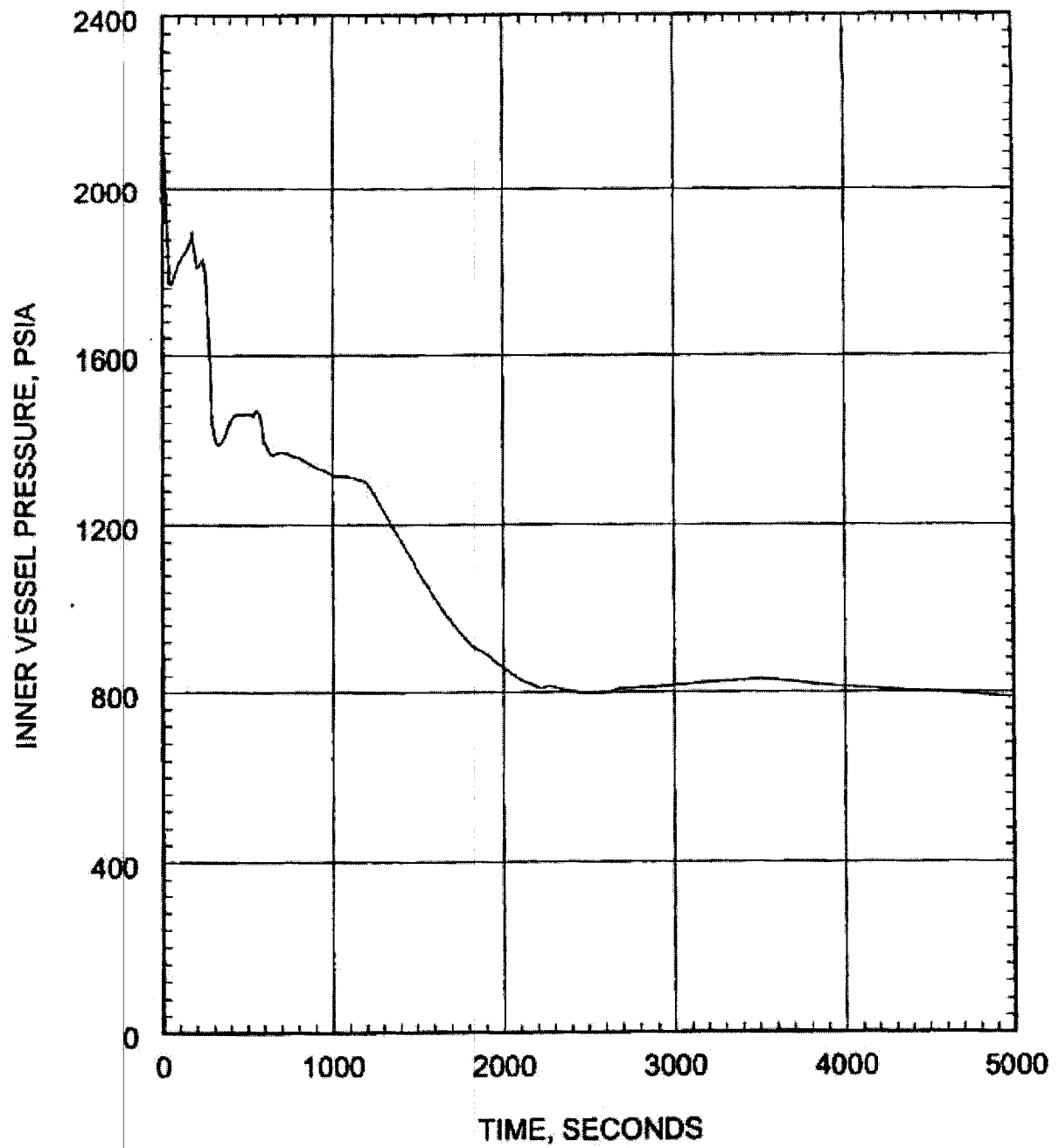
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.04 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.3-4A

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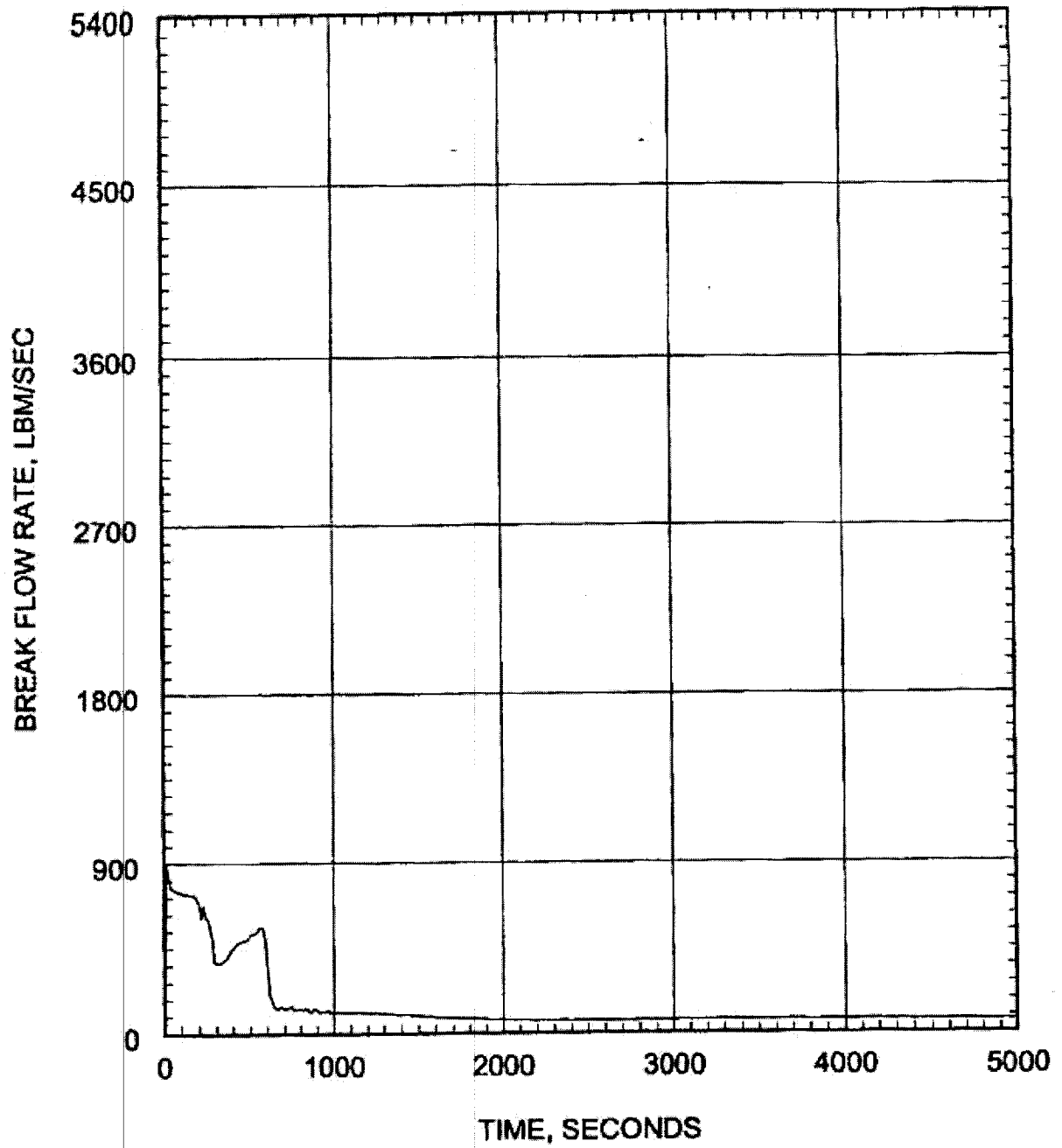
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.04 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL PRESSURE

FIGURE 6.3.3.3-4B

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

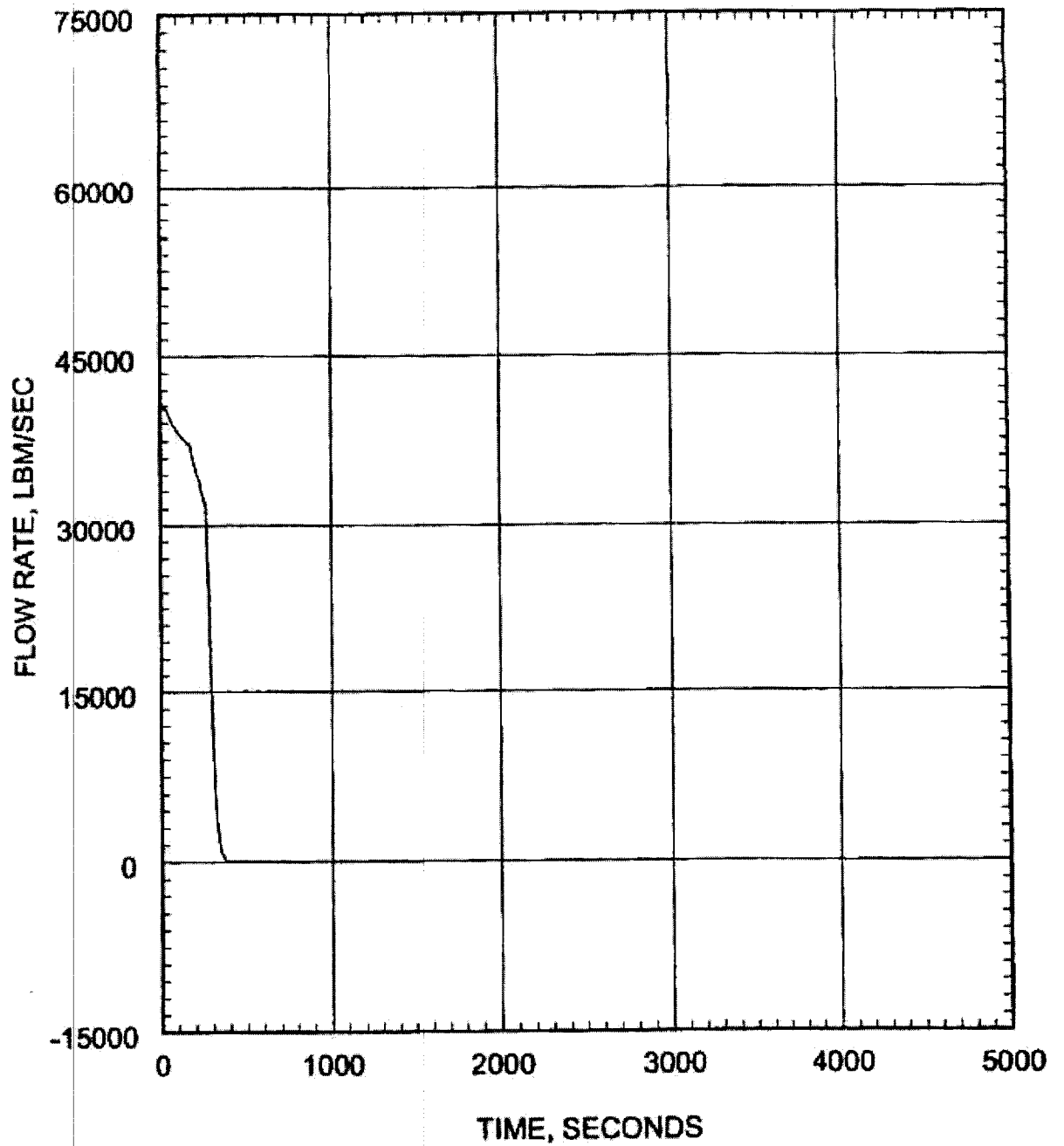
0.04 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
BREAK FLOW RATE

FIGURE 6.3.3.3-4C

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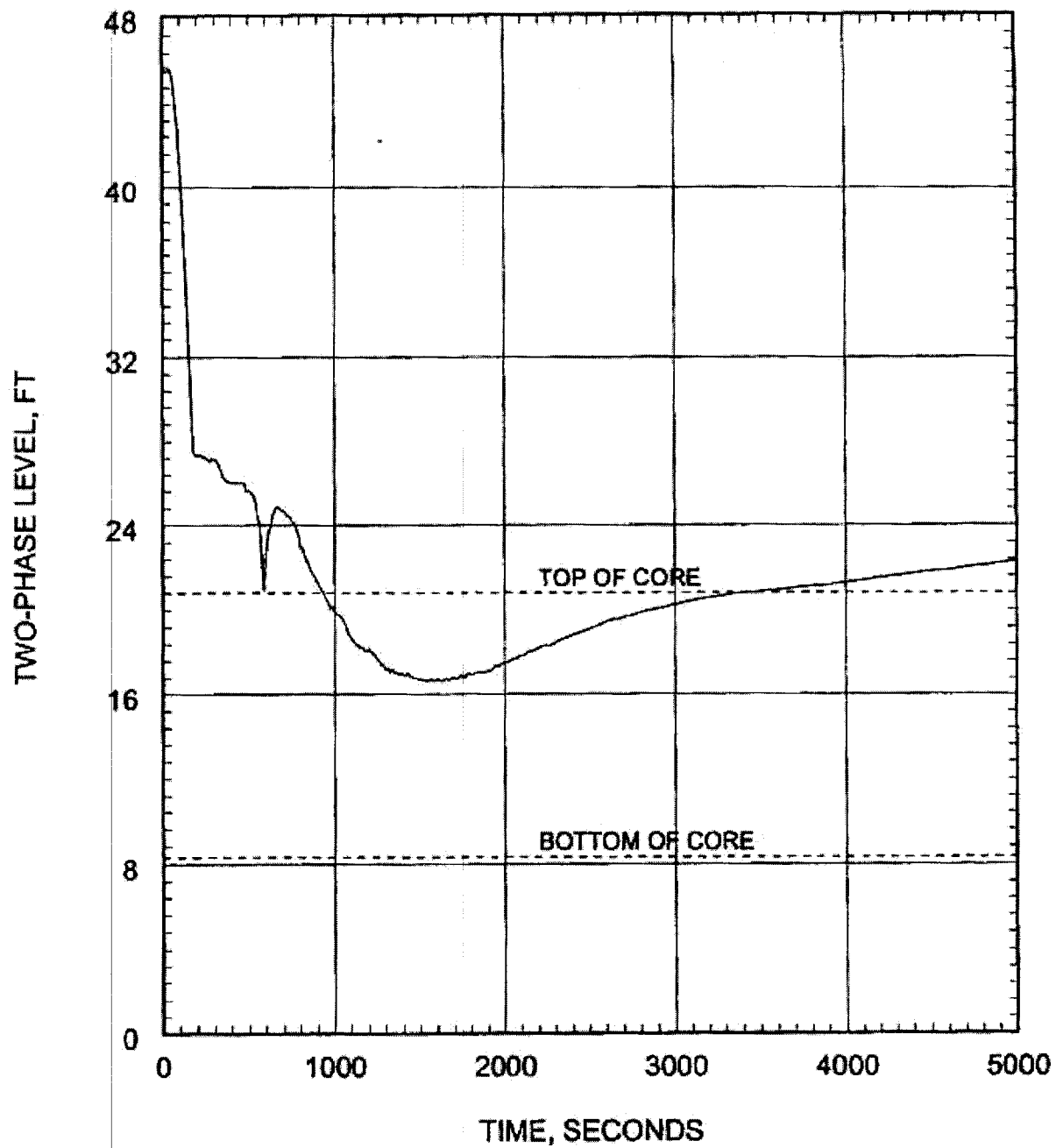
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.04 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL INLET FLOW RATE

FIGURE 6.3.3.3-4D

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

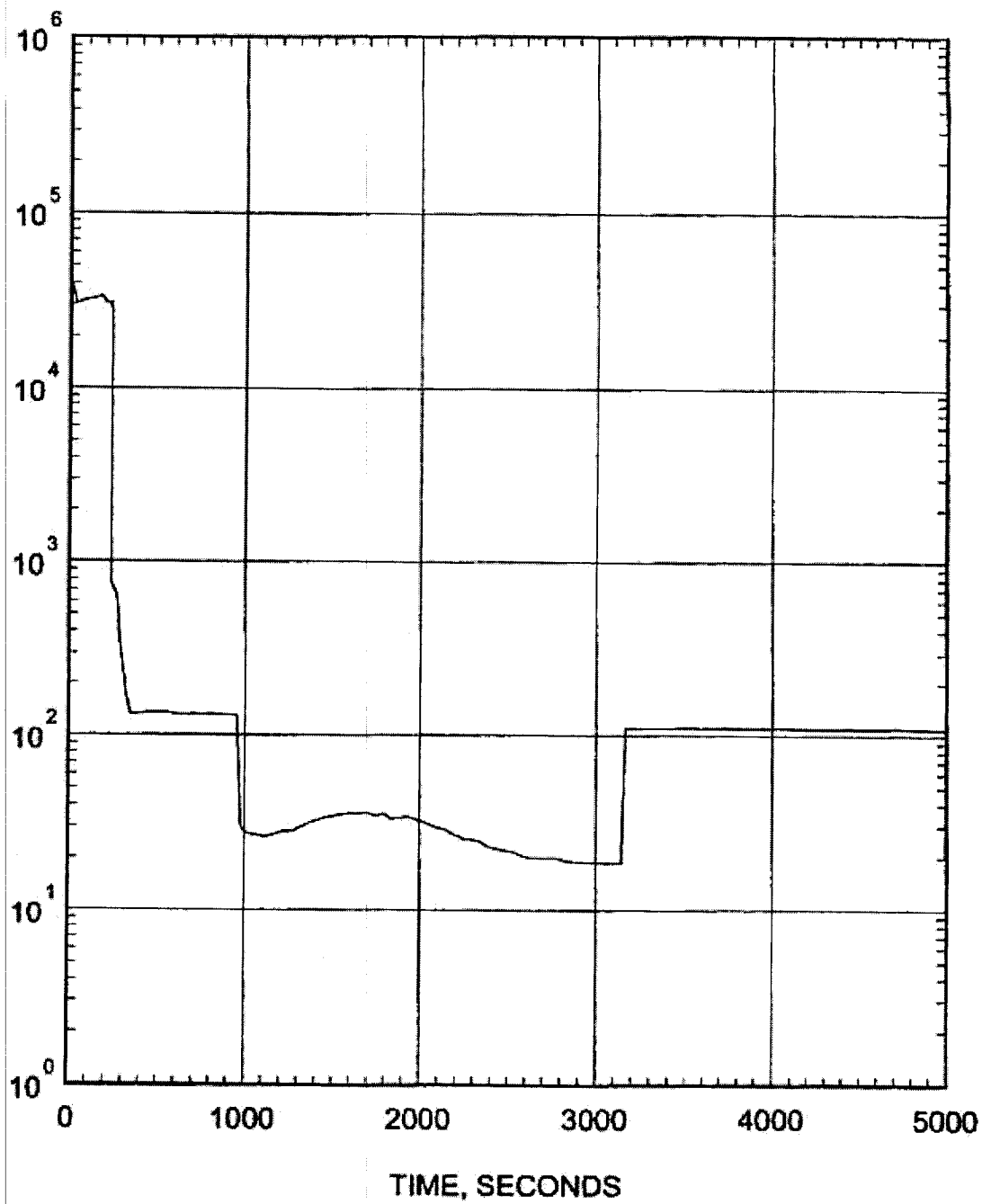
0.04 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
INNER VESSEL TWO-PHASE MIXTURE LEVEL

FIGURE 6.3.3.3-4E

JUNE 2003

REVISION 12

HTC, BTU/HR-FT<sup>2</sup>-DEGF



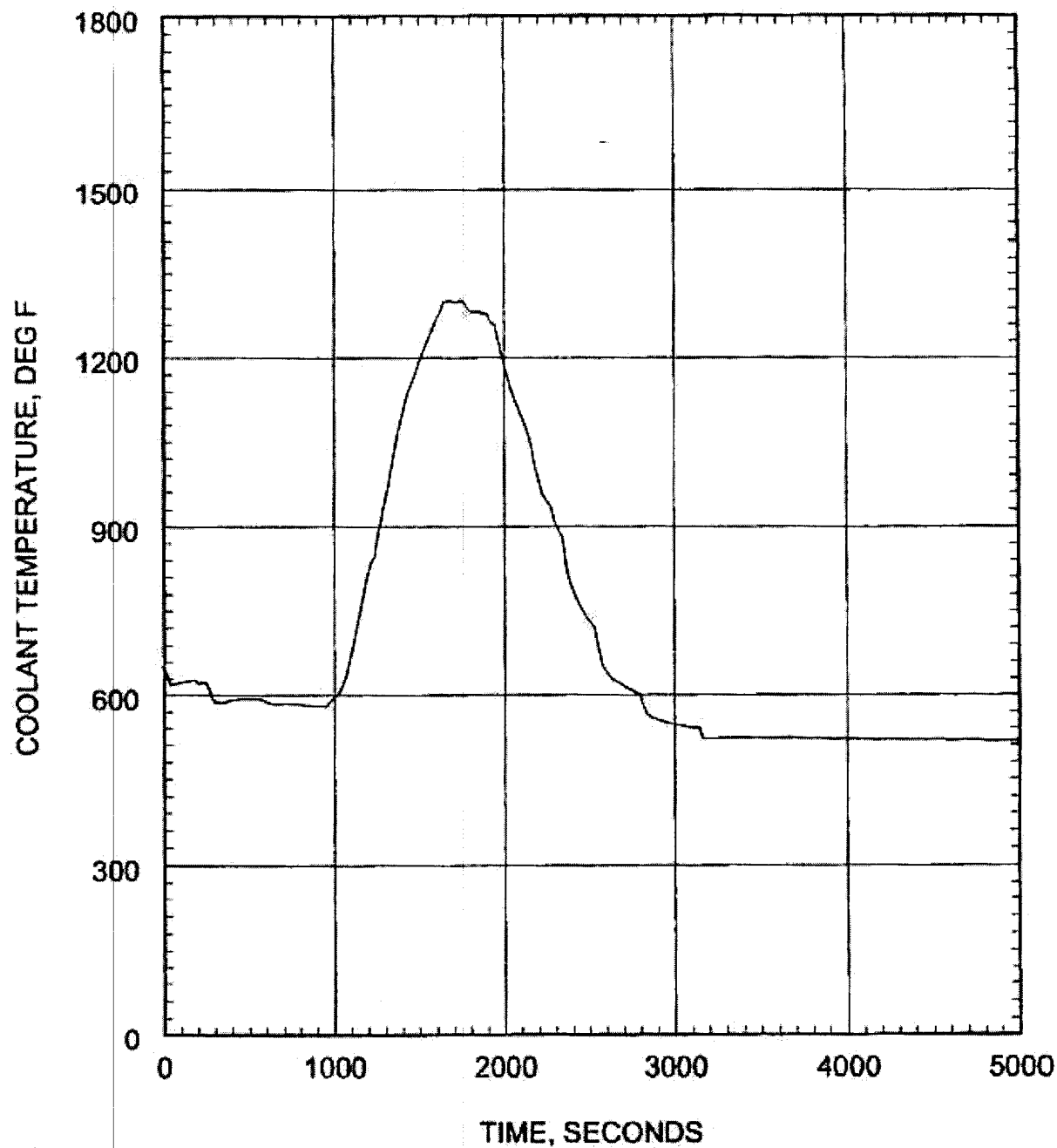
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.04 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
HEAT TRANSFER COEFFICIENT AT HOT SPOT

FIGURE 6.3.3.3-4F

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REVISION 12



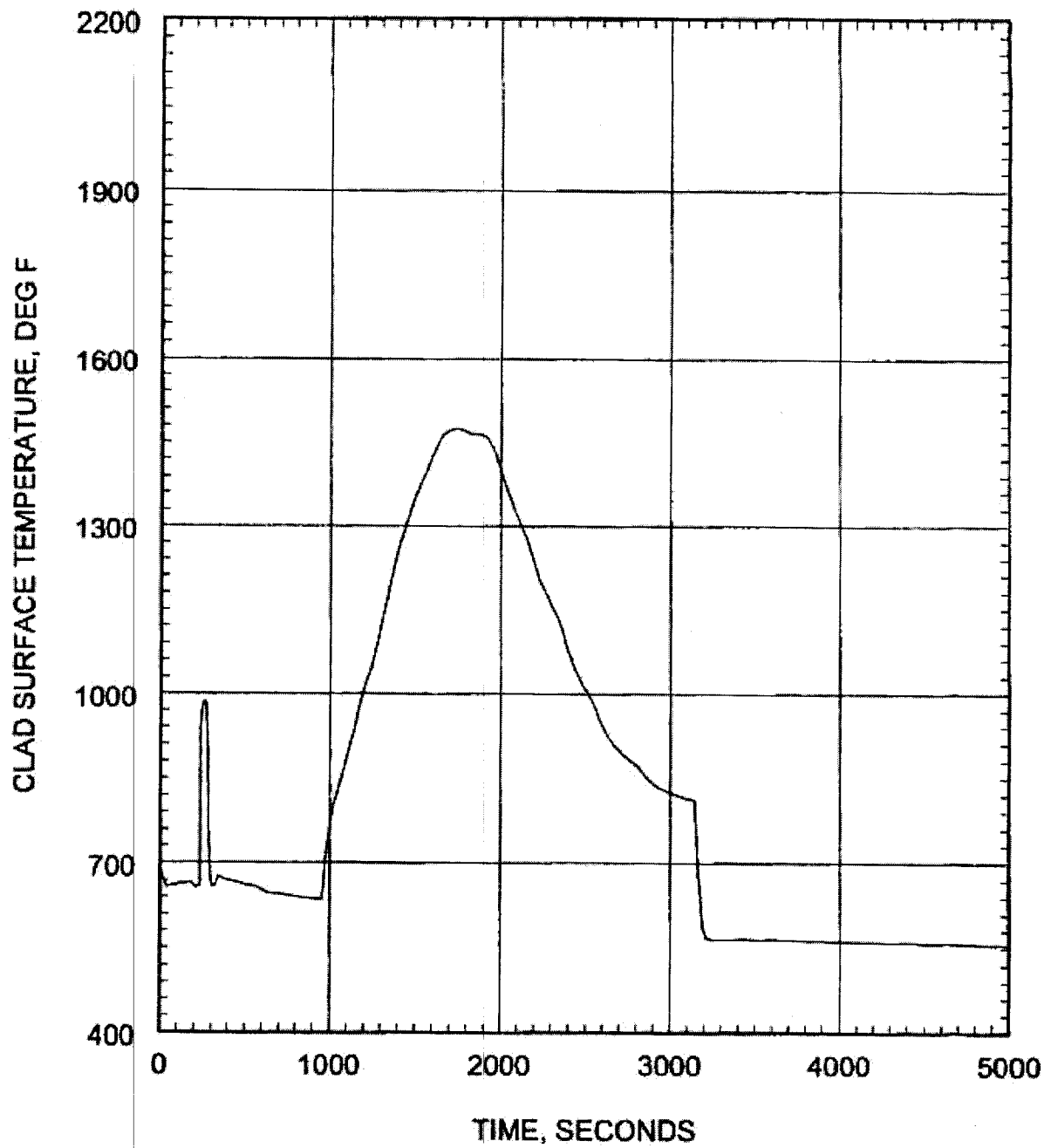
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.04 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
COOLANT TEMPERATURE AT HOT SPOT

FIGURE 6.3.3.3-4G

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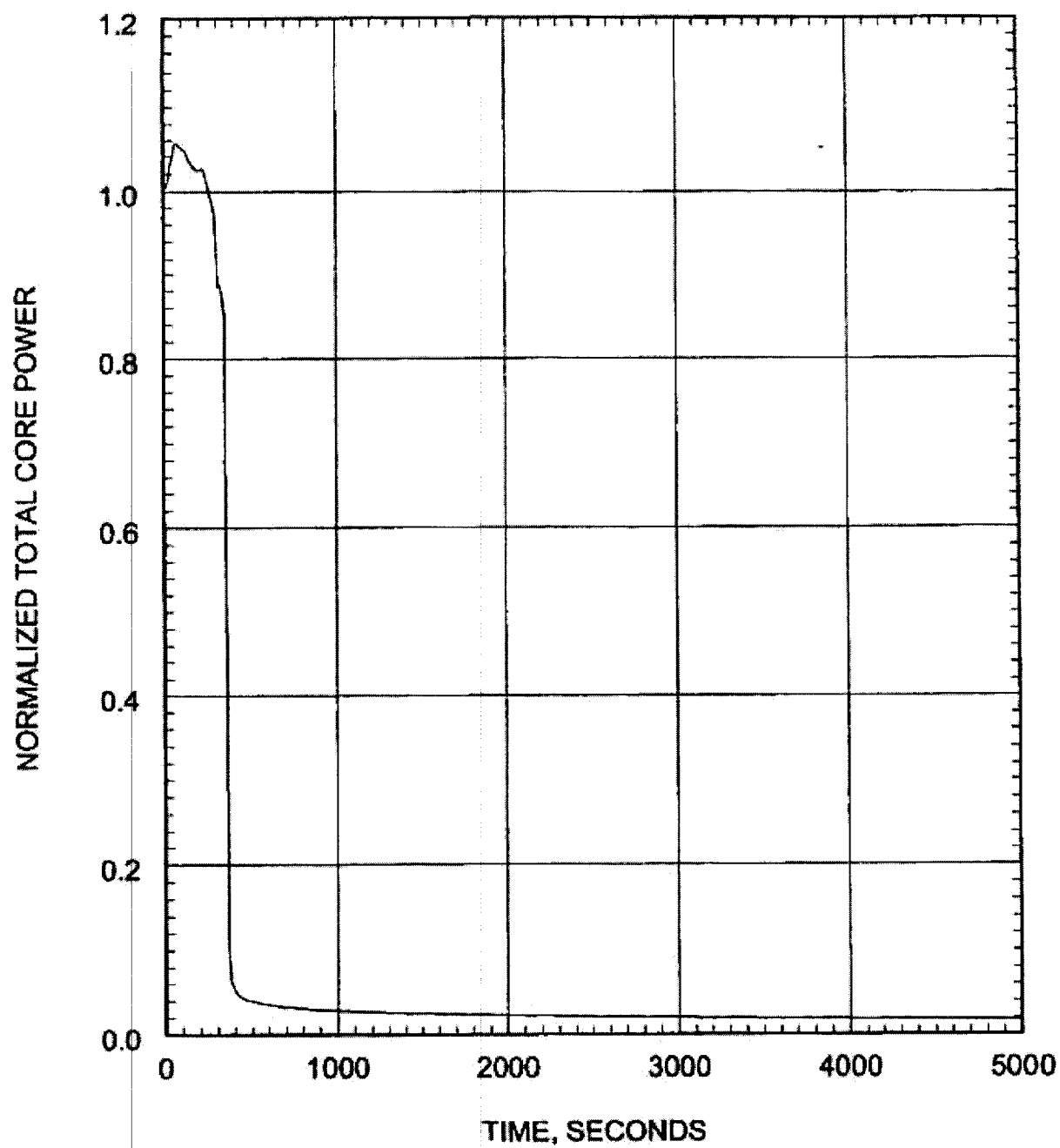
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.04 FT<sup>2</sup> COLD LEG BREAK AT PUMP DISCHARGE  
HOT SPOT CLAD SURFACE TEMPERATURE

FIGURE 6.3.3.3-4H

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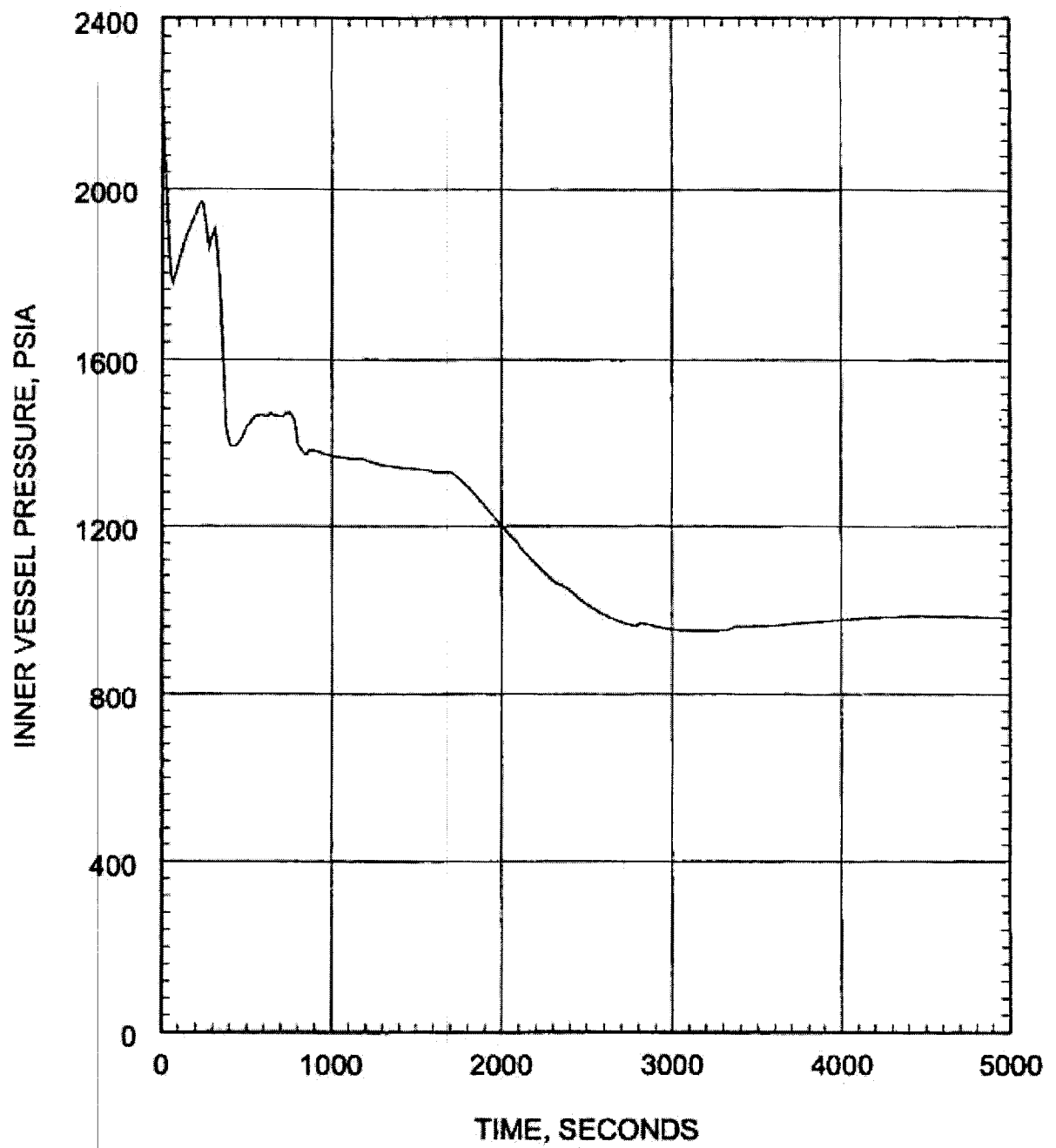
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.03 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.3-5A

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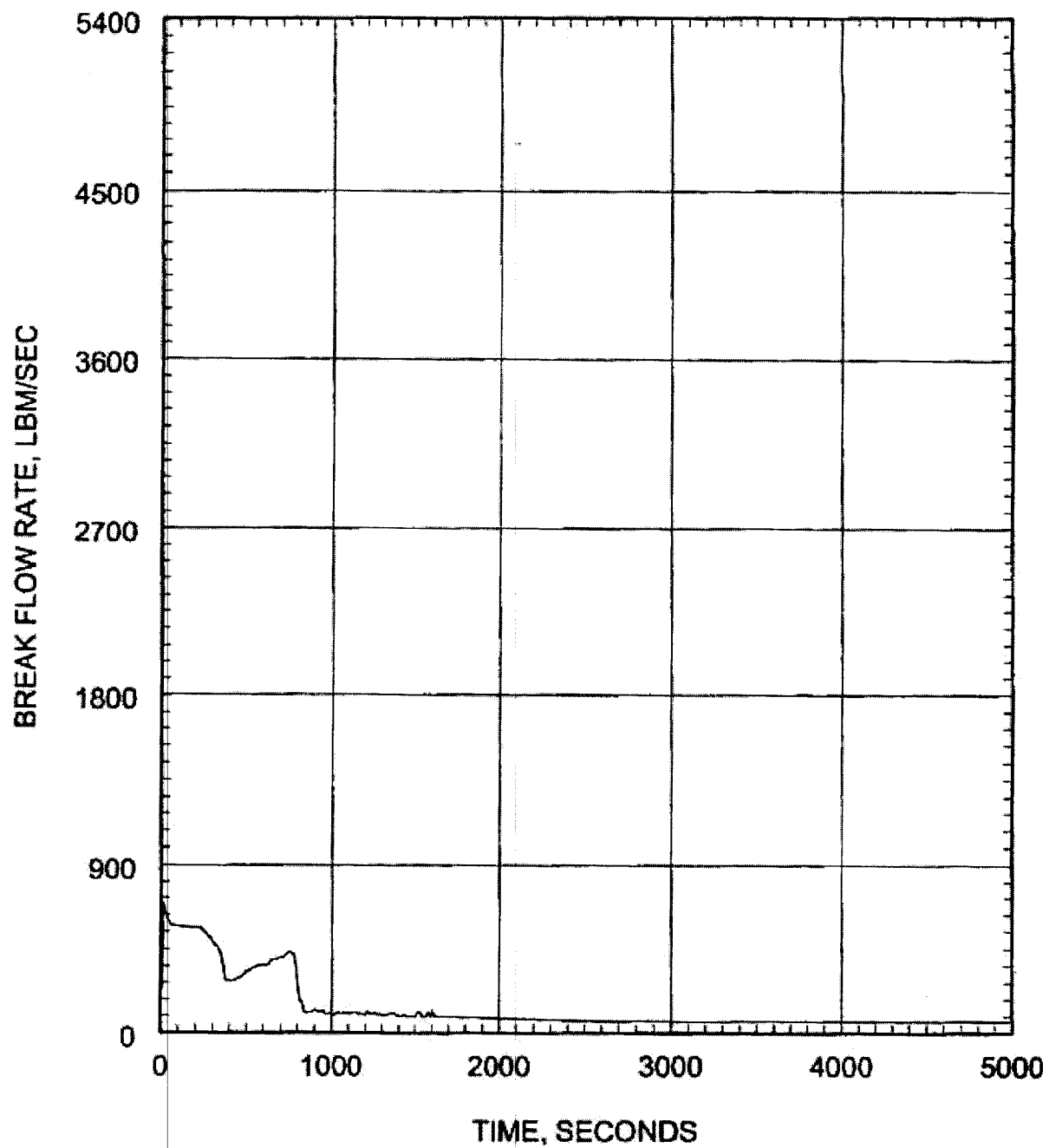
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.03 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
INNER VESSEL PRESSURE

FIGURE 6.3.3.3-5B

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

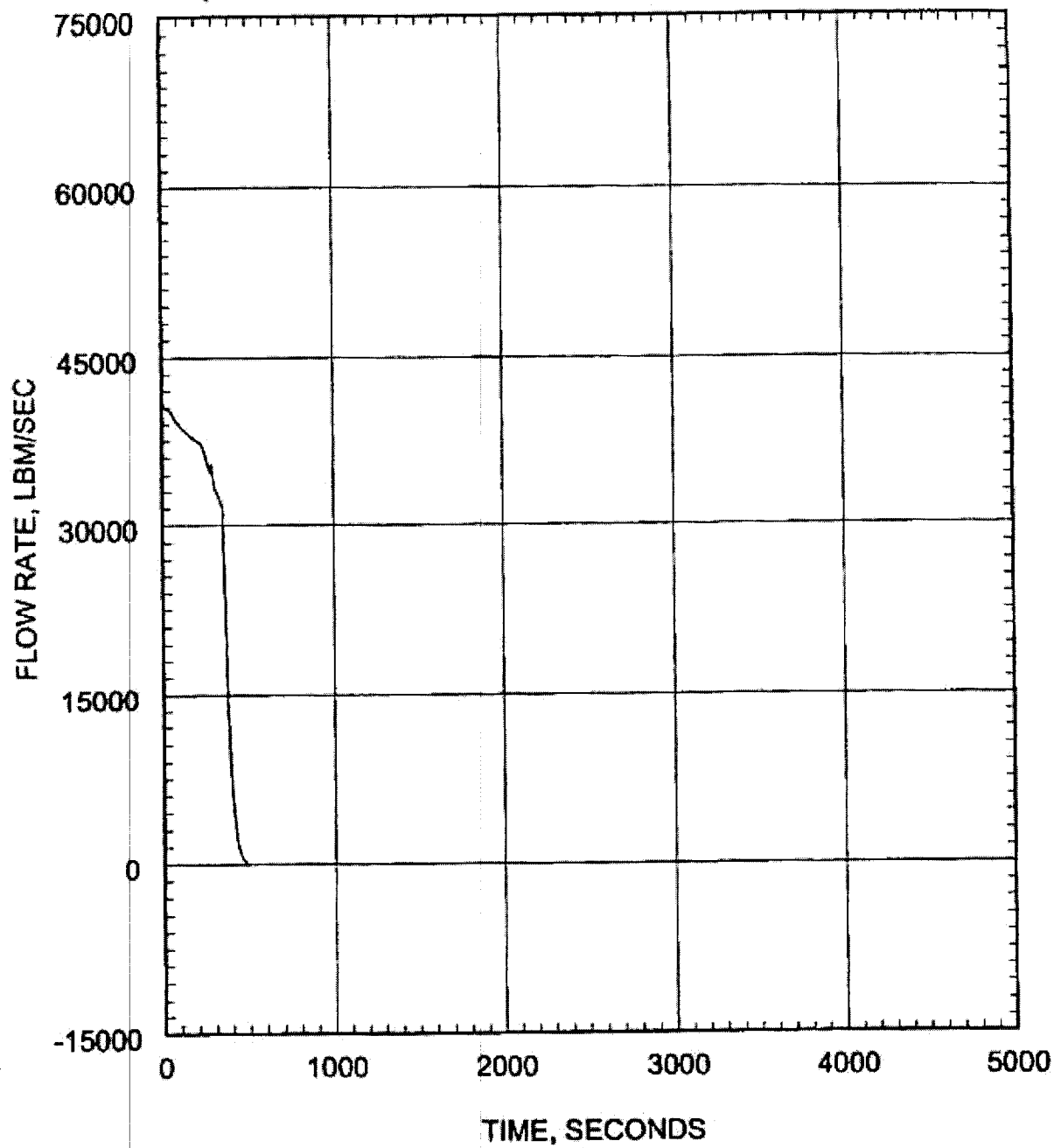
0.03 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
BREAK FLOW RATE

FIGURE 6.3.3.3-5C

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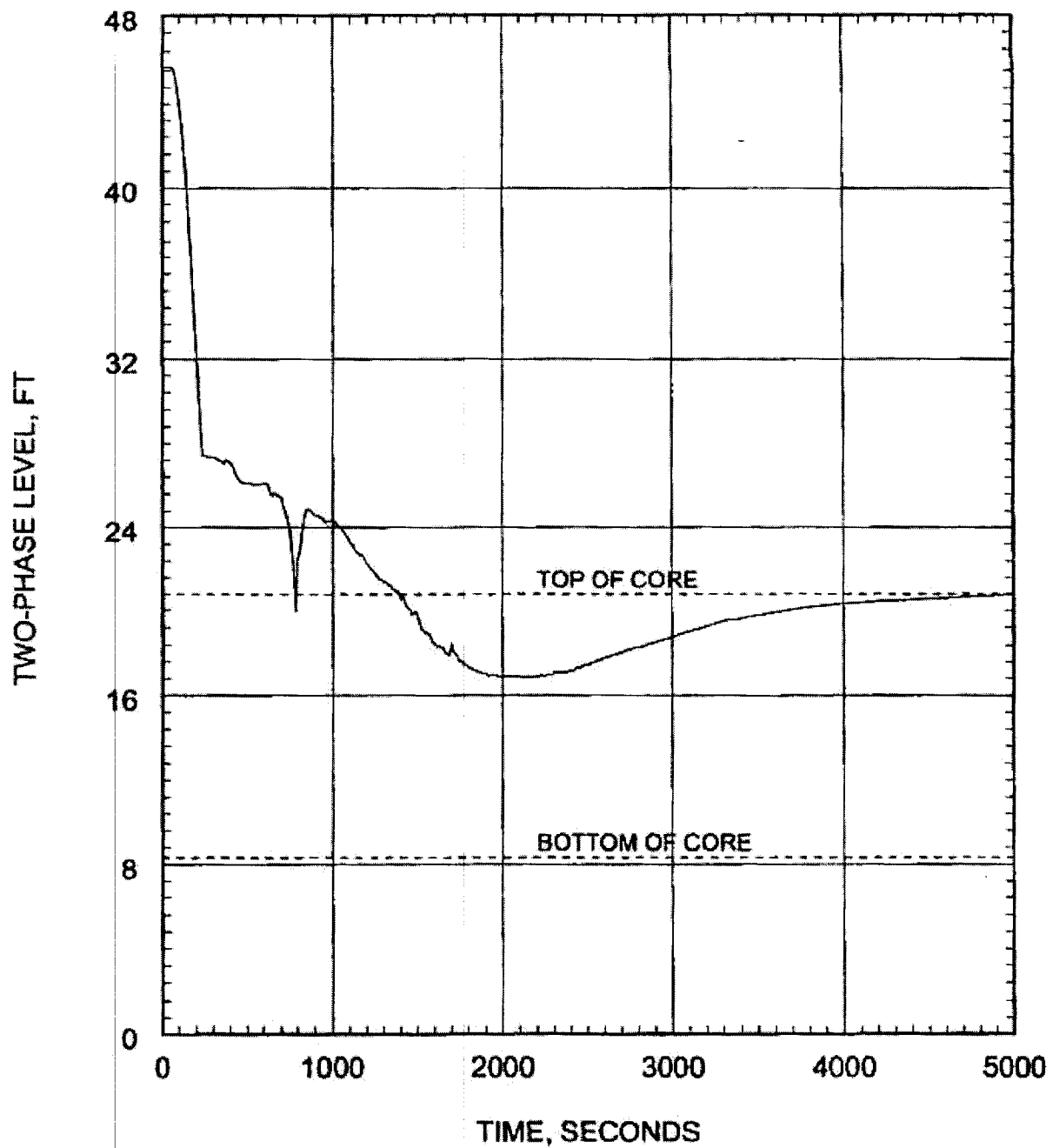
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.03 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
INNER VESSEL INLET FLOW RATE

FIGURE 6.3.3.3-5D

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

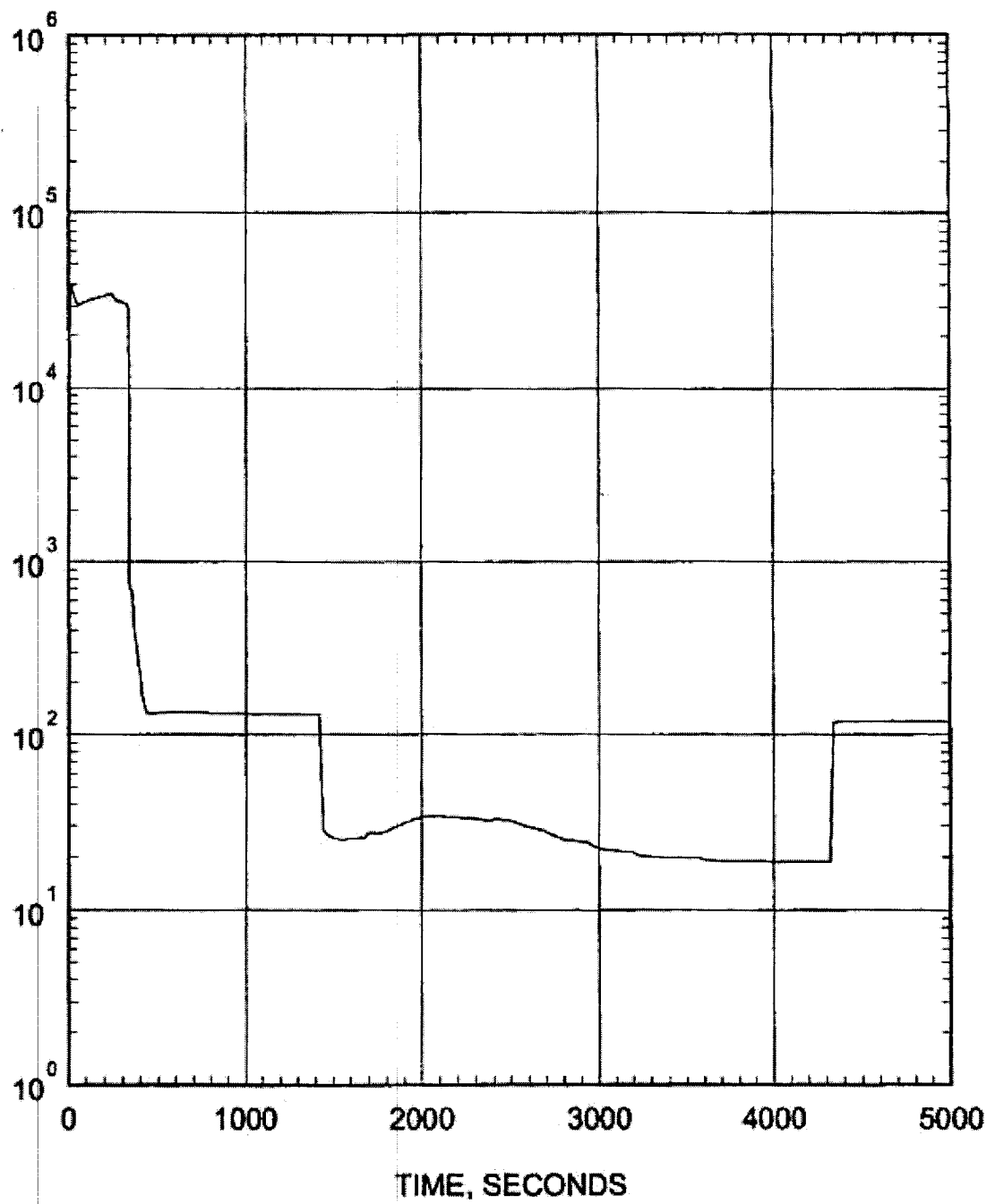
0.03 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
INNER VESSEL TWO-PHASE MIXTURE LEVEL

FIGURE 6.3.3.3-5E

JUNE 2003

REVISION 12

HTC, BTU/HR-FT<sup>2</sup>-DEGF



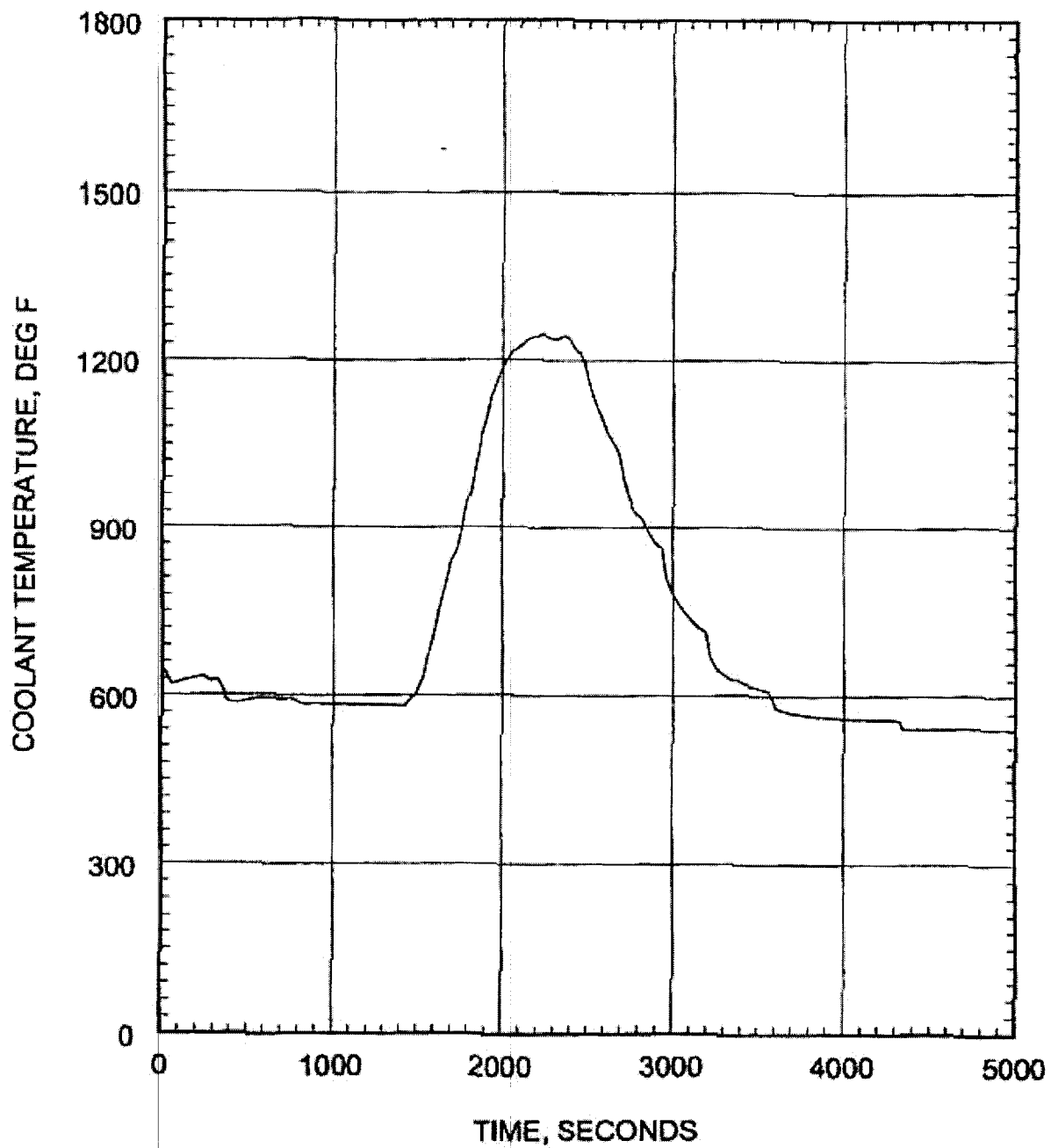
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.03 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
HEAT TRANSFER COEFFICIENT AT HOT SPOT

FIGURE 6.3.3.3-5F

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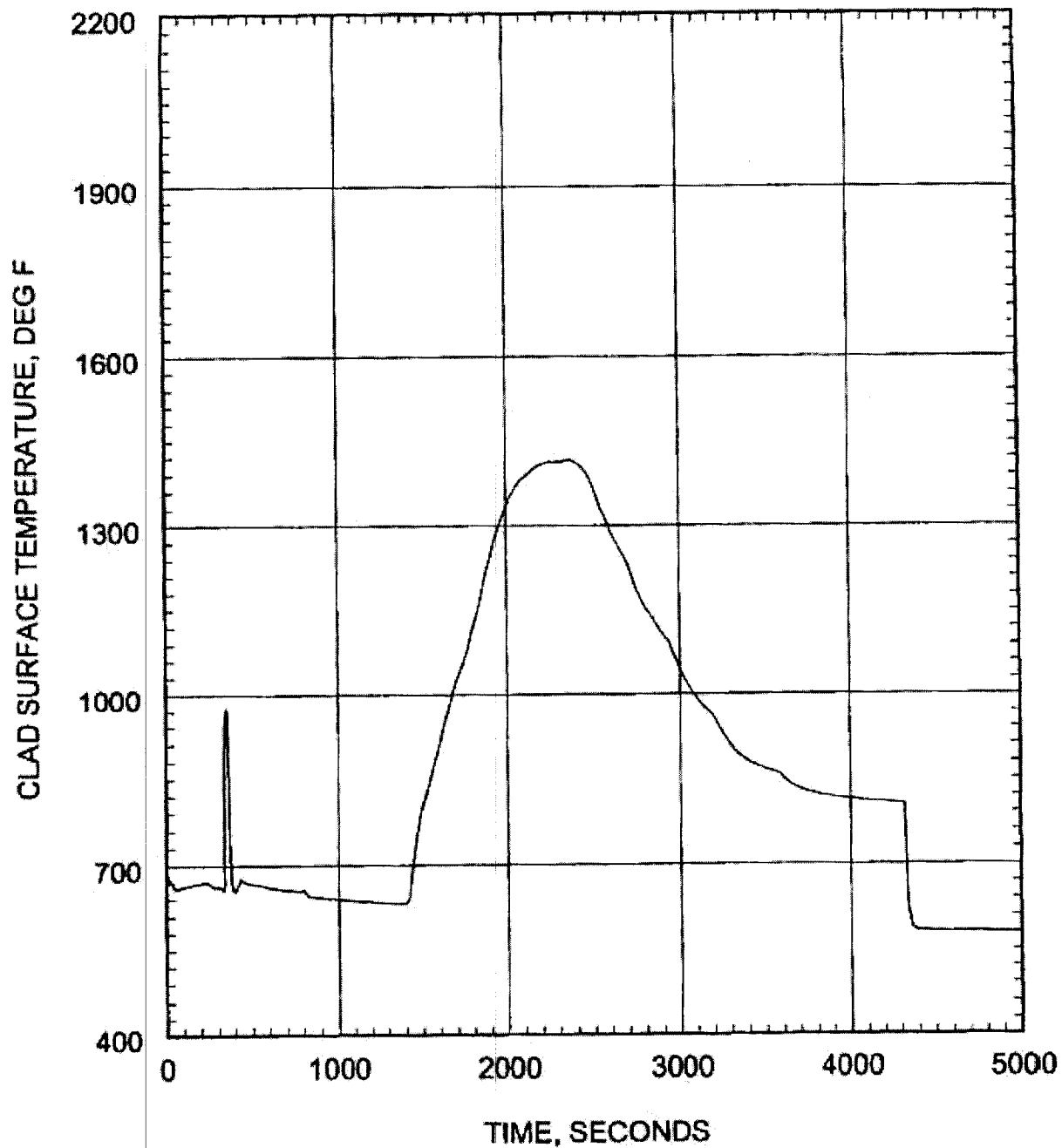
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.03 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
COOLANT TEMPERATURE AT HOT SPOT

FIGURE 6.3.3.3-5G

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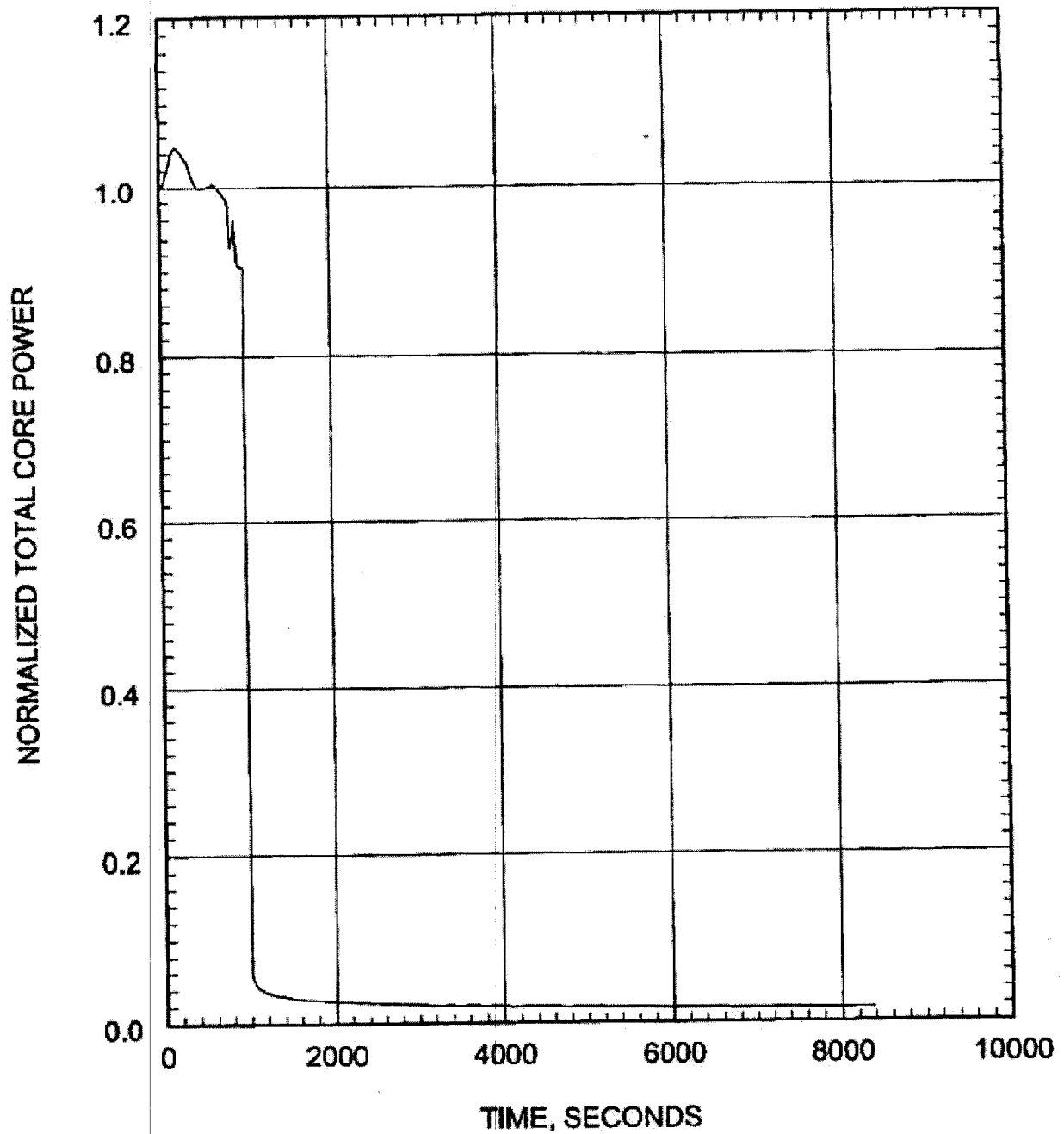
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.03 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
HOT SPOT CLAD SURFACE TEMPERATURE

FIGURE 6.3.3.3-5H

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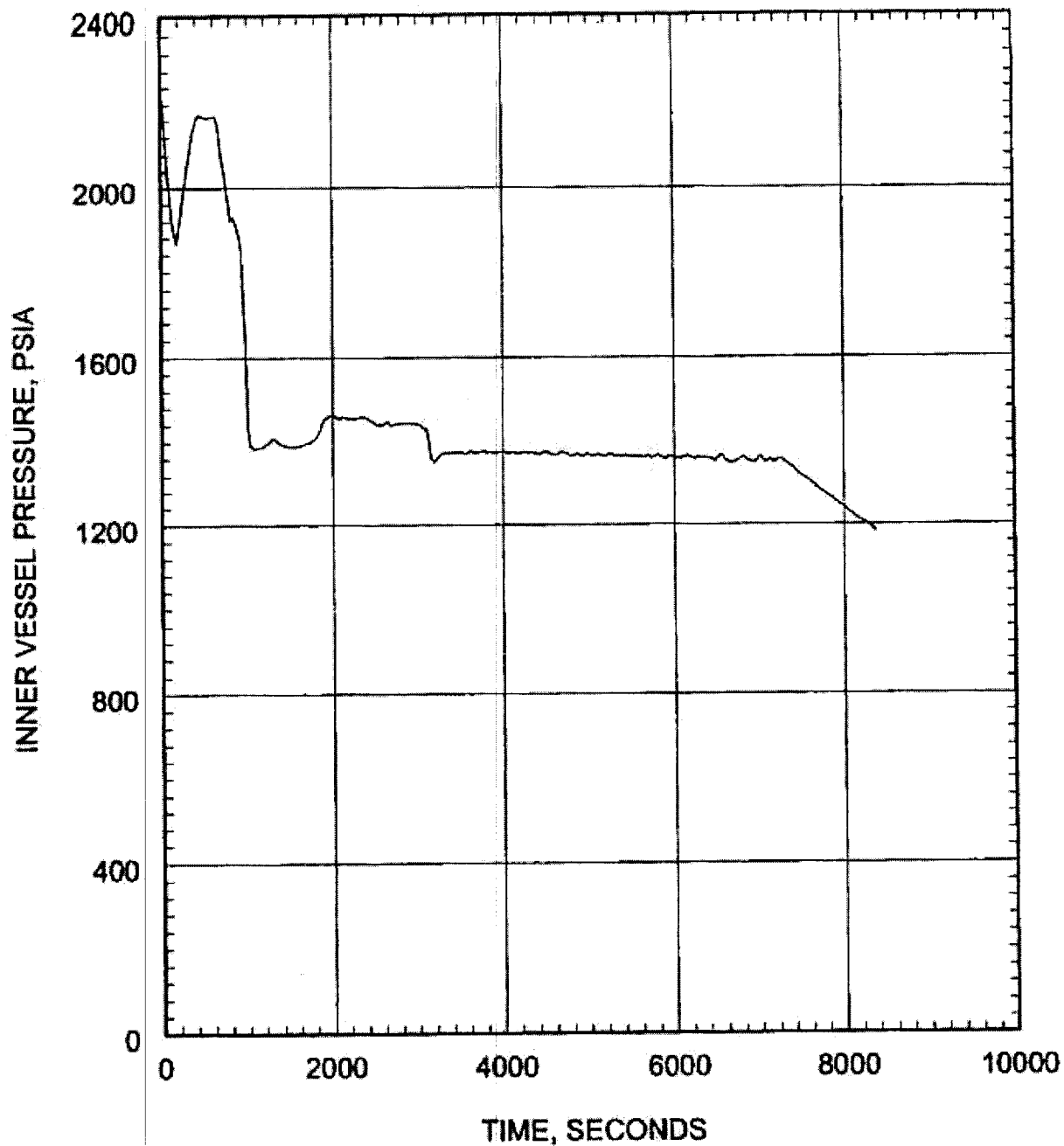
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.01 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.3-6A

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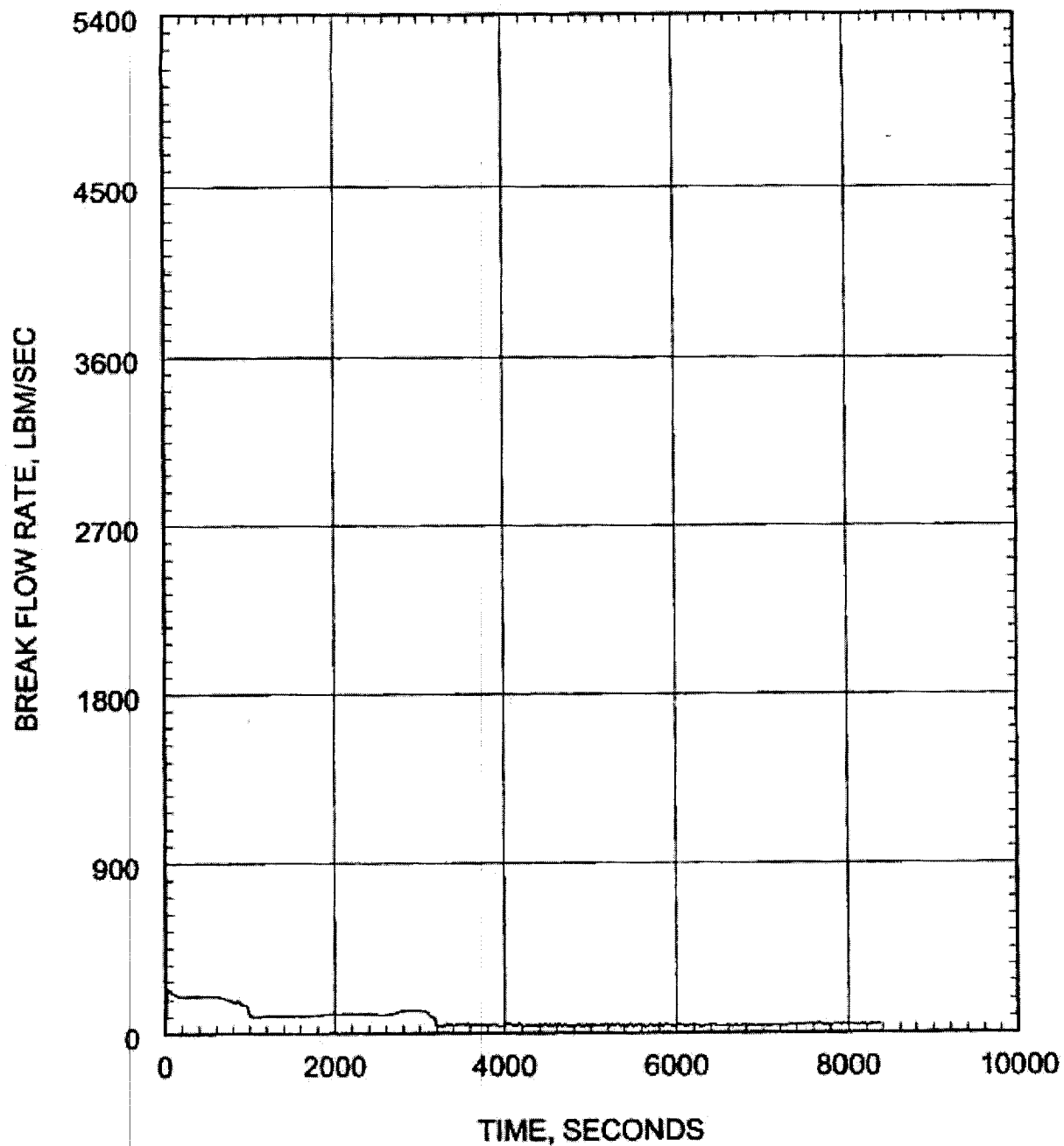
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.01 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
INNER VESSEL PRESSURE

FIGURE 6.3.3.3-6B

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

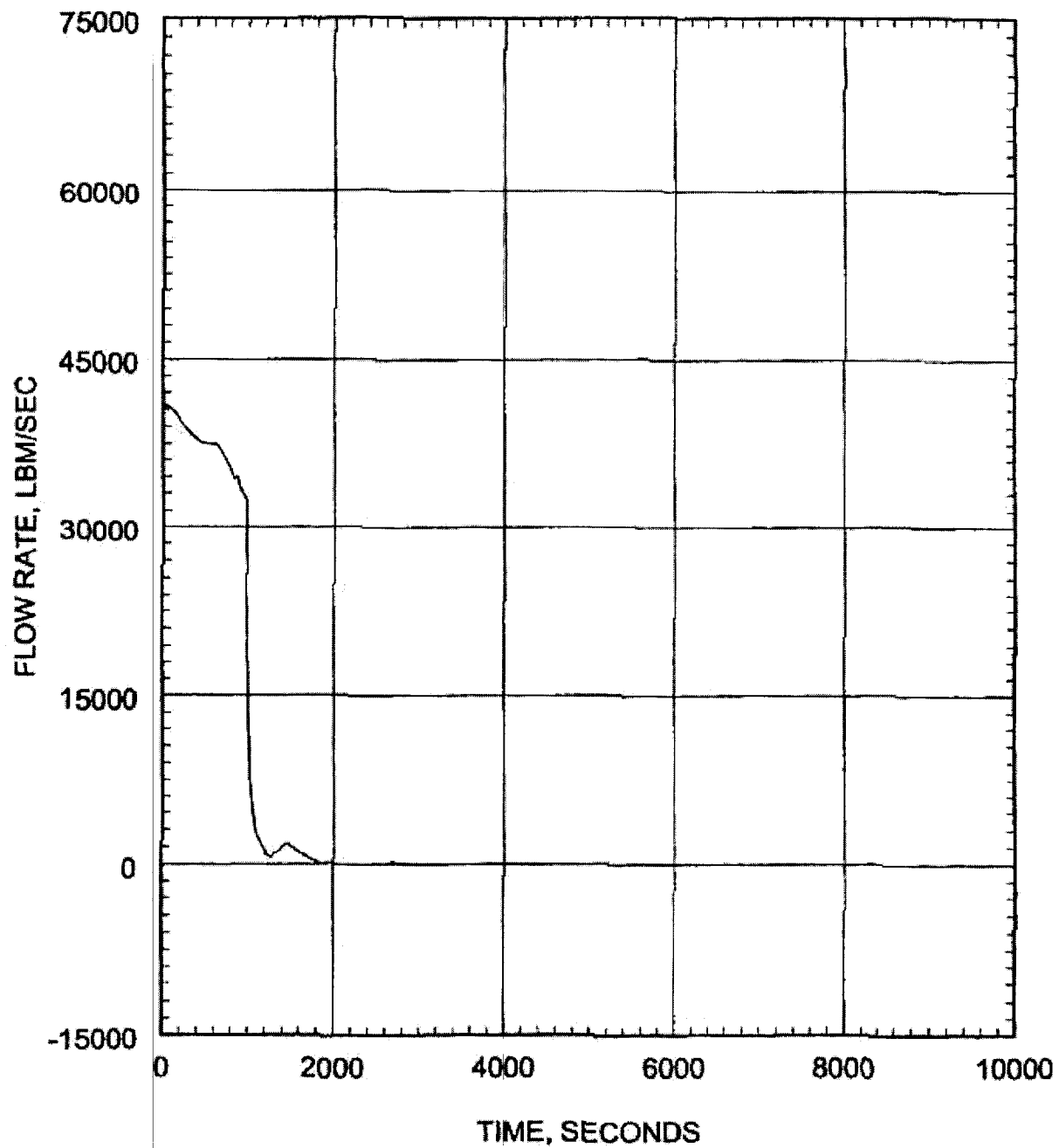
0.01 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
BREAK FLOW RATE

FIGURE 6.3.3.3-6C

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REVISION 12





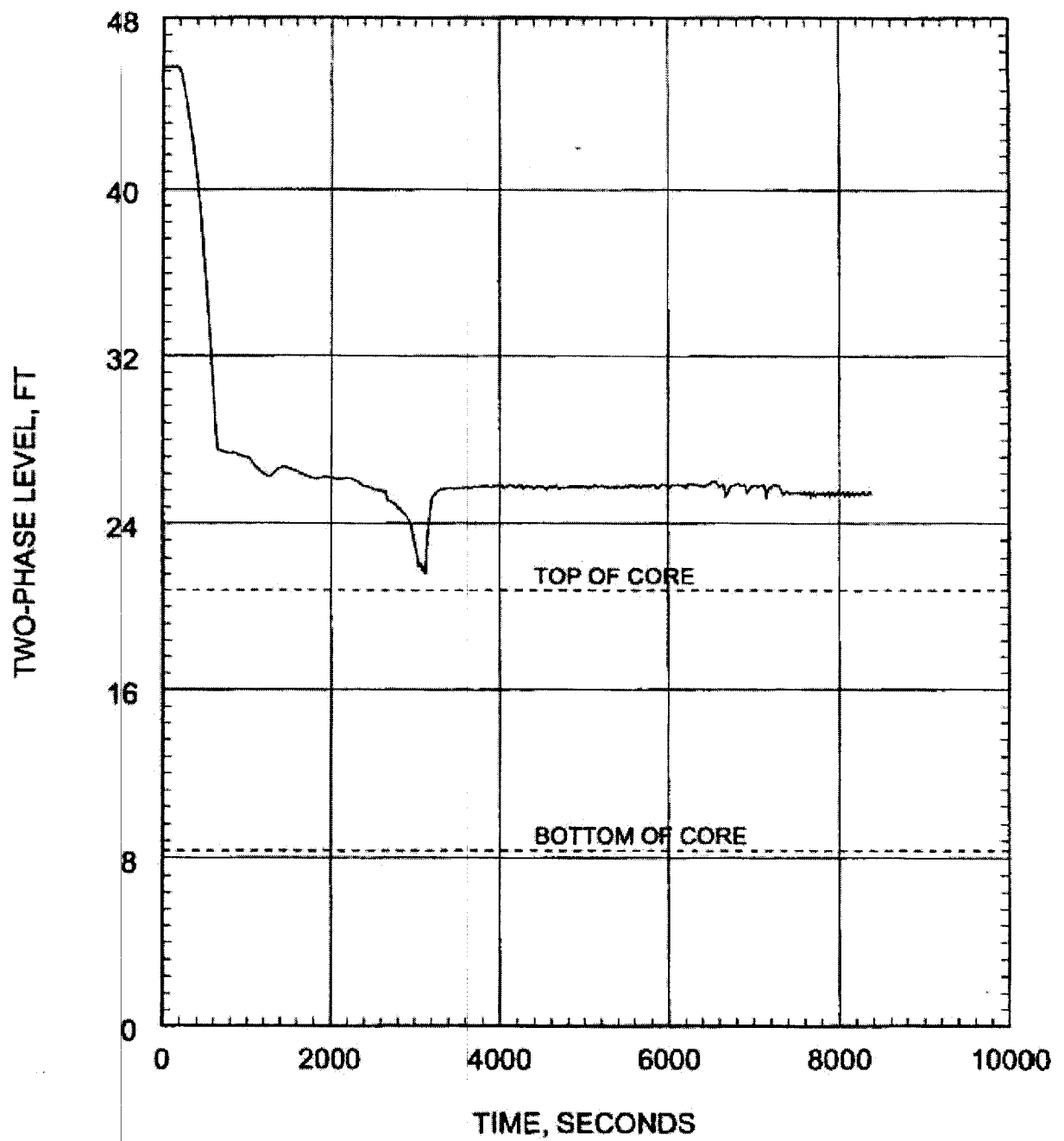
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.01 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
INNER VESSEL INLET FLOW RATE

FIGURE 6.3.3.3-6D

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

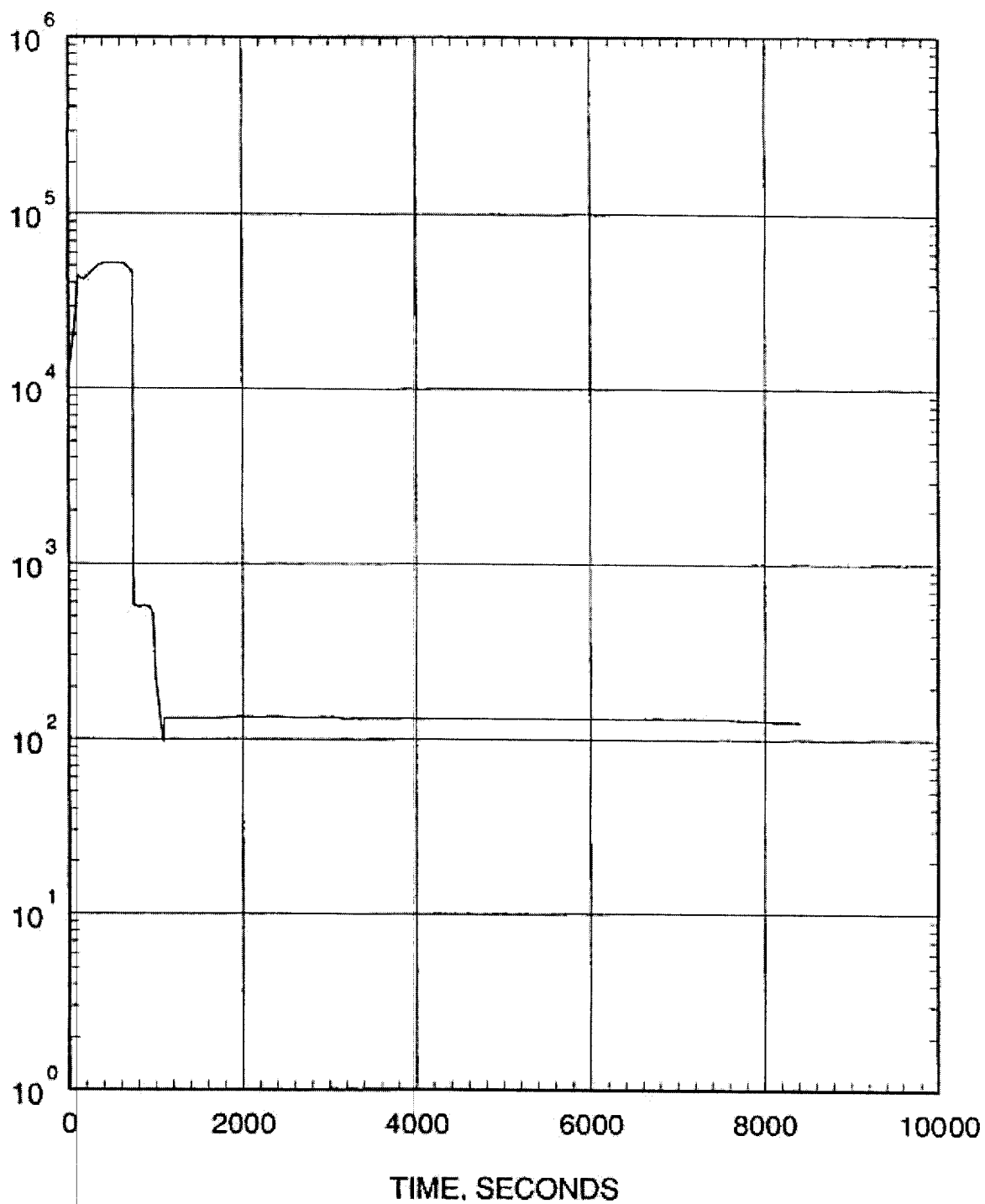
0.01 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
INNER VESSEL TWO-PHASE MIXTURE LEVEL

FIGURE 6.3.3.3-6E

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HTC, BTU/HR-FT<sup>2</sup>-DEGF



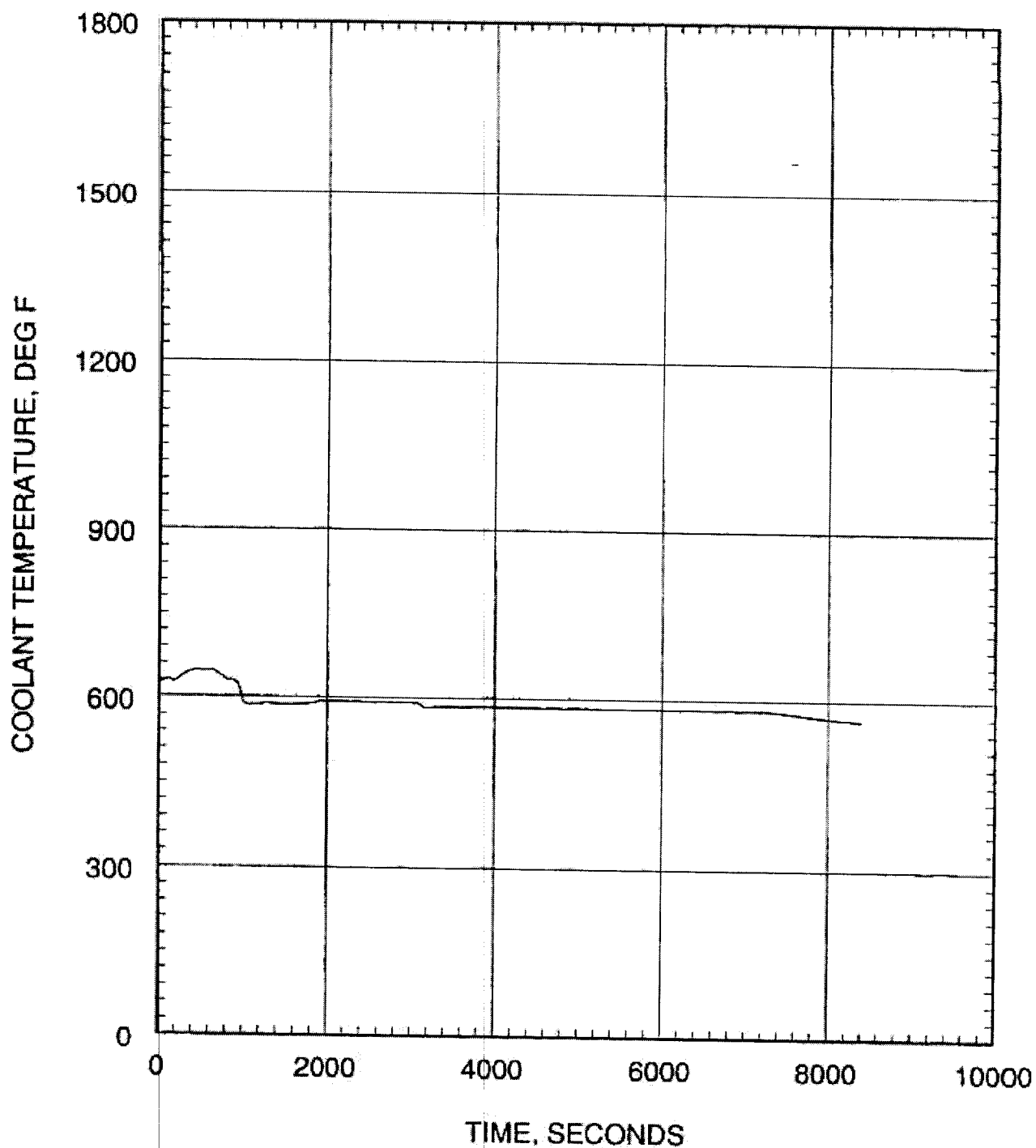
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.01 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
HEAT TRANSFER COEFFICIENT AT HOT SPOT

FIGURE 6.3.3.3-6F

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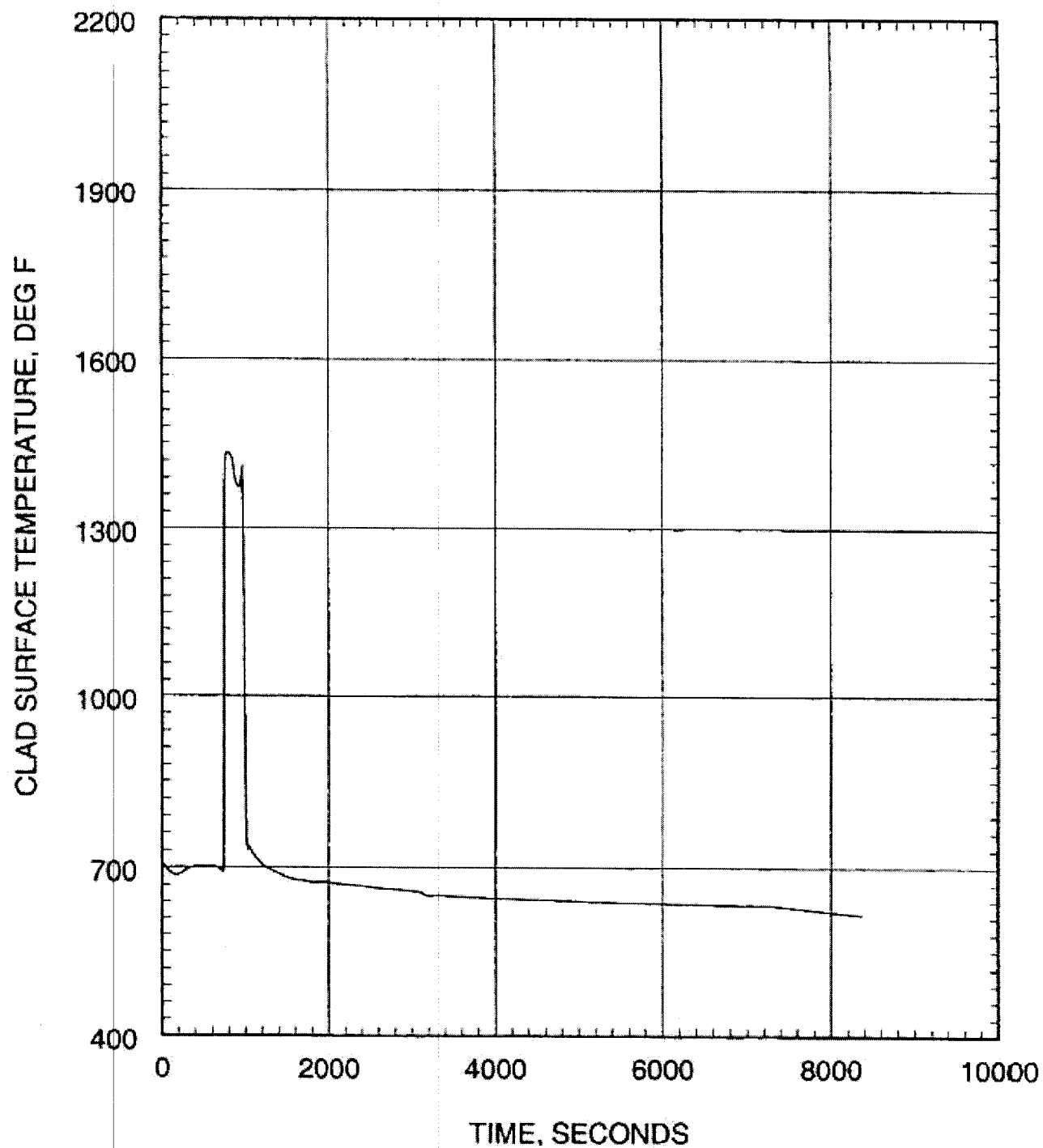
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.01 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
COOLANT TEMPERATURE AT HOT SPOT

FIGURE 6.3.3.3-6G

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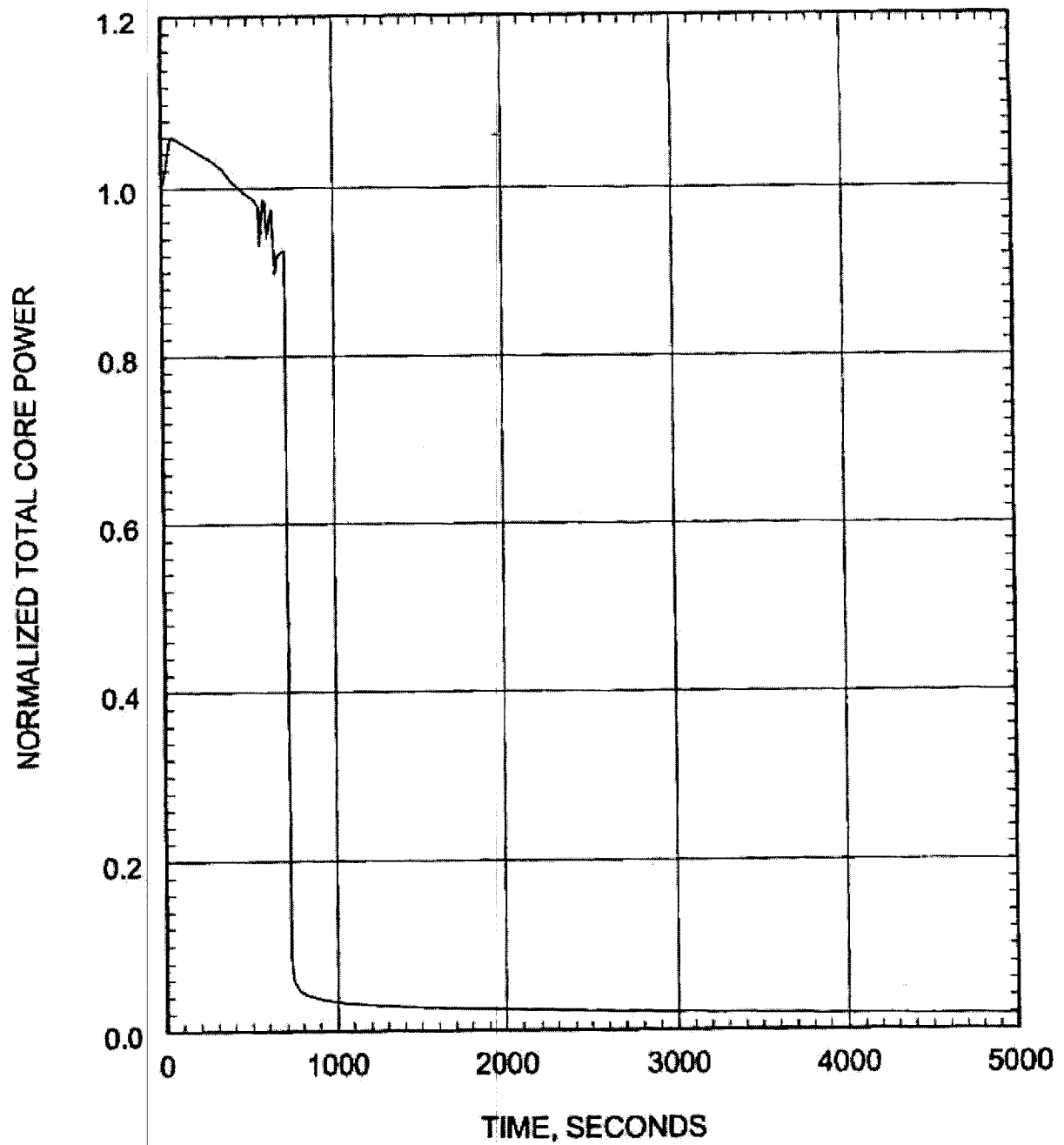
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

0.01 FT<sup>2</sup> BREAK AT TOP OF PRESSURIZER  
HOT SPOT CLAD SURFACE TEMPERATURE

FIGURE 6.3.3.3-6H

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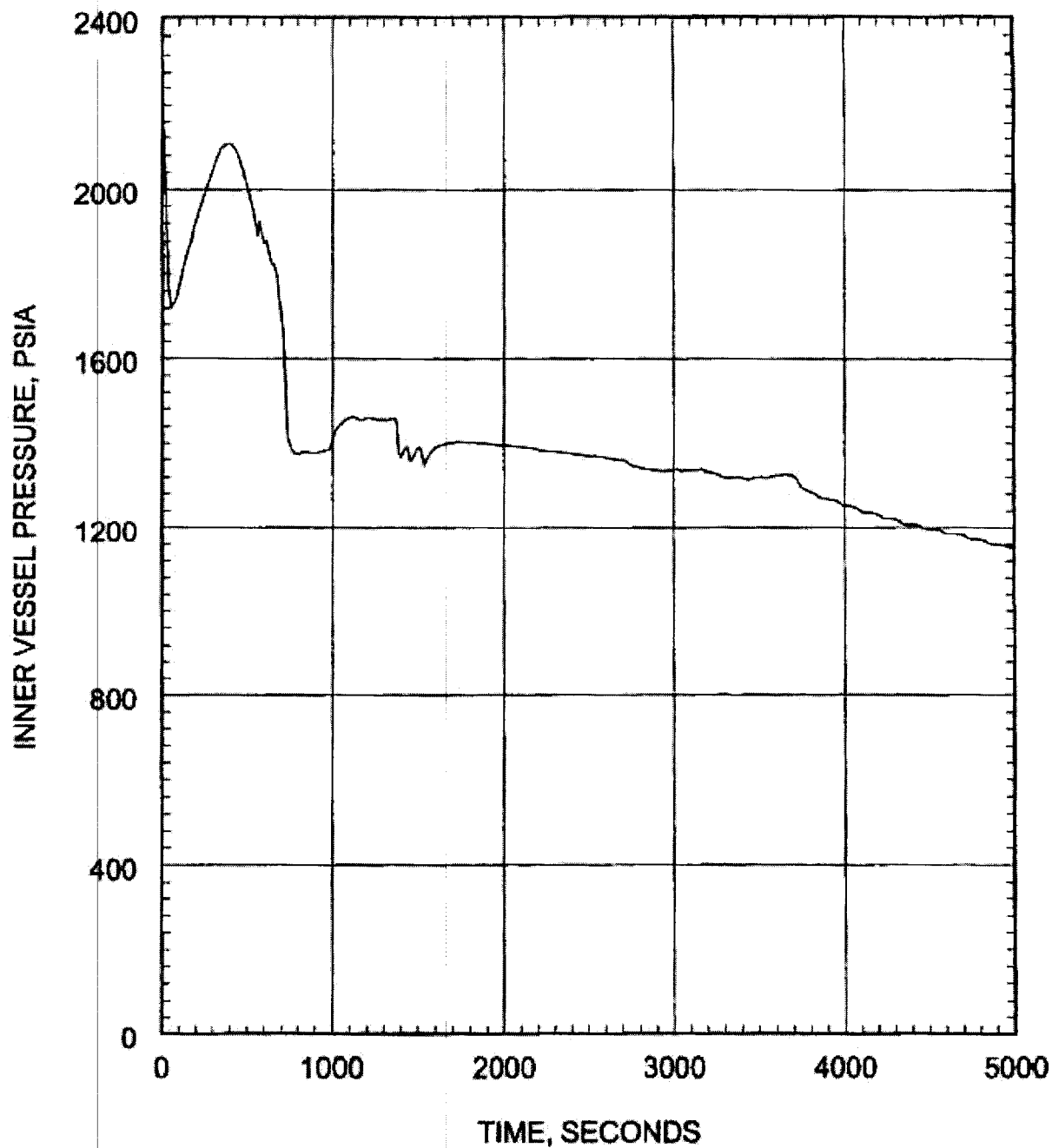
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BREAK AT PRESSURIZER SAFETY VALVE  
NORMALIZED TOTAL CORE POWER

FIGURE 6.3.3.3-7A

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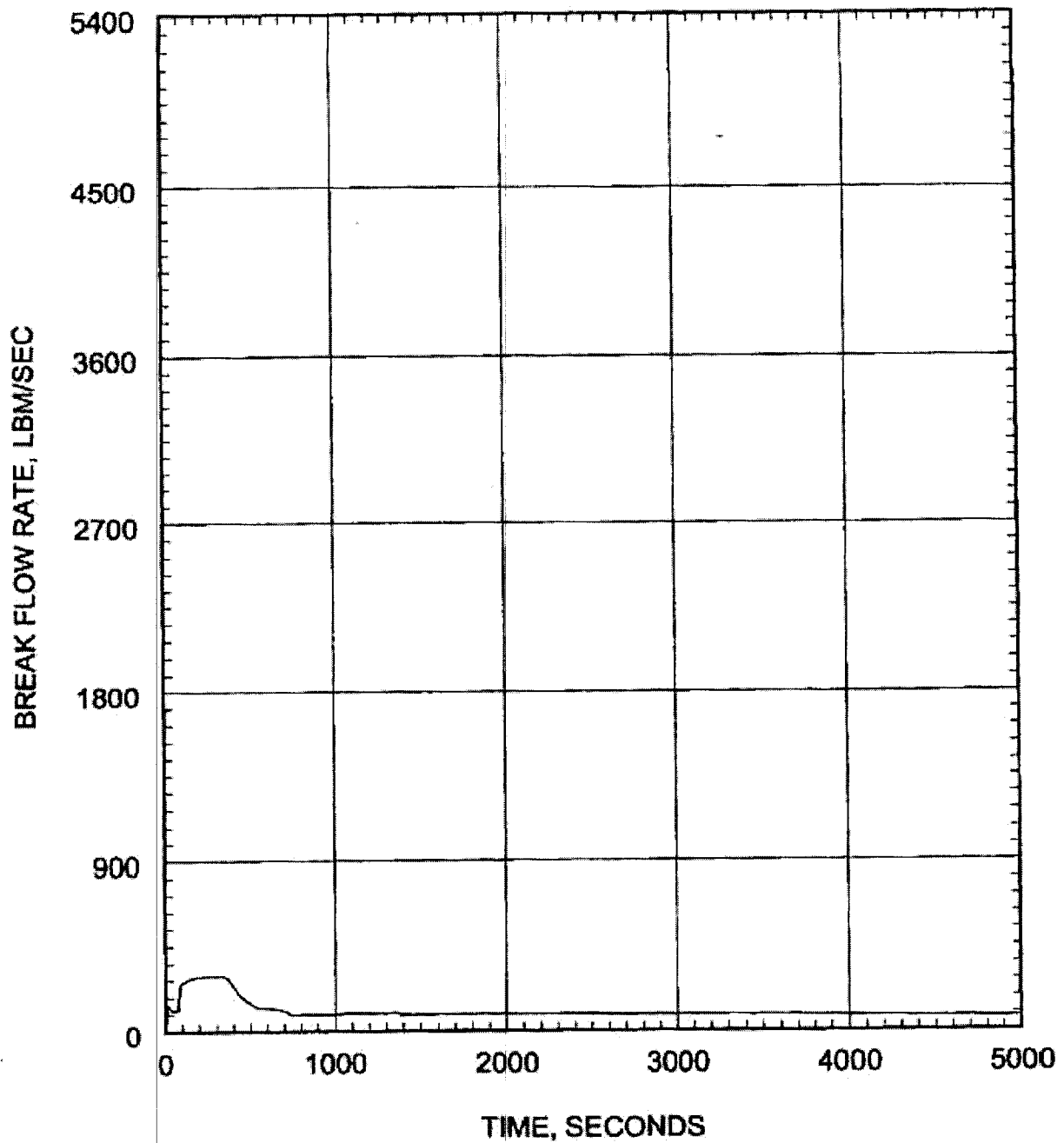
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BREAK AT PRESSURIZER SAFETY VALVE  
INNER VESSEL PRESSURE

FIGURE 6.3.3.3-7B

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

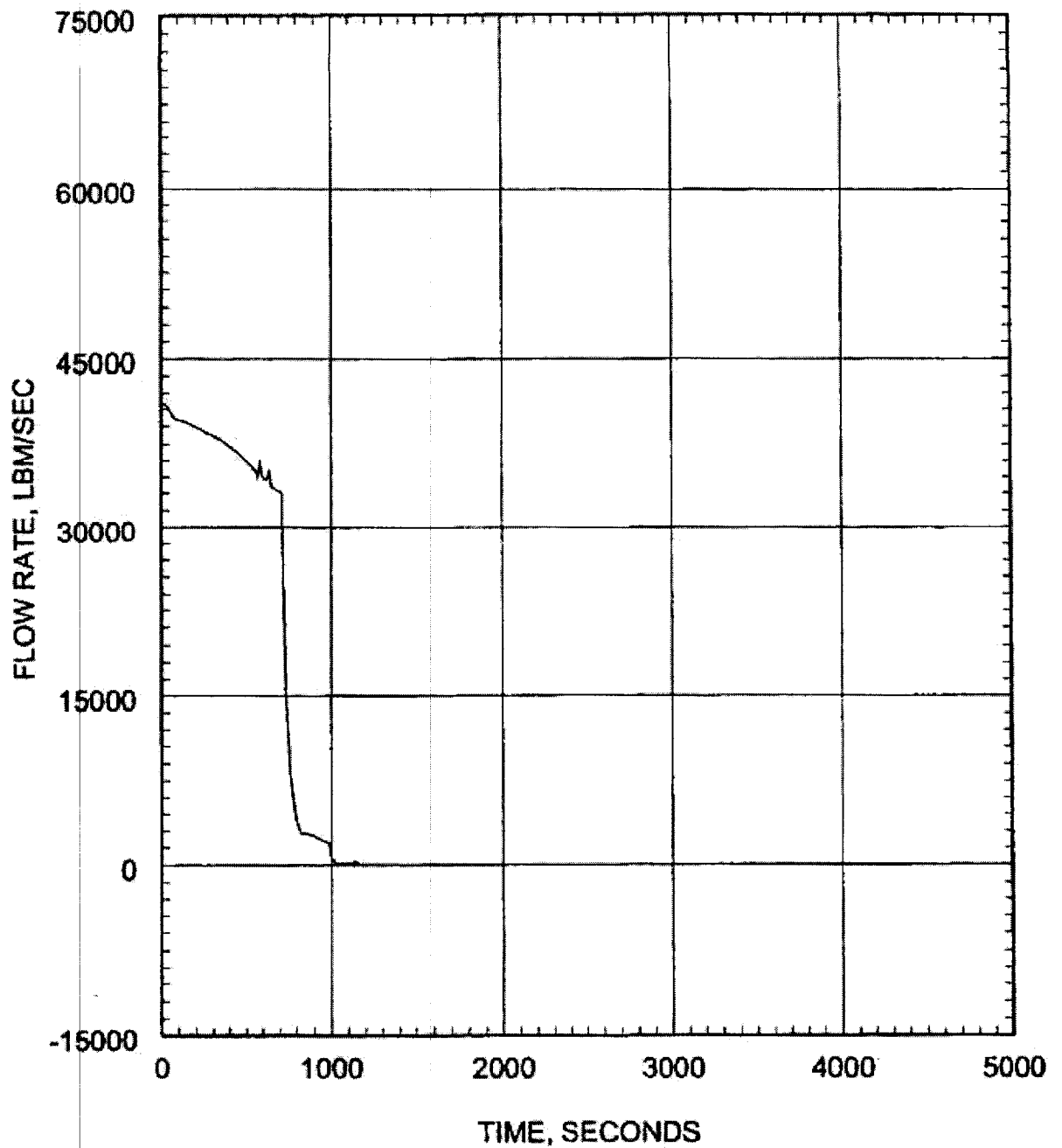
BREAK AT PRESSURIZER SAFETY VALVE  
BREAK FLOW RATE

FIGURE 6.3.3.3-7C

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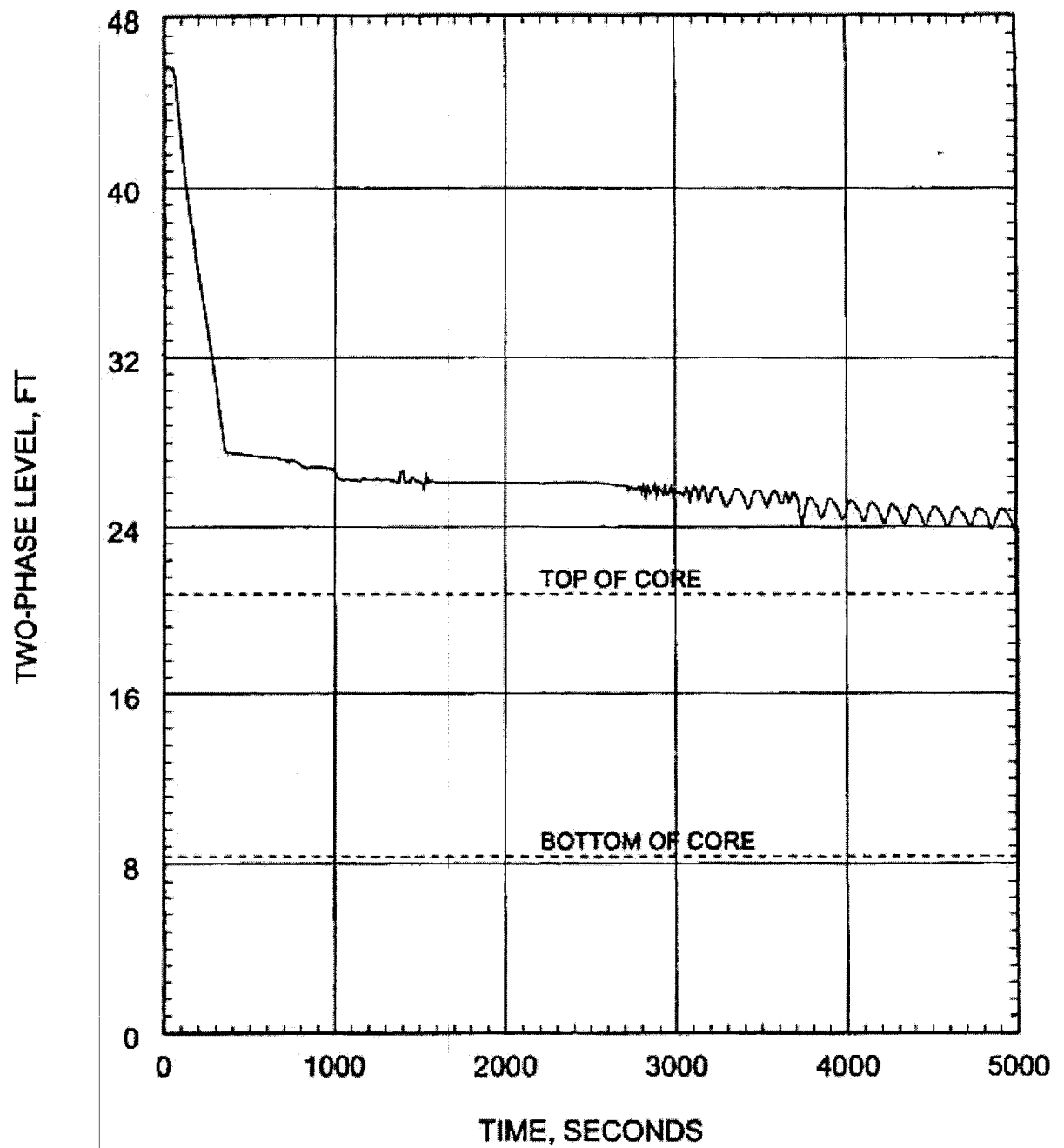
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BREAK AT PRESSURIZER SAFETY VALVE  
INNER VESSEL INLET FLOW RATE

FIGURE 6.3.3.3-7D

JUNE 2003

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

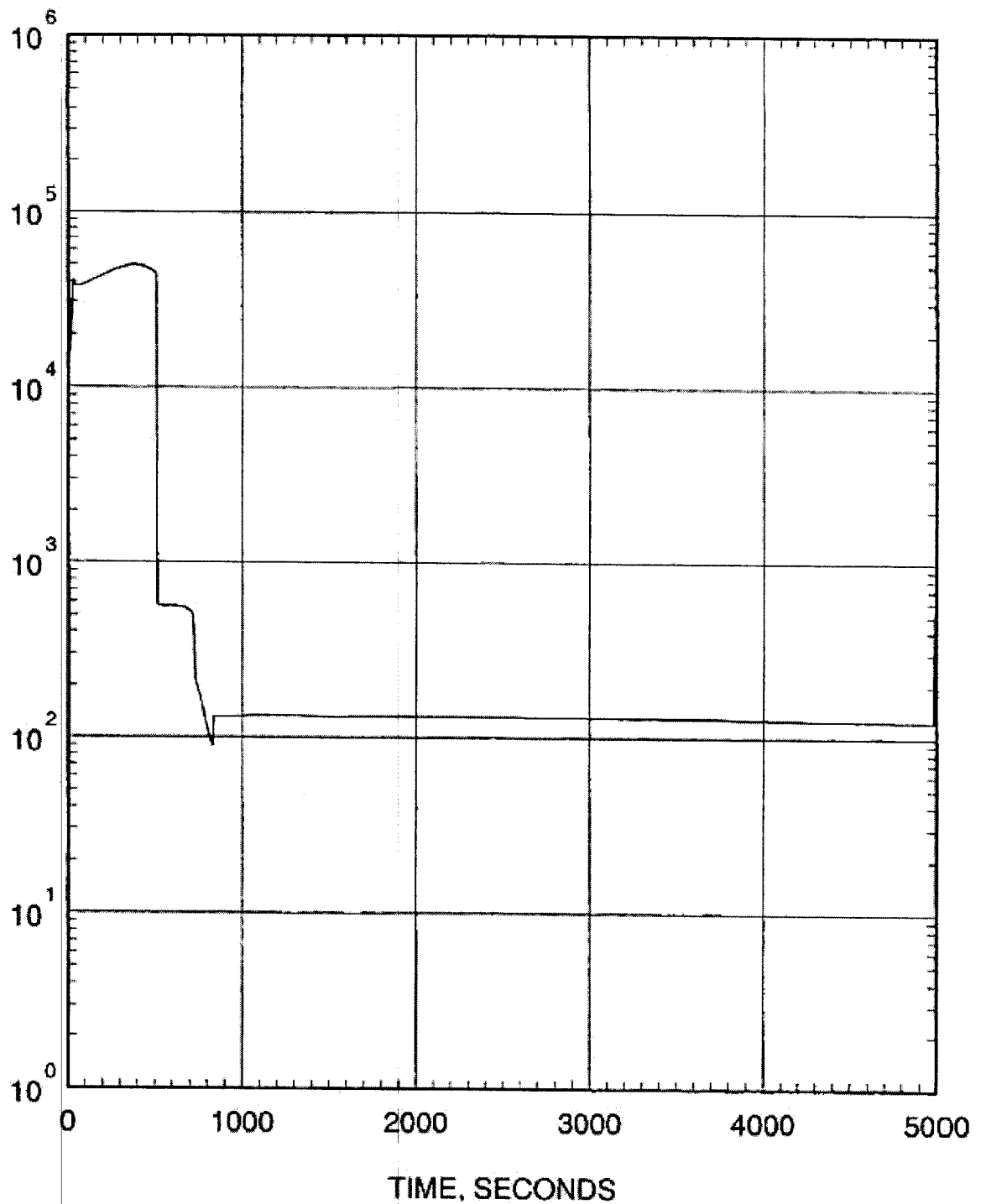
BREAK AT PRESSURIZER SAFETY VALVE  
INNER VESSEL TWO-PHASE MIXTURE LEVEL

FIGURE 6.3.3.3-7E

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HTC, BTU/HR-FT<sup>2</sup>-DEGF



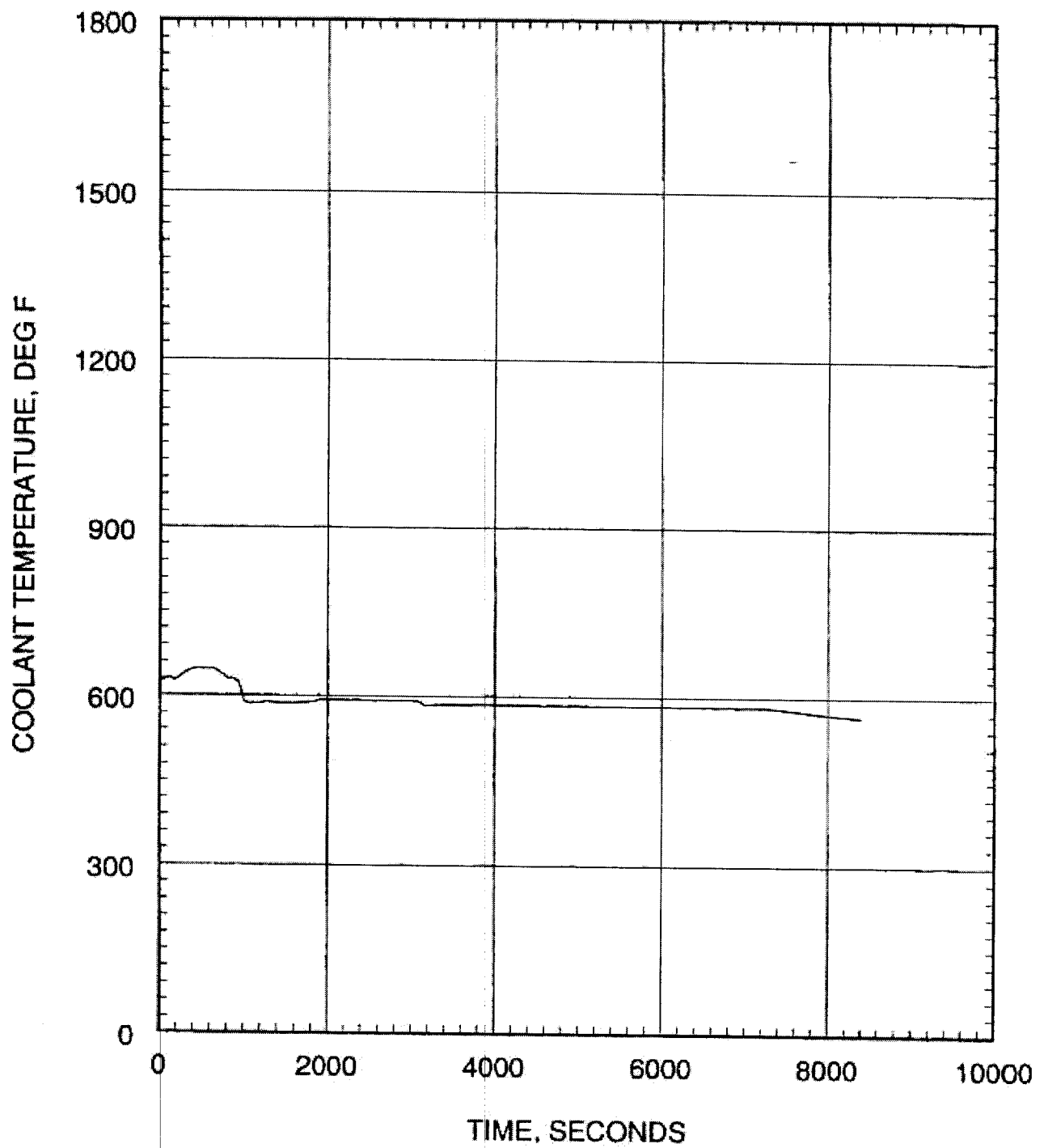
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BREAK AT PRESSURIZER SAFETY VALVE  
HEAT TRANSFER COEFFICIENT AT HOT SPOT

FIGURE 6.3.3.3-7F

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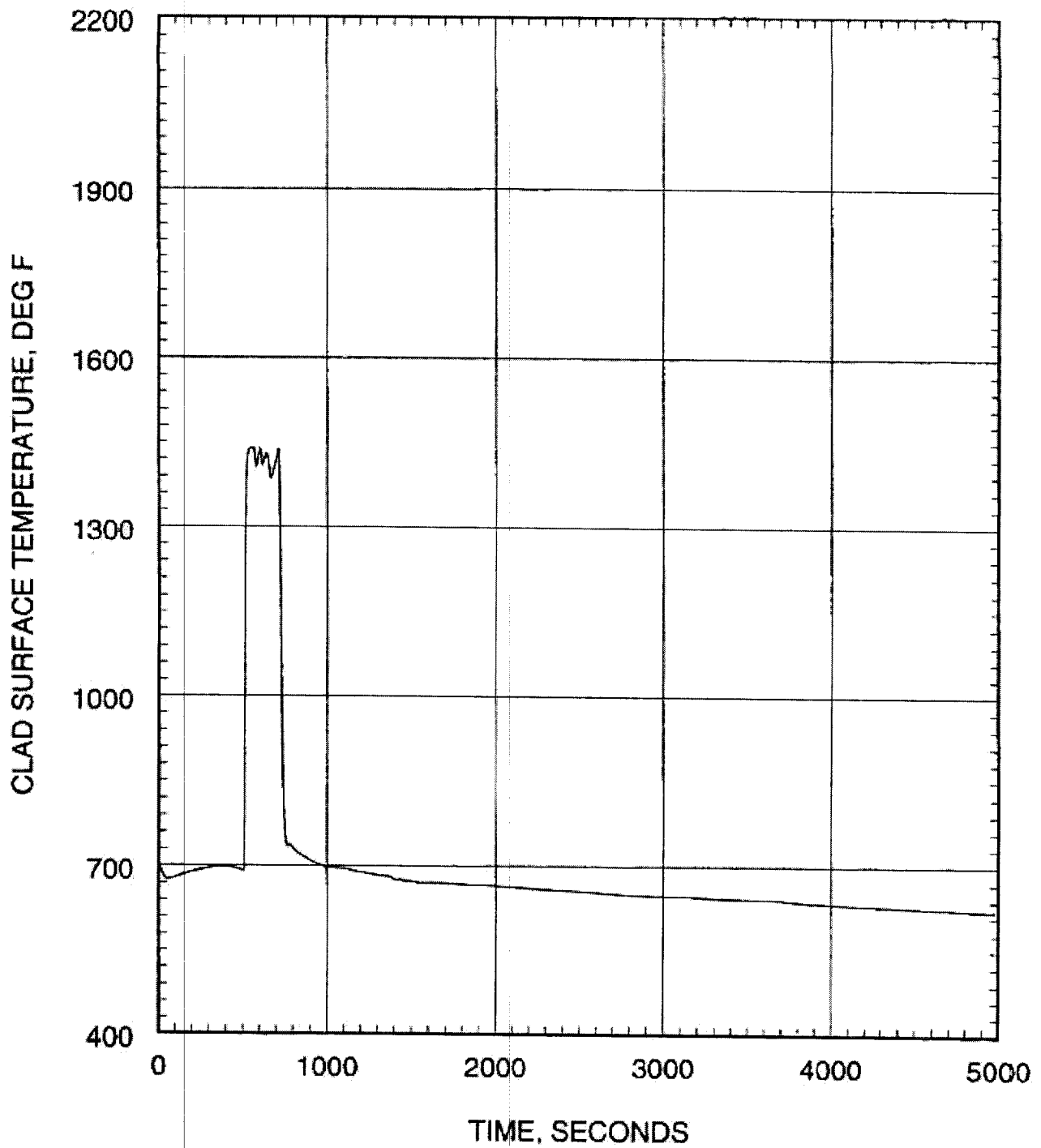
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BREAK AT PRESSURIZER SAFETY VALVE  
COOLANT TEMPERATURE AT HOT SPOT

FIGURE 6.3.3.3-7G

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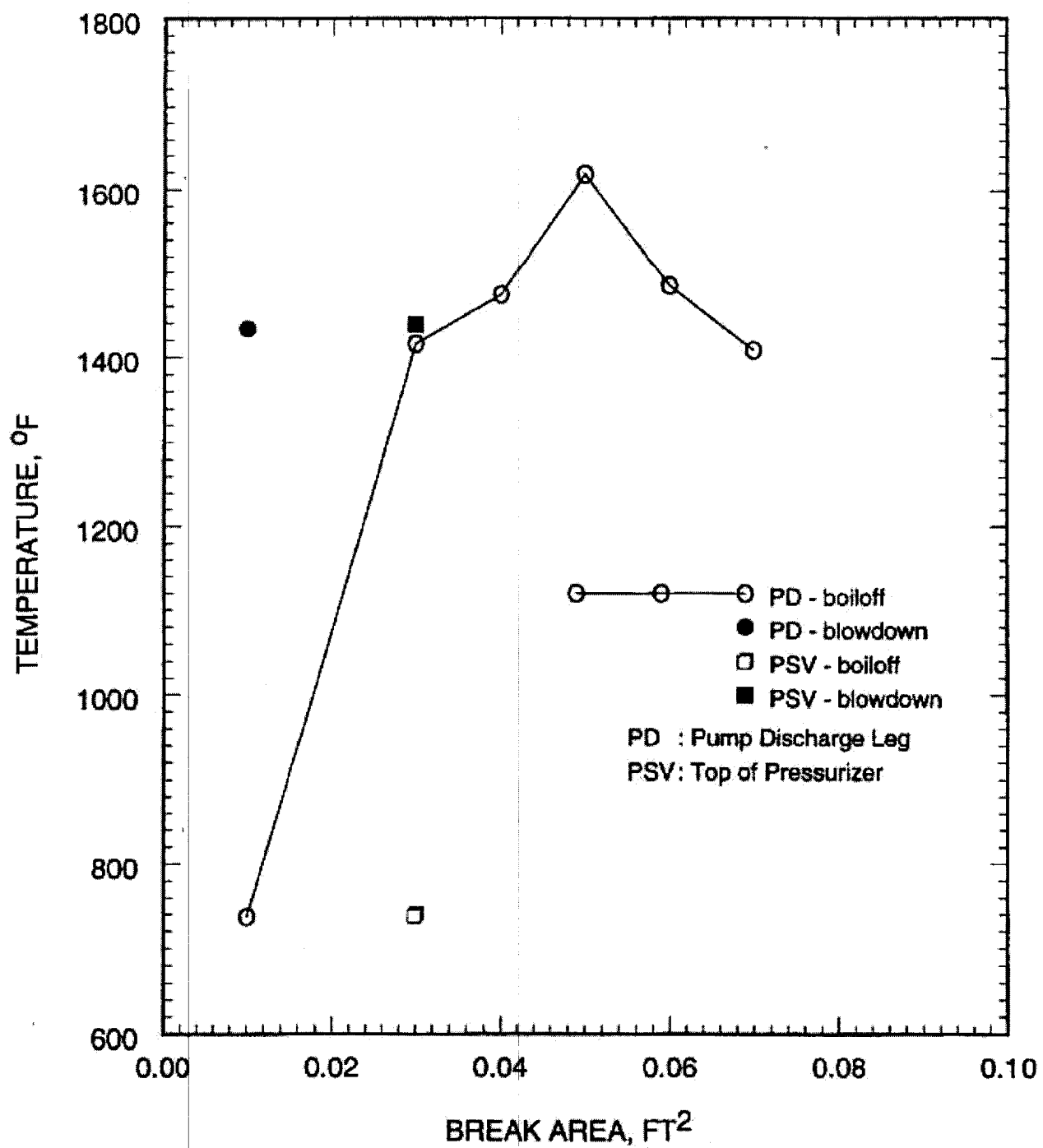
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BREAK AT PRESSURIZER SAFETY VALVE  
HOT SPOT CLAD SURFACE TEMPERATURE

FIGURE 6.3.3.3-7H

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

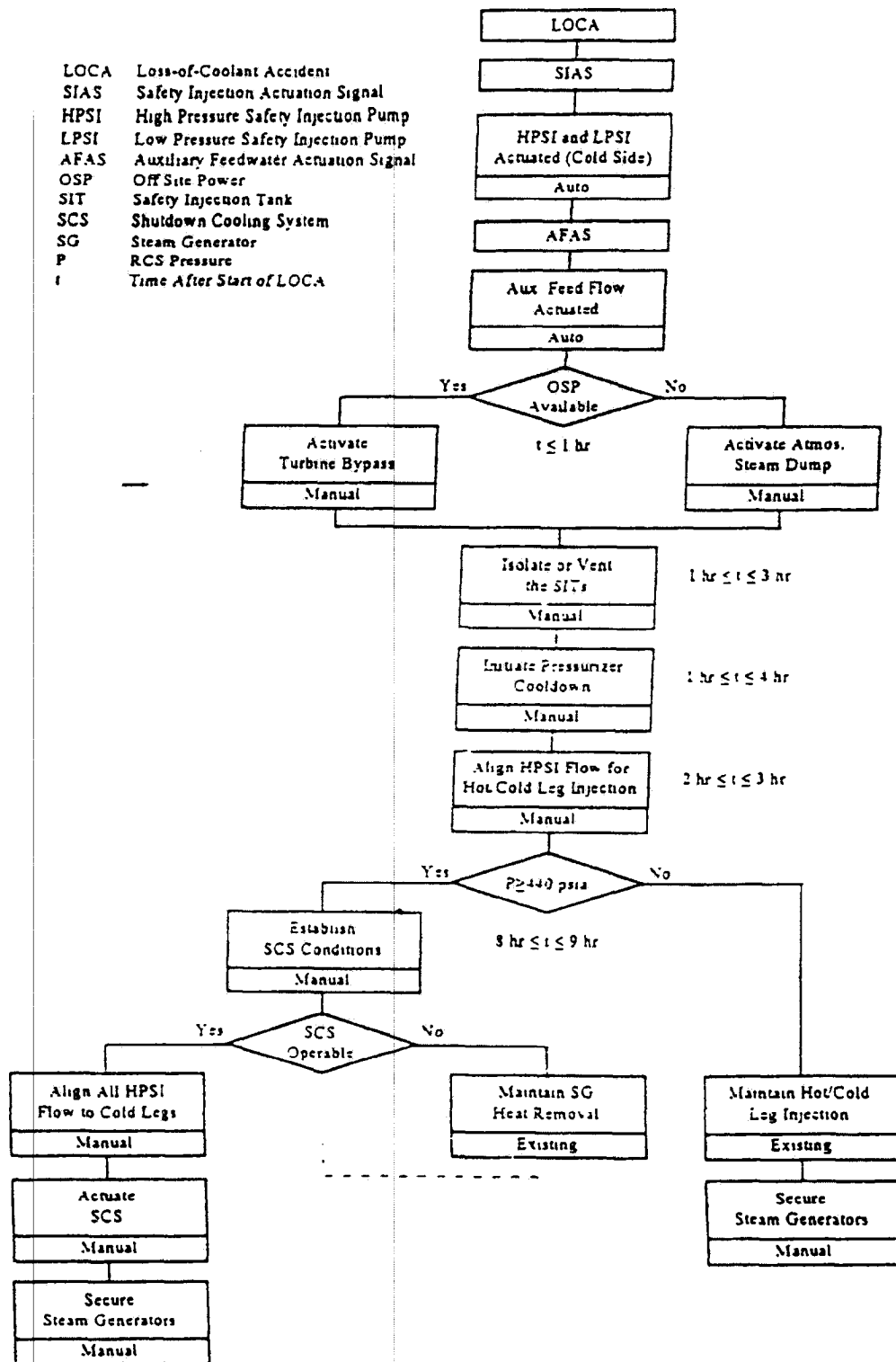
MAXIMUM HOT SPOT CLAD TEMPERATURE  
VERSUS BREAK SIZE

FIGURE 6.3.3.3-8

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LOCA Loss-of-Coolant Accident  
 SIAS Safety Injection Actuation Signal  
 HPSI High Pressure Safety Injection Pump  
 LPSI Low Pressure Safety Injection Pump  
 AFAS Auxiliary Feedwater Actuation Signal  
 OSP Off Site Power  
 SIT Safety Injection Tank  
 SCS Shutdown Cooling System  
 SG Steam Generator  
 P RCS Pressure  
 t Time After Start of LOCA



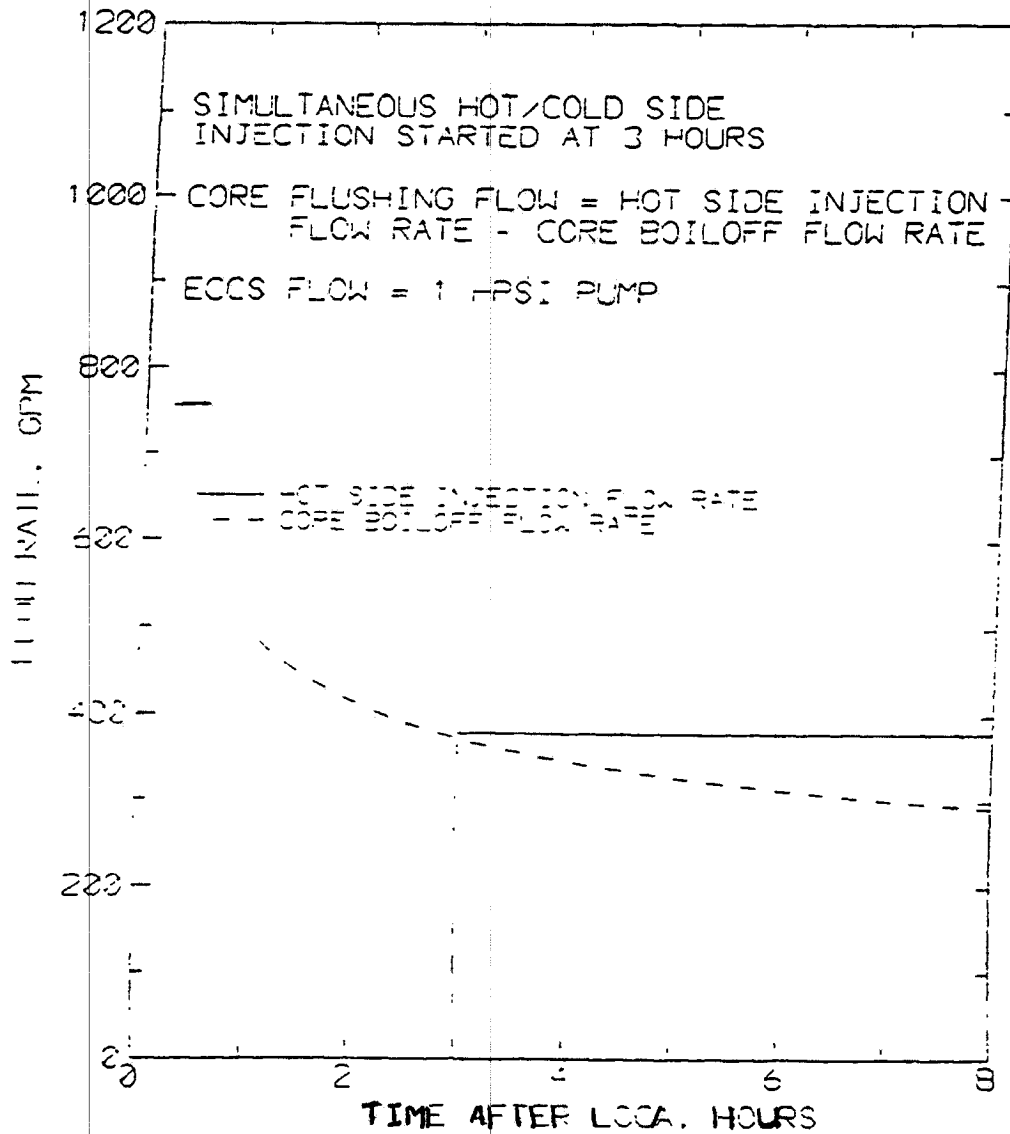
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

LONG TERM COOLING PLAN

FIGURE 6.3.3.4-1

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

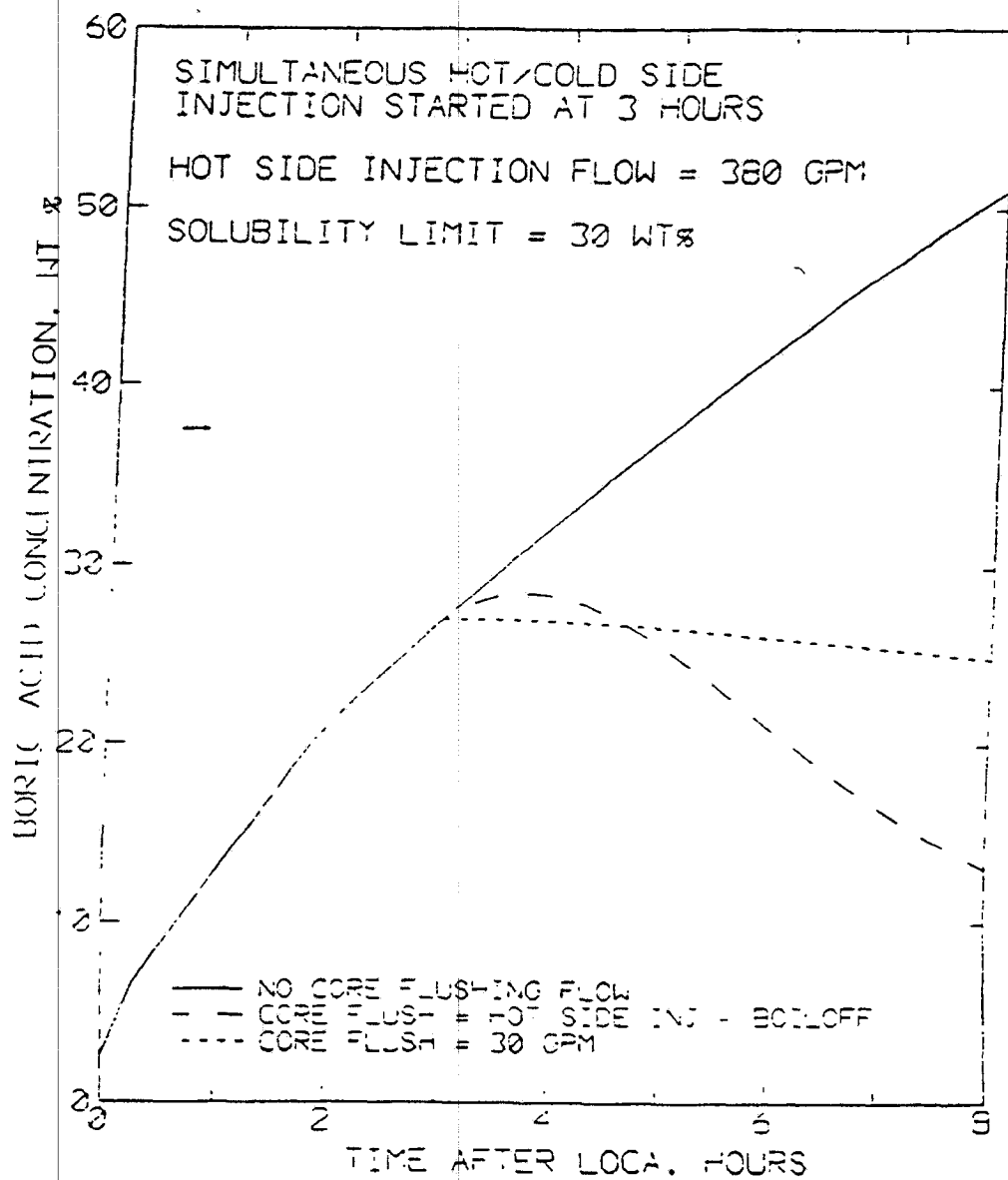
CORE FLUSH BY HOT SIDE INJECTION FOR  
9.8 FT<sup>2</sup> COLD LEG BREAK

FIGURE 6.3.3.4-2

JUNE 2001

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

INNER VESSEL BORIC ACID CONCENTRATION  
VS TIME

FIGURE 6.3.3.4-3

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	Break Area, ft <sup>2</sup>	RCS Pressure at 8 Hours, psia
Simultaneous hot and cold side injection can cool the core and flush boric acid from the reactor vessel for these breaks	10	17
	•	•
	•	•
	•	•
	•	•
	0.050	81
	0.045	81
	0.040	81
	0.035	81
RCS refill can disperse boric acid and the SGs can cool the RCS to SCS entry conditions for these breaks	0.030	107
	0.025	127
	0.020	155
	0.015	204
	0.010	346
	0.007	533
	0.006	639
	0.005	776
	0.004	950
	0.003	1159
	0.002	1392
	0.001	1594
	0.0005	1653

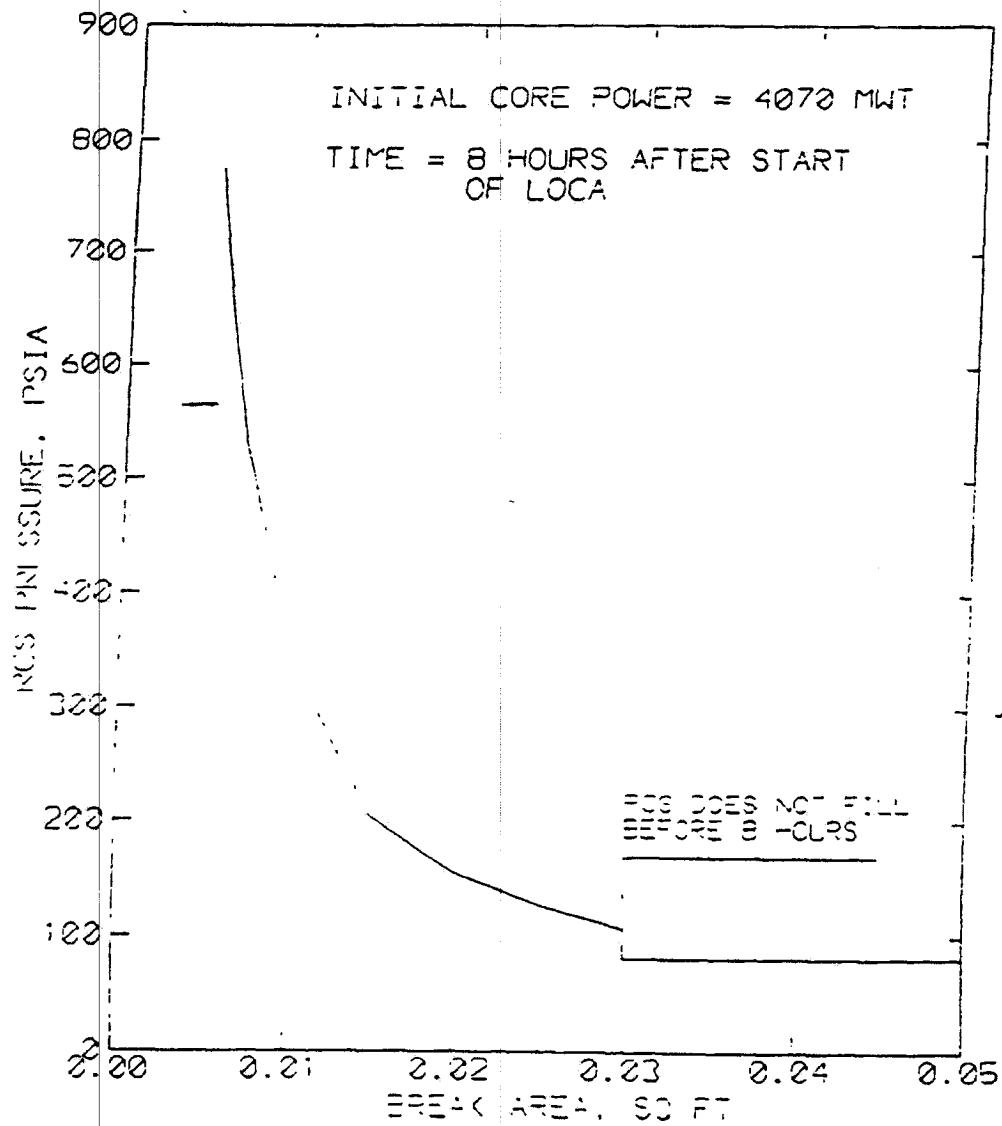
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

OVERLAP OF ACCEPTABLE LTC MODES IN  
TERMS OF COLD LEG BREAK SIZE

FIGURE 6.3.3.4-5

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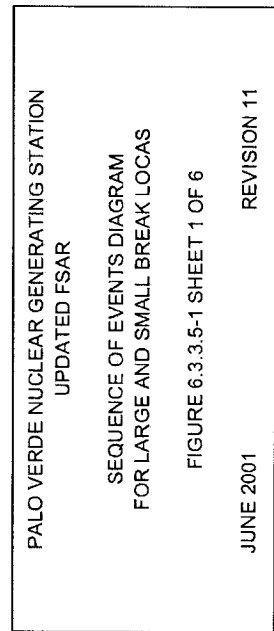
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

RCS PRESSURE AFTER REFILL VS BREAK AREA

FIGURE 6.3.3.4-6

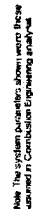
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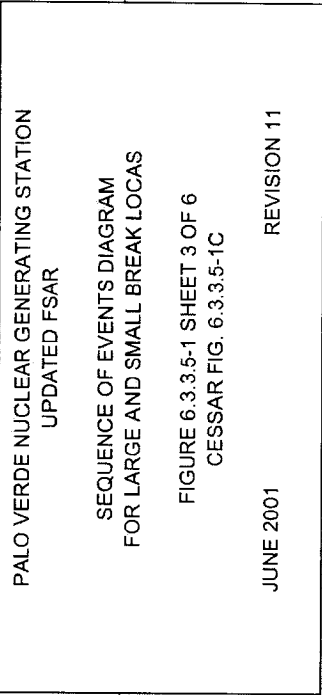


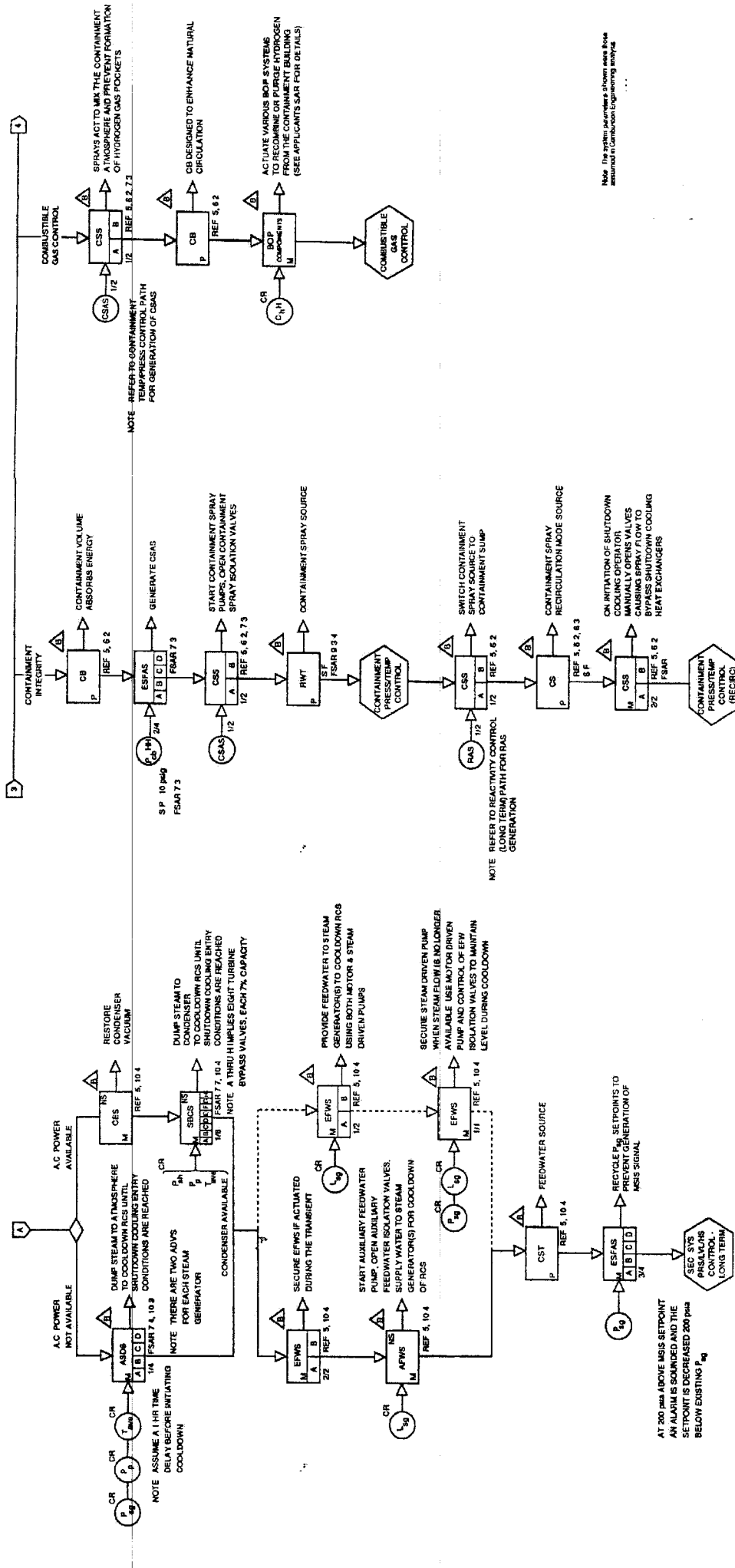
### SEQUENCE OF EVENTS DIAGRAM FOR LARGE AND SMALL BREAK LOCAS

FIGURE 6.3.3.5-1 SHEET 2 OF 6  
CESSAR FIG. 6.3.3.5-1B

JUNE 2001

REVISION 11





# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

## SEQUENCE OF EVENTS DIAGRAM FOR LARGE AND SMALL BREAK LOCAS

FIGURE 6.3.3.5-1 SHEET 4 OF 6  
CESSAR FIG. 6.3.3.5-1D

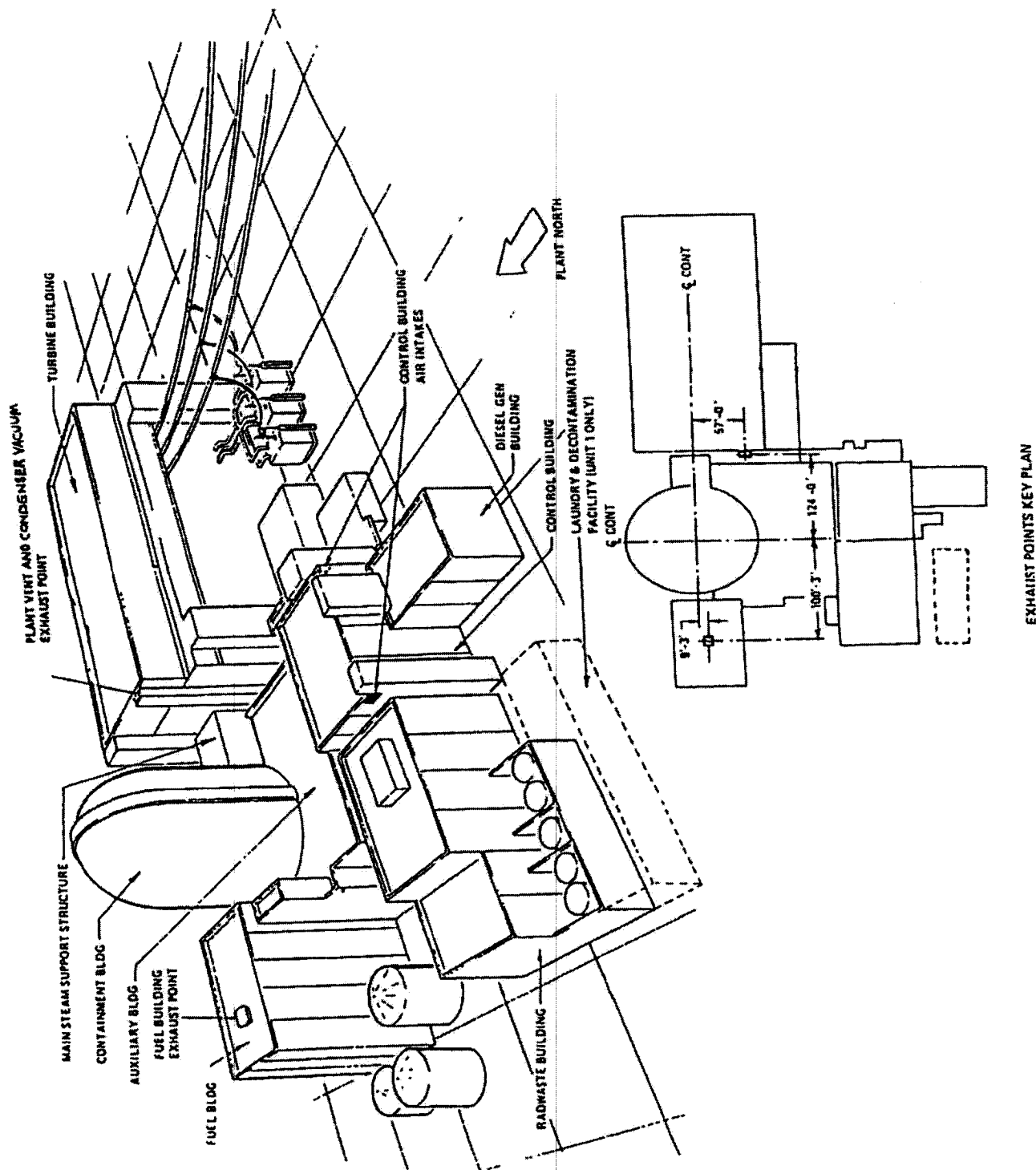
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JUNE 2001  
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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PLANT LAYOUT  
AIR INTAKE AND POTENTIAL RELEASE POINTS

FIGURE 6.4-1

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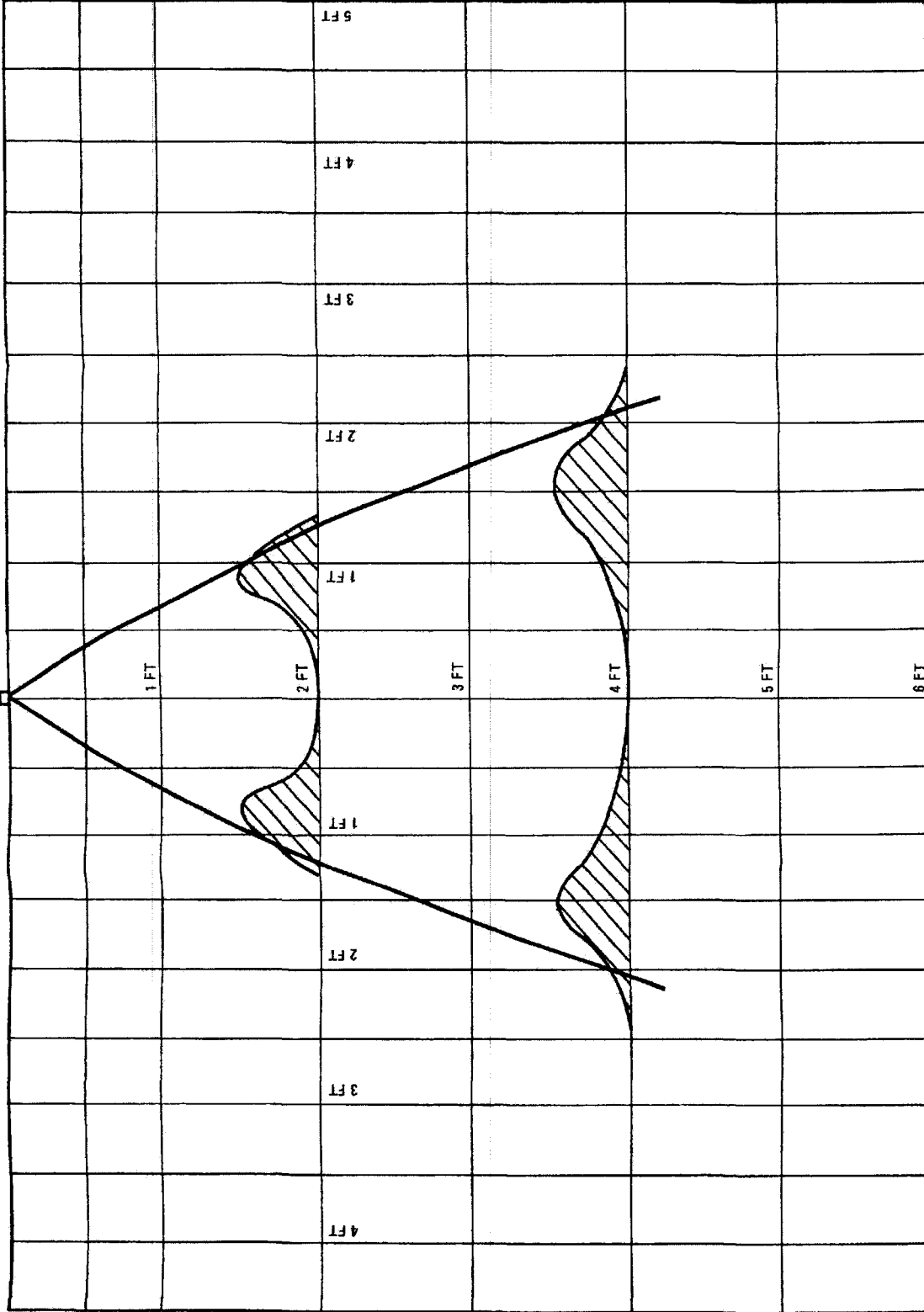
This Figure has been redacted.

This Figure has been redacted.



This Figure has been redacted.

PRESSURE 40 LBS/SQ. IN.  
CAPACITY 3.0 GAL/MIN  
TIME SECONDS



EFFECTIVE DIAMETER	EFFECTIVE ANGLE
2 FT 5 IN.	62°
4 FT 1 IN.	54°

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

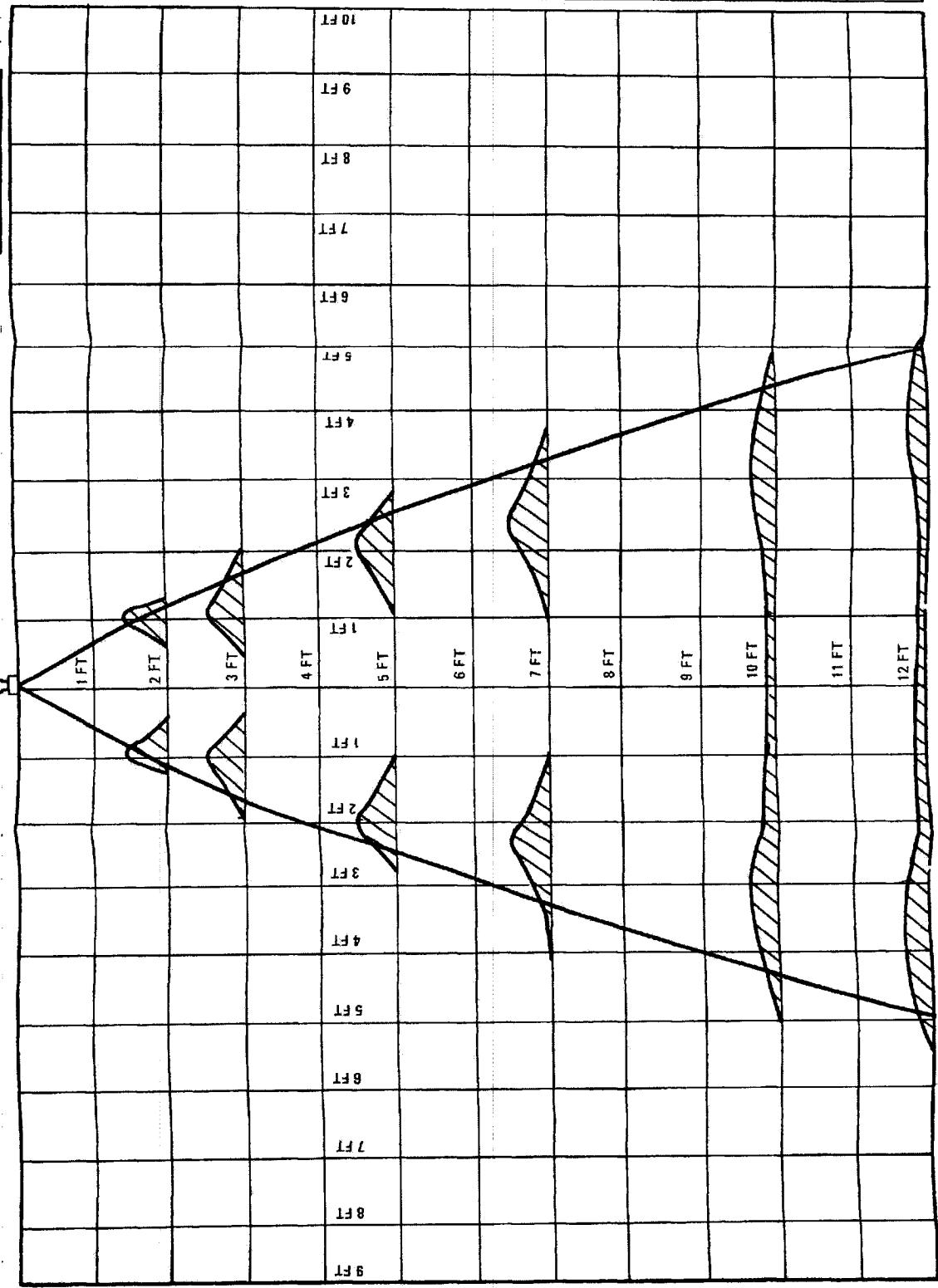
SPRAY NOZZLE PERFORMANCE DATA  
(SPRACO NO. 17651308)

FIGURE 6A-1

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PRESSURE 40 LBS/SQ. IN.  
CAPACITY 15.2 GAL/MIN  
TIME SECONDS

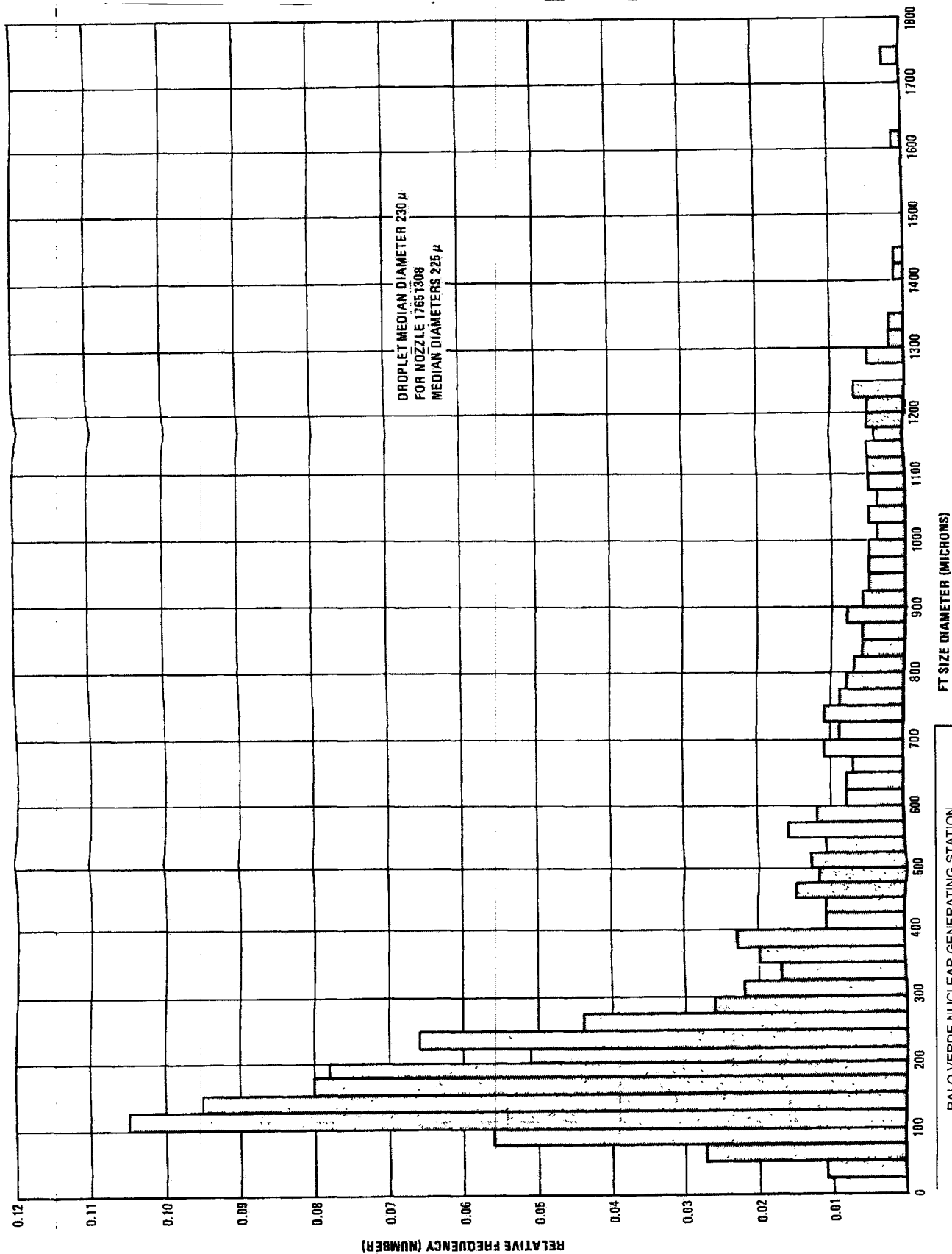


EFFECTIVE DIAMETER	EFFECTIVE ANGLE
28 IN.	60°
37 IN.	55°
60 IN.	53°
78 IN.	50°
102 IN.	45°
120 IN.	40°

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SPRAY NOZZLE PERFORMANCE DATA  
(SPRACO NO. 17071417)

FIGURE 6A-2



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

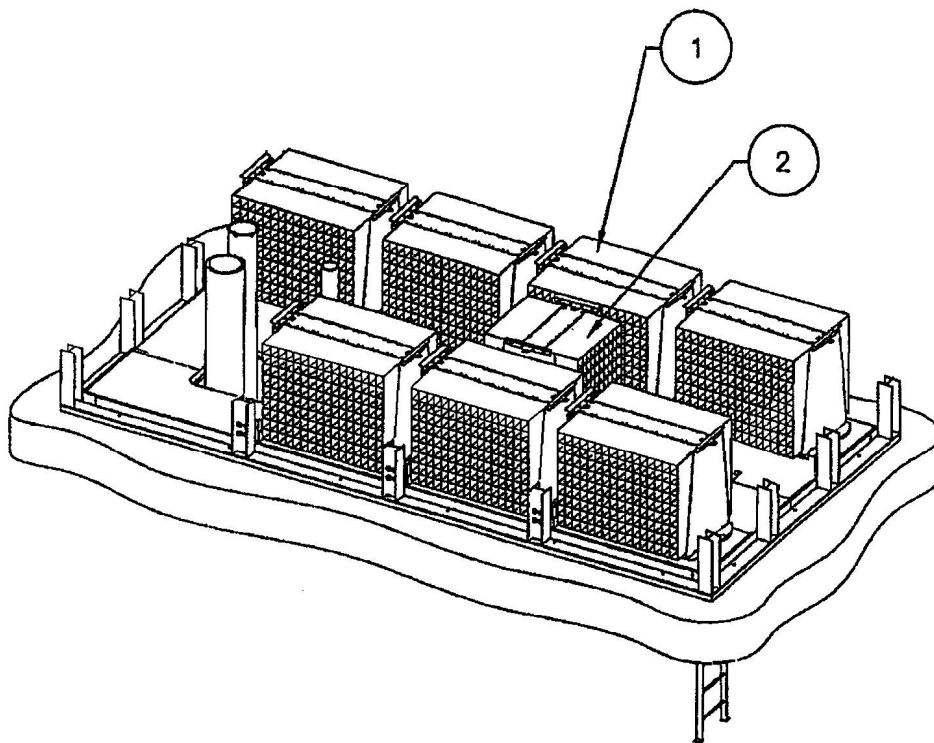
SPATIAL DROPLET SIZE DISTRIBUTION OF SPRACO 17071417  
NOZZLE APPLYING SURFACE AREA CORRECTION AND  
SPRAYING H<sub>2</sub>O @ 40 PSIG UNDER LABORATORY CONDITIONS

JUNE 2001

FIGURE 6A-3

REVISION 11

This Figure has been redacted.



### WEST SUMP SCREEN ARRANGEMENT

①	7X 16 CARTRIDGE UNIT	2875 SQ FT
②	1X 10 CARTRIDGE UNIT	266 SQ FT
	10" PIPE, VENT	1 SQ FT
<u>TOTAL FLOW AREA APPROX</u>		<u>3142 SQ FT</u>

SIZE OF SCREEN PERFORATIONS: 0.083 IN

West sump only is shown. East sump is similar in arrangement.

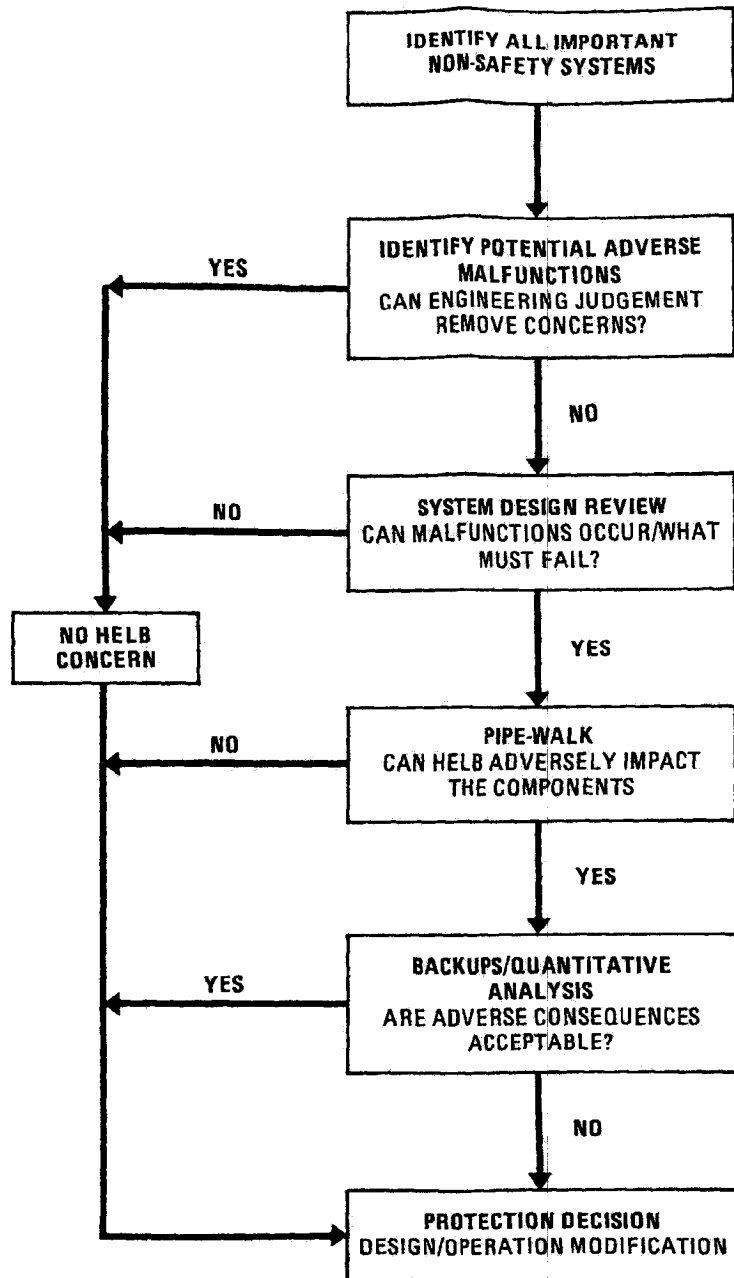
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT RECIRCULATION SUMP  
REPLACEMENT STRAINER DETAIL

FIGURE 6A-5

JUNE 2009

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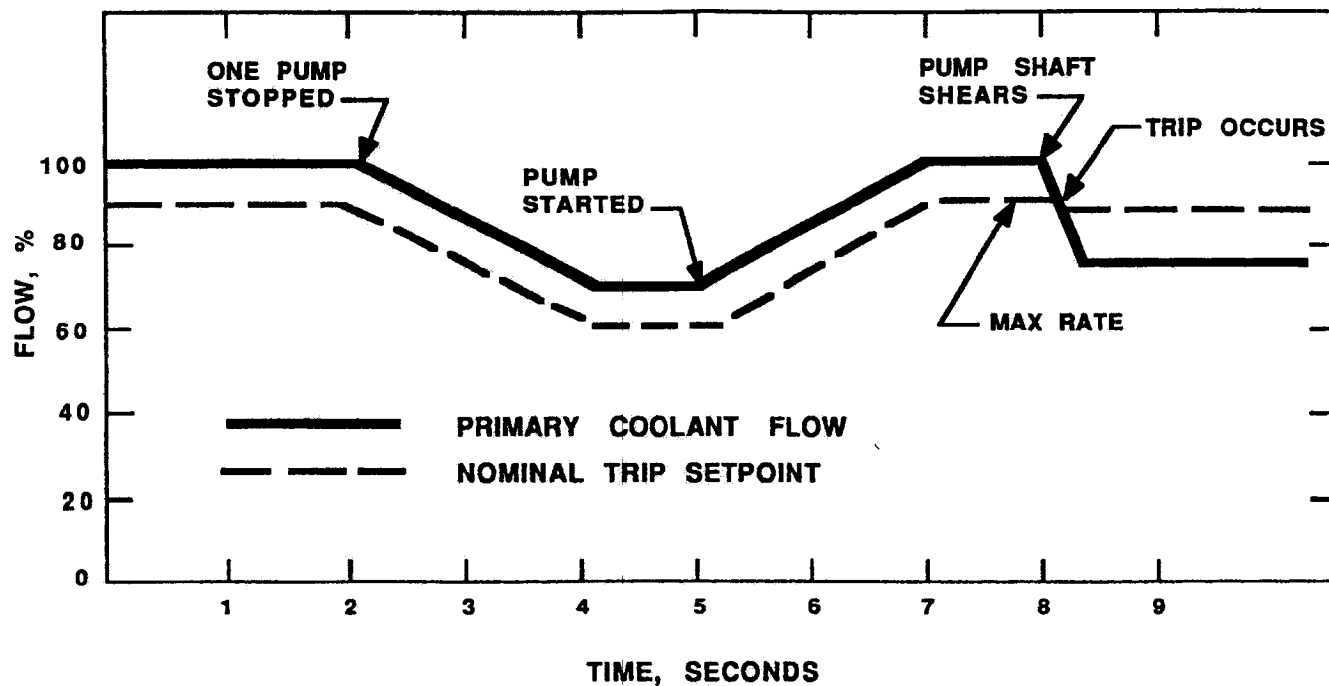
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

HELBA PROCESS

FIGURE 7.1-1

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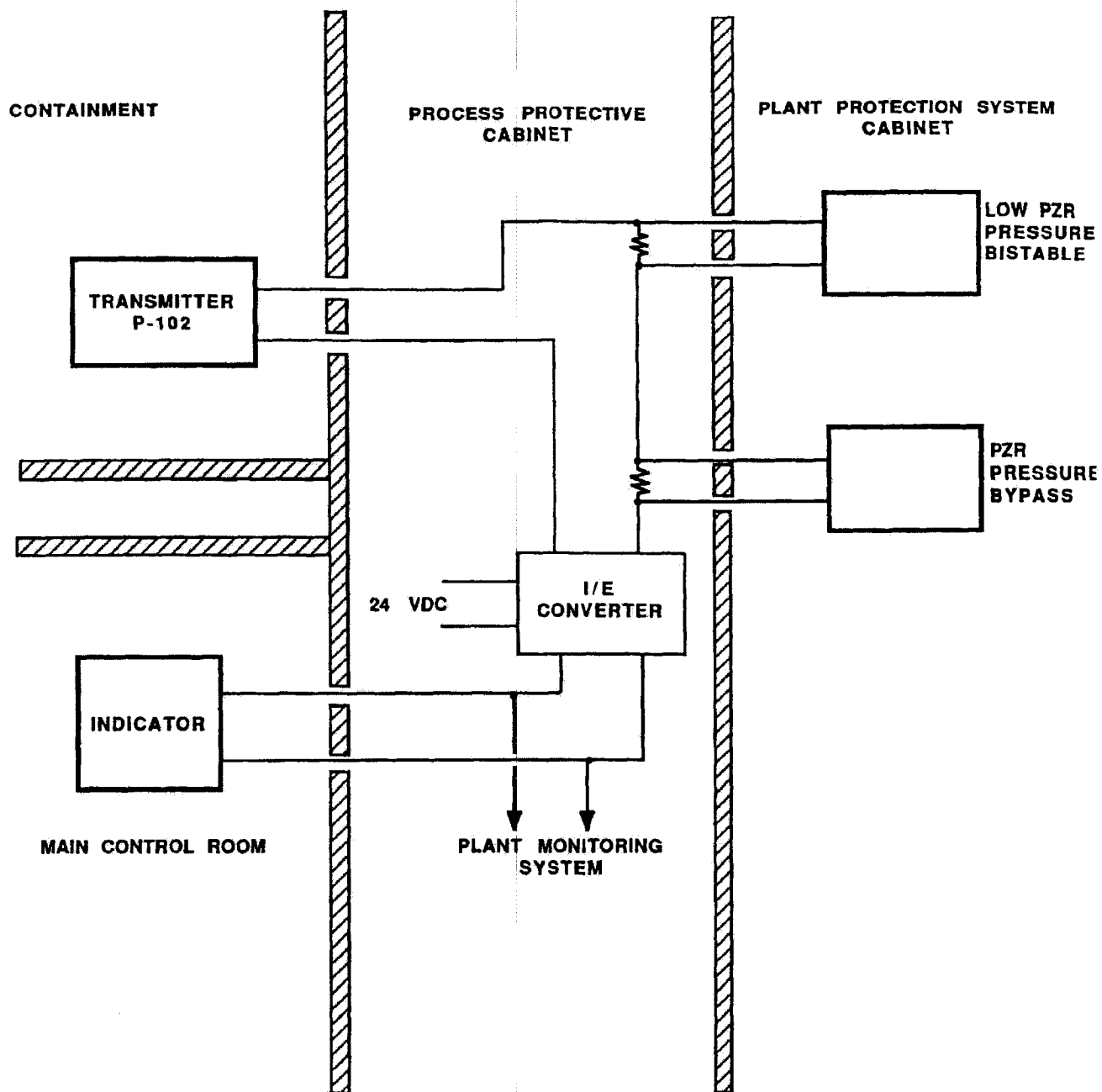
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TYPICAL LOW REACTOR COOLANT FLOW TRIP  
SETPOINT OPERATION  
FIGURE 7.2-0

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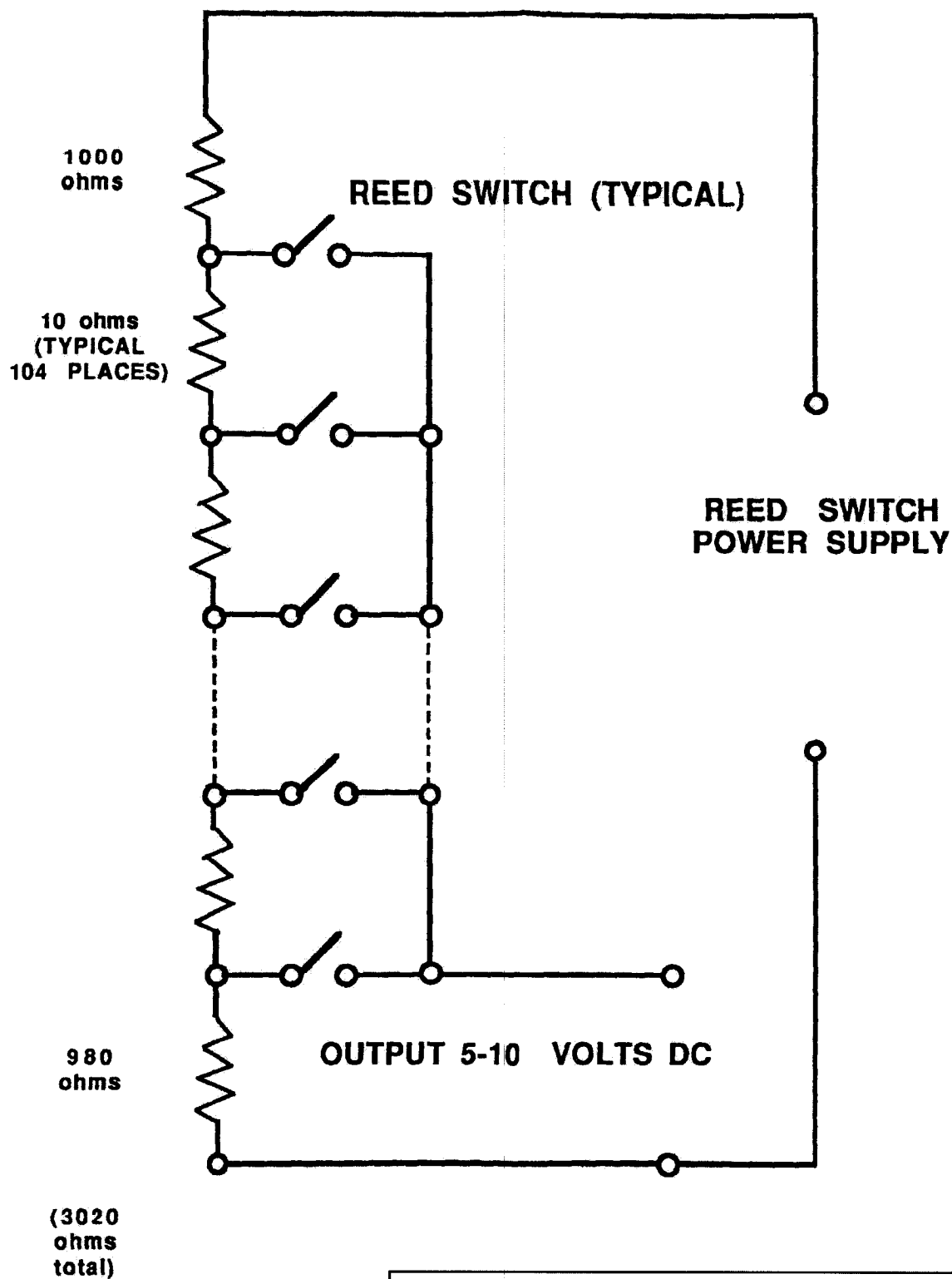


PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 TYPICAL MEASUREMENT CHANNEL FUNCTIONAL  
 DIAGRAM  
 (PRESSURIZER PRESSURE WIDE RANGE)

FIGURE 7.2-0A

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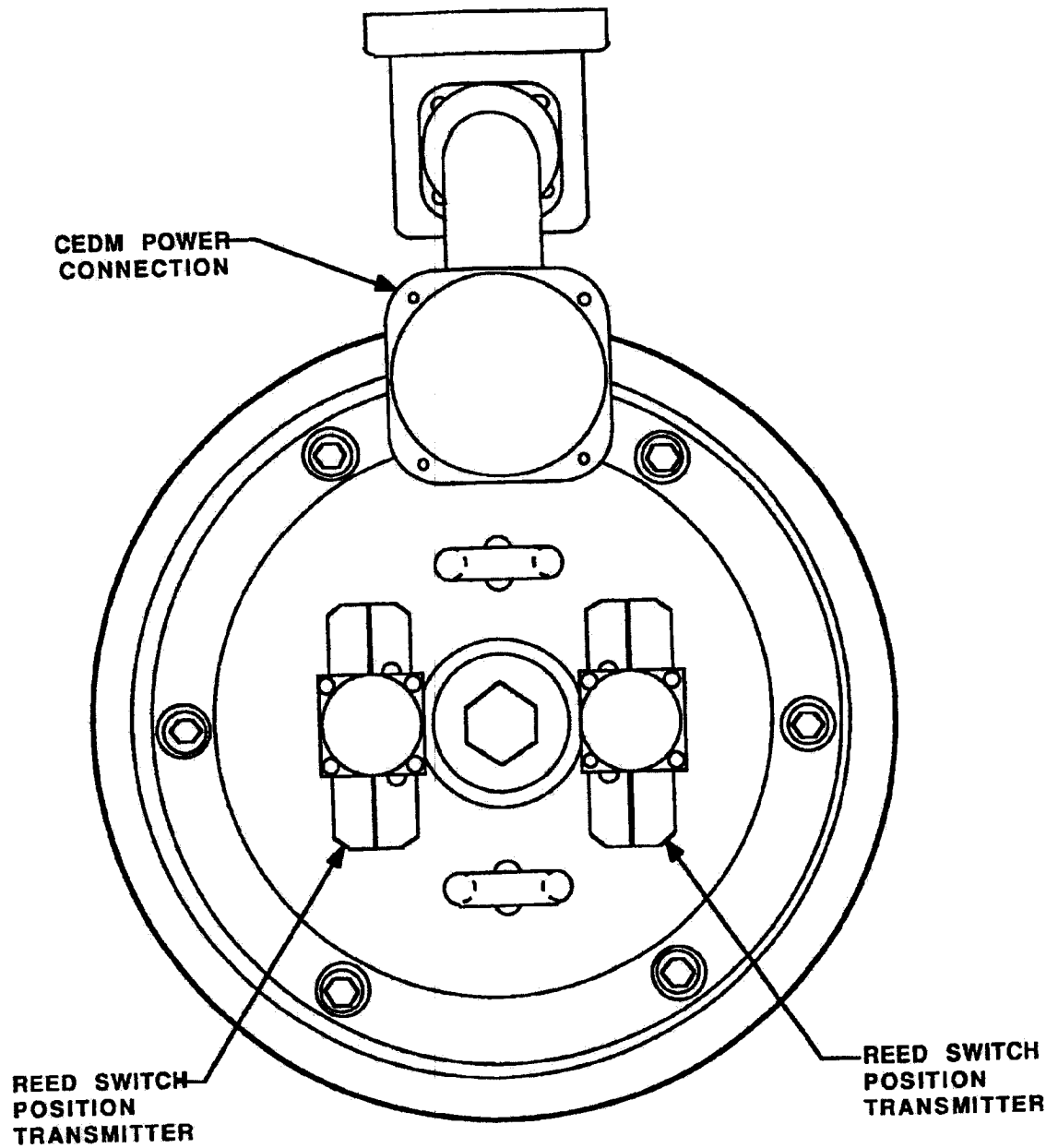
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REED SWITCH POSITION TRANSMITTER  
ASSEMBLY  
SCHEMATIC DIAGRAM

FIGURE 7.2-0B

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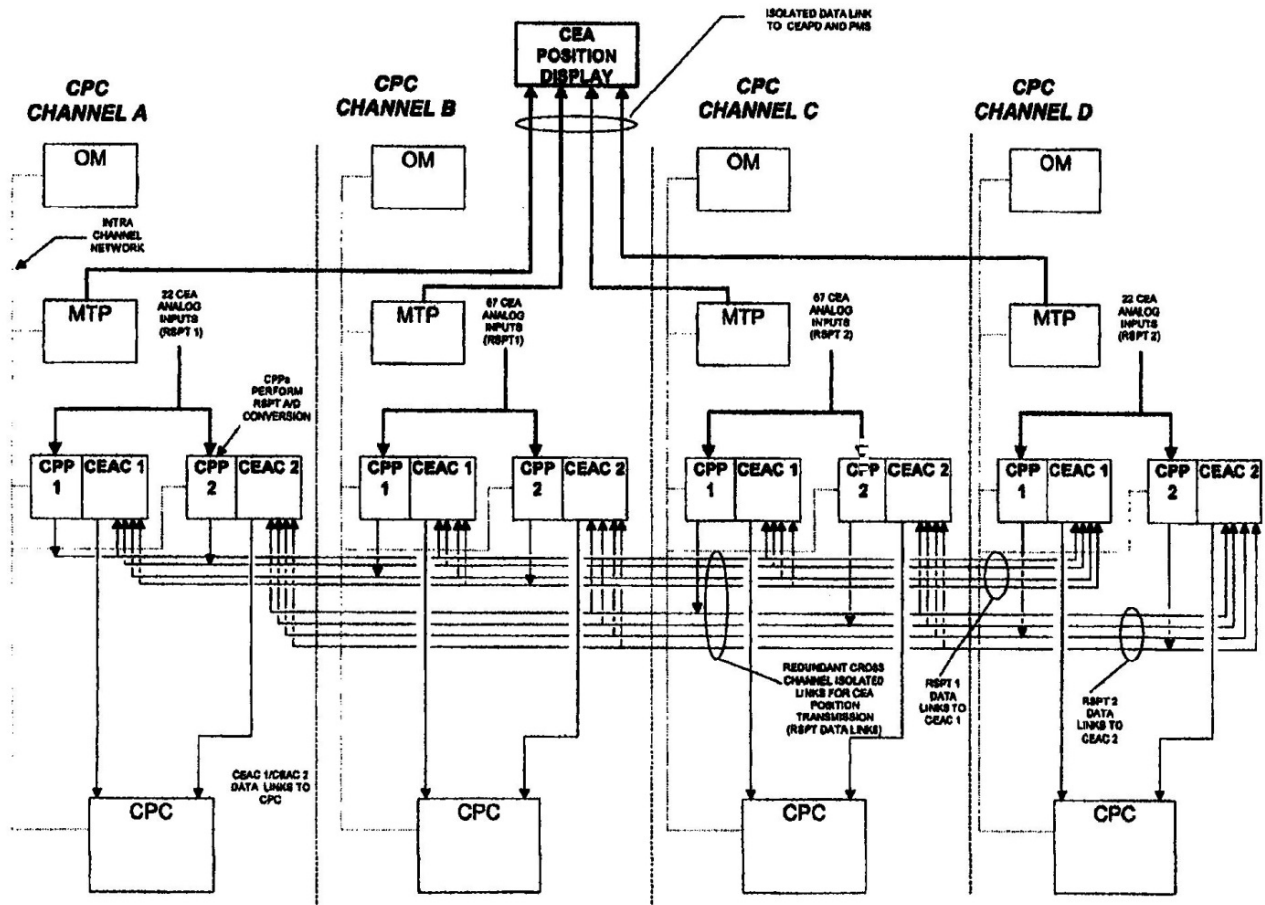
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REED SWITCH POSITION TRANSMITTER  
CABLE ASSEMBLIES

FIGURE 7.2-0C

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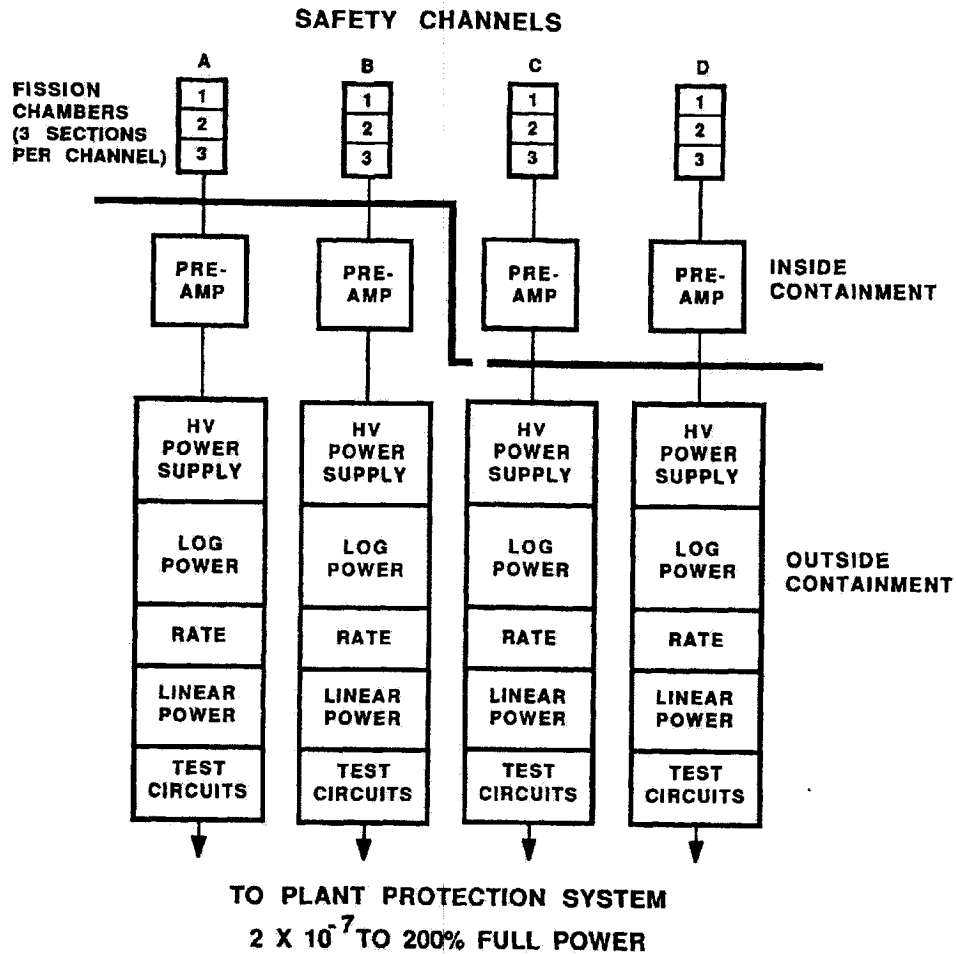
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CEA POSITION SIGNALS WITHIN REACTOR  
PROTECTIVE SYSTEM

FIGURE 7.2-0D

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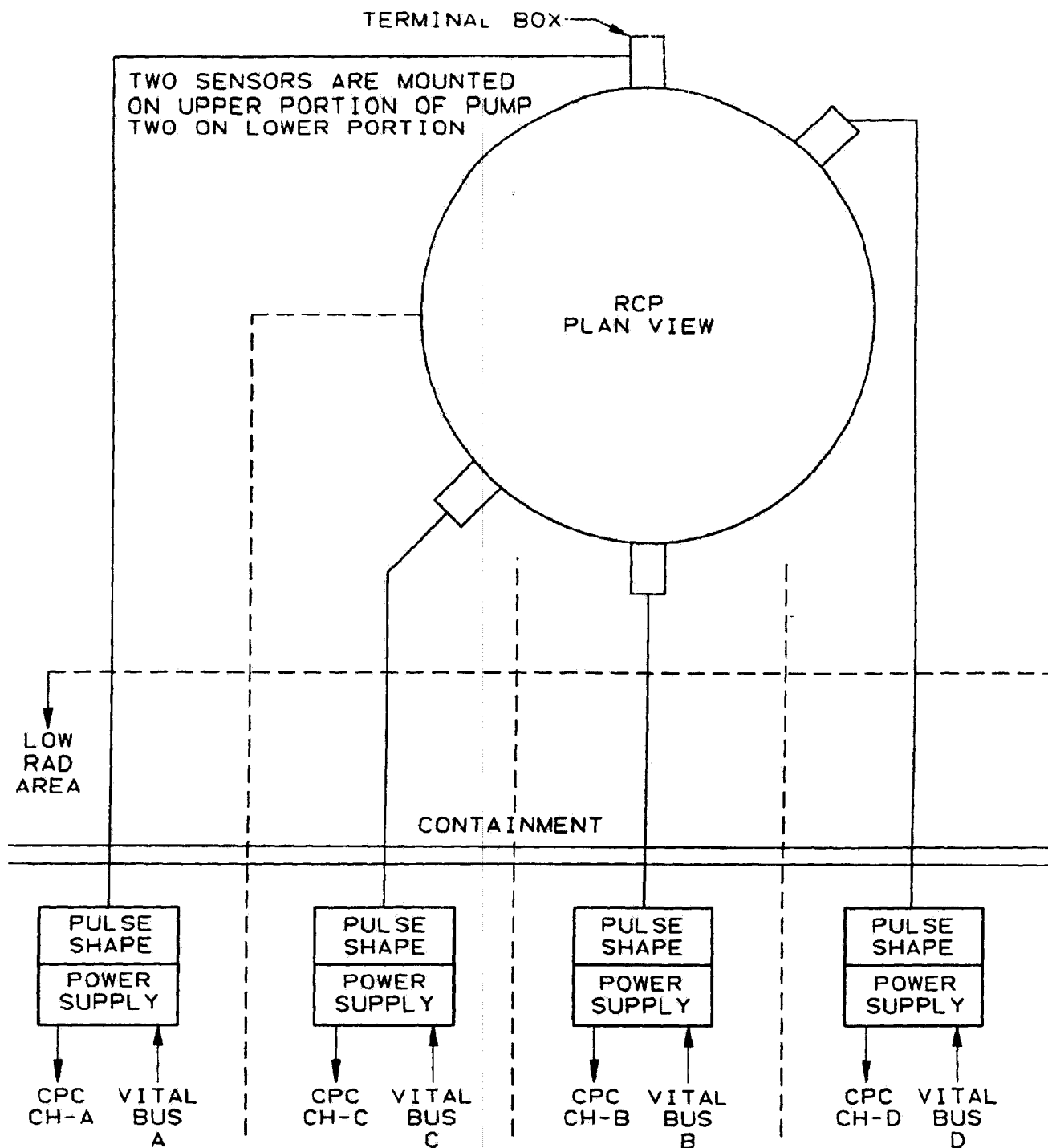
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

EXCORE NEUTRON FLUX MONITORING  
SYSTEM

FIGURE 7.2-0E

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NOTE: SPEED SENSORS S2 AND S5 WHICH ARE NOT SHOWN, ARE USED FOR MONITORING FUNCTIONS ONLY.

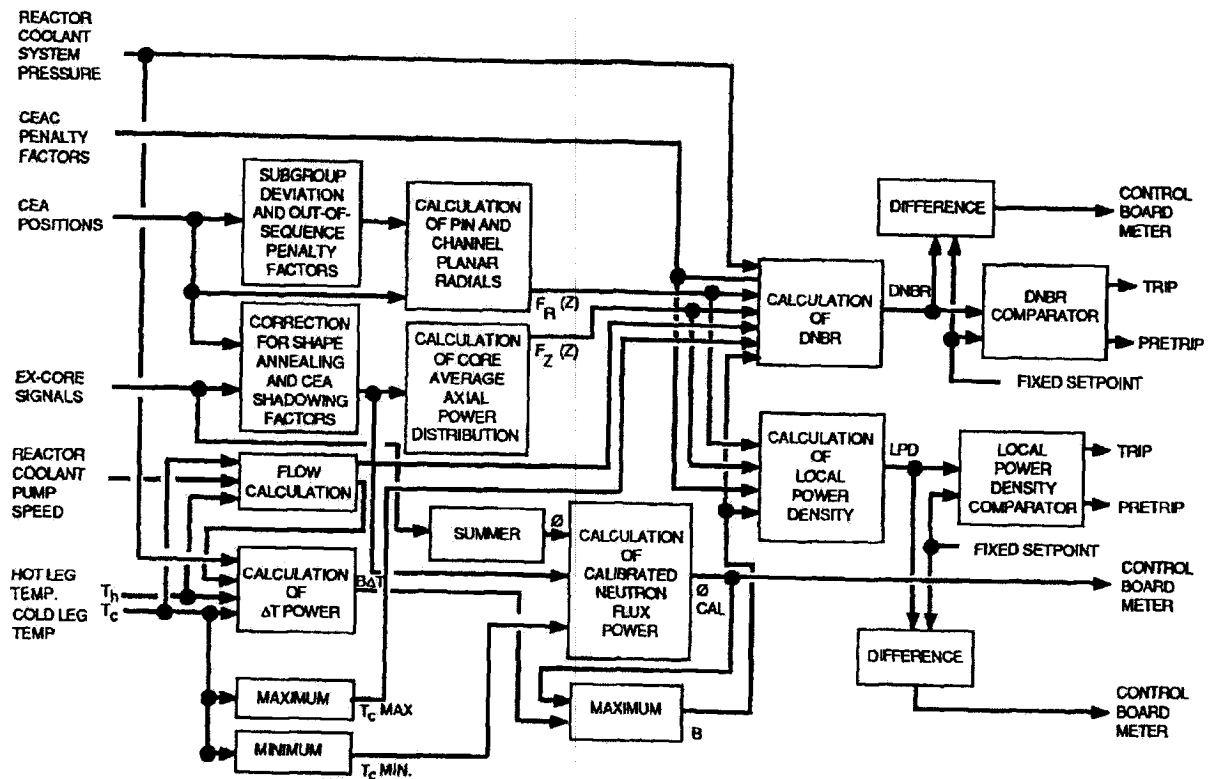
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REACTOR COOLANT PUMP SPEED SENSORS  
TYPICAL FOR EACH  
REACTOR COOLANT PUMP

FIGURE 7.2-0F

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CORE PROTECTION CALCULATOR  
FUNCTIONAL BLOCK DIAGRAM

FIGURE 7.2-0G

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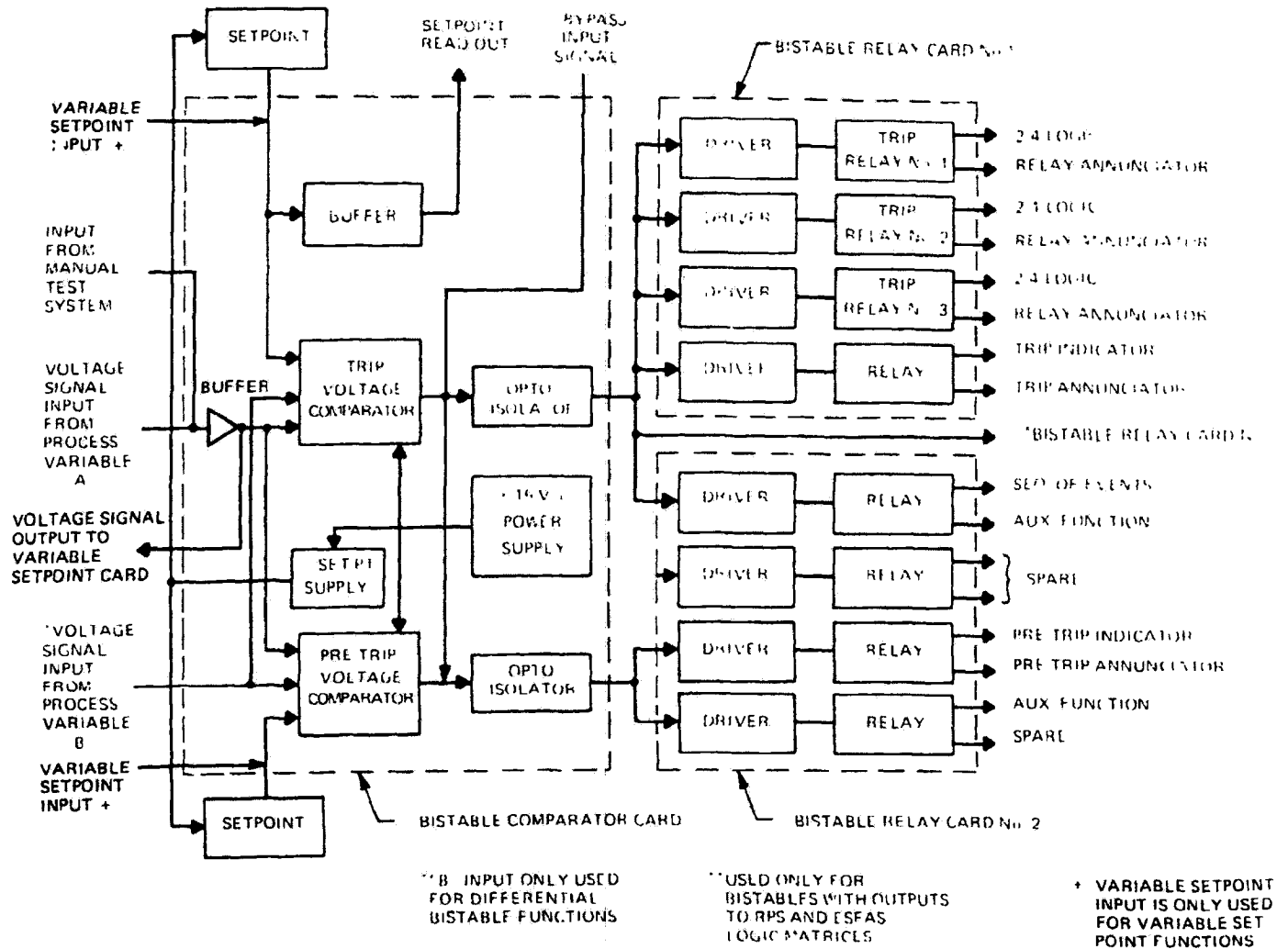
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This Figure has been redacted.



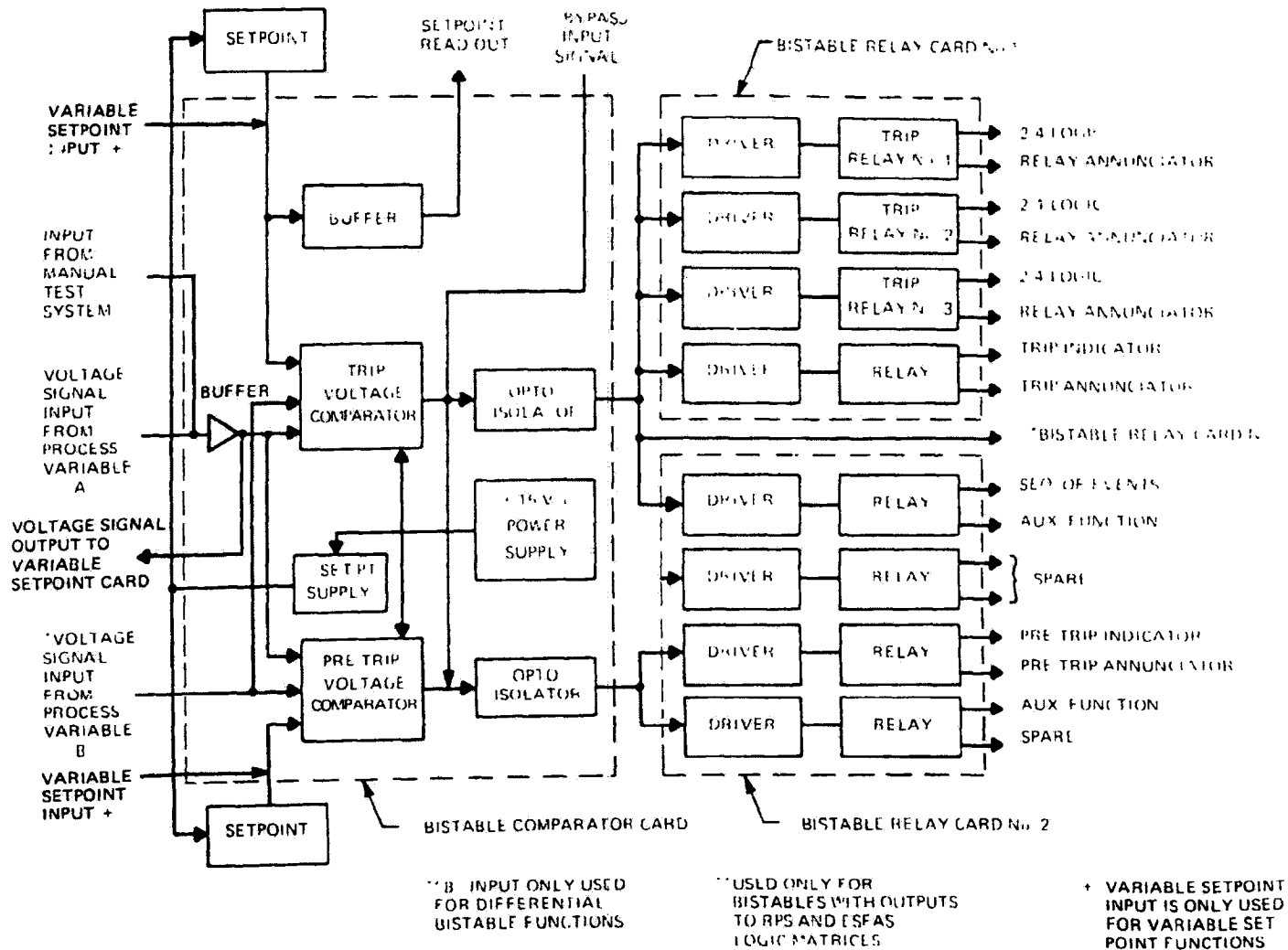
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SPLA FUNCTIONAL BLOCK DIAGRAM

FIGURE 7.2-5

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BISTABLE BLOCK DIAGRAM

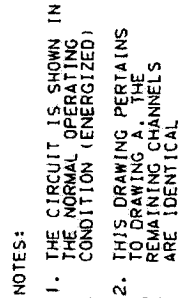
FIGURE 7.2-6

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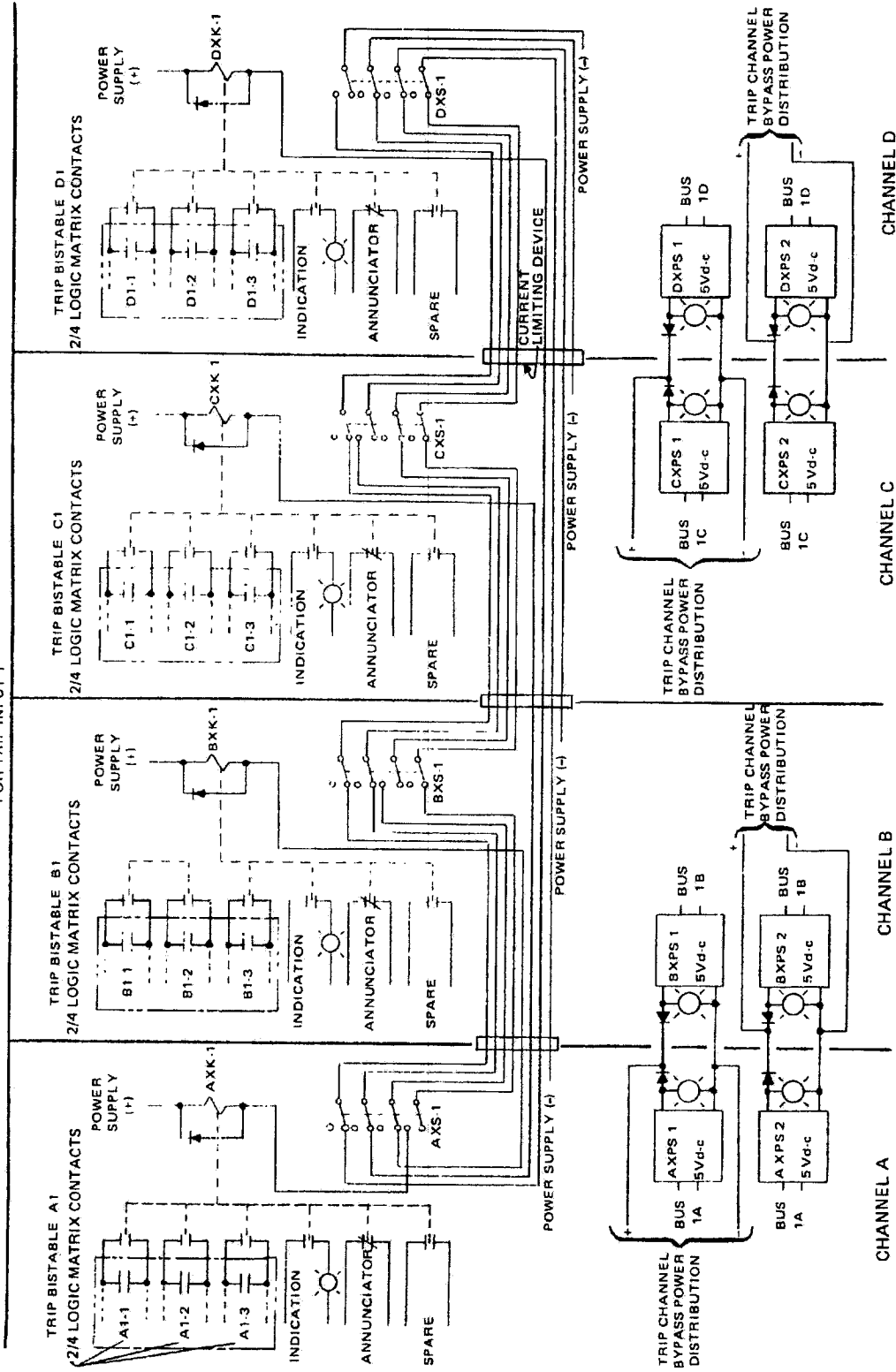






MATRIX, BISTABLE TRIP  
AND LOG TRIP INTERLOCK CKT.

MANUALLY INITIATED/MANUALLY REMOVED  
BYPASS CIRCUIT  
FOR TRIP INPUT 1



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TYPICAL TRIP CHANNEL BYPASS

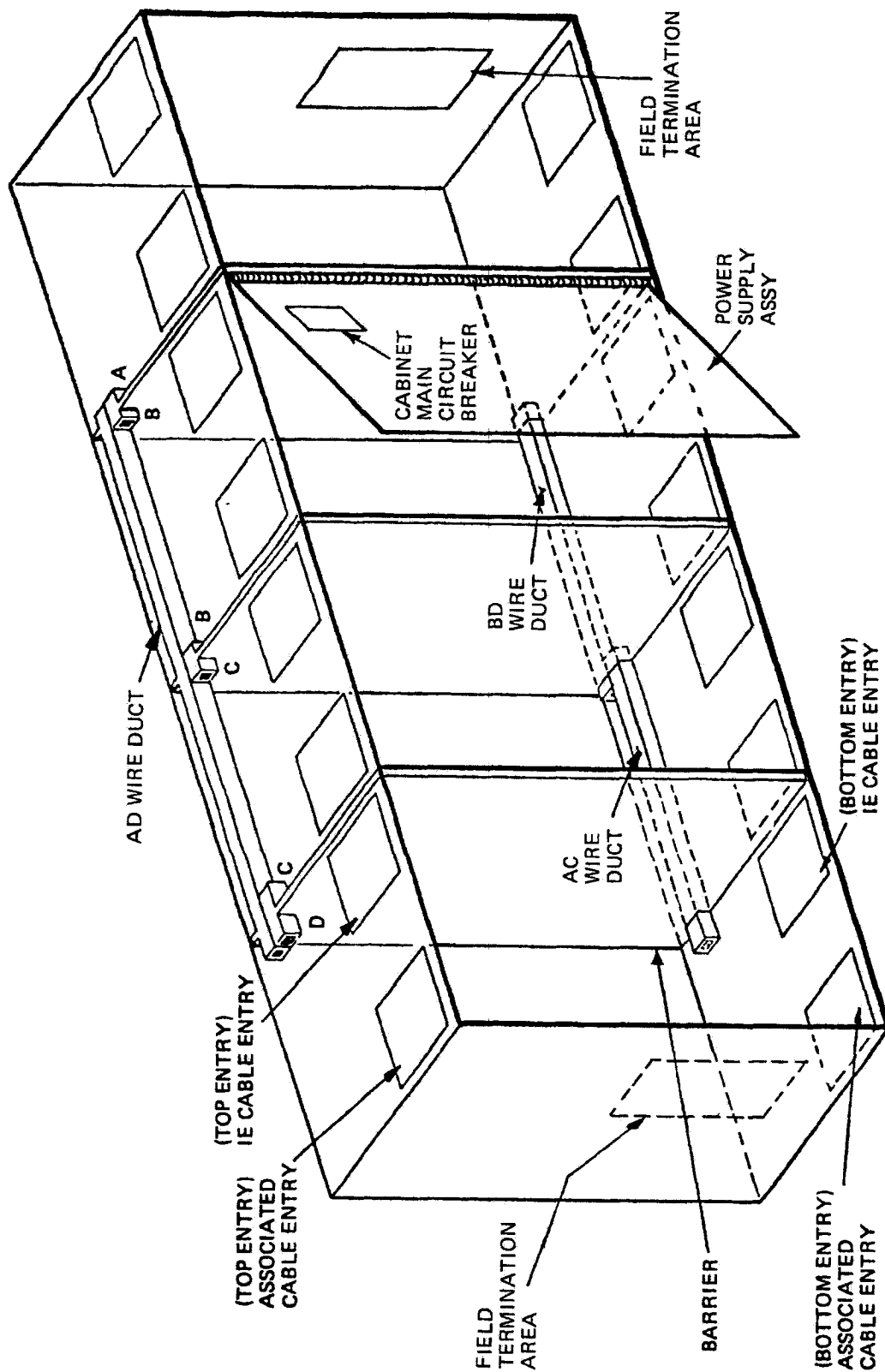
FIGURE 7.2-10

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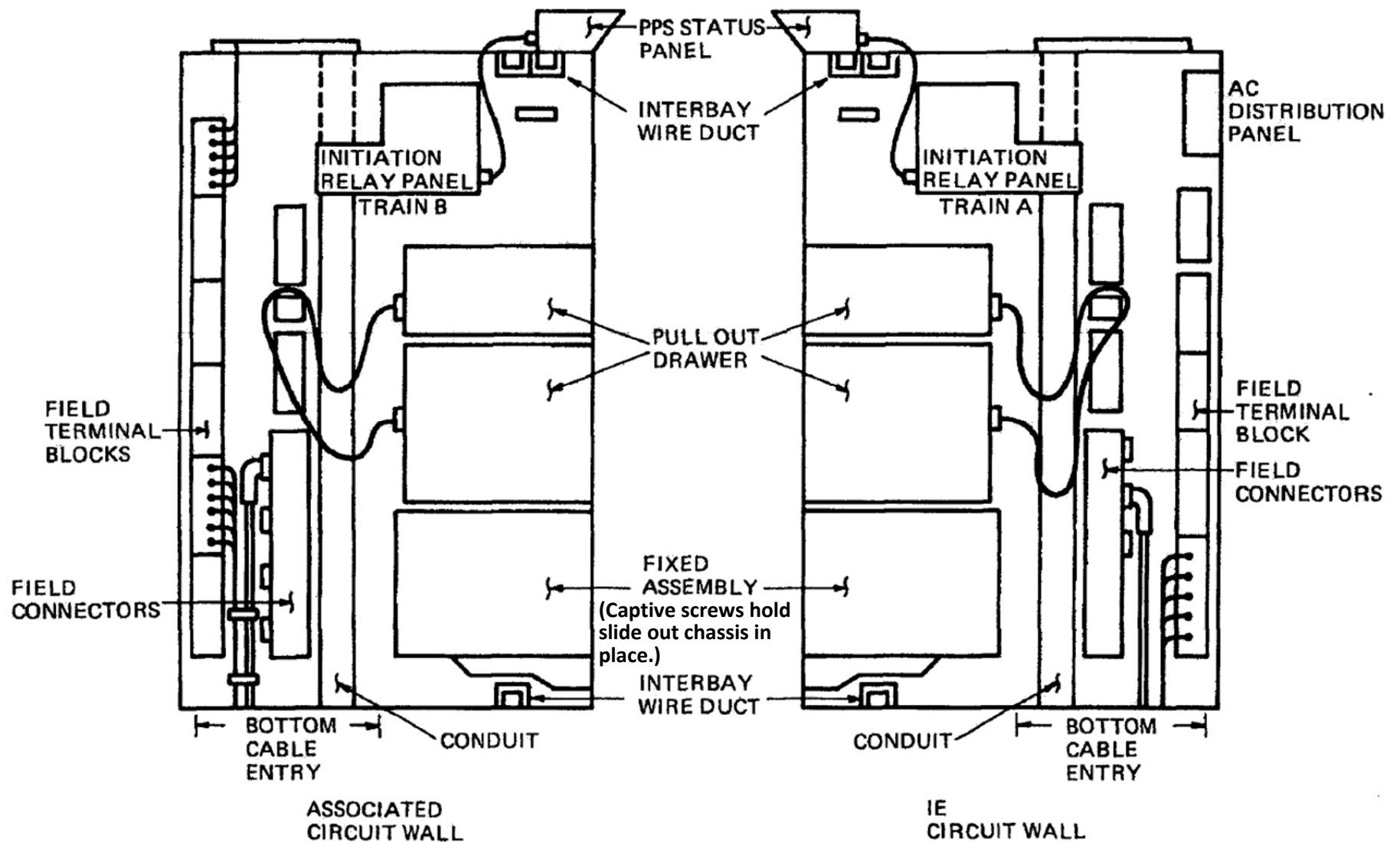
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SIMPLIFIED P.P.S. CABINET LAYOUT  
(REAR VIEW)

FIGURE 7.2-12

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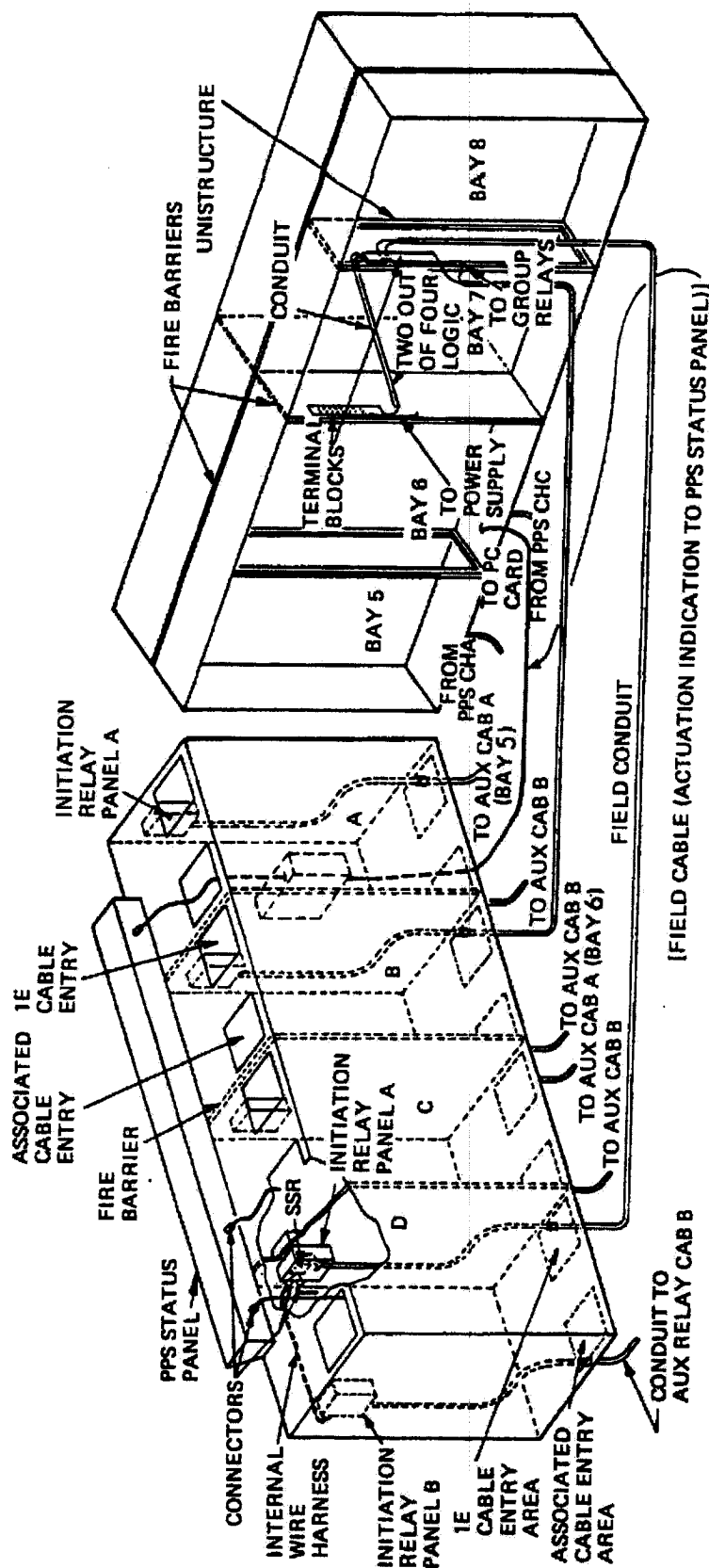
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

TYPICAL P.P.S. BAY LAYOUT

FIGURE 7.2-13

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REVISION 18



PPS CABINET (REAR VIEW)

AUX. RELAY CABINET A (FRONT VIEW)

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

AUXILIARY RELAY CABINET A  
(FRONT VIEW)

FIGURE 7.2-14

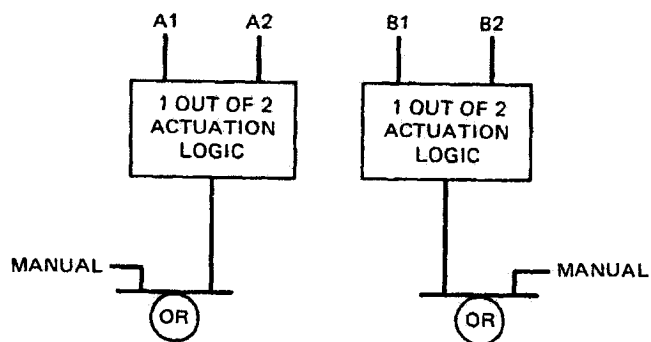
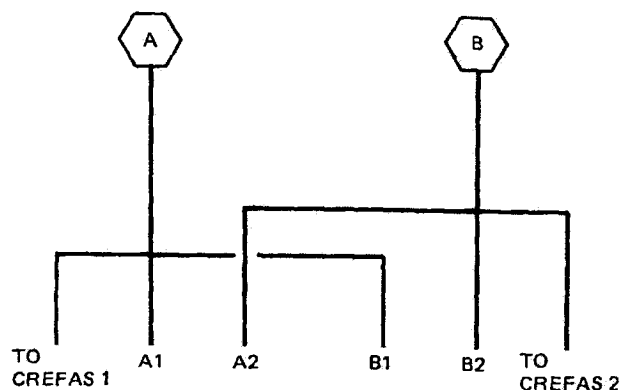
JUNE 2003

REVISION 12

## FUEL BUILDING MONITORS

SPENT FUEL POOL  
AREA HIGH RADIATION

FUEL BUILDING  
EXHAUST DUCT  
HIGH ACTIVITY



TRAIN A  
COMPONENTS

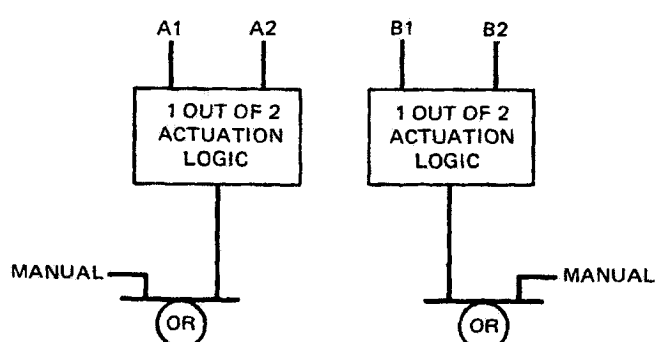
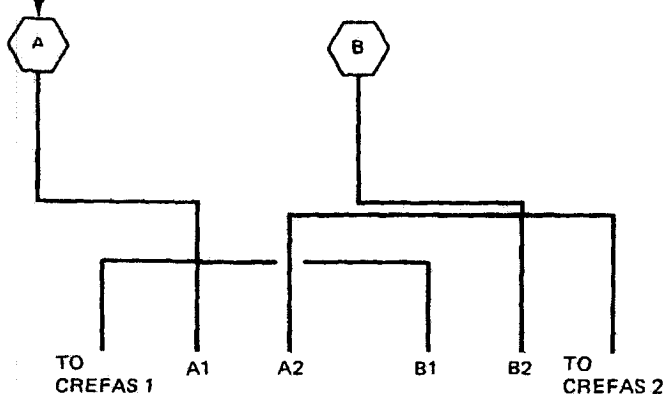
TRAIN B  
COMPONENTS

FBEVAS

## CONTAINMENT BUILDING MONITORS

CONTAINMENT BUILDING  
POWER ACCESS PURGE  
EXHAUST AREA  
RADIATION

CONTAINMENT BUILDING  
POWER ACCESS PURGE  
EXHAUST AREA  
RADIATION



TRAIN A  
COMPONENTS

TRAIN B  
COMPONENTS

CPIAS

### LEGEND:

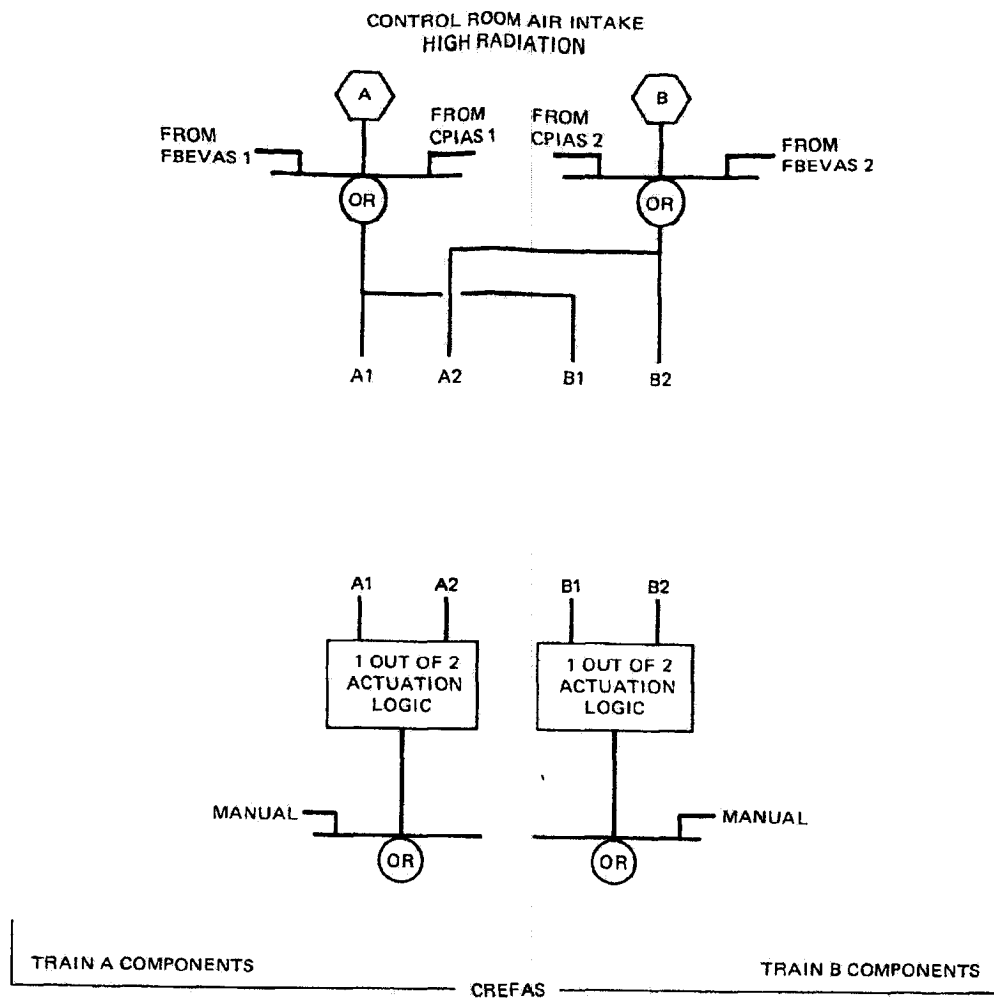
CPIAS = CONTAINMENT PURGE ISOLATION  
ACTUATION SIGNAL  
CREFAS = CONTROL ROOM ESSENTIAL  
FILTRATION ACTUATION SIGNAL  
FBEVAS = FUEL BUILDING ESSENTIAL  
VENTILATION ACTUATION SIGNAL

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR  
ESFAS SIGNAL LOGIC

FIGURE 7.3-1

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**LEGEND:**

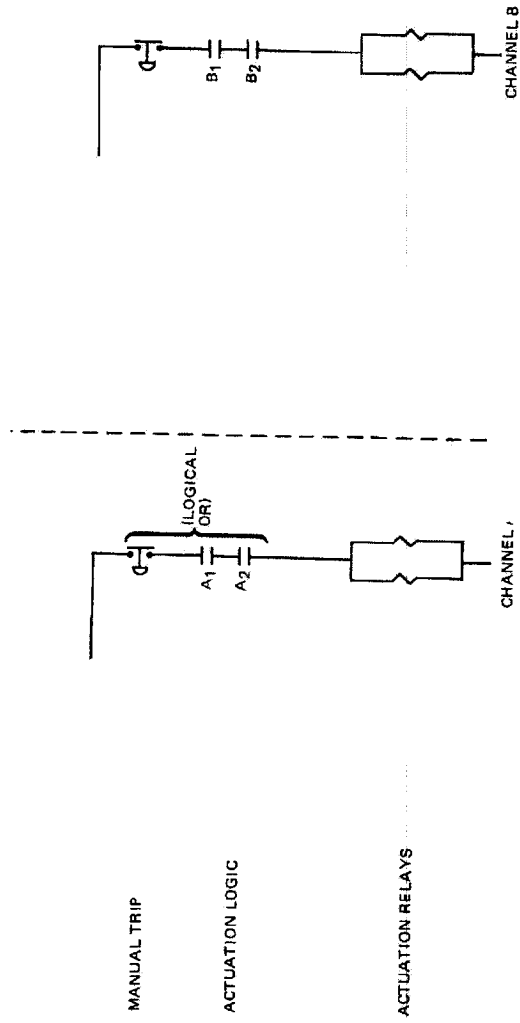
CPIAS = CONTAINMENT PURGE ISOLATION  
ACTUATION SIGNAL  
CREFAS = CONTROL ROOM ESSENTIAL  
FILTRATION ACTUATION SIGNAL  
FBEVAS = FUEL BUILDING ESSENTIAL  
VENTILATION ACTUATION SIGNAL

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR  
ESFAS SIGNAL LOGIC

JUNE 2001

FIGURE 7.3-2

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PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 ONE-OUT-OF-TWO ESFAS LOGIC  
 JUNE 2001  
 FIGURE 7.3-3  
 REVISION 11

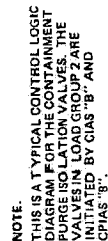
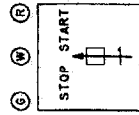


FIGURE 7.3-4  
JUNE 2001 REVISION 11





LEGEND:

- HS HAND SWITCH
- SIAS SAFETY INJECTION ACTUATION SIGNAL
- CRVIAS CONTROL ROOM VENTILATION ISOLATION ACTUATION SIGNAL
- CRFAS CONTROL ROOM ESSENTIAL FILTRATION ACTUATION SIGNAL
- LOP LOSS OF OFFSITE POWER

R - RED  
G - GREEN  
W - WHITE



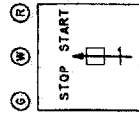
CR - CONTROL ROOM  
MCC - MOTOR CONTROL CENTER

NOTE:  
THESE ARE TYPICAL CONTROL LOGIC DIAGRAMS SHOWING THE COMBINATION OF SIAS, CRVIAS, AND CRFAS AT THE COMPONENT LEVEL. A SIMILAR COMPONENT IN LOAD GROUP 2 WOULD BE INITIATED BY SIAS 'B', CRVIAS 'B', AND CRFAS 'B'.

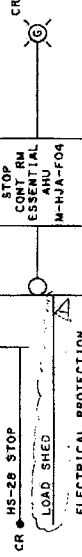
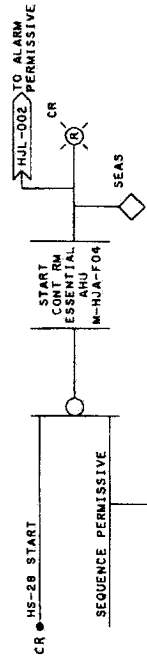
# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

## ESF COMPONENT CONTROL LOGIC

JUNE 2001  
FIGURE 7.3-5  
REVISION 11



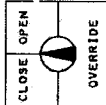
CR-28  
PRESSING RETURN  
TO NEUTRAL



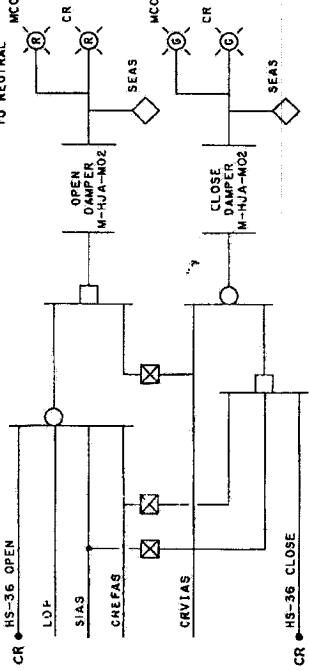
NOTES:

1. CKT SHALL HAVE SEQUENCE PERMISSIVE OVERRIDE CAPABILITY AS PER GEN NOTE #13 DWG NO 13-J-721-012.
2. MOTORS ARE 480V LOAD CENTER.
3. TWO 100% CAPACITY AHU.
4. AHU'S ARE Q ITEMS.

EQUIPMENT	EQUIPMENT ID	CONTROL SWITCH	ELECTRICAL PROTECTION	ESF CHAN
CR ESSENTIAL AHU FAN A	M-HJA-F04	HS-28	ANN	HJVS-10 A
CR ESSENTIAL AHU FAN B	M-HJB-F04	HS-29	HJVS-11	B

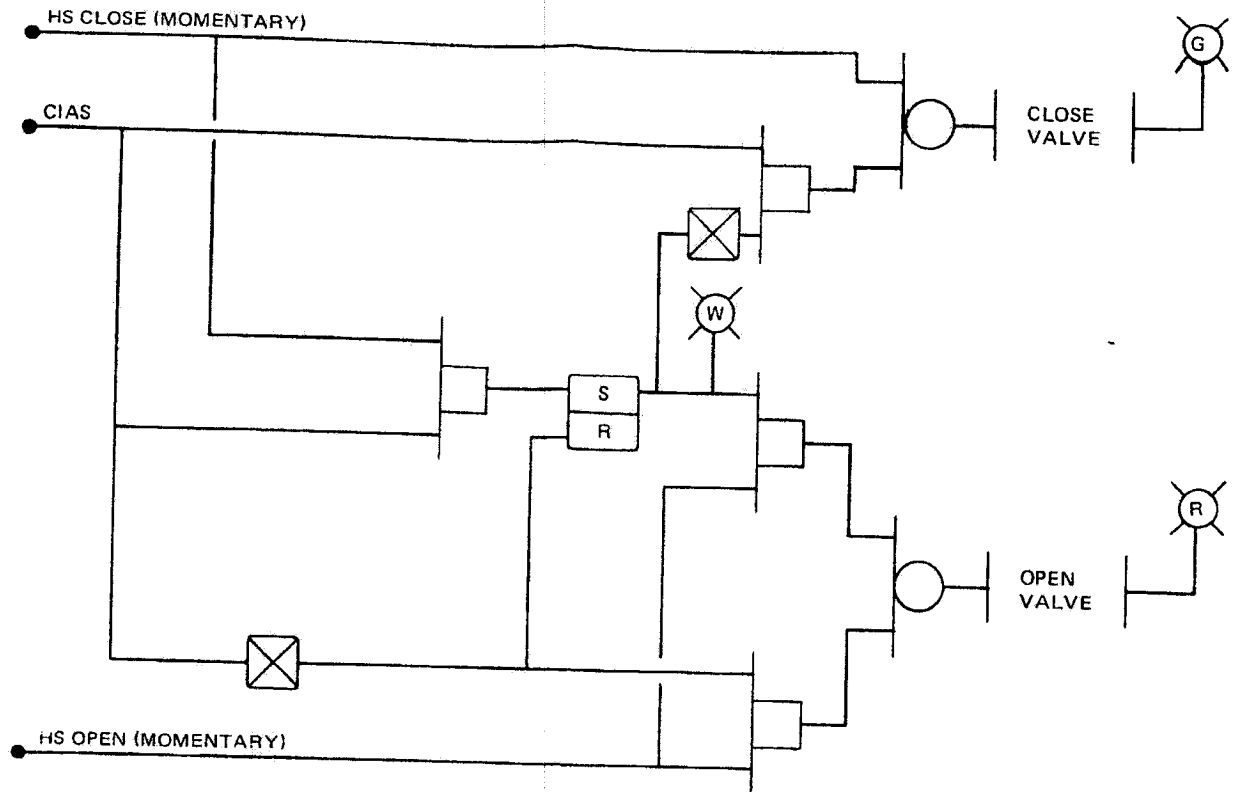


CR-36  
PRESSING RETURN  
TO NEUTRAL

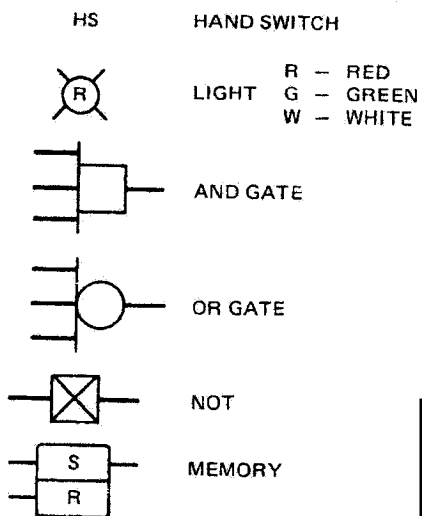


- NOTES:
1. CRFAS, LOP & SIAS OPEN DAMPERS. CRVIAS CLOSES DAMPERS. CRVIAS OVERRIDES CRFAS, LOP & SIAS.
  2. CKT SHALL HAVE CRFAS OR SIAS OVERRIDE CAPABILITY AS PER GEN NOTE #13 DWG NO 13-J-721-012.
  3. DAMPER WILL NOT REVERSE TRAVEL WHILE IN MOTION EXCEPT DURING ESFAS.
  4. DAMPERS ARE Q ITEMS.
  5. DAMPERS ARE 480V-MCC. DURING ESFAS, LIMIT STOPPED CLOSE - LIMIT STOPPED OPEN.

DAMPER	DMPR ID	CONTR SW	ESF CHAN
ESSENTIAL AHU A OSA INTK DMPR	M-HJA-M02	HS-36	A
ESSENTIAL AHU B OSA INTK DMPR	M-HJB-M02	HS-34	B
ESSENTIAL AHU A OSA INTK DMPR	M-HJA-M03	HS-37	A
ESSENTIAL AHU B OSA INTK DMPR	M-HJB-M03	HS-35	B



**LEGEND:**



**NOTE:**

THIS IS A TYPICAL CONTROL LOGIC FOR THE VALVES IN TABLE 7.3-11.

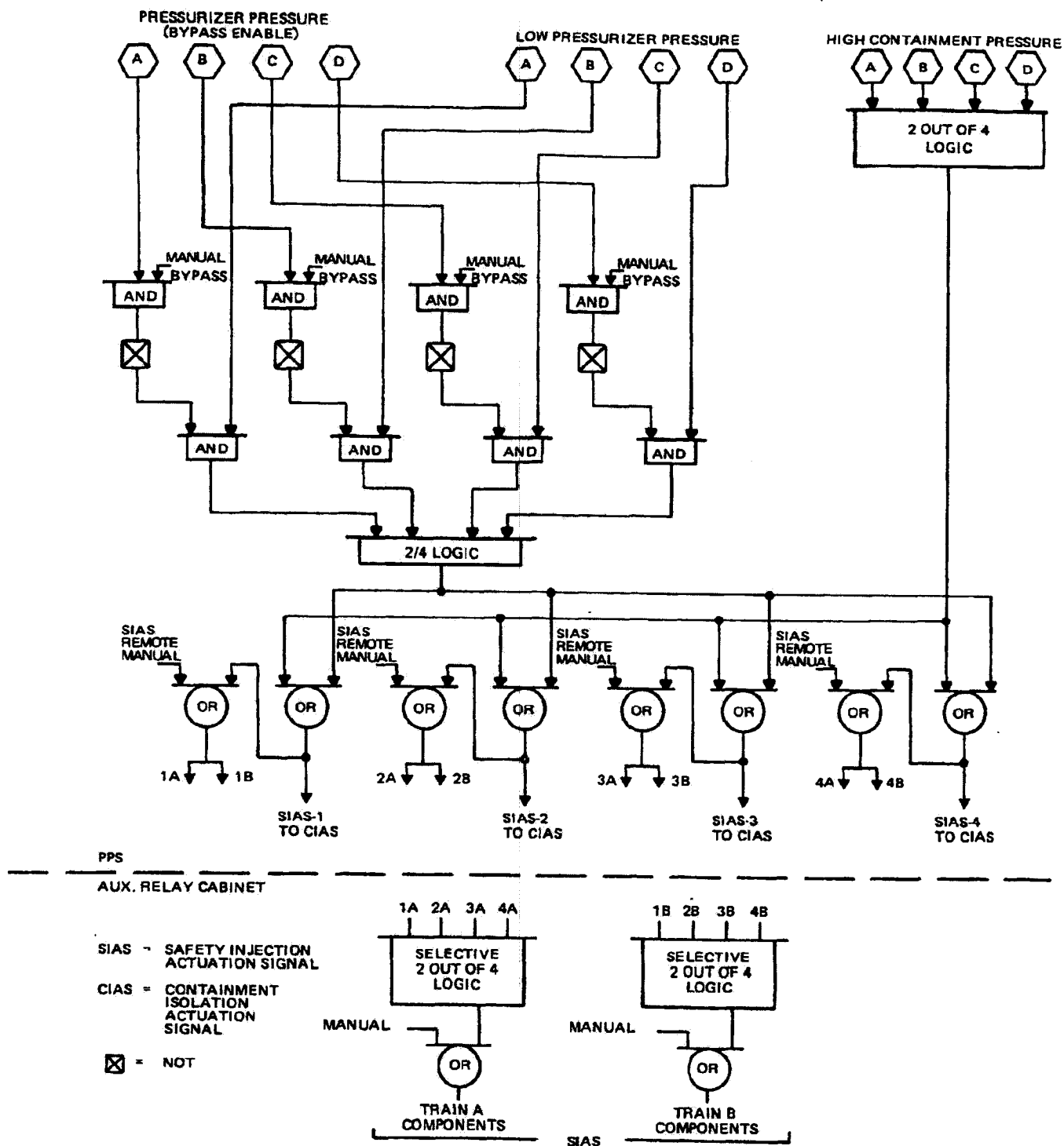
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTAINMENT COMBUSTIBLE GAS CONTROL  
SYSTEM DEVICE CONTROL LOGIC

FIGURE 7.3-6

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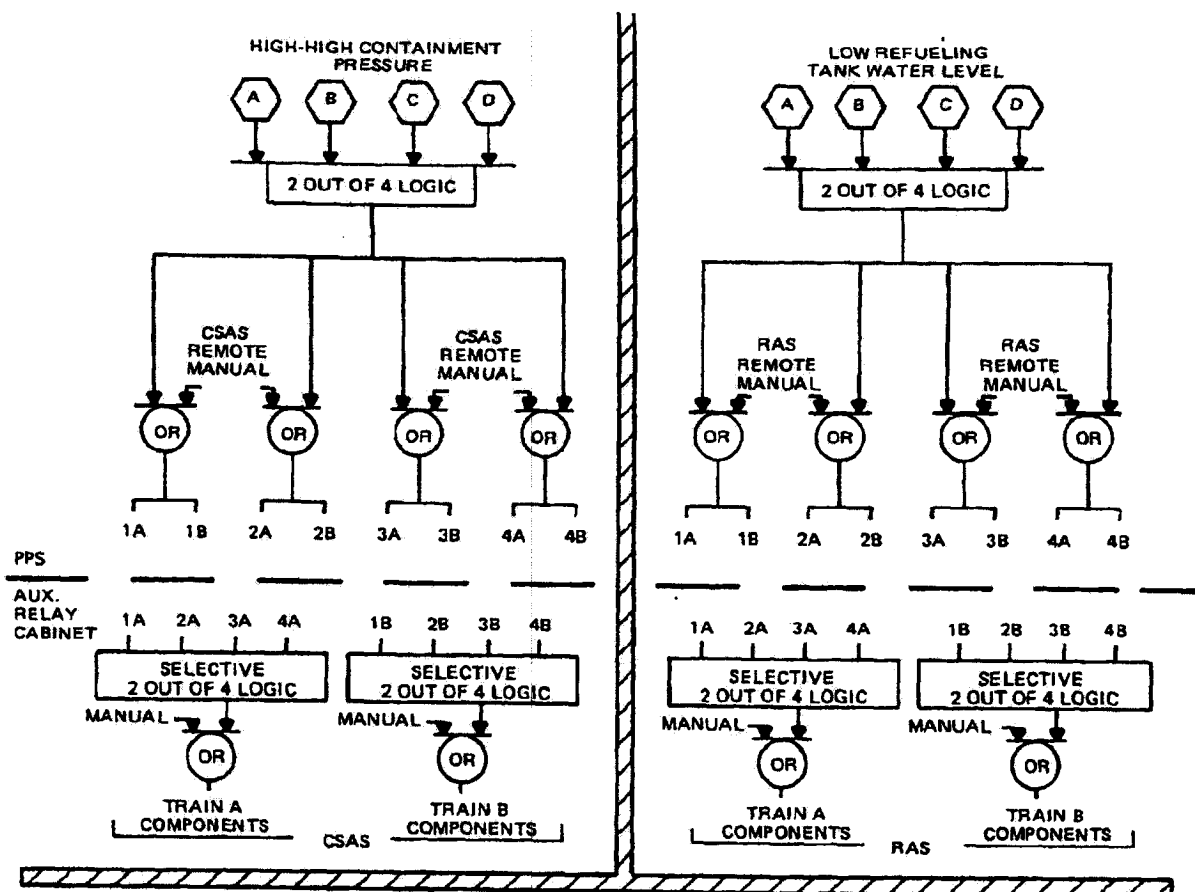
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

ESFAS SIGNAL LOGIC (SIAS)

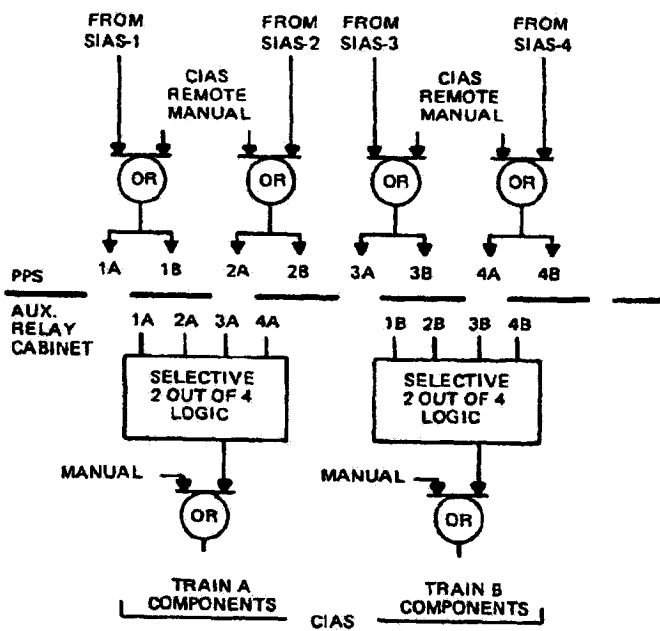
FIGURE 7.3-7A

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SIAS = SAFETY INJECTION ACTUATION SIGNAL  
 CSAS = CONTAINMENT SPRAY ACTUATION SIGNAL  
 RAS = RECIRCULATION ACTUATION SIGNAL  
 CIAS = CONTAINMENT ISOLATION ACTUATION SIGNAL



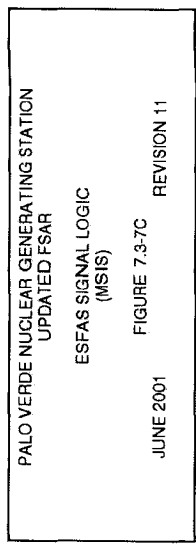
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR

ESFAS SIGNAL LOGIC  
 (CSAS, CIAS, RAS)

FIGURE 7.3-7B

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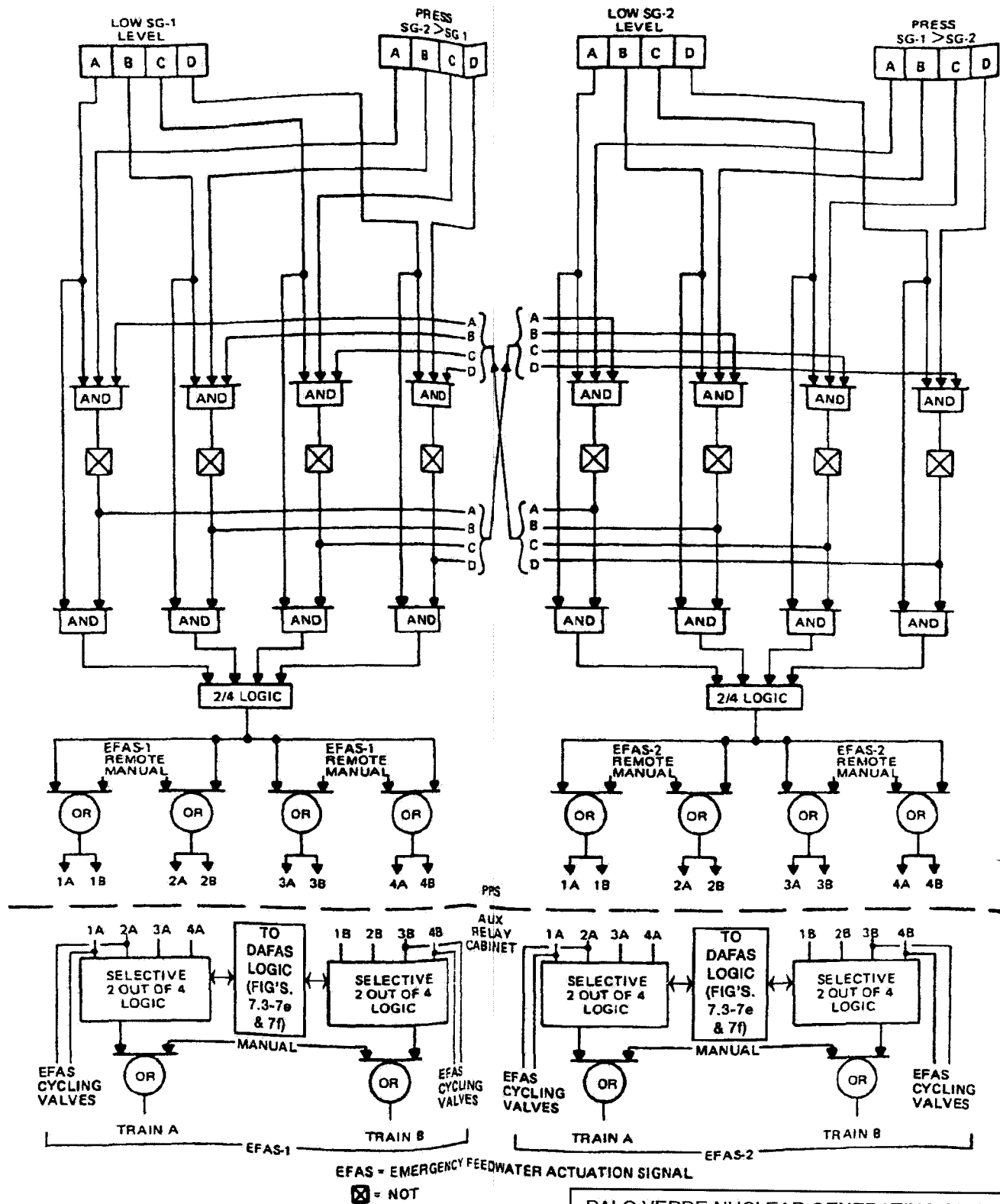
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

ESFAS SIGNAL LOGIC  
(MSIS)

FIGURE 7.3-7C

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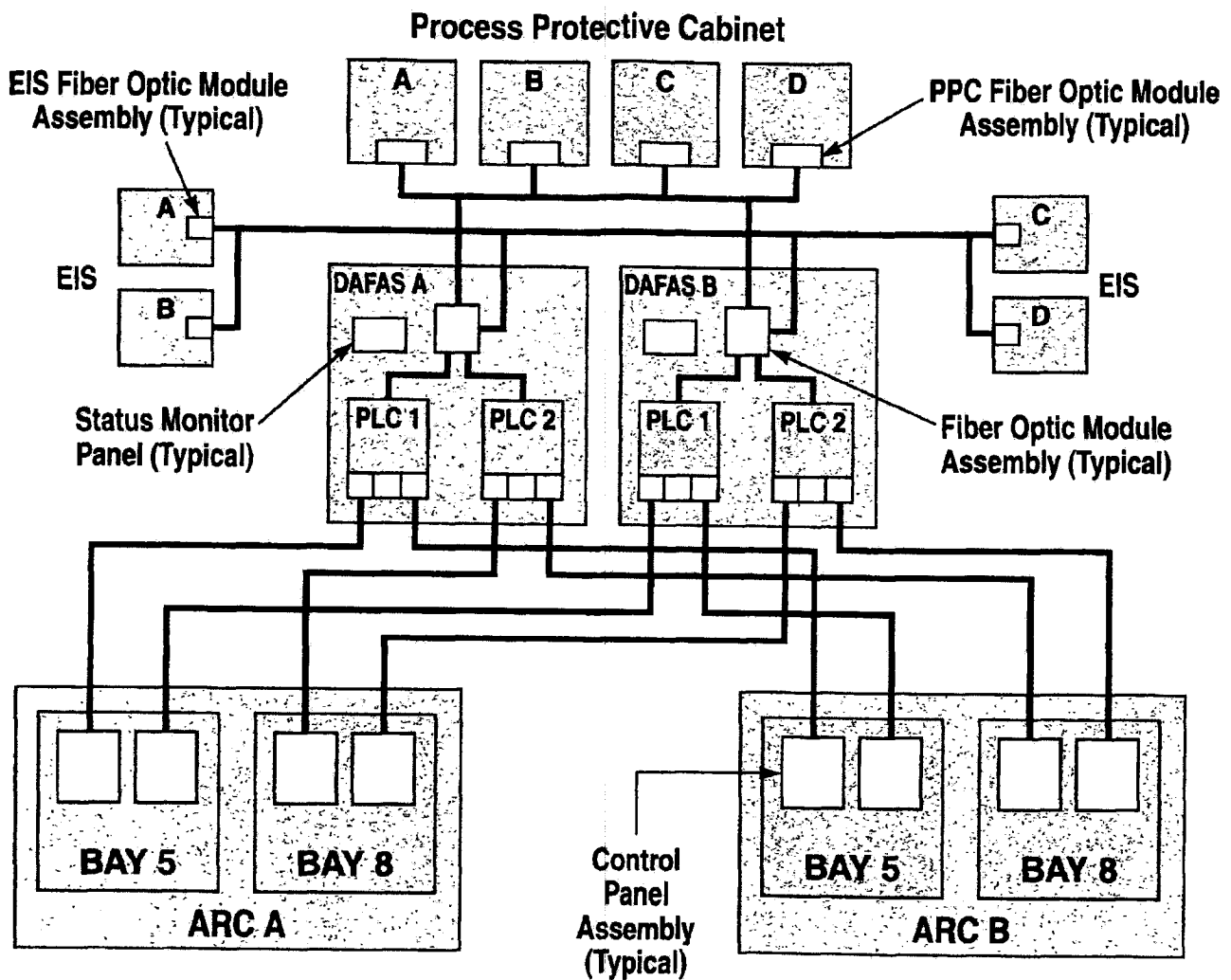
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

ESFAS SIGNAL LOGIC  
(EFAS 1, EFAS 2)

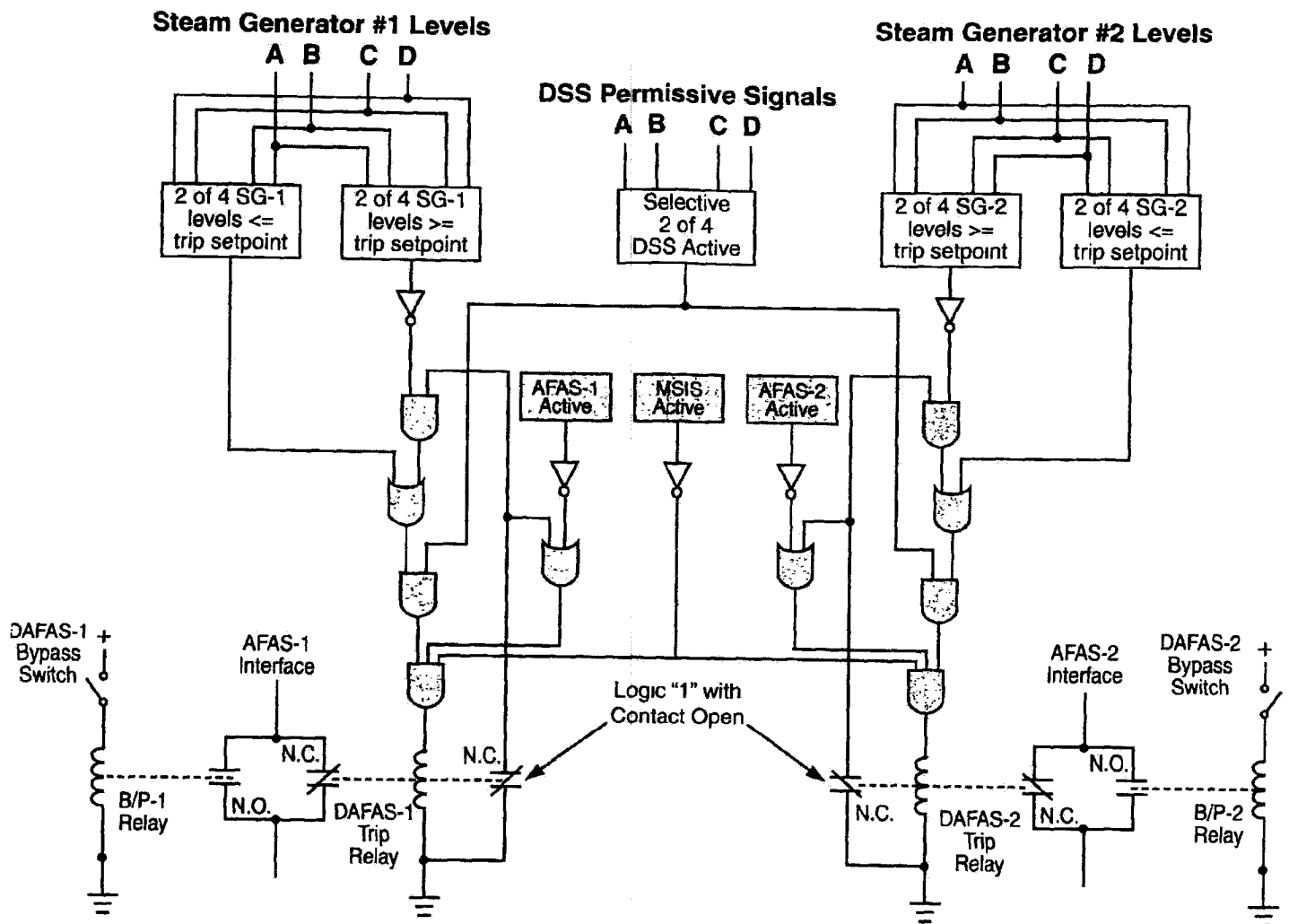
FIGURE 7.3-7D

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PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 DAFAS BLOCK DIAGRAM  
 FIGURE 7.3-7E  
 JUNE 2001 REVISION 11



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

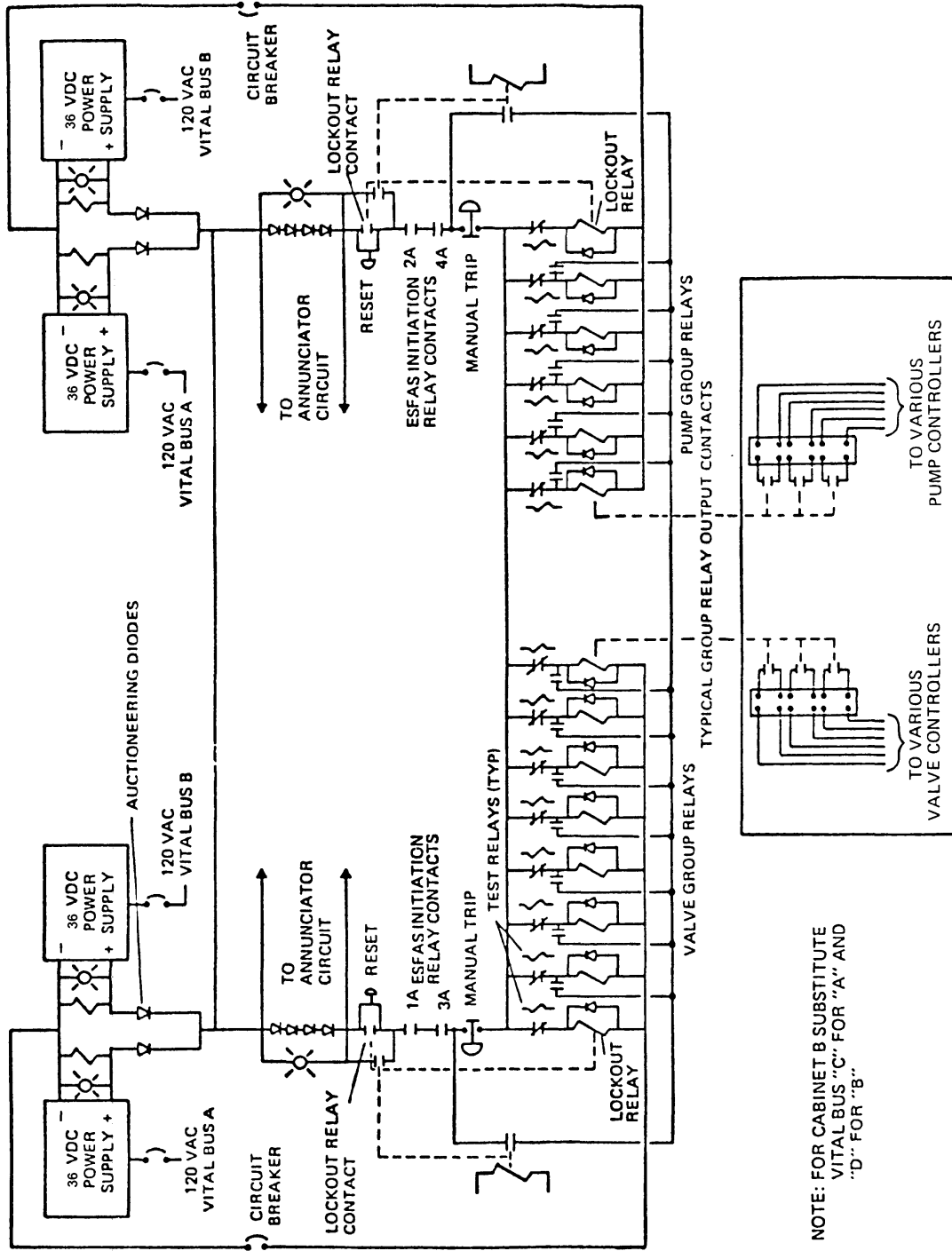
DAFAS LOGIC DIAGRAM

FIGURE 7.3-7F

JUNE 2001

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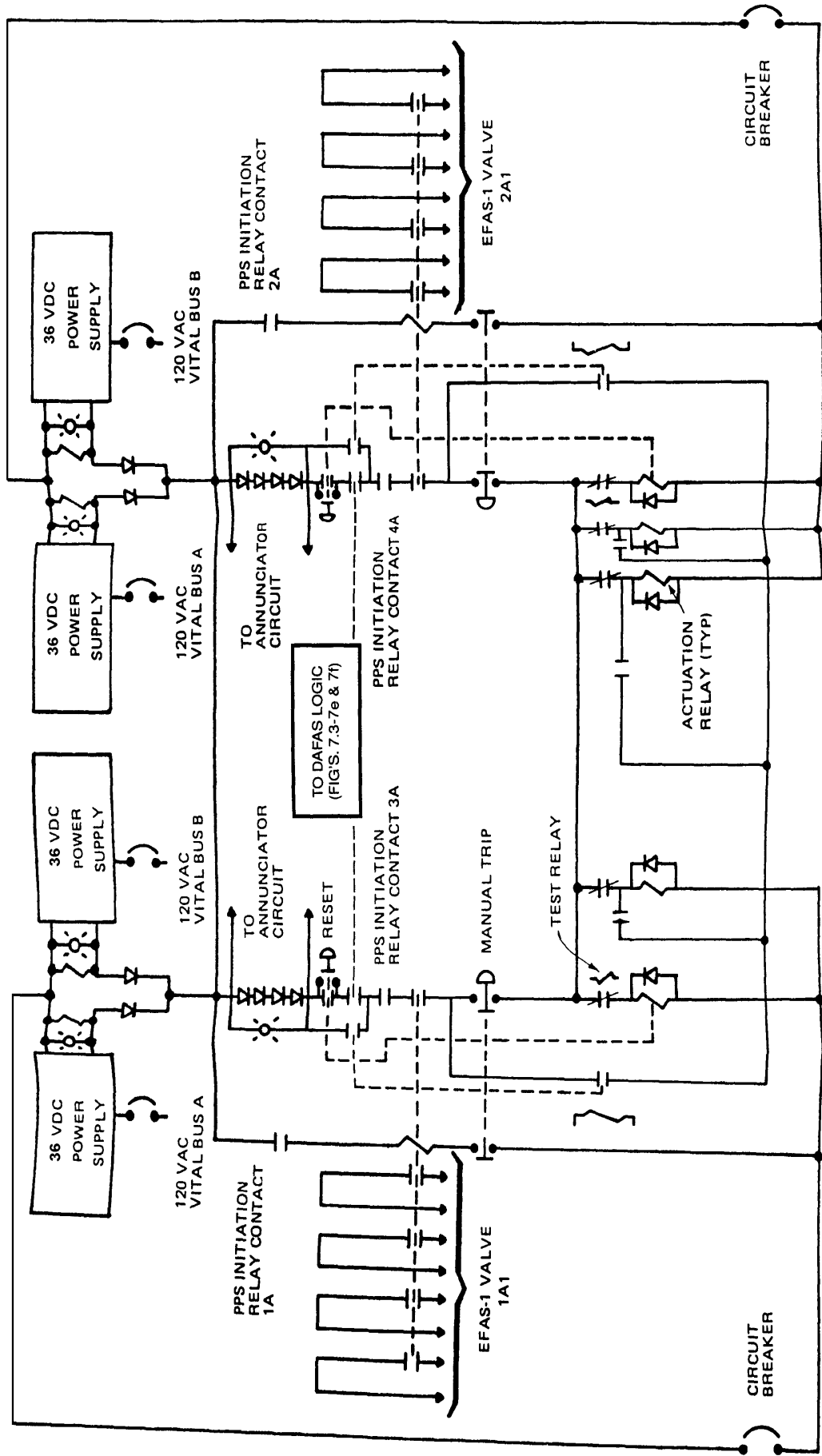
# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

## ESFAS AUXILIARY RELAY CABINET SCHEMATIC DIAGRAM FOR TYPICAL ACTUATION SIGNAL

FIGURE 7.3-8A

JUNE 2009

REVISION 15



NOTE: FOR CABINET B SUBSTITUTE VITAL BUS "C"  
 FOR "A," "D" FOR "B," "EFAS-2 VALVE 1B1" FOR  
 "EFAS-1 VALVE 1A1" AND "EFAS-2 VALVE 2B1"  
 FOR "EFAS-1 VALVE 2A1"

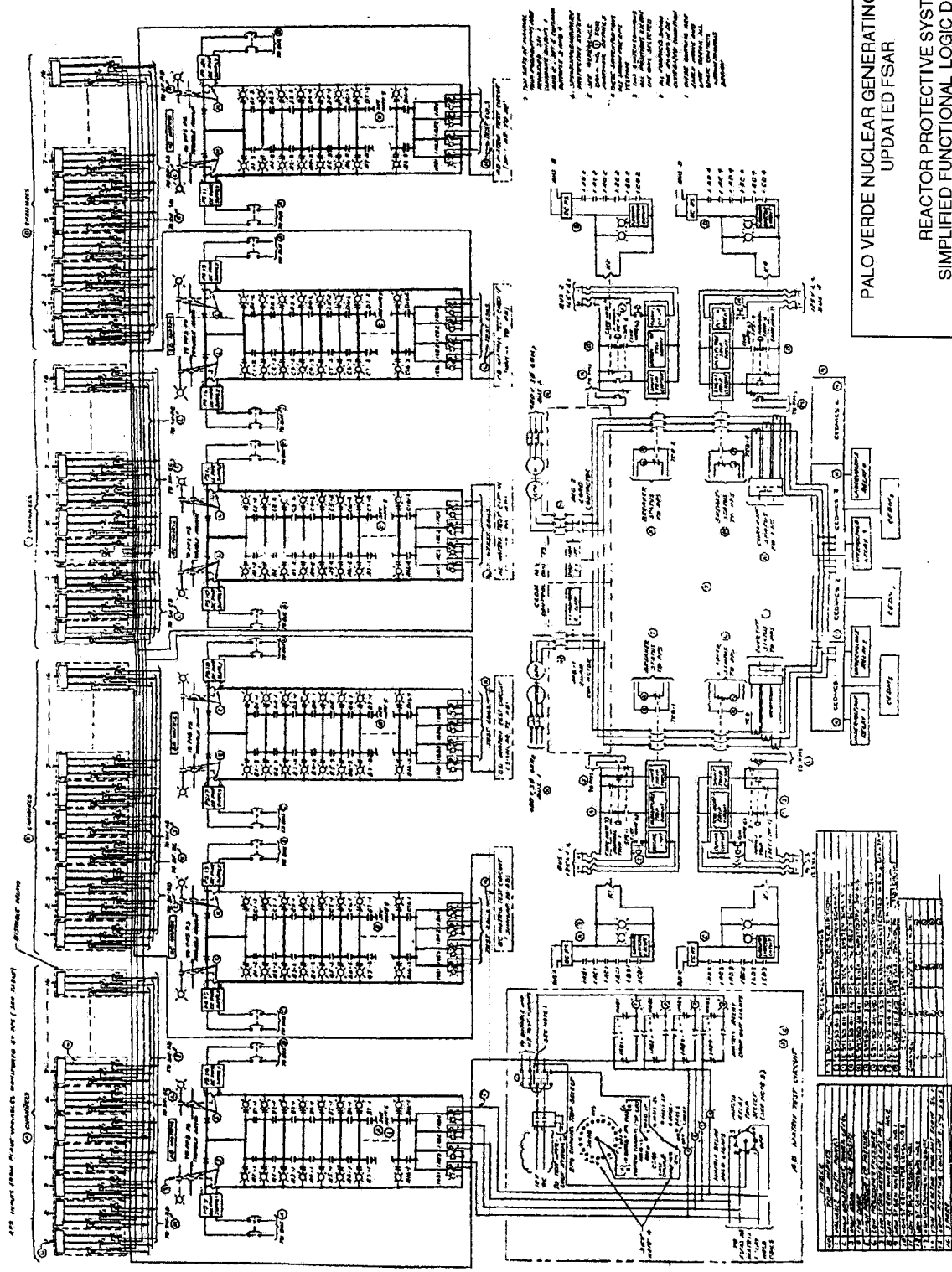
# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

## ESFAS AUXILIARY RELAY CABINET SCHEMATIC DIAGRAM FOR THE EFAS

FIGURE 7.3-8B

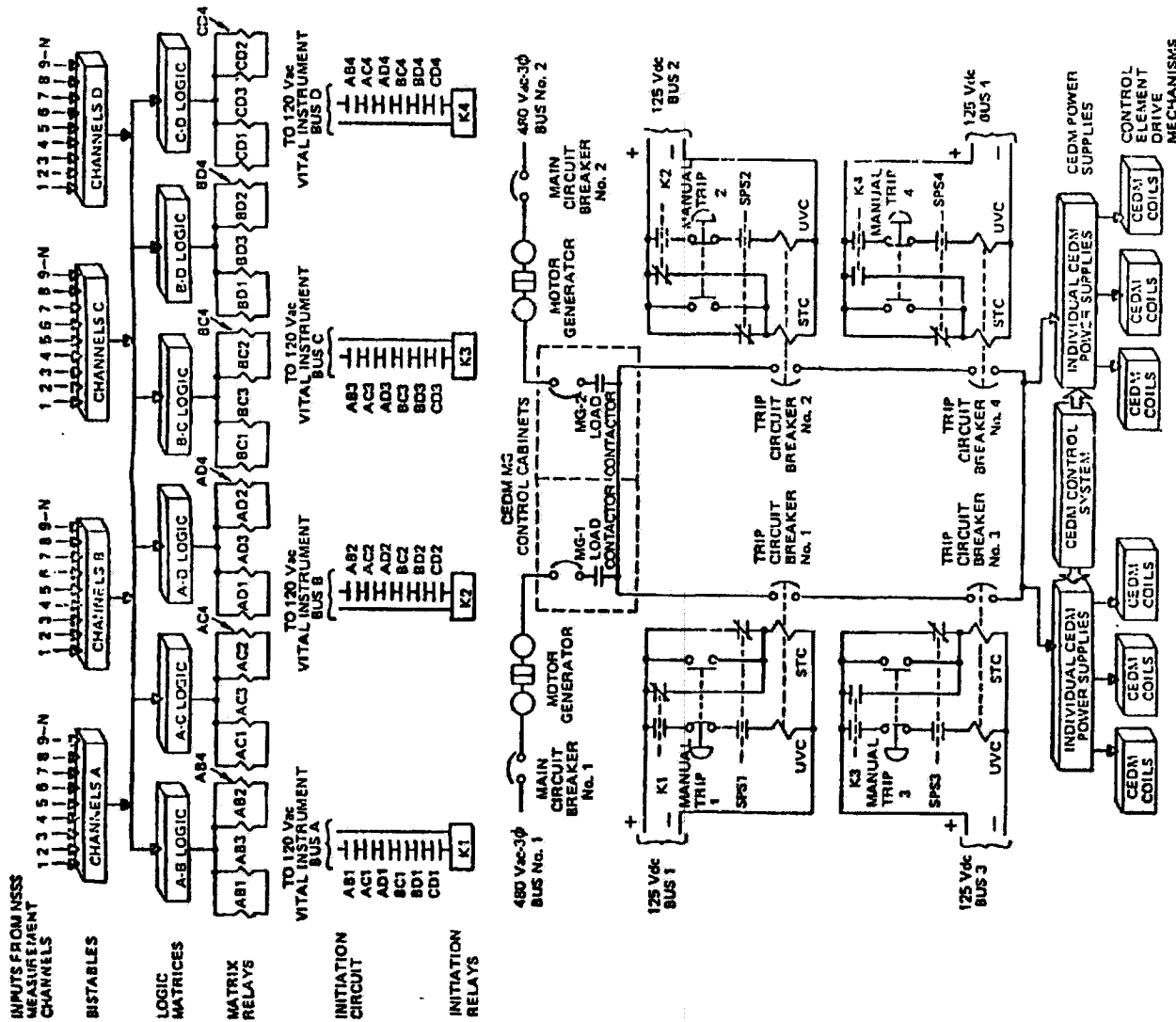
JUNE 2009

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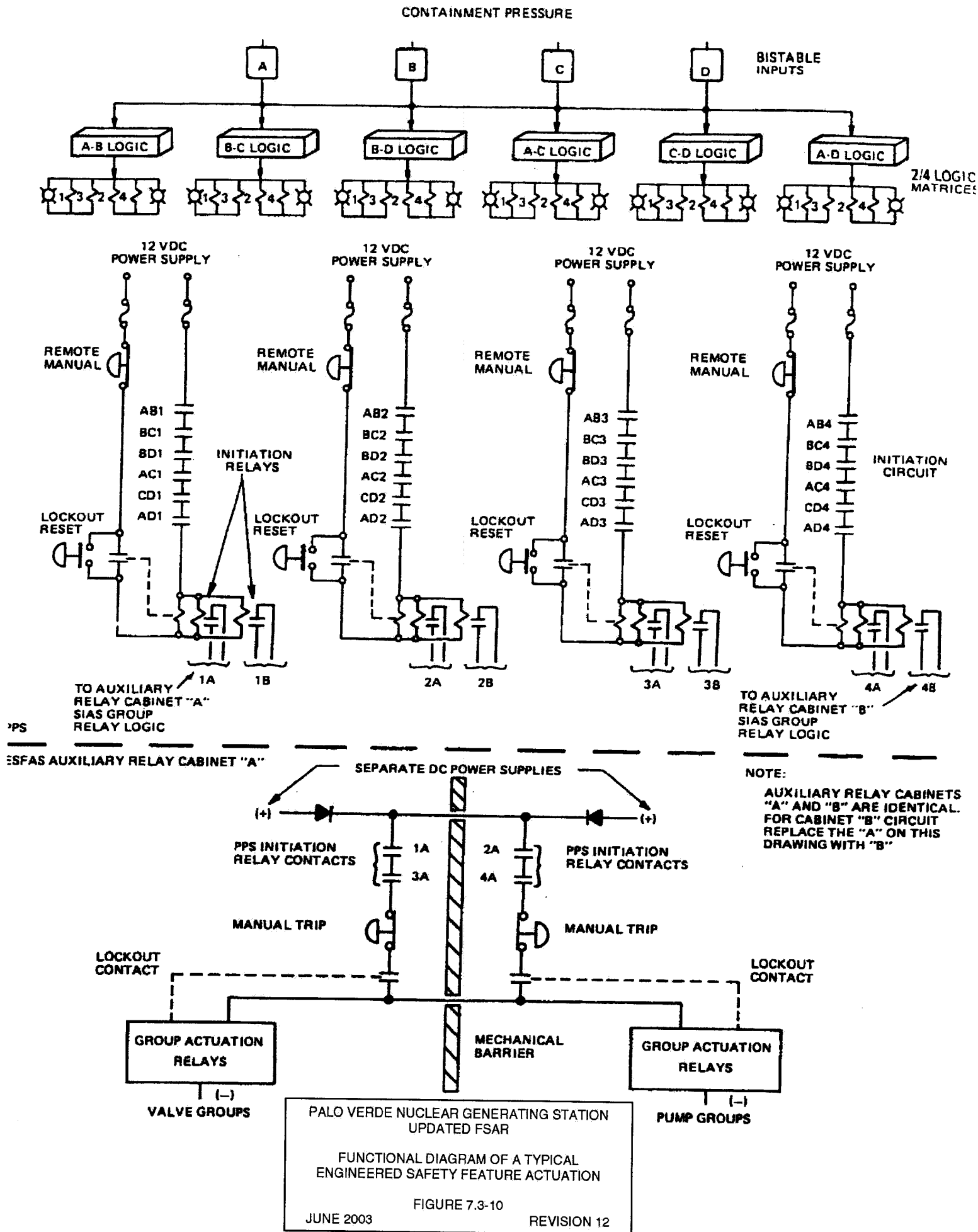


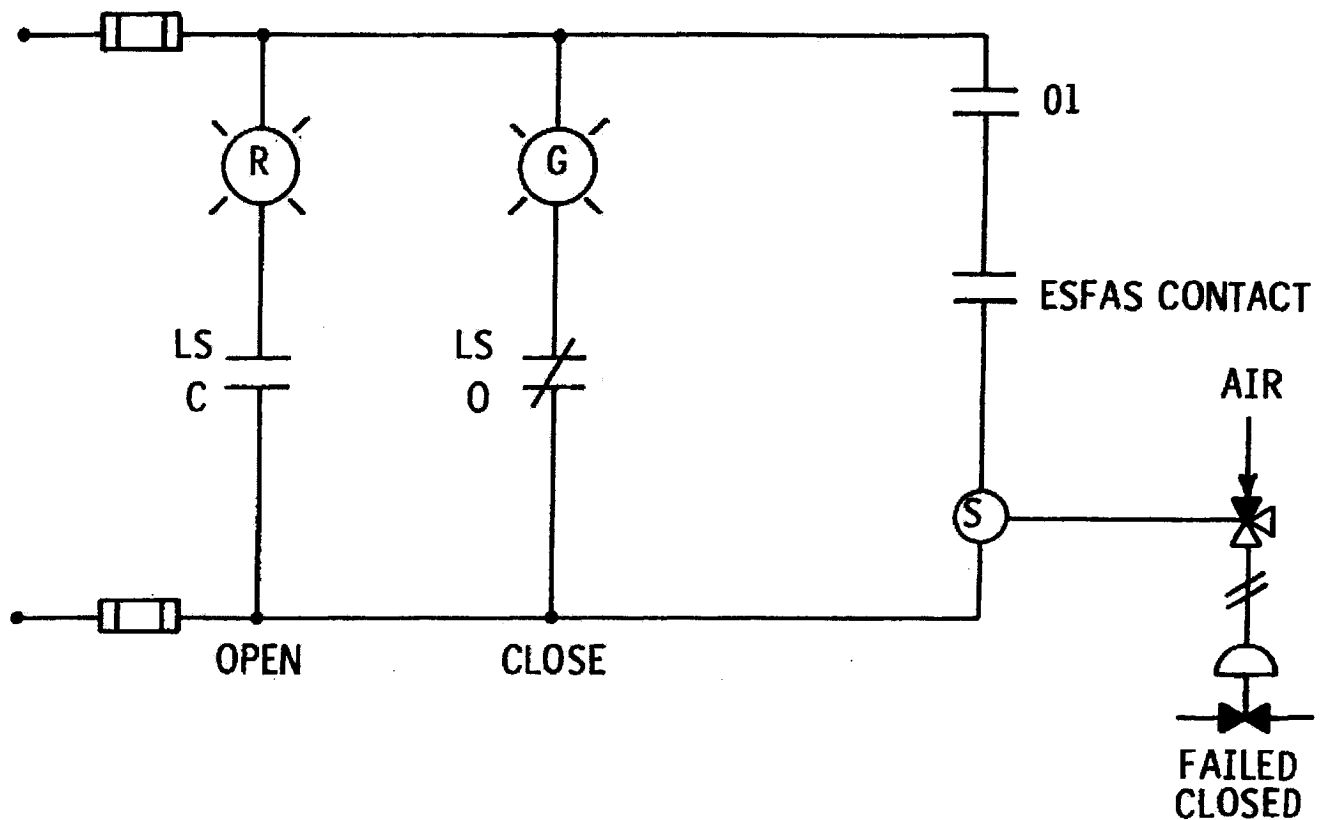
PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 REACTOR PROTECTIVE SYSTEM  
 SIMPLIFIED FUNCTIONAL LOGIC DIAGRAM  
 JUNE 2001  
 FIGURE 7.3-9A  
 REVISION 11





- NOTES:
1. STC = SHUNT TRIP COIL
  2. UVC = UNDER VOLTAGE COIL
  3. SPS = SUPPLEMENTARY PROTECTIVE SYSTEM





1. ESFAS CONTACT SHOWN IN DEENERGIZED POSITION
2. THE ESFAS CONTACT OPENS AND VALVE GOES TO FAILURE POSITION
3. 01 - VALVE CONTROL SWITCH
4. S - SOLENOID
5. L. S. - LIMIT SWITCH

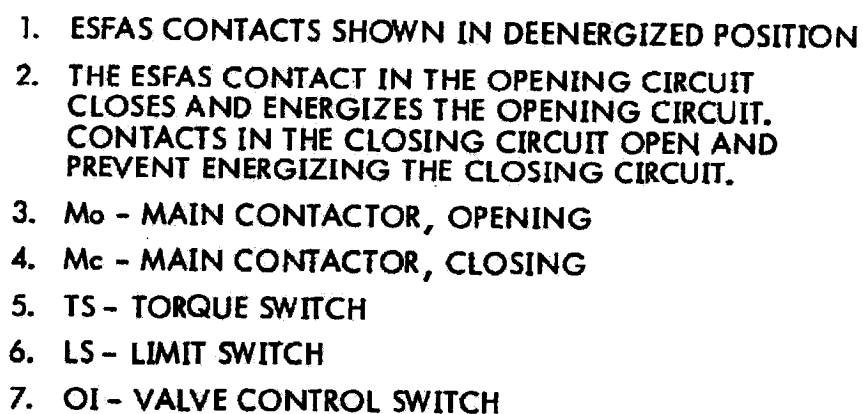
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTROL CIRCUIT FOR A SOLENOID  
ACTUATED  
AIR OPERATED VALVE

FIGURE 7.3-11A

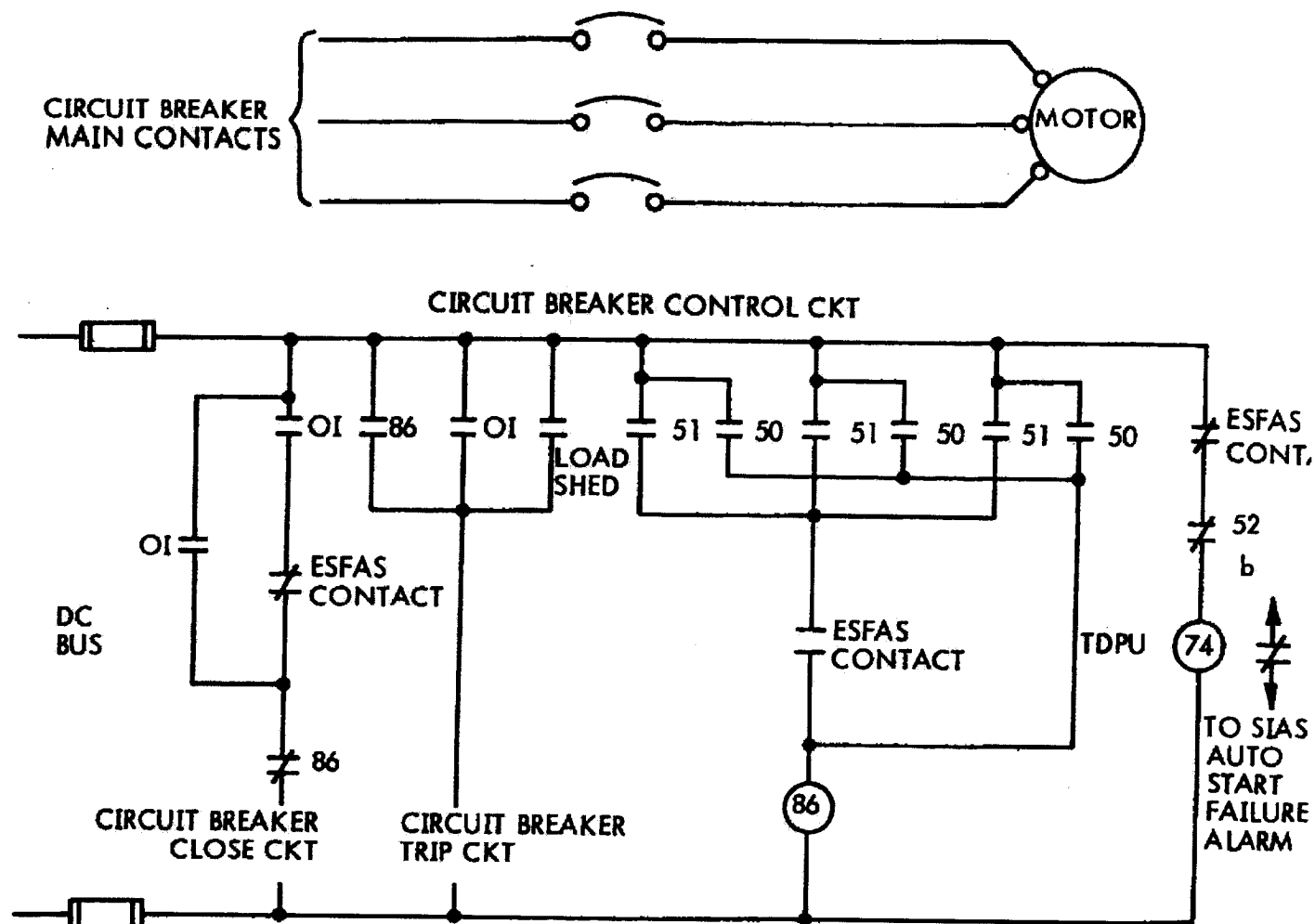
JUNE 2003

REVISION 12



REVISION 12





1. ESFAS CONTACTS SHOWN IN DEENERGIZED POSITION
2. THE ESFAS CONTACT IN ALARM CIRCUIT CLOSSES AND IF THE BREAKER DOES NOT CLOSE AN ALARM WILL BE INITIATED. THE CONTACT IN THE LOCKOUT CIRCUIT PREVENTS THE TRIP CIRCUIT FROM BEING ENERGIZED WHEN A 51 DEVICE IS INITIATED IN COINCIDENT WITH A ESFAS SIGNAL. THE CLOSING CIRCUIT CONTACT CLOSSES AND ENERGIZES THE CLOSING CIRCUIT.
3. 50 - INSTANTANEOUS OVERCURRENT RELAY
4. 51 - TIME OVERCURRENT RELAY
5. OI - CIRCUIT BREAKER CONTROL SWITCH
6. 86 - LOCK-OUT RELAY
7. 52 - CIRCUIT BREAKER AUXILIARY CONTACT, NORMALLY CLOSED
8. 74 - ALARM RELAY

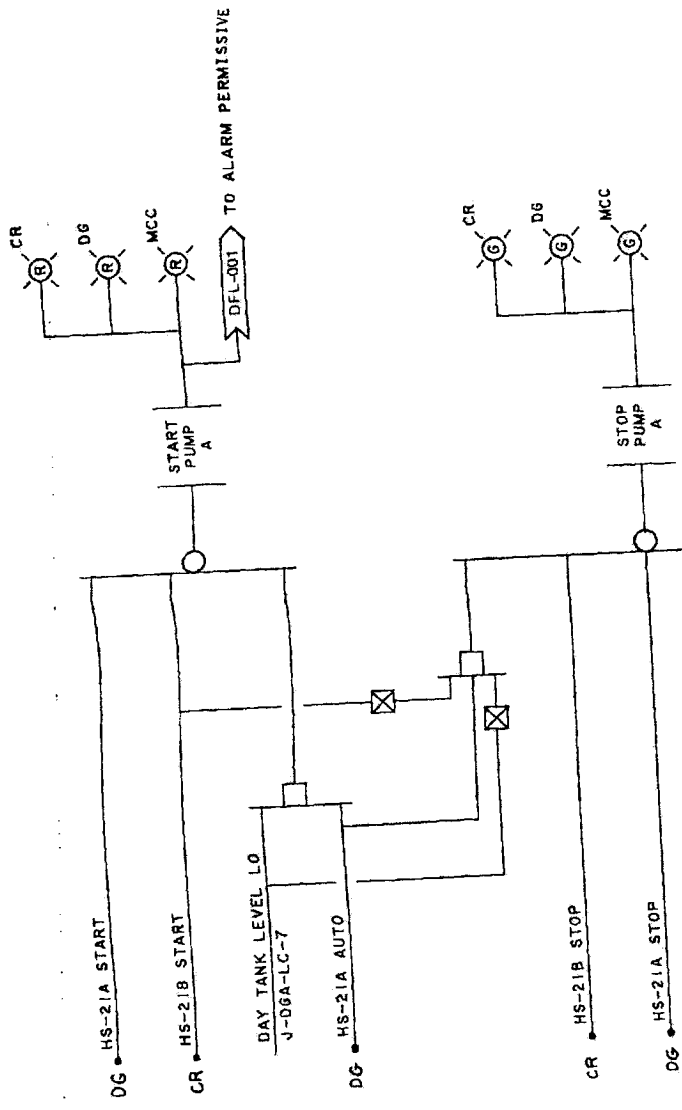
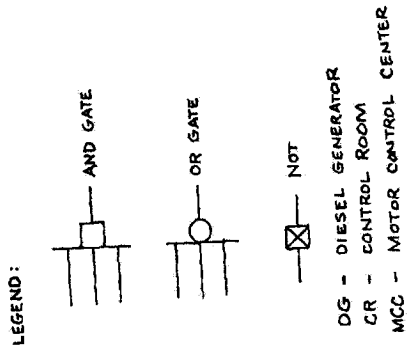
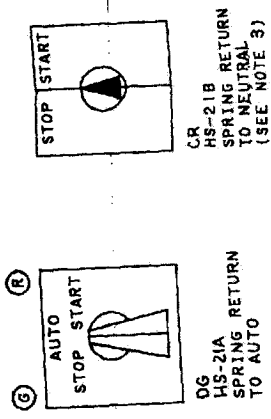
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTROL CIRCUIT FOR A  
PUMP MOTOR

FIGURE 7.3-11C

JUNE 2003

REVISION 12



- NOTES:
1. PUMPS ARE 480V MCC
  2. PUMPS ARE Q-ITEMS.
  3. HOLDING CONTROL SWITCH HS-21B IN "START" WILL OVERRIDE THE AUTO STOP SIGNAL.

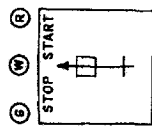
ELECTRICAL PROTECTION

TRAIN	PUMP ID	CONTROL SWITCH (CR)	CONTROL SWITCH LOCAL	DAY TANK LEVEL SW
A	M-0FA-P01	HS-21B	HS-21A	HI-LO
B	M-0FB-P01	HS-22B	HS-22A	LC-7
				LC-6

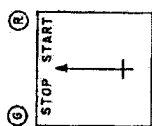
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTROL LOGIC DIAGRAM  
DIESEL GENERATOR FUEL OIL

TRANSFER PUMPS

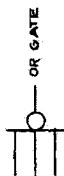
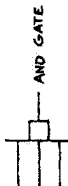


SPRING RETURN  
TO NEUTRAL



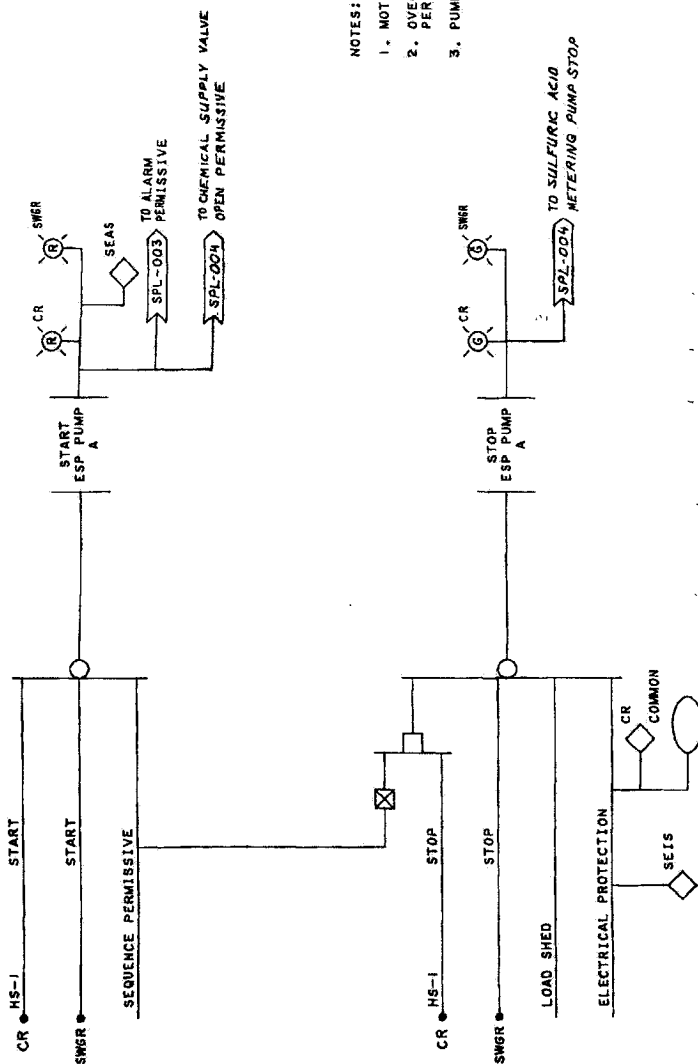
SPRING RETURN  
TO NEUTRAL

# LEGEND:



CR - CONTROL ROOM  
SWGR - SWITCHGEAR

- NOTES:
1. MOTORS ARE 4160V SWGR.
  2. OVERRIDE IMPLEMENTED AS PER FIGURE 7.4-5
  3. PUMPS ARE Q-ITEMS.

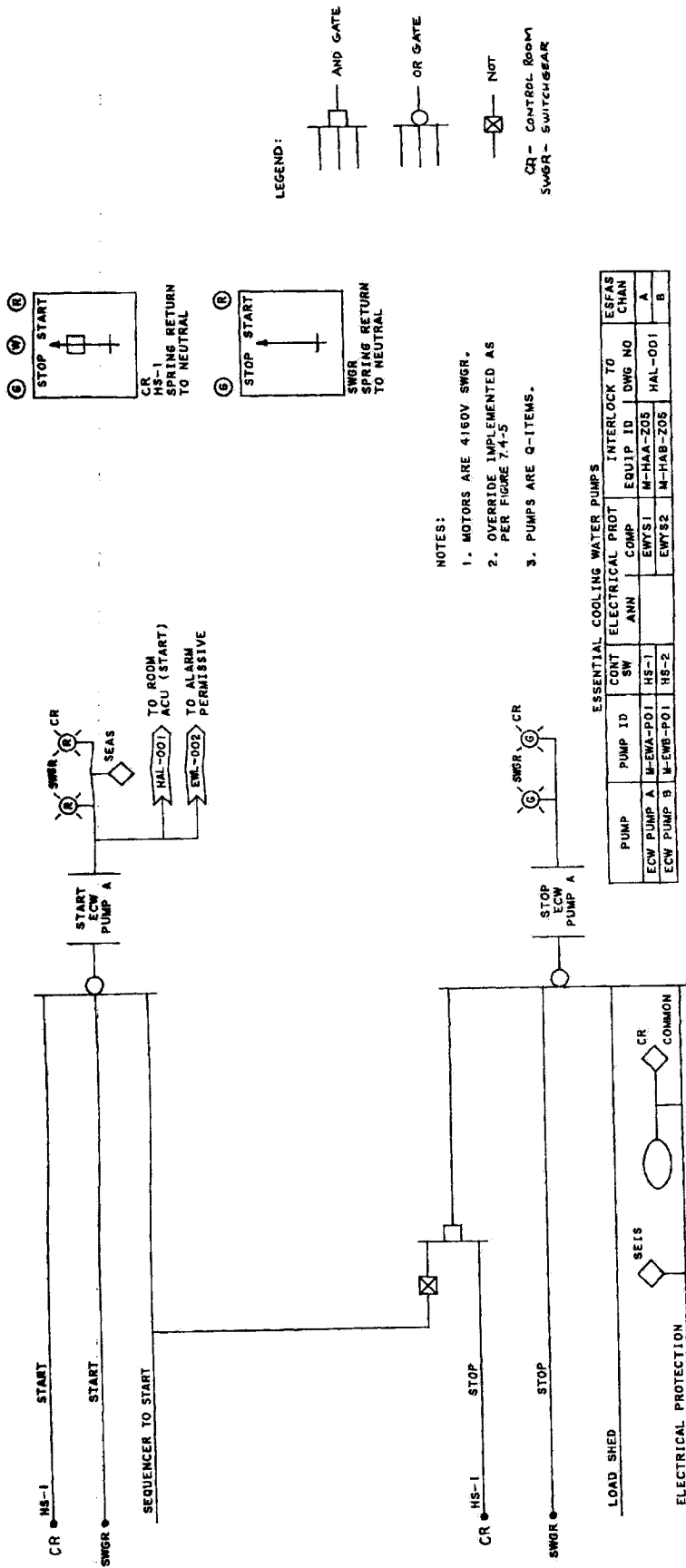


ESSENTIAL SPRAY POND PUMPS									
INTERLOCK WITH EQUIP ID	INTERLOCK WITH EQUIP ID	INTERLOCK WITH EQUIP ID	PUMP ID	CONTROL SWITCH	ELECT ANN	PROT COMP	ESFAS CHAN		
HY-99	SPL-004	M-SAN-A04A	M-SAN-P01	HS-1		SPYS1	A		
HY-100	SPL-004	M-SAN-A04B	M-SAN-P02	HS-2		SPYS2	B		

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

## CONTROL LOGIC DIAGRAM ESSENTIAL SPRAY POND PUMPS

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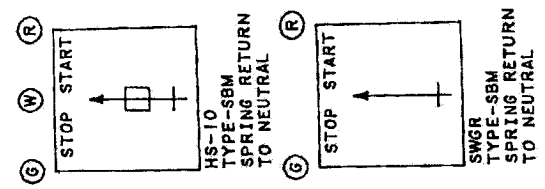
# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

## CONTROL LOGIC DIAGRAM ESSENTIAL COOLING WATER PUMPS

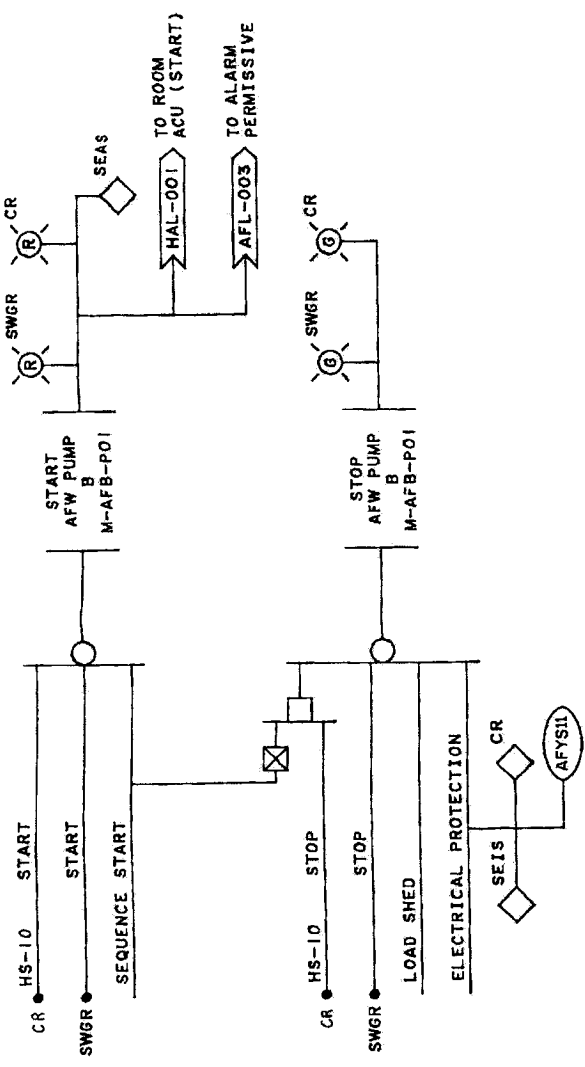
FIGURE 7.4-3

JUNE 2001

REVISION 11



- NOTES:
1. MOTOR IS 4160V SWGR.
  2. OVERRIDE IS IMPLEMENTED AS PER FIGURE 74-5
  3. PUMP IS A Q-ITEM.



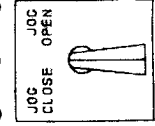
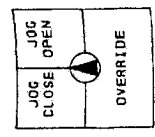
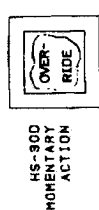
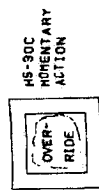
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTROL LOGIC DIAGRAM  
AUXILIARY FEEDWATER PUMP B

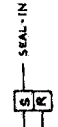
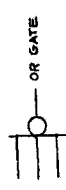
FIGURE 7.4-4 SHEET 1 OF 3

JUNE 2001

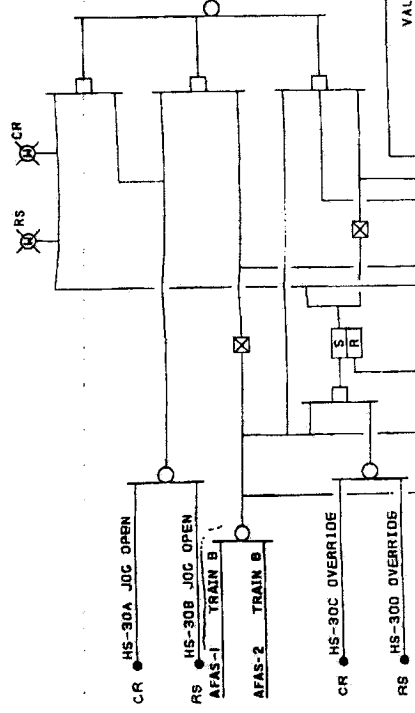
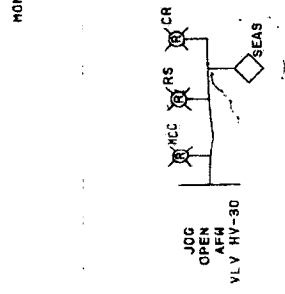
REVISION 11



LEGEND:



CR — CONTROL ROOM  
RS — REMOTE SHUTDOWN PANEL  
MCC — MOTOR CONTROL CENTER



AUXILIARY FEEDWATER (SAFETY) REGULATING VALVES

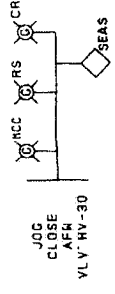
VALVE	VALVE ID	CONTROL SWITCH	AFAS CYCLING	AFAS1/2 TRAIN	APPLICABLE NOTES
AFH PP.B TO S/C #1 (UPSTREAM)	HY-30	HS-30A&C	1 TRAIN B	B	1.3A, 9
AFH PP.B TO S/C #2 (UPSTREAM)	HY-31	HS-31A&C	2 TRAIN B	B	1.3A, 9
AFH PP.A TO S/C #1 (UPSTREAM)	HY-32	HS-32A&C	1 TRAIN A	A	2.3A, 9
AFH PP.A TO S/C #2 (UPSTREAM)	HY-33	HS-33A&C	2 TRAIN A	A	2.3A, 5, 9
AFH PP.B TO S/C #1 (DOWNSTREAM)	UV-34	HS-34A&C	1 TRAIN B	B	1.3B, 4
AFH PP.B TO S/C #2 (DOWNSTREAM)	UV-35	HS-35A&C	2 TRAIN B	B	1.3B, 4
AFH PP.A TO S/C #1 (DOWNSTREAM)	UV-36	HS-36A&C	1 TRAIN A	A	2.3B, 4, 5
AFH PP.A TO S/C #2 (DOWNSTREAM)	UV-37	HS-37A&C	2 TRAIN A	A	2.3B, 4

NOTES - SEE TABLE FOR APPLICATION

1. VALVE MOTORS ARE 480V MCC.
2. VALVE MOTORS ARE 125V MCC.
- 3A. GLOBE VALVE — OPEN — LIMIT STOPPED
- 3B. GATE VALVE — CLOSE — TORQUE SEATED
4. JOG FEATURE NOT USED — VALVE WILL NOT REVERSE TRAVEL WHILE IN MOTION EXCEPT DURING AFAS.
5. ISOLATION OF CYCLING AND NORMAL AFAS SIGNALS REQUIRED SINCE POWER IS FROM CHANNEL C BATTERIES.

NOTES - GENERAL - APPLIES TO ALL VALVES

6. VALVES ARE Q-ITEMS.
7. OVERRIDE IMPLEMENTED AS SHOWN.
8. VALVE POSITION INDICATOR IN CONTROL ROOM AND REMOTE SHUTDOWN ROOM FROM 2K 32 POTENTIOMETER VALVE POSITION TRANSMITTER.



AFAS-1 TRAIN B CYCLING

HS-30A JOG CLOSE

HS-30B JOG CLOSE

TORQUE PROTECTION

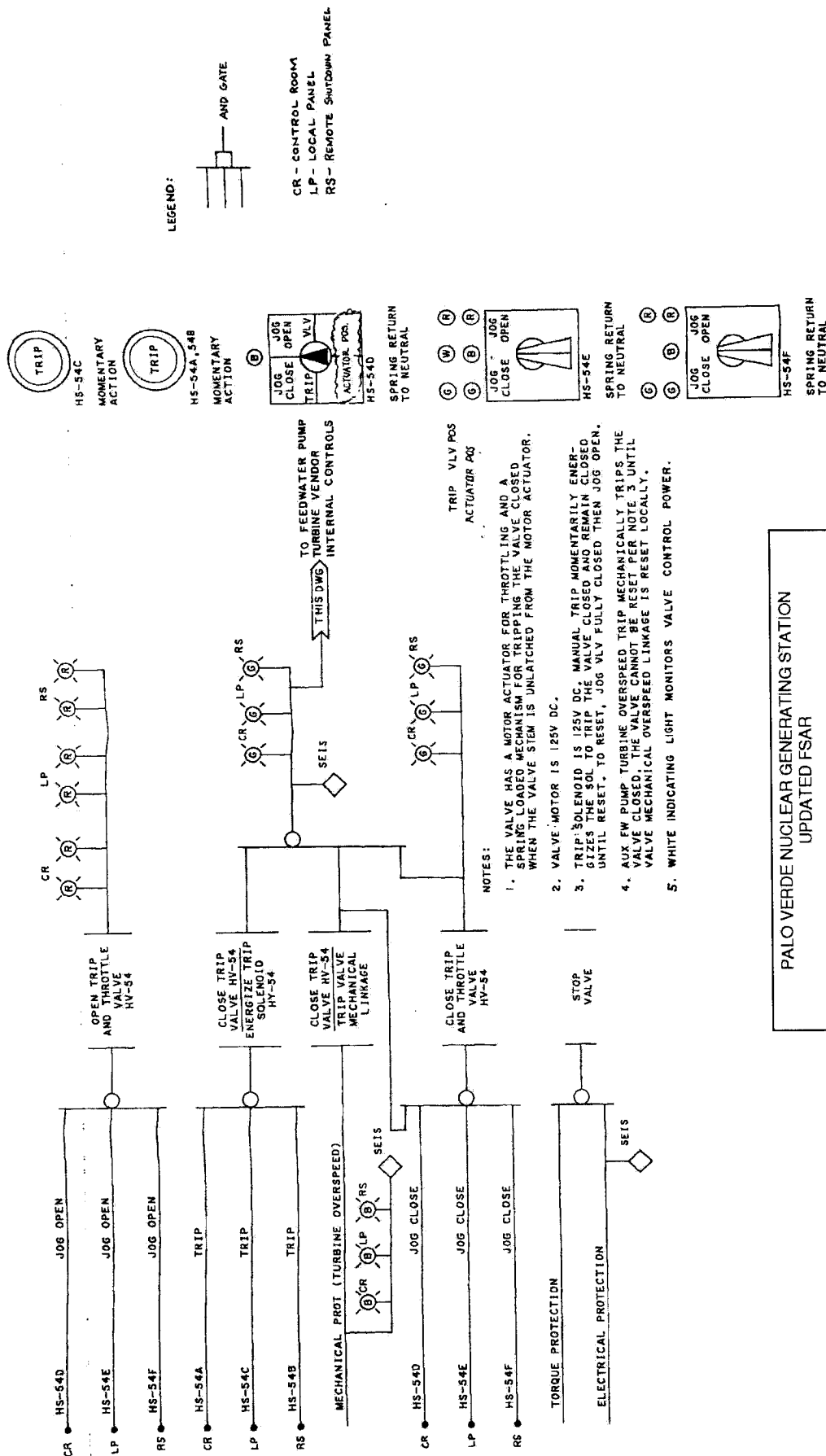
ELECTRICAL PROTECTION

STOP VALVE



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTROL LOGIC DIAGRAM  
AUXILIARY FEEDWATER  
REGULATING VALVES

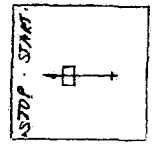


PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTROL LOGIC DIAGRAM AUX  
FEEDWATER PUMP A TURB TRIP  
& THROTTLE VALVE J-AFA HV-54

FIGURE 7.4-4 SHEET 3 OF 3  
JUNE 2001  
REVISION 11

⑤ ④ ③



MS-1

SPRING RETURN TO NEUTRAL

HS-1 START

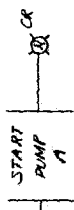
ESFAS OR SEQUENCER START  
(WHERE APPLICABLE - SEE NOTE 4)

LDP SIGNAL  
(WHERE APPLICABLE - SEE NOTE 4)

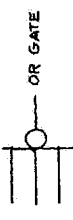
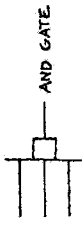
HS-1 STOP

LOAD SHED  
(WHERE APPLICABLE - SEE NOTE 4)

ELECTRICAL PROTECTION



LEGEND:



NOTES:

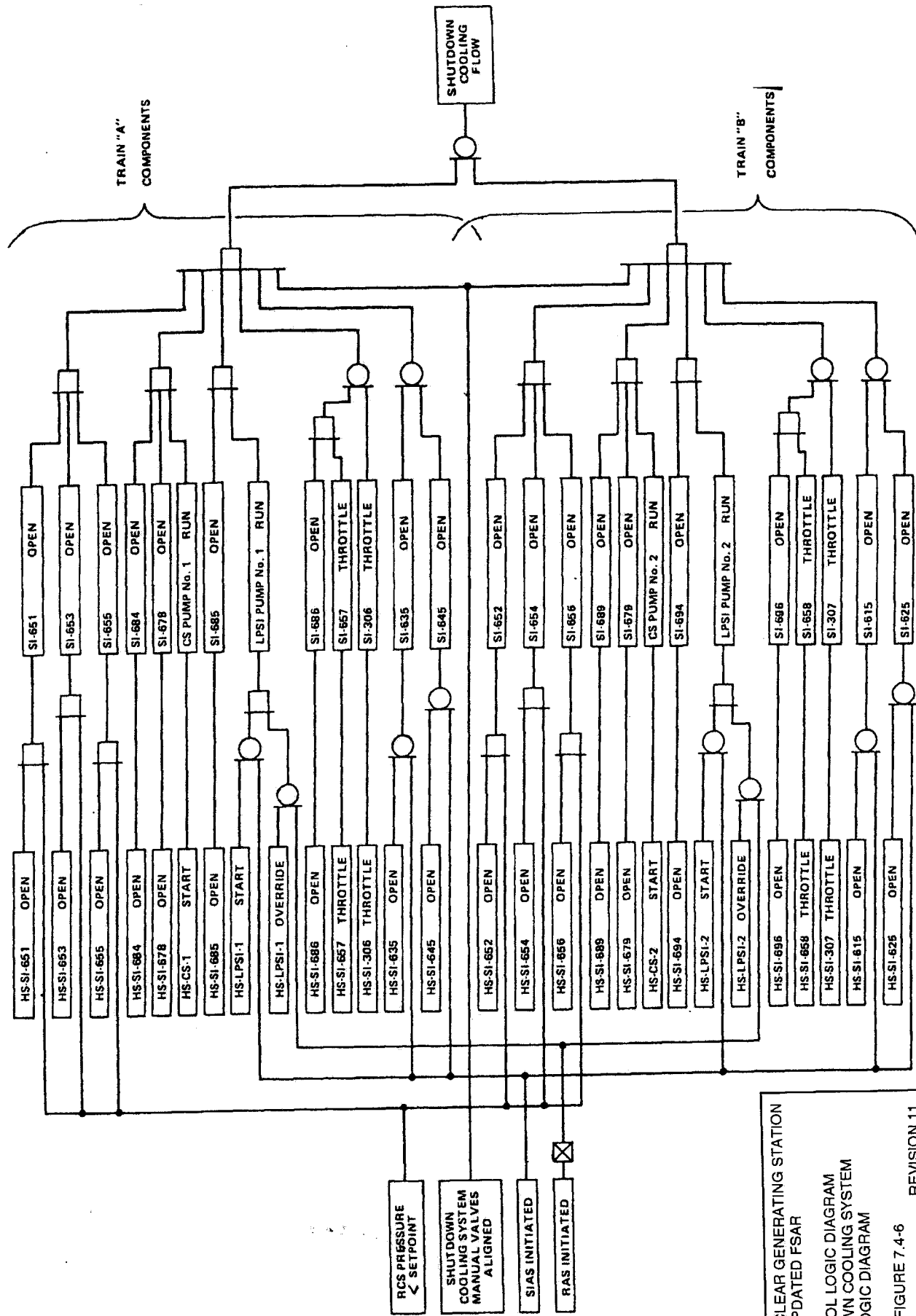
- 1) OVERRIDE MODE INITIATED BY PULLING CONTROL SWITCH TO THE ESFAS INITIATED POSITION OR CONDITION AS IN THIS DIAGRAM TO START.
- 2) OVERRIDE CAN ONLY BE INITIATED DURING AN ESFAS CONDITION.
- 3) A WHITE LIGHT SHALL INDICATE THE OVERRIDE MODE.
- 4) SEE INDIVIDUAL COMPONENT LOGIC DIAGRAMS.

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CONTROL LOGIC DIAGRAM  
OVERRIDE MODE AS APPLIED TO  
ESFAS CONTROL

JUNE 2001  
FIGURE 7.4-5  
REVISION 11





PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 CONTROL LOGIC DIAGRAM  
 SHUTDOWN COOLING SYSTEM  
 LOGIC DIAGRAM  
 FIGURE 7.4-6  
 JUNE 2001  
 REVISION 11

This Figure has been redacted.

This Figure has been redacted.

SESS CONTROL TRAIN A						
CONTAINMENT ISOLATION	MAIN STEAM ISOLATION	HIGH PRESSURE SAFETY INJECTION	RECIRCULATION	AUX FW STEAM GEN NO.1	AUX FW STEAM GEN NO. 2	SPARE
LOW PRESSURE SAFETY INJECTION	PASSIVE SAFETY INJECTION	CONTAINMENT SPRAY	CHEM ADD	CONTAINMENT PURGE ISOLATION	SPARE	SPARE
CONTROL ROOM FILTRATION & ISOLATION	CONTROL BLDG ESSENTIAL ACV's	FUEL BUILDING ESSENTIAL VENTILATION	CONTAINMENT GAS CONTROL	SPARE	SPARE	SPARE
ESSENTIAL CHILLED WATER	ESSENTIAL COOLING WATER	ESSENTIAL SPRAY POND	DIESEL GENERATOR	IE LOAD CENTER BREAKERS	NON - ESF LOAD SHED	SPARE

**MANUAL BYPASS INITIATE**

ALARM RESET	FLASHER RESET	LAMP RESET	BYPASS/NOP TEST	STATUS TEST	STATUS DISPLAY
-------------	---------------	------------	-----------------	-------------	----------------

**SYSTEM RESET AND TEST**

**NOTES:**

1. ALL SWITCHED ARE MASTER SPECIALTIES  
MODEL 10H TWIST - LITE OR EQUIVALENT  
WITH P/N CM-382 LAMPS.
  - MANUAL BYPASS - ALTERNATE ACTION SWITCHCH
  - SYSTEM RESET, TEST AND DISPLAY - MOMENTARY ACTION PUSHBUTTONS
2. CONTROL PANNEL IS INSERT TO MAIN ESF CONTROL BOARD

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY EQUIPMENT STATUS SYSTEM  
CONTROL PANEL

FIGURE 7.5-2 SHEET 1 OF 2

JUNE 2001

REVISION 11

SESS CONTROL TRAIN A							
CONTAINMENT ISOLATION	MAIN STEAM ISOLATION	HIGH PRESSURE SAFETY INJECTION	RECIRCULATION	AUX FW STEAM GEN NO 1	AUX FW STEAM GEN NO. 2	SPARE	SPARE
LOW PRESSURE SAFETY INJECTION	PASSIVE SAFETY INJECTION	CONTAINMENT SPRAY		CONTAINMENT PURGE ISOLATION	SPARE	SPARE	SPARE
CONTROL ROOM FILTRATION & ISOLATION	CONTROL BLDG ESSENTIAL ACV's	FUEL BUILDING ESSENTIAL VENTILATION	CONTAINMENT GAS CONTROL	SPARE	SPARE	SPARE	SPARE
ESSENTIAL CHILLED WATER	ESSENTIAL COOLING WATER	ESSENTIAL SPRAY POND	DIESEL GENERATOR	IE LOAD CENTER BREAKERS	NON - ESF LOAD SHED	SPARE	SPARE

**NOTES**

- 1 STATUS DISPLAY PANEL IS INSERT TO MAIN ESF CONTROL BOARD

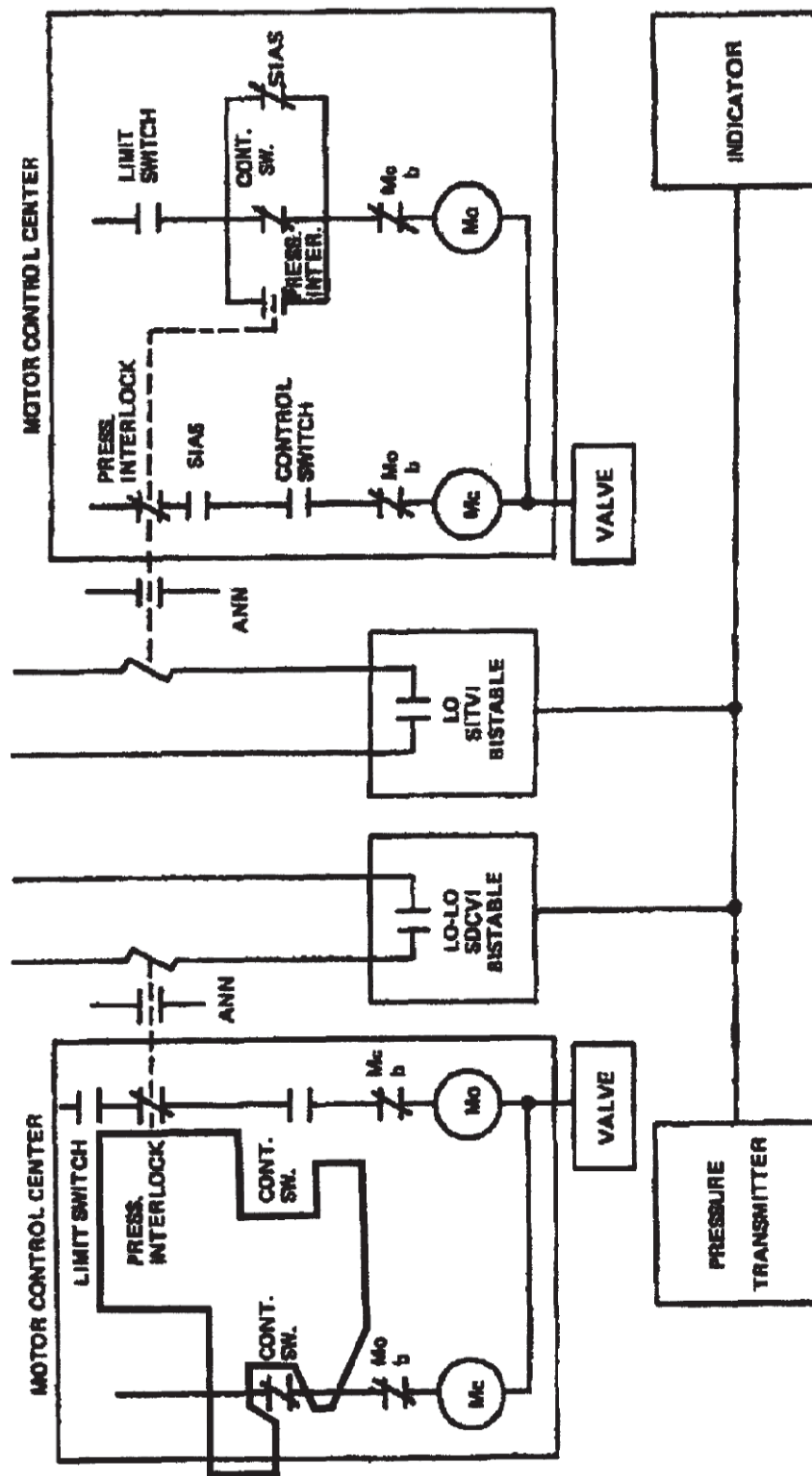
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SAFETY EQUIPMENT STATUS SYSTEM  
ANNUNCIATOR PANEL

FIGURE 7.5-2 SHEET 2 OF 2

JUNE 2001

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SDCVI – SHUTDOWN COOLING VALVE INTERLOCKS

SITVI – SAFETY INJECTION TANK VALVE INTERLOCKS

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

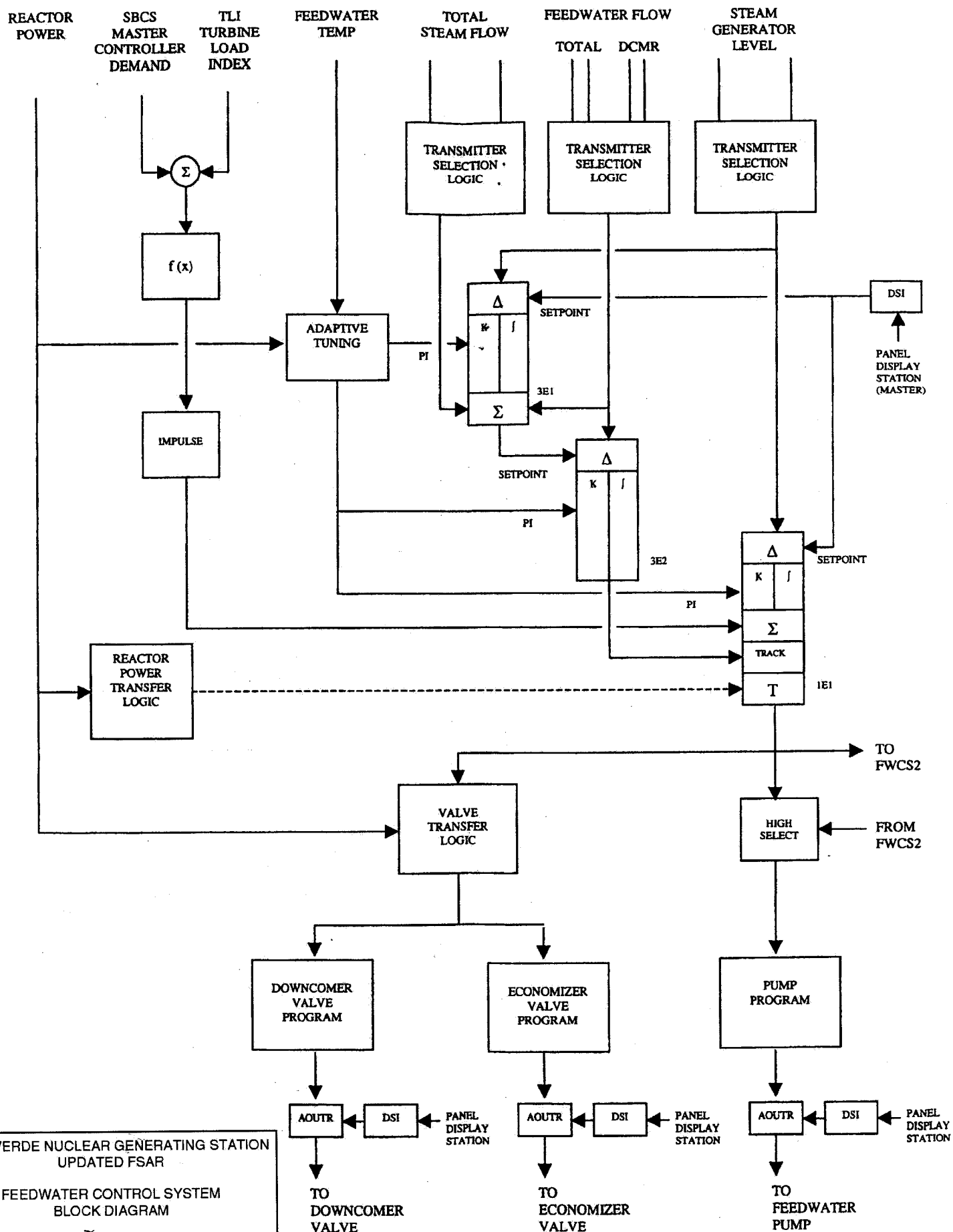
SAFETY-RELATED INTERLOCK LOGIC CIRCUIT

FIGURE 7.6-1

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

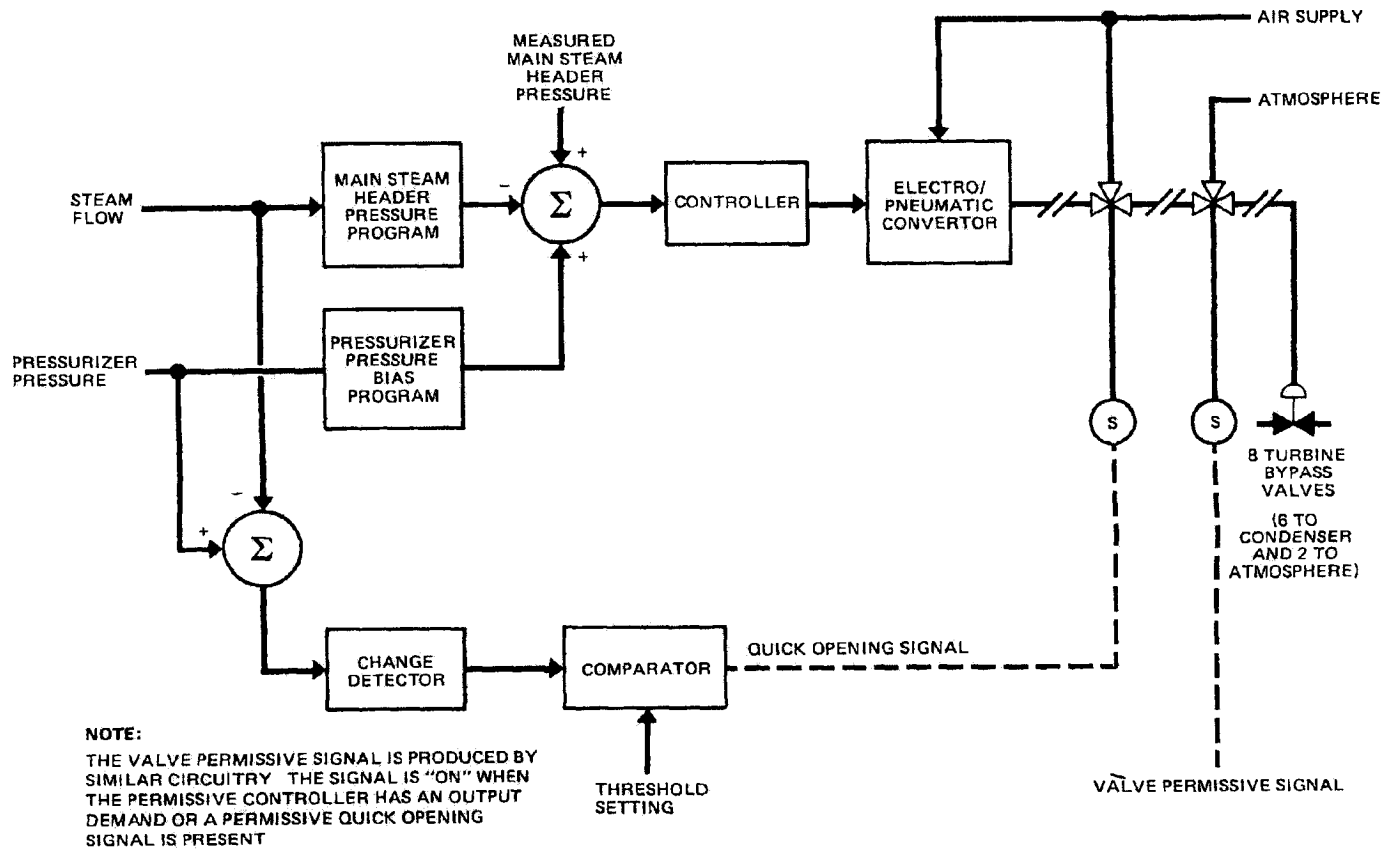
FEEDWATER CONTROL SYSTEM  
BLOCK DIAGRAM

FIGURE 7.7-1

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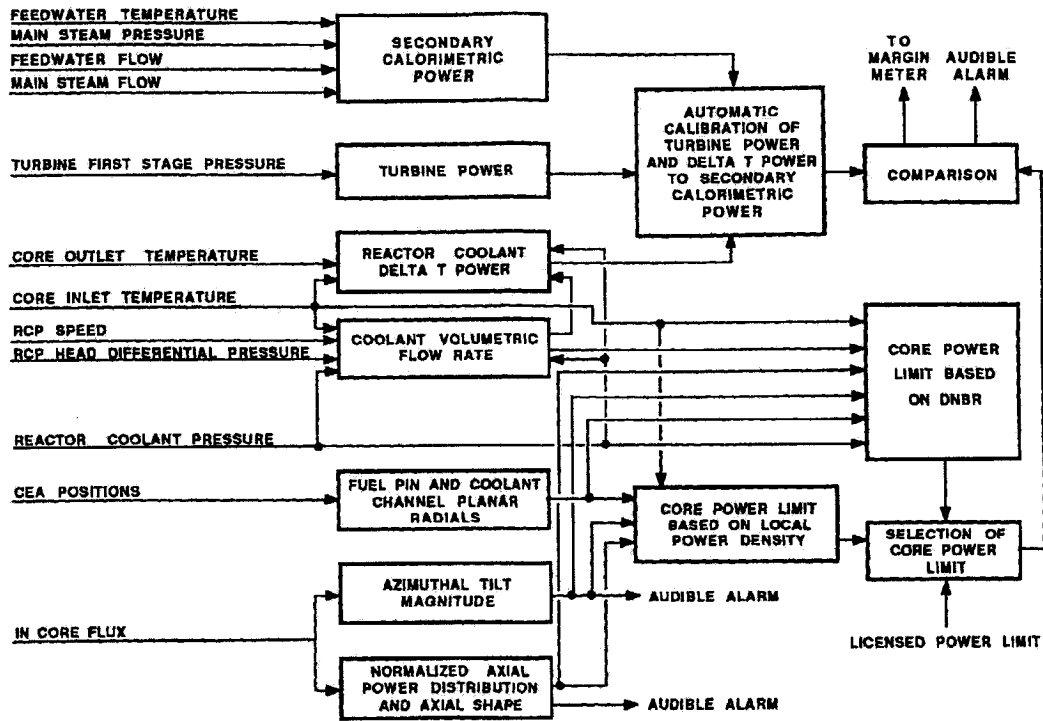
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

STEAM BYPASS CONTROL  
SYSTEM BLOCK DIAGRAM

FIGURE 7.7-2

JUNE 2001

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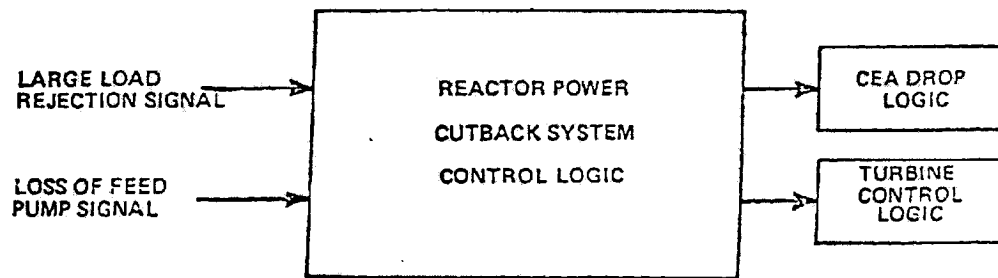
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

FUNCTIONAL DIAGRAM OF THE CORE OPERATING  
LIMIT SUPERVISORY SYSTEM

FIGURE 7.7-3

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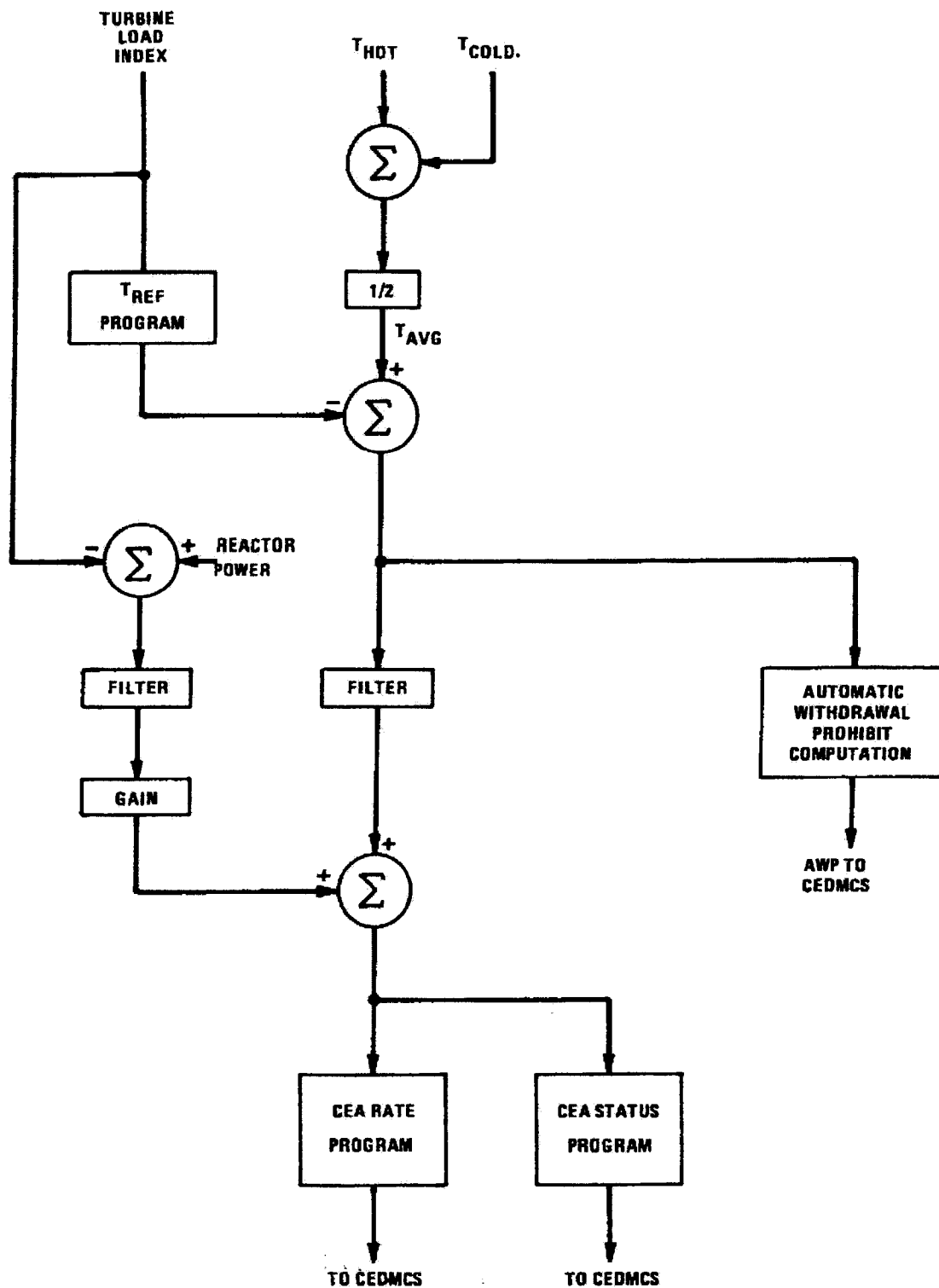
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

RPCS BLOCK DIAGRAM

FIGURE 7.7-4

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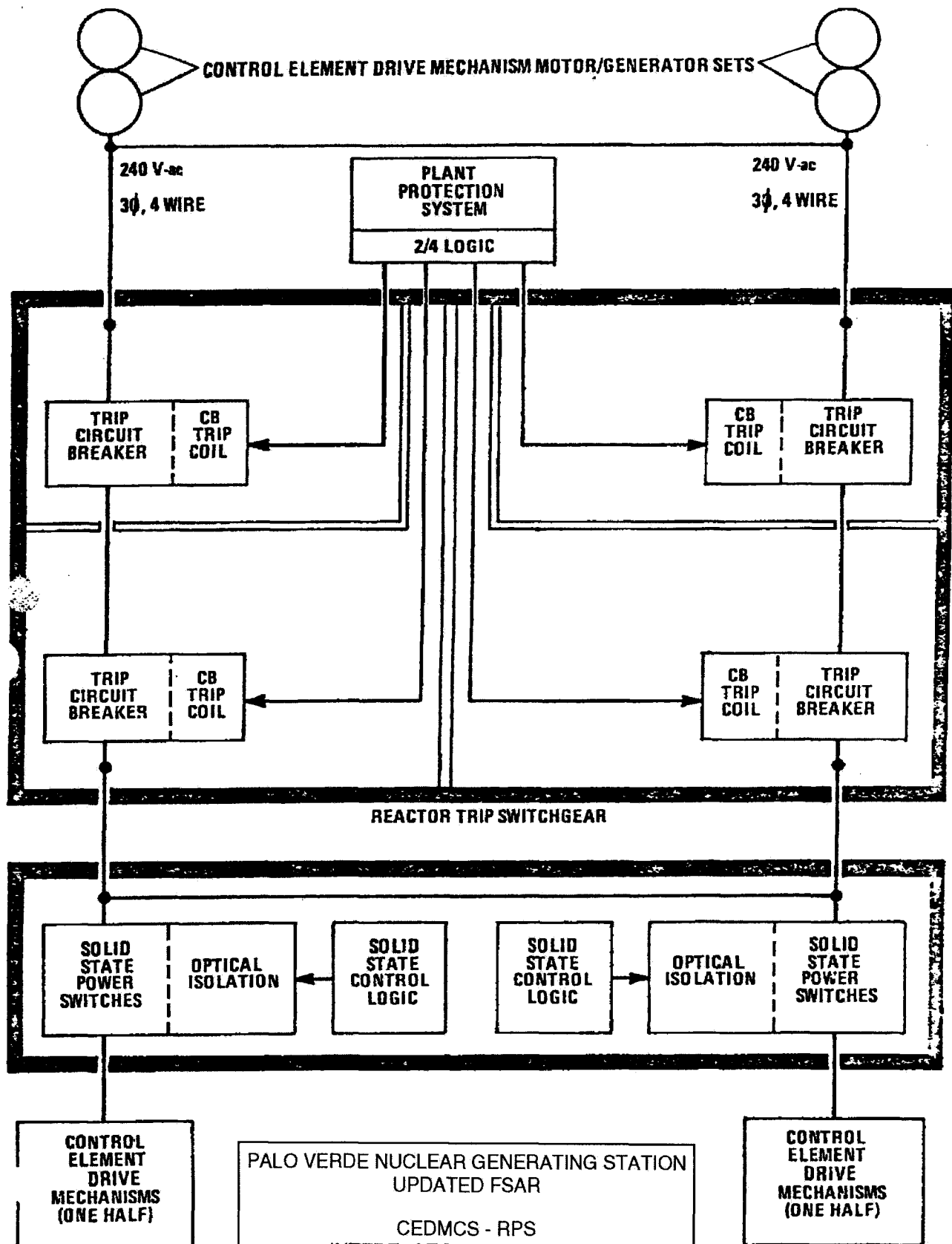
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REACTOR REGULATING SYSTEM

FIGURE 7.7-5

JUNE 2003

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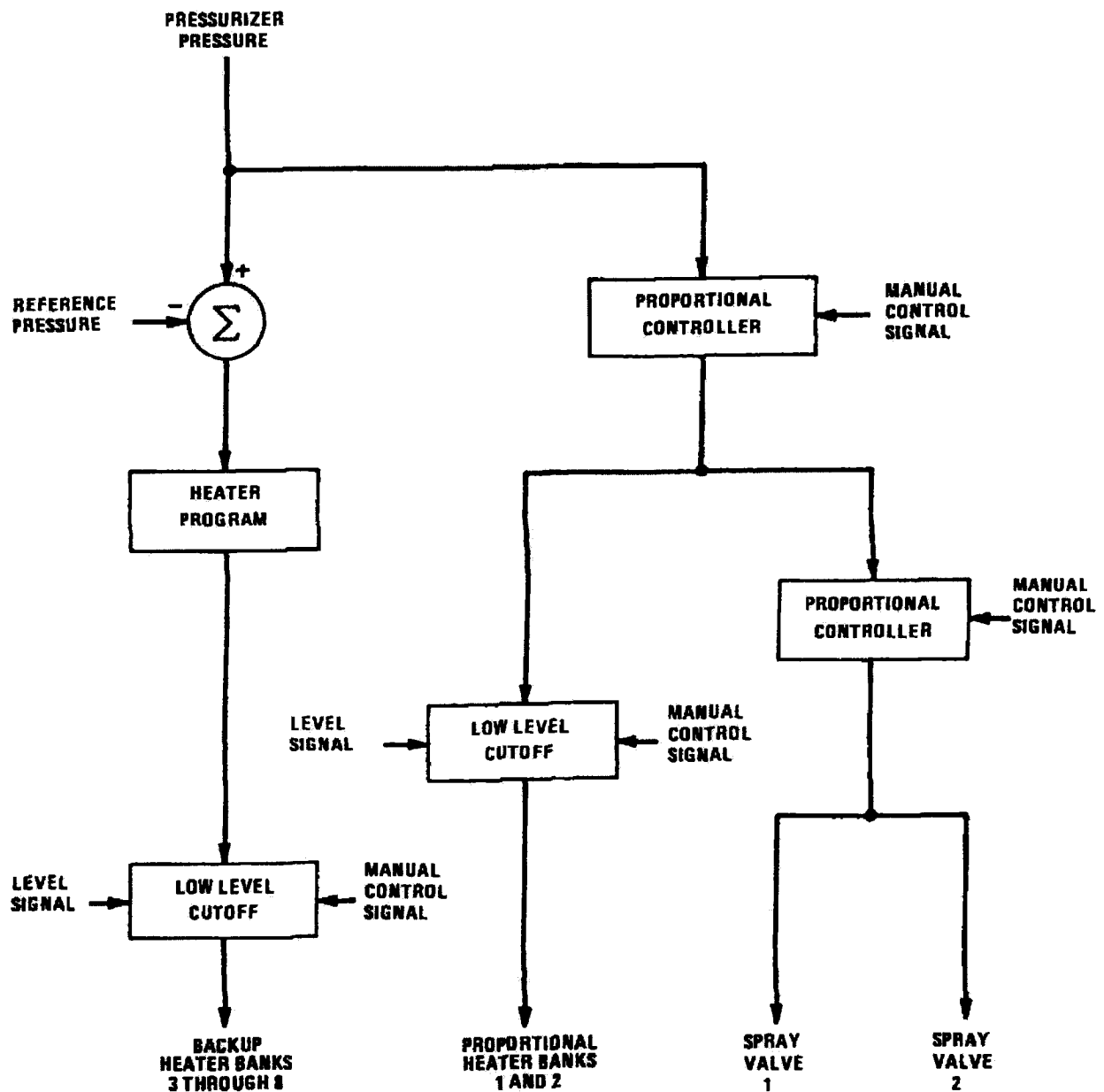
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CEDMCS - RPS  
INTERFACE BLOCK DIAGRAM

FIGURE 7.7-6

JUNE 2003

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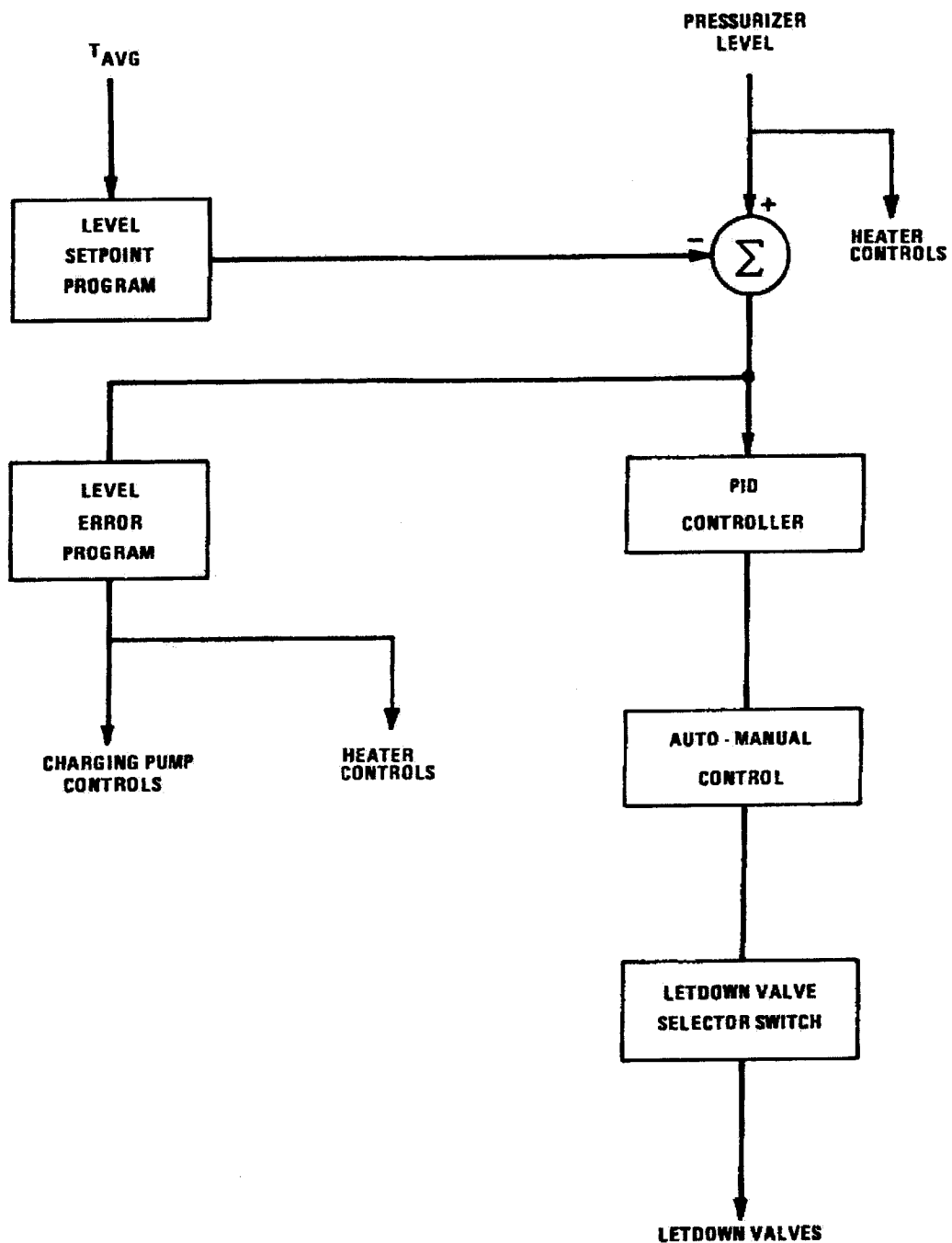
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

PRESSURIZER PRESSURE CONTROL SYSTEM  
BLOCK DIAGRAM

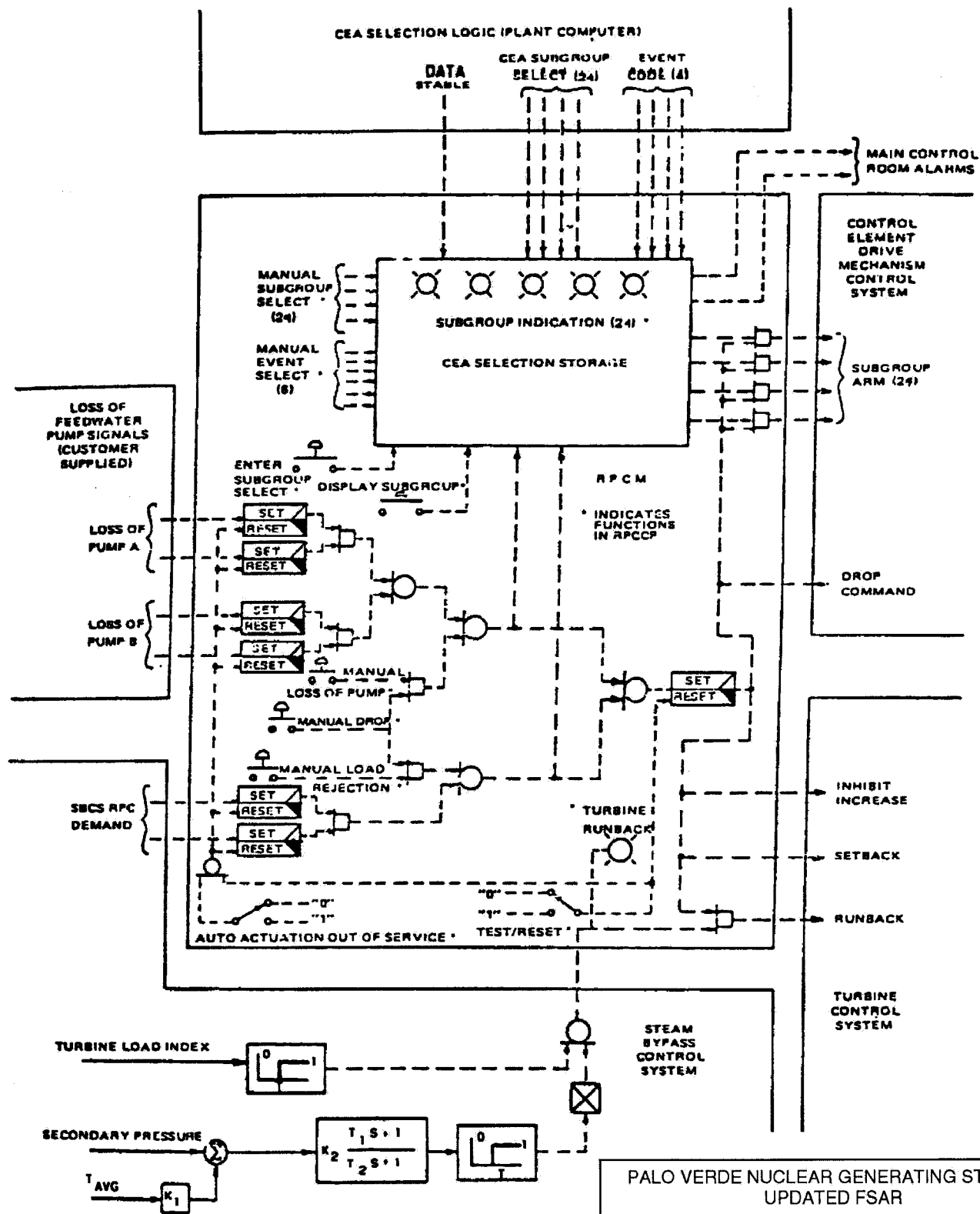
FIGURE 7.7-7

JUNE 2003

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PALO VERDE NUCLEAR GENERATING STATION  
 UPDATED FSAR  
 PRESSURIZER LEVEL CONTROL SYSTEM  
 BLOCK DIAGRAM  
 FIGURE 7.7-8  
 JUNE 2003      REVISION 12



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

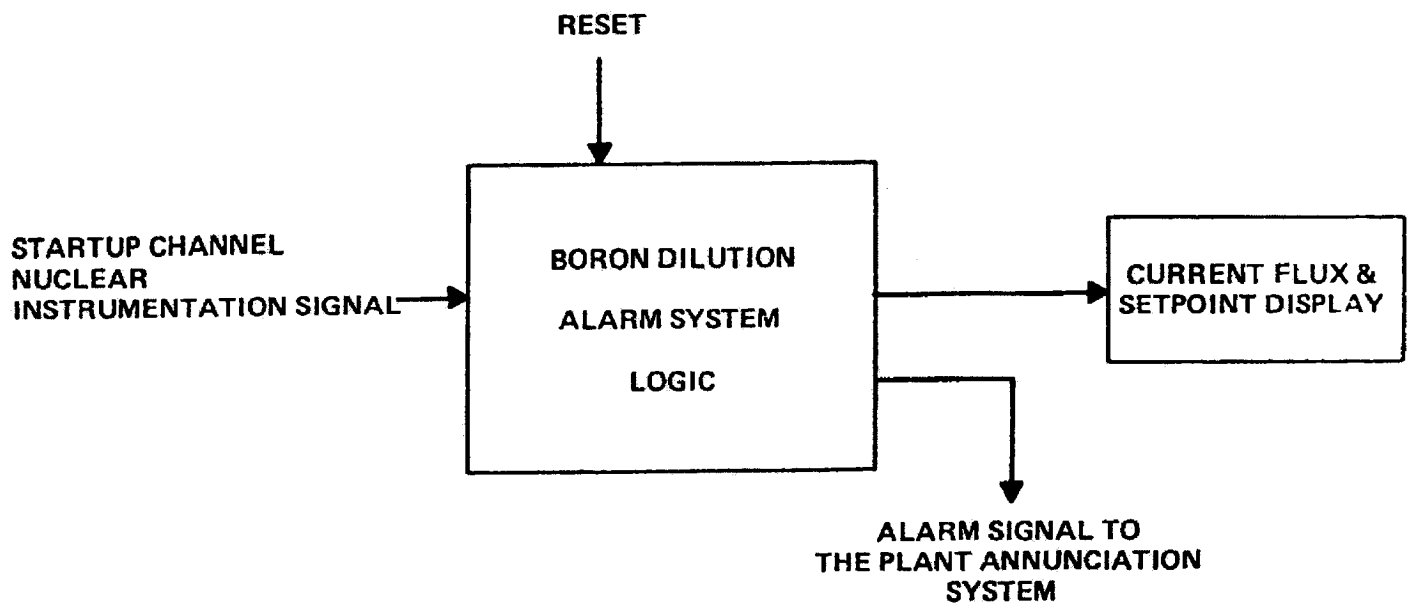
REACTOR POWER CUTBACK SYSTEM  
SIMPLIFIED BLOCK DIAGRAM

FIGURE 7.7-9

JUNE 2003

REVISION 12





**NOTE: ONLY ONE OF TWO IDENTICAL CHANNELS IS SHOWN.**

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BORON DILUTION ALARM SYSTEM  
SIMPLIFIED BLOCK DIAGRAM

FIGURE 7.7-11

JUNE 2003

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Figure 8.1-1 Sheet 1 of 2 has been deleted

Refer to Western Electricity Coordinating Council (WECC) maps for latest Grid System.

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

GRID SYSTEM

FIGURE 8.1-1 SHEET 1 OF 2

JUNE 2015

REVISION 18

Figure 8.1-1 Sheet 2 of 2 has been deleted

Refer to Western Electricity Coordinating Council (WECC) maps for latest Grid System.

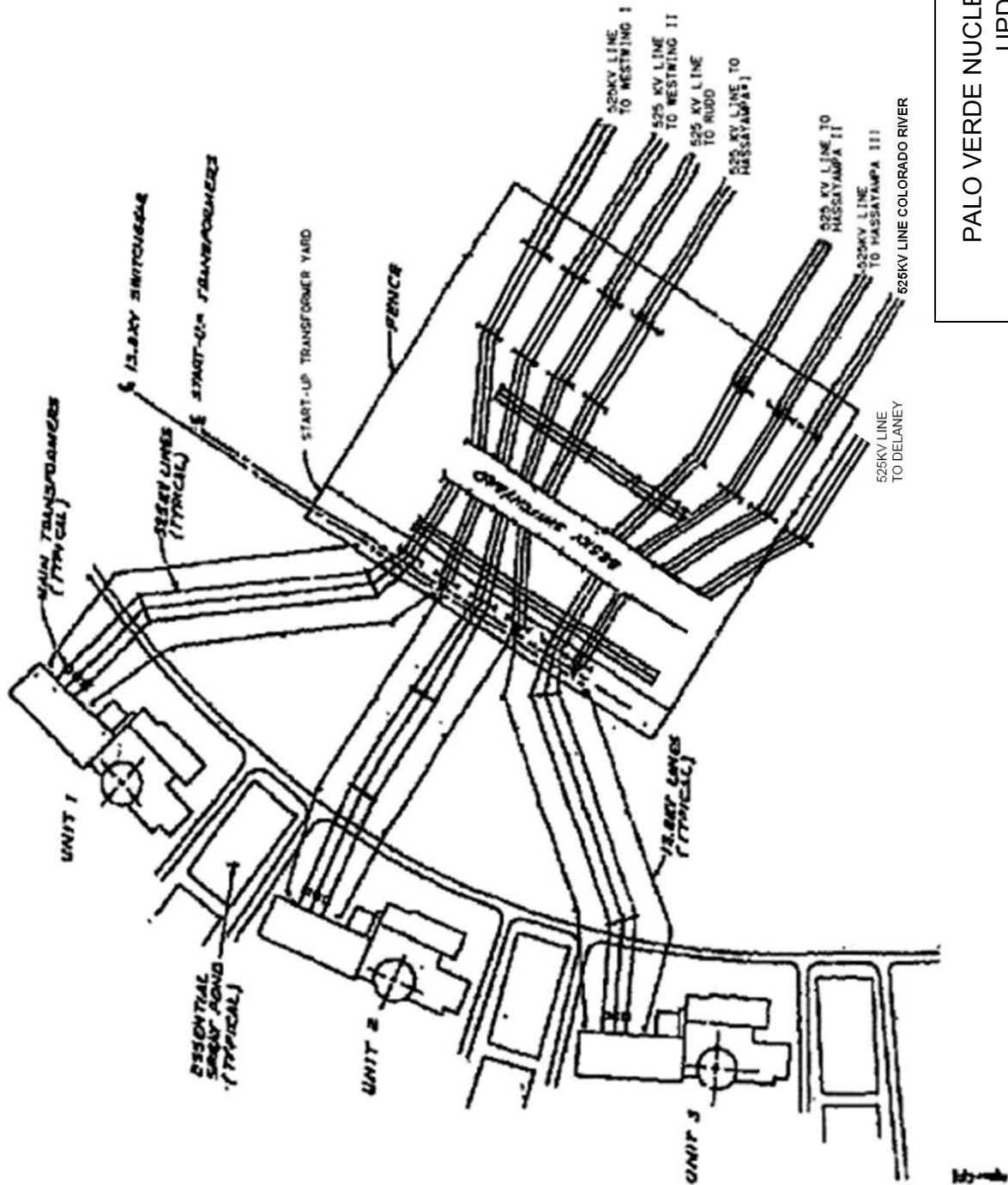
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

GRID SYSTEM

FIGURE 8.1-1 SHEET 2 OF 2

JUNE 2015

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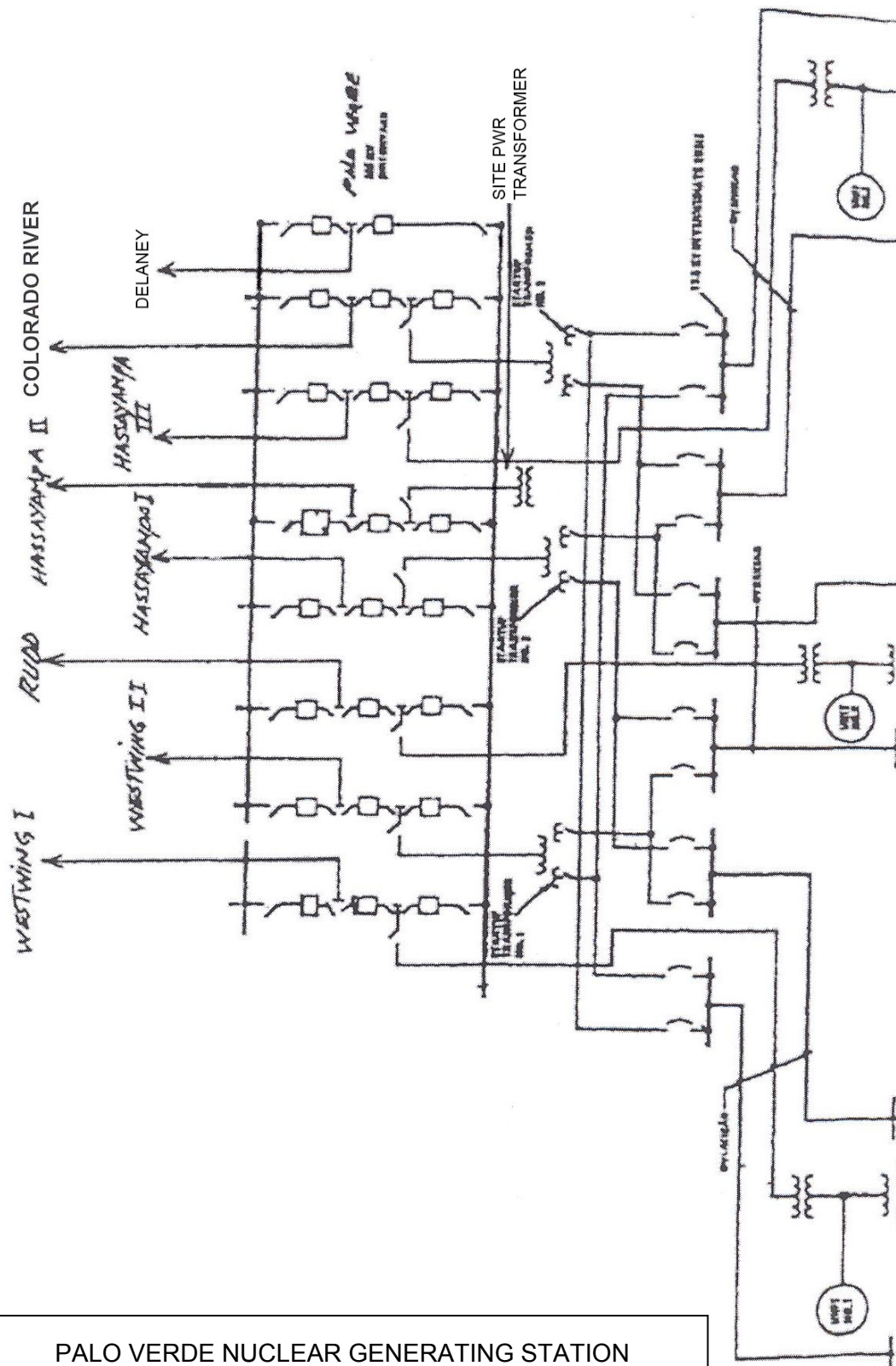
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

525 KV SWITCHYARD AND CONNECTIONS  
TO ONSITE POWER SYSTEM

FIGURE 8.2-1

JUNE 2017

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

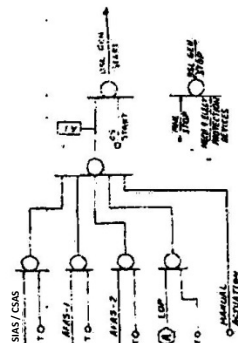
525 SWITCHYARD AND  
SINGLE LINE DIAGRAM FOR UNITS 1, 2, AND 3

FIGURE 8.2-2

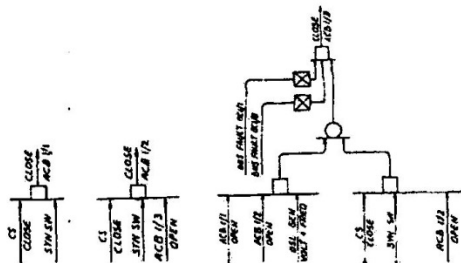
JUNE 2017

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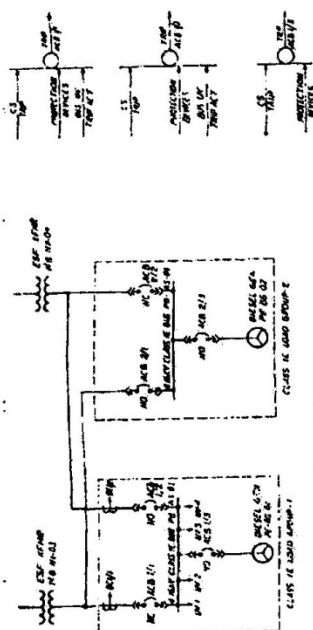


[illegible]

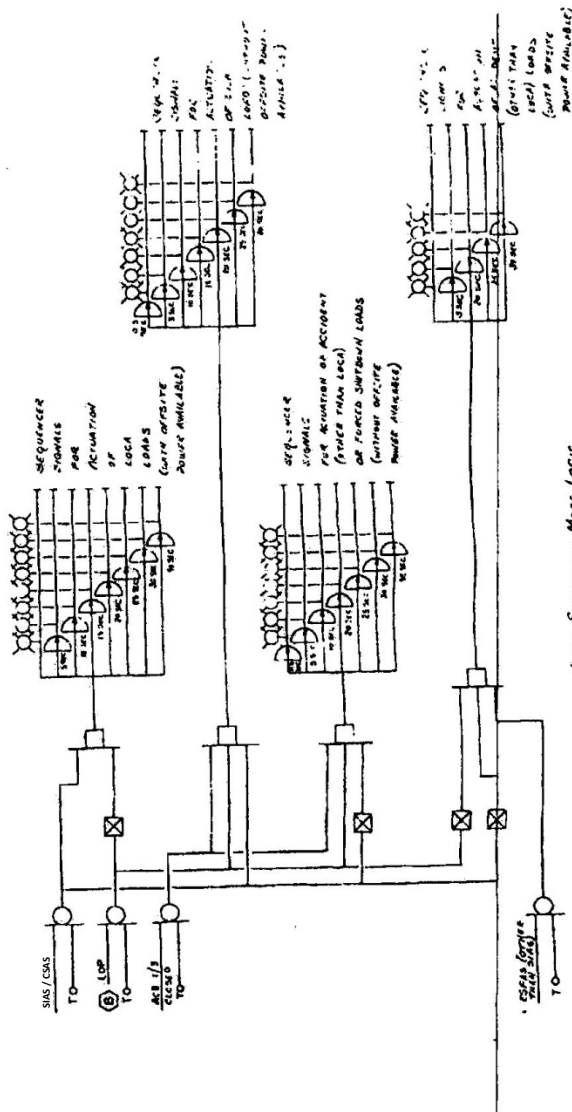
DIESEL GENERATOR START/STOP LOGIC



ESF BUS ACB LOGIC




























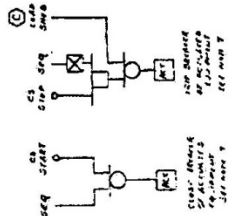
### SIMPLIFIED SINGLE LINE DIAGRAM



## LOAD SEQUENCER MODE LOGIC

LOGIC SYMBOLS

<p>1. <b>STANDARD</b></p>  <p>2. <b>STANDARD</b></p>  <p>3. <b>STANDARD</b></p>  <p>4. <b>STANDARD</b></p>  <p>5. <b>STANDARD</b></p>  <p>6. <b>STANDARD</b></p>  <p>7. <b>STANDARD</b></p>  <p>8. <b>STANDARD</b></p>  <p>9. <b>STANDARD</b></p>  <p>10. <b>STANDARD</b></p>  <p>11. <b>STANDARD</b></p>  <p>12. <b>STANDARD</b></p>  <p>13. <b>STANDARD</b></p>  <p>14. <b>STANDARD</b></p>  <p>15. <b>STANDARD</b></p>  <p>16. <b>STANDARD</b></p>  <p>17. <b>STANDARD</b></p>  <p>18. <b>STANDARD</b></p>  <p>19. <b>STANDARD</b></p>  <p>20. <b>STANDARD</b></p>  <p>21. <b>STANDARD</b></p>  <p>22. <b>STANDARD</b></p>  <p>23. <b>STANDARD</b></p>  <p>24. <b>STANDARD</b></p>  <p>25. <b>STANDARD</b></p> 	<p>1. <b>STANDARD</b></p> <p>2. <b>STANDARD</b></p> <p>3. <b>STANDARD</b></p> <p>4. <b>STANDARD</b></p> <p>5. <b>STANDARD</b></p> <p>6. <b>STANDARD</b></p> <p>7. <b>STANDARD</b></p> <p>8. <b>STANDARD</b></p> <p>9. <b>STANDARD</b></p> <p>10. <b>STANDARD</b></p> <p>11. <b>STANDARD</b></p> <p>12. <b>STANDARD</b></p> <p>13. <b>STANDARD</b></p> <p>14. <b>STANDARD</b></p> <p>15. <b>STANDARD</b></p> <p>16. <b>STANDARD</b></p> <p>17. <b>STANDARD</b></p> <p>18. <b>STANDARD</b></p> <p>19. <b>STANDARD</b></p> <p>20. <b>STANDARD</b></p> <p>21. <b>STANDARD</b></p> <p>22. <b>STANDARD</b></p> <p>23. <b>STANDARD</b></p> <p>24. <b>STANDARD</b></p> <p>25. <b>STANDARD</b></p>
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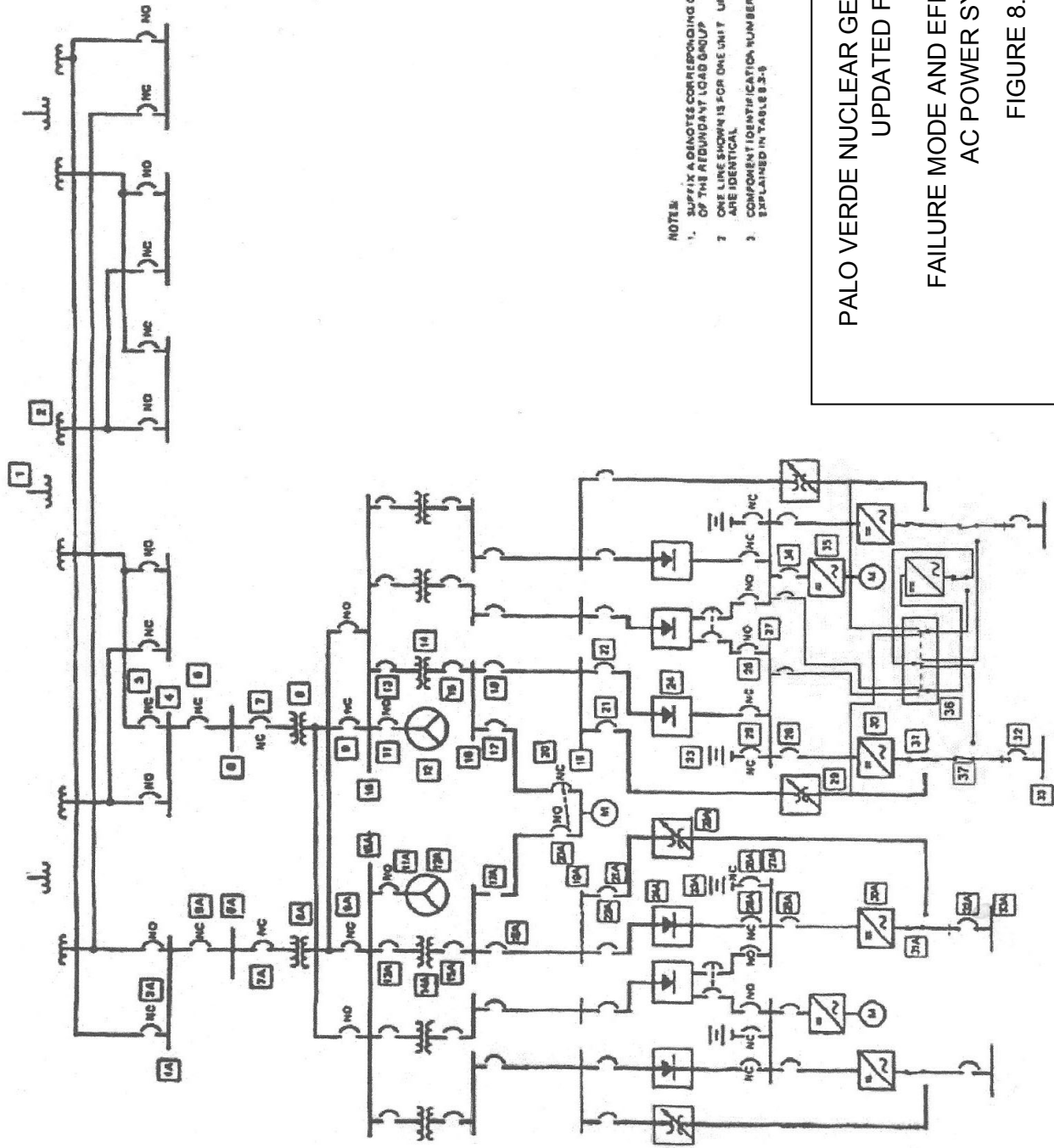
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

# LOGIC DIAGRAM DIESEL GENERATOR STARTING AND ESF BUS LOADING SEQUENCE

FIGURE 8.3-1 SHEET 2 OF 2

JUNE 2017

REVISION 19



NOTES:  
 1. SUPPLY A DINOTES CORRESPONDING COMPONENT OF THE REDUNDANT LOAD GROUP  
 2. ONE LINE SHOWN IS FOR ONE UNIT. UNITS 2 AND 3 ARE IDENTICAL  
 3. COMPONENT IDENTIFICATION NUMBERS ARE EXPLAINED IN TABLE 8.3-1

# PALO VERDE NUCLEAR GENERATING STATION UPDATED FSAR

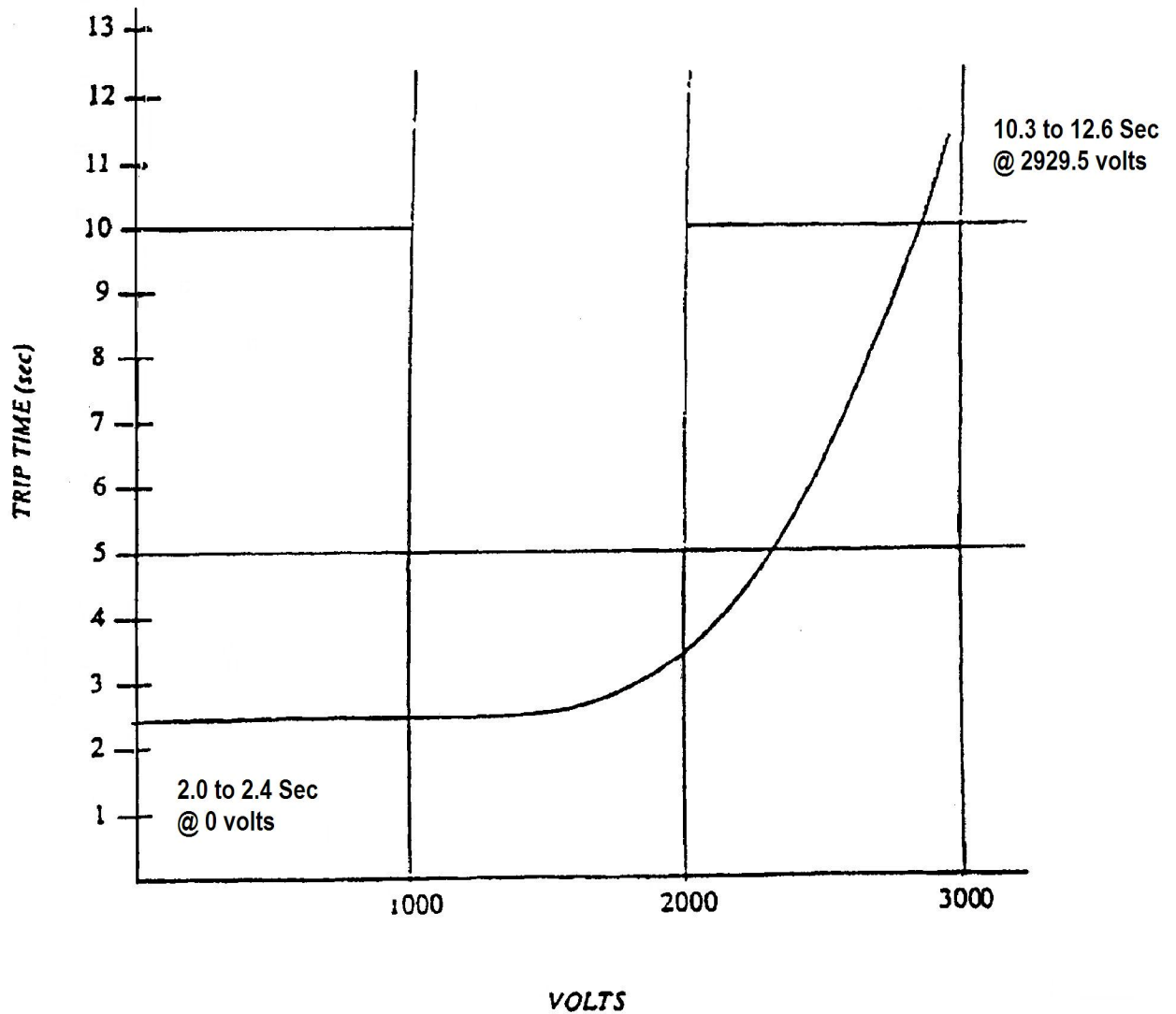
## FAILURE MODE AND EFFECTS ANALYSIS AC POWER SYSTEM

FIGURE 8.3-2

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

LOSS OF BUS VOLTAGE  
SETTING TIME VS. VOLTS

FIGURE 8.3-3

JUNE 2009

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FIGURE 8B.1A-1 DELETED

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

POWER FLOW MAP  
CASE 1A

FIGURE 8B.1A-1

JUNE 2013

REVISION 17

FIGURE 8B.1B-1 DELETED

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

POWER FLOW MAP  
CASE 1B

FIGURE 8B.1B-1

JUNE 2013

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FIGURE 8B.2A-1 DELETED

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

POWER FLOW MAP  
CASE 2A

FIGURE 8B.2A-1

JUNE 2013

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FIGURE 8B.2B-1 DELETED

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

POWER FLOW MAP  
CASE 2B

FIGURE 8B.2B-1

JUNE 2013

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FIGURE 8B.3A-1 DELETED

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

POWER FLOW MAP  
CASE 3A

FIGURE 8B.3A-1

JUNE 2013

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FIGURE 8B.3B-1 DELETED

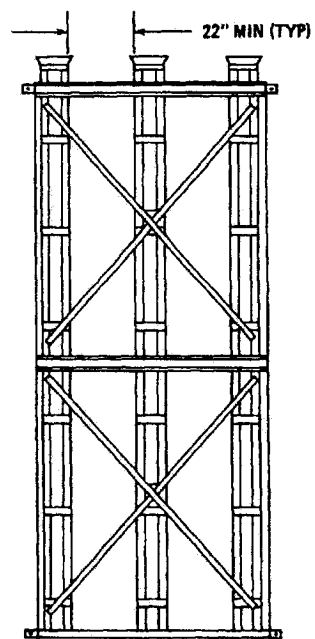
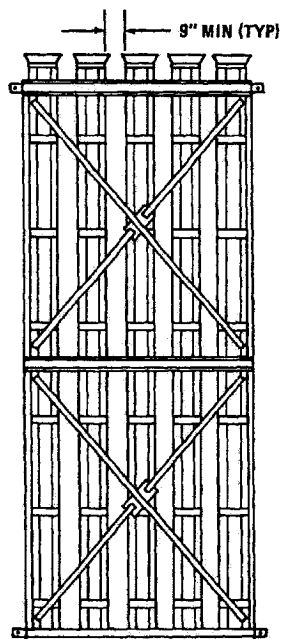
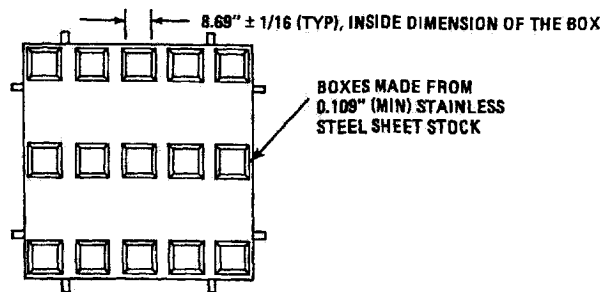
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

POWER FLOW MAP  
CASE 3B

FIGURE 8B.3B-1

JUNE 2013

REVISION 17



PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

NEW FUEL STORAGE RACK  
(150" ACTIVE FUEL LENGTH)

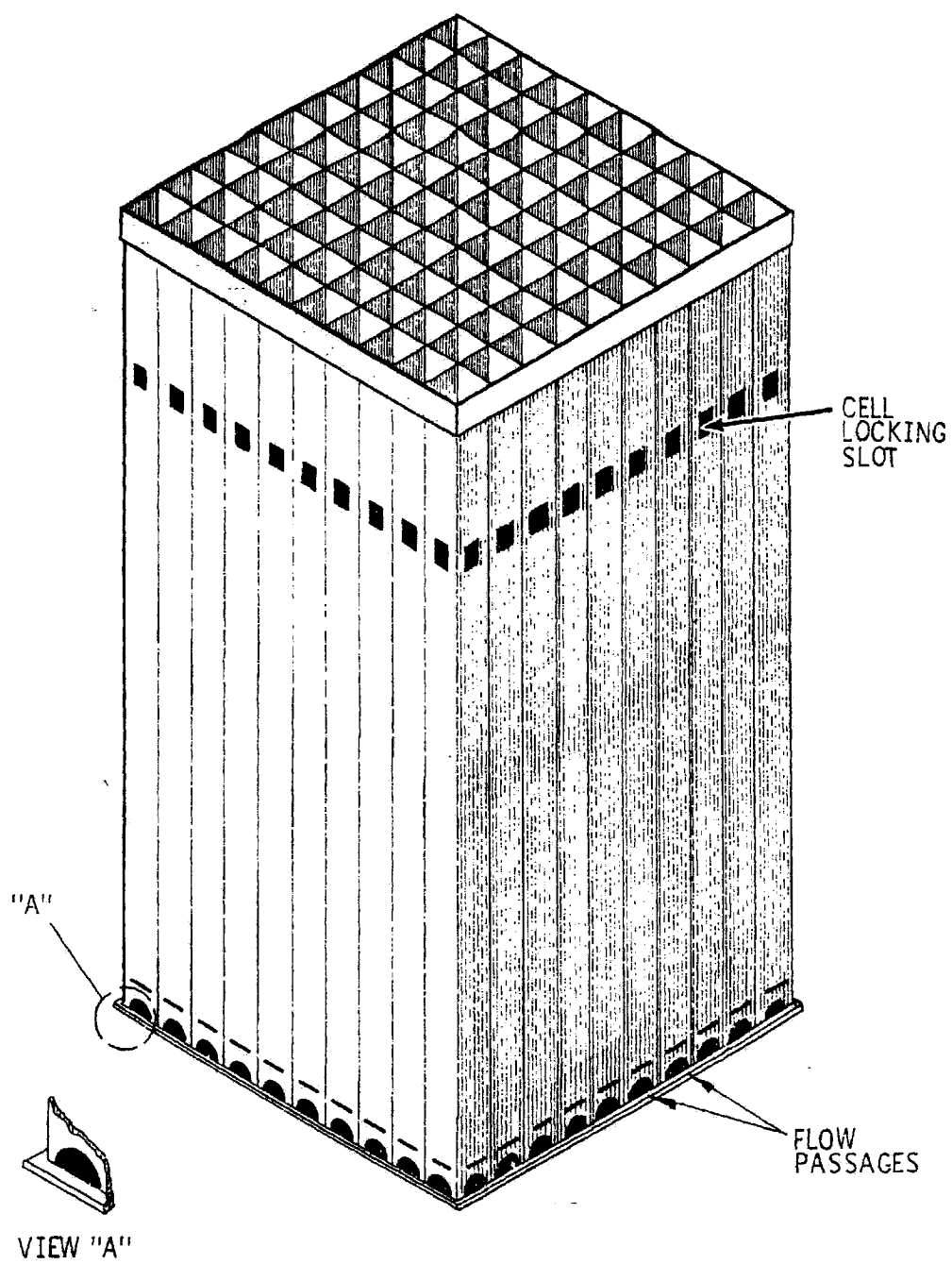
FIGURE 9.1-1

JUNE 2001

REVISION 11



This Figure has been redacted.



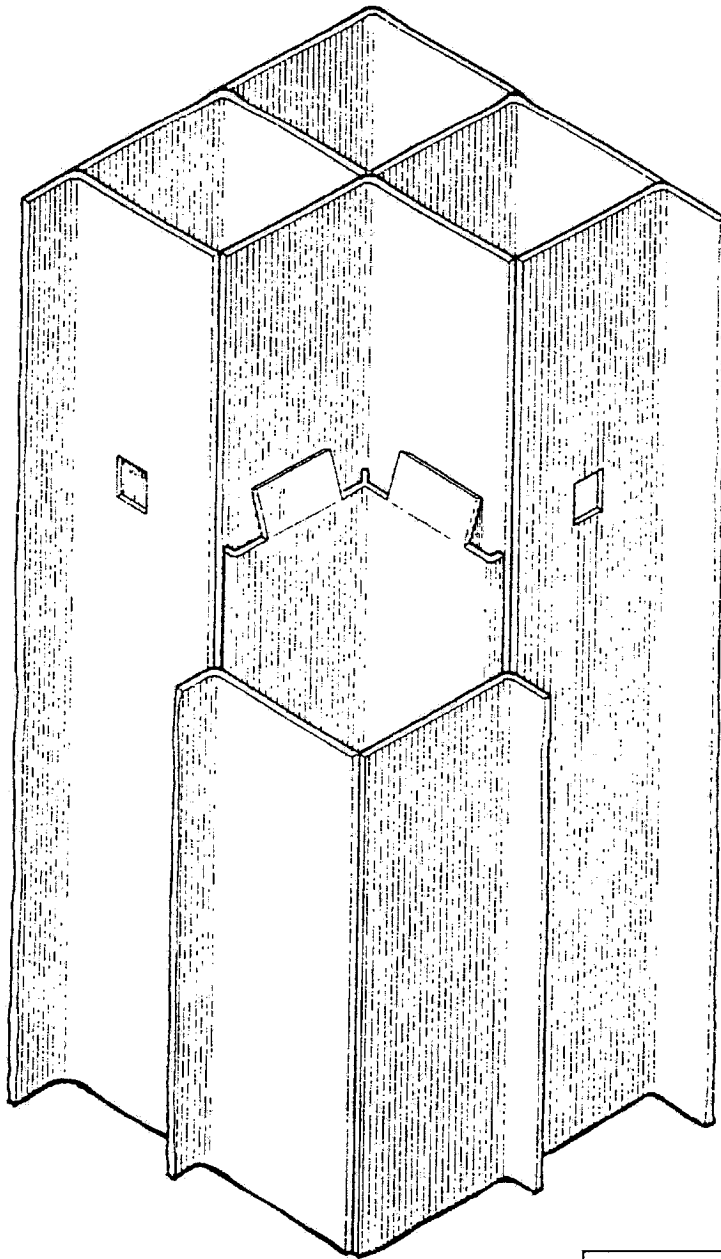
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SPENT FUEL STORAGE RACK

FIGURE 9.1-3

JUNE 2001

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

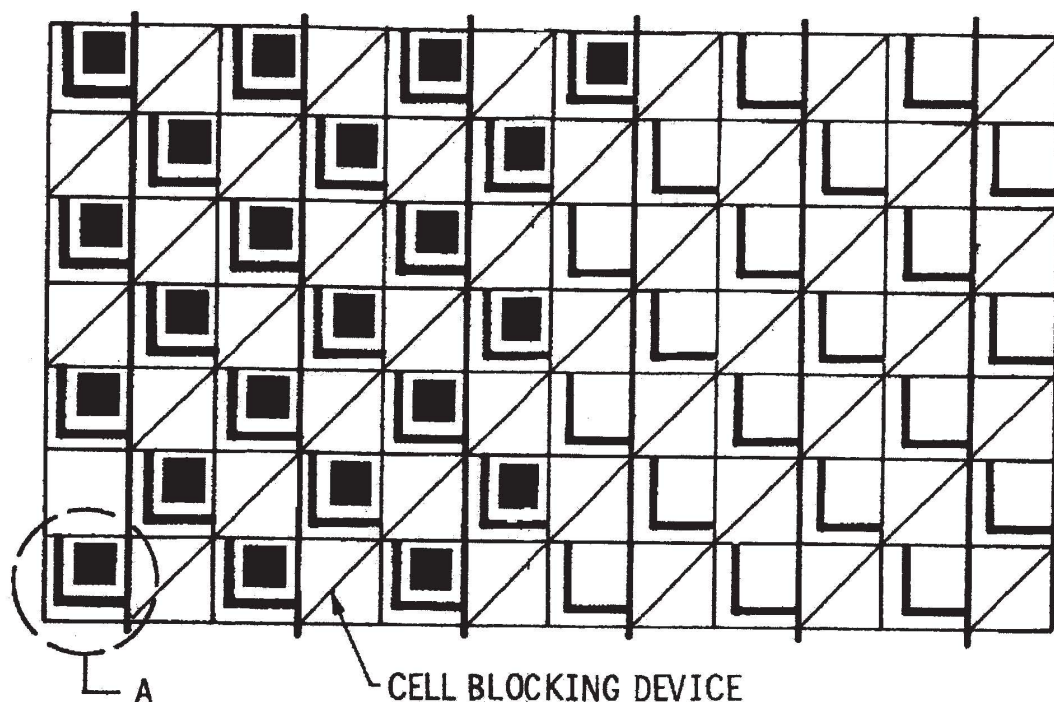
CELL DETAILS OF "L" INSERT BOX

FIGURE 9.1-4

JUNE 2001

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# ARRANGEMENT OF STAINLESS STEEL "L" INSERTS AND CELL BLOCKING DEVICES



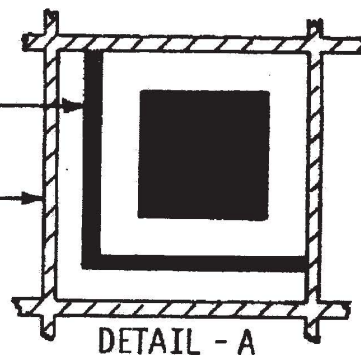
CELL BLOCKING DEVICE

(SEE SECTION 9.1.2.2.2.1)

(SEE NOTE 1)

STAINLESS STEEL "L" INSERT

STAINLESS STEEL MODULE



DETAIL - A

## Note 1:

The diagonal line represents a cell that is required to have a blocking device, and does not specify a particular orientation requirement for the blocking device.

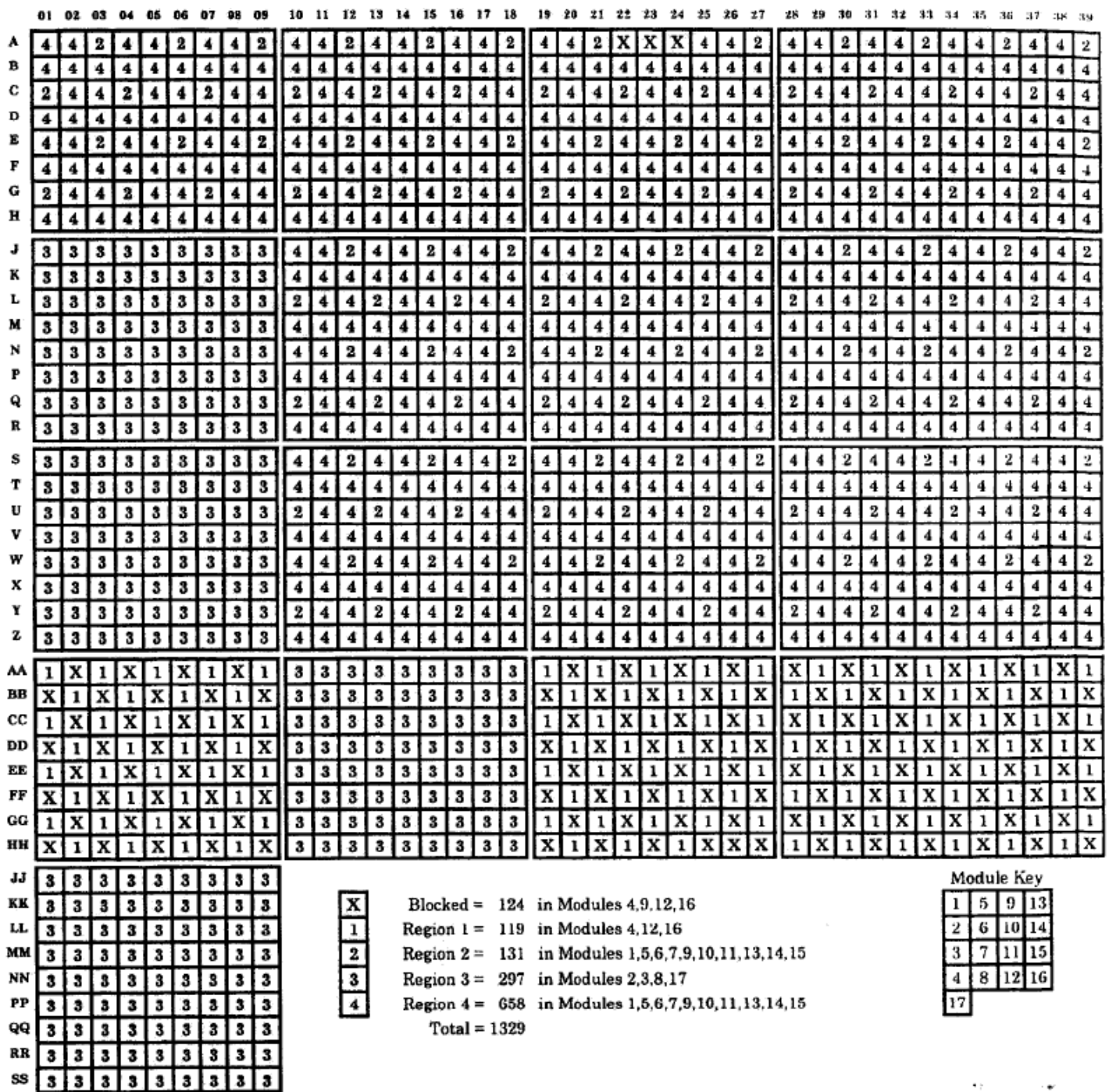
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

NEW OR SPENT FUEL  
STORED IN A CHECKERBOARD ARRAY

FIGURE 9.1-5

JUNE 2017

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

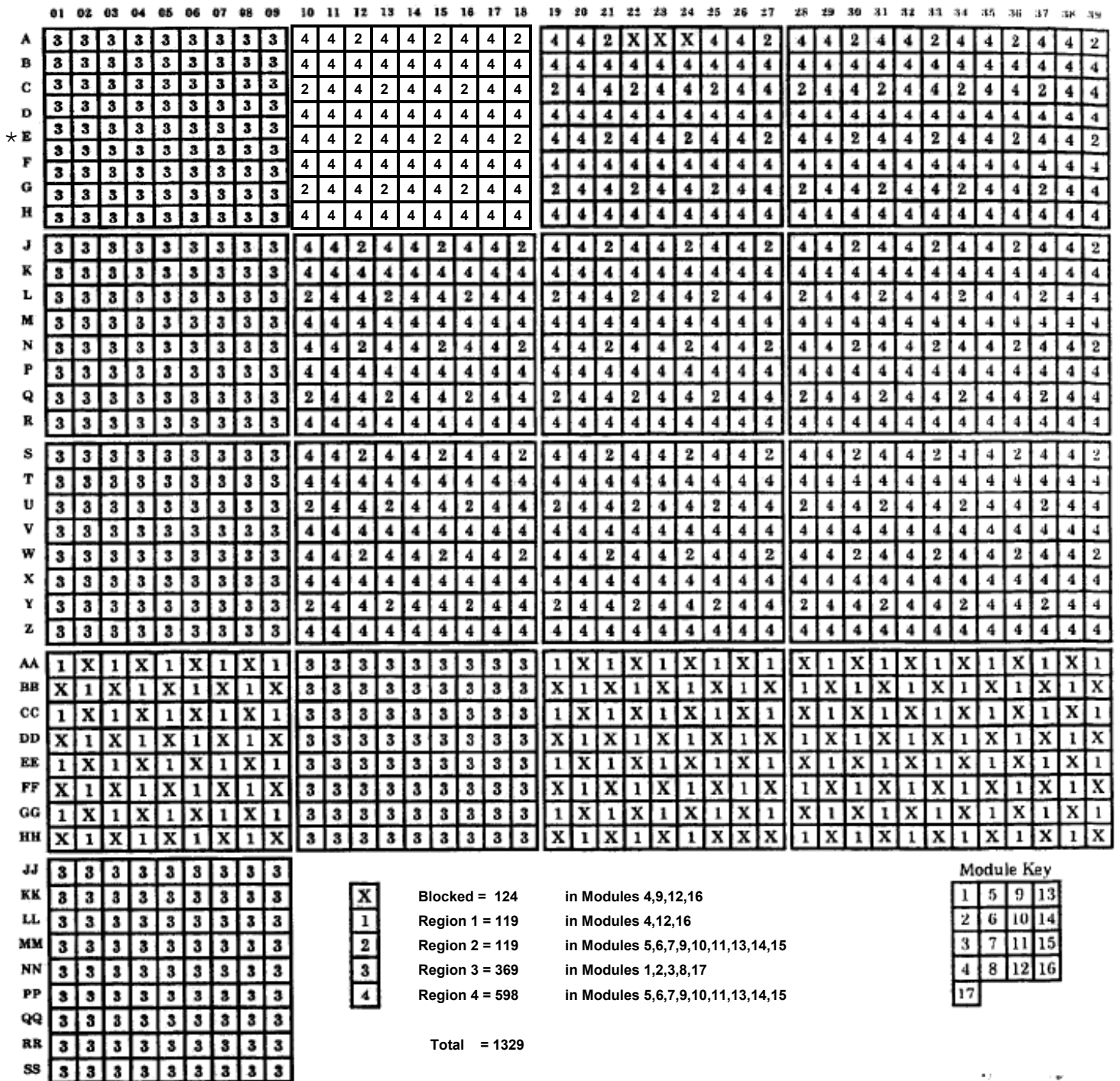
UNITS 2 & 3

SPENT FUEL POOL  
CONFIGURATION

FIGURE 9.1-7

JUNE 2011

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

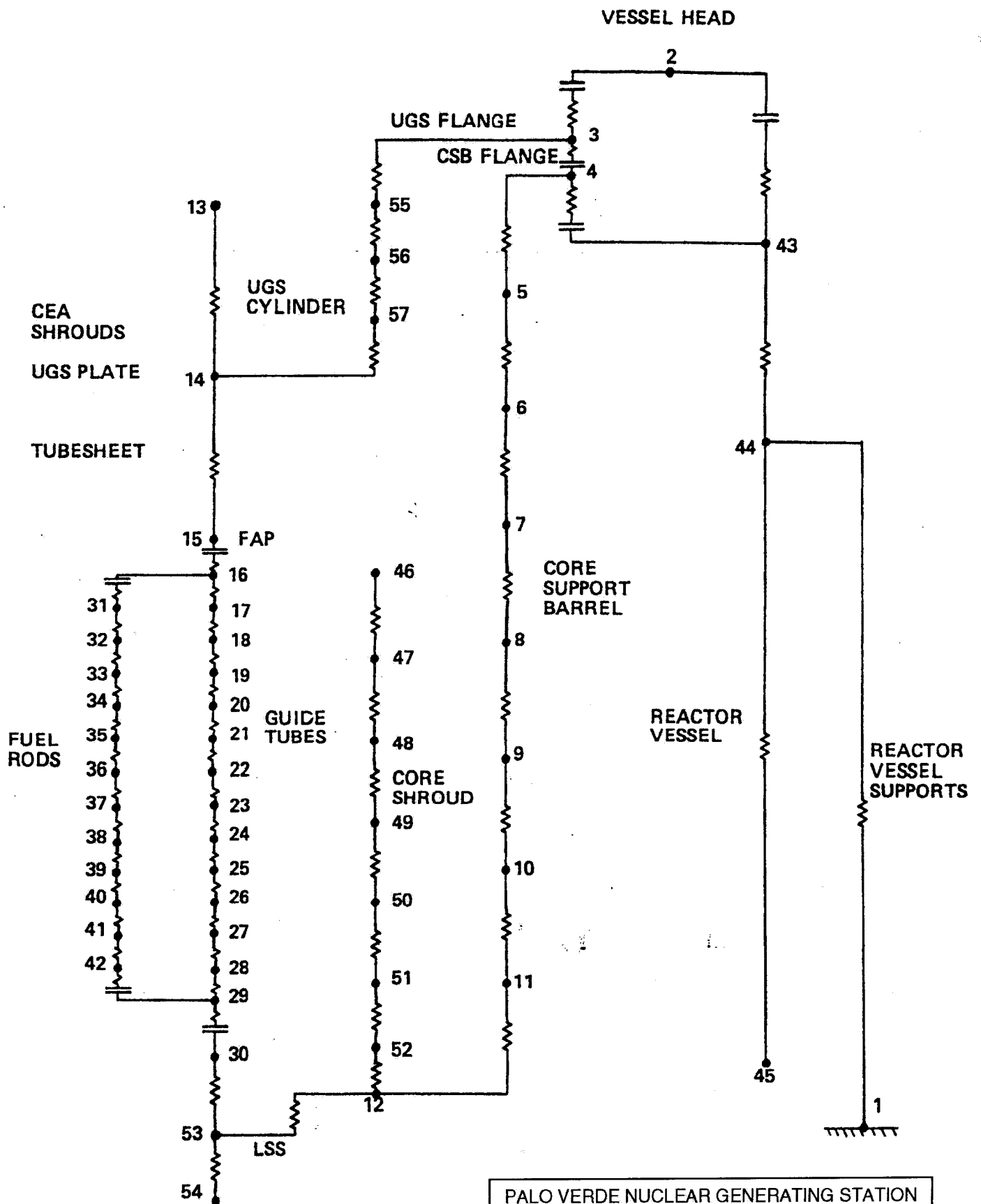
UNIT 1  
SPENT FUEL POOL  
CONFIGURATION

FIGURE 9.1-7A

JUNE 2015

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\* => changes relative to  
Fig 9.1-7



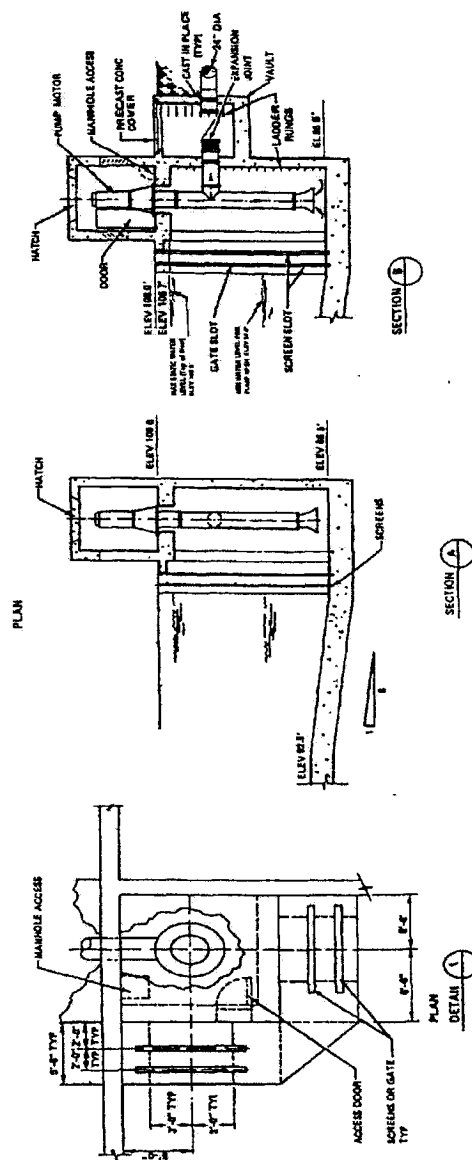
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

REACTOR VESSEL AND INTERNALS MODEL  
FOR FLAT HEAD DROP ANALYSIS

FIGURE 9.1-11

JUNE 2003

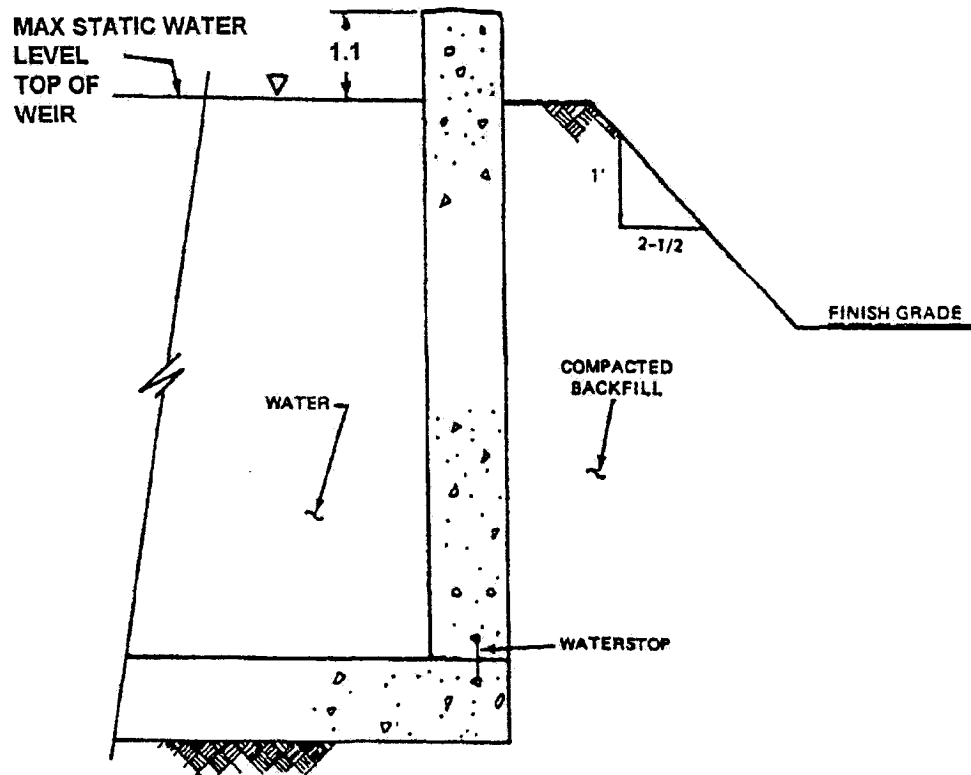
REVISION 12

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

## DETAIL DRAWINGS

FIGURE 9.2-1 SHEET 1 OF 2  
JUNE 2003  
REVISION 12





TYPICAL EXTERIOR  
WALL SECTION

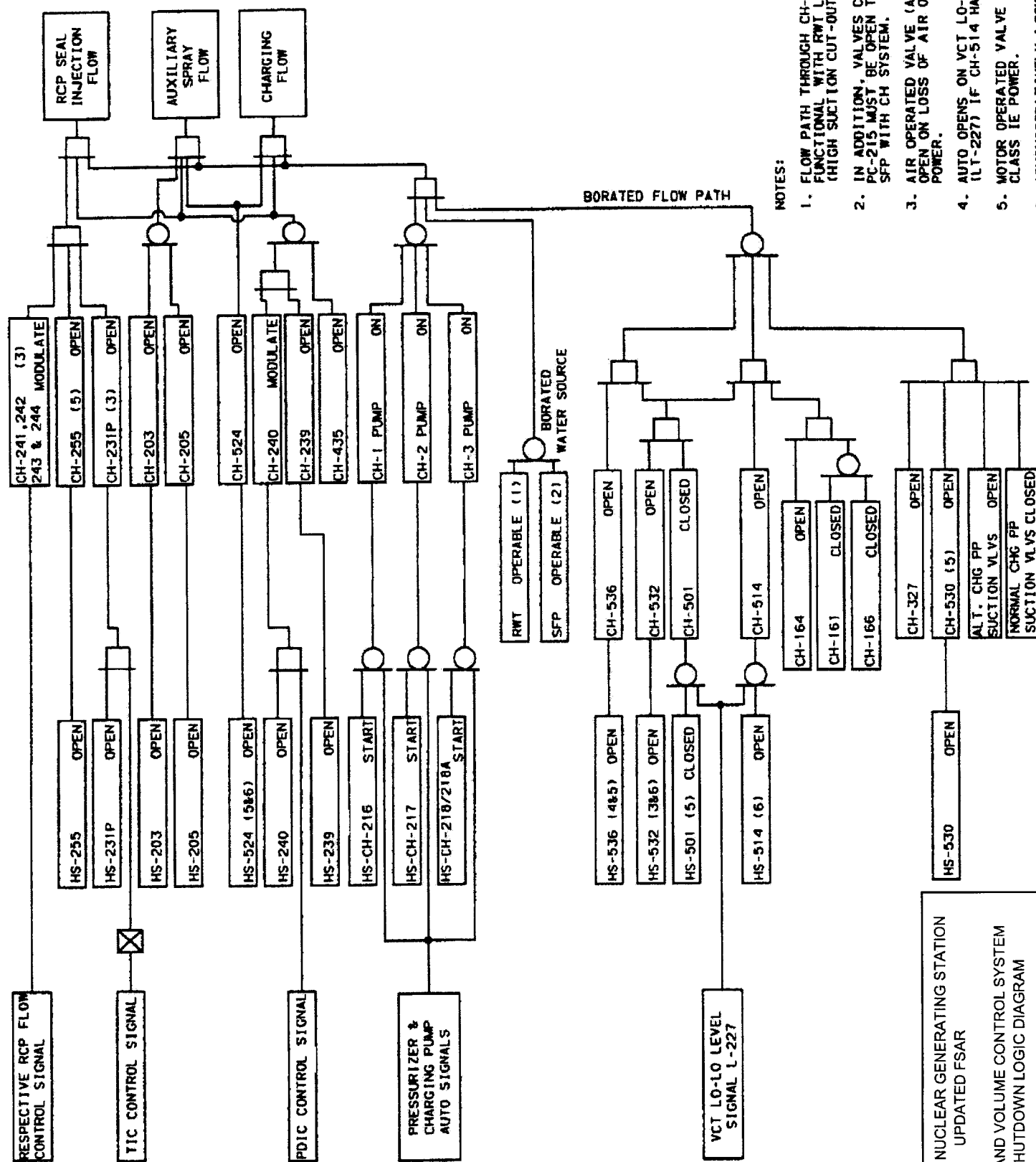
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

DETAIL DRAWINGS  
ESSENTIAL SPRAY POND

FIGURE 9.2-1 SHEET 2 OF 2

REVISION 12

JUNE 2003



NOTES:

1. FLOW PATH THROUGH CH-327 MAY BE FUNCTIONAL WITH RWT LEVEL BELOW 73% (HIGH SUCTION CUT-OUT)
2. IN ADDITION, VALVES CH-144 AND PC-215 MUST BE OPEN TO CROSS-CONNECT SFP WITH CH SYSTEM.
3. AIR OPERATED VALVE (AOV) THAT FALLS OPEN ON LOSS OF AIR OR SOLENOID POWER.
4. AUTO OPENS ON VCT LO-LO LEVEL. (LT-227) IF CH-514 HAS NO POWER.
5. MOTOR OPERATED VALVE (MOV) WITH CLASS IE POWER.
6. ADMINISTRATIVELY LOCKED OPEN WITH POWER TO MOTOR (MOV) OR SOLENOID (AOV) DE-ENERGIZED.

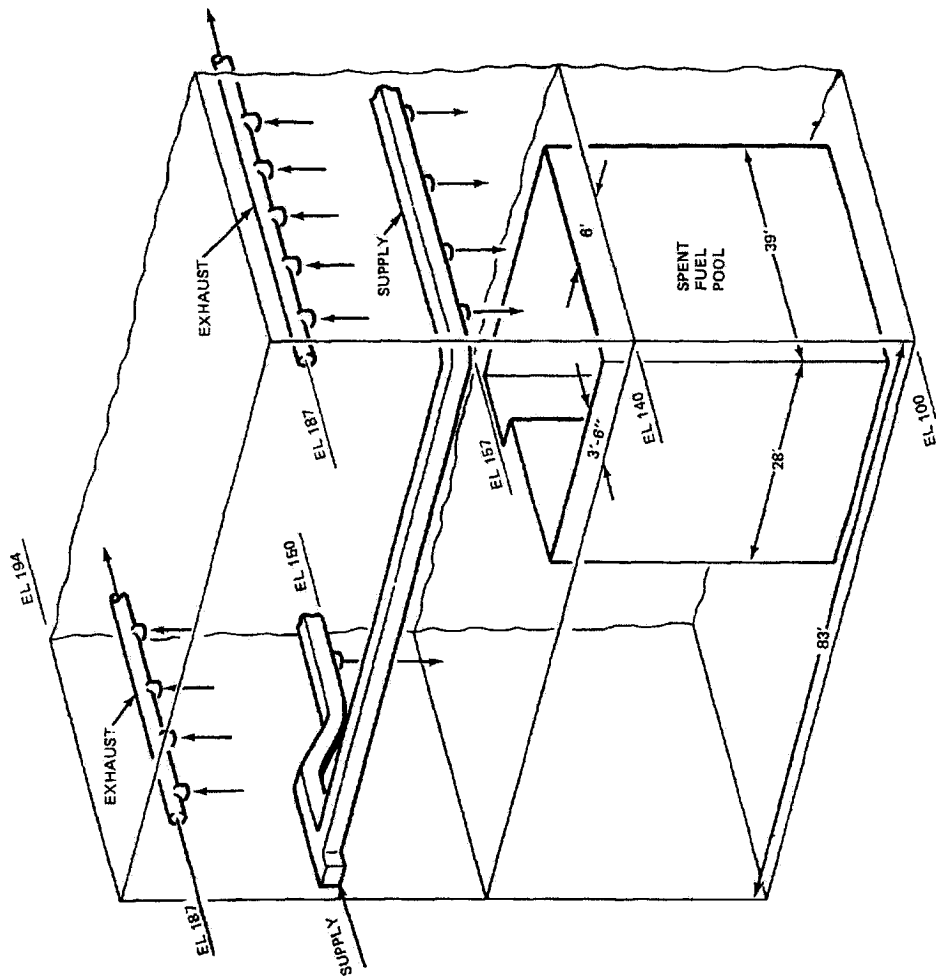
PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

CHEMICAL AND VOLUME CONTROL SYSTEM  
SAFE SHUTDOWN LOGIC DIAGRAM

FIGURE 9.3-1

June 2003

REVISION 12



NOTE: DIMENSIONS ARE APPROXIMATE

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

FUEL BUILDING  
VENTILATION AND DUCT ARRANGEMENT  
ABOVE SPENT FUEL POOL

JUNE 2003  
FIGURE 9.4-1  
REVISION 12

Figure 9.5-1 has been deleted.

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SCHEMATIC DIAGRAM  
PUBLIC ADDRESS EQUIPMENT  
FIGURE 9.5-1

JUNE 2013

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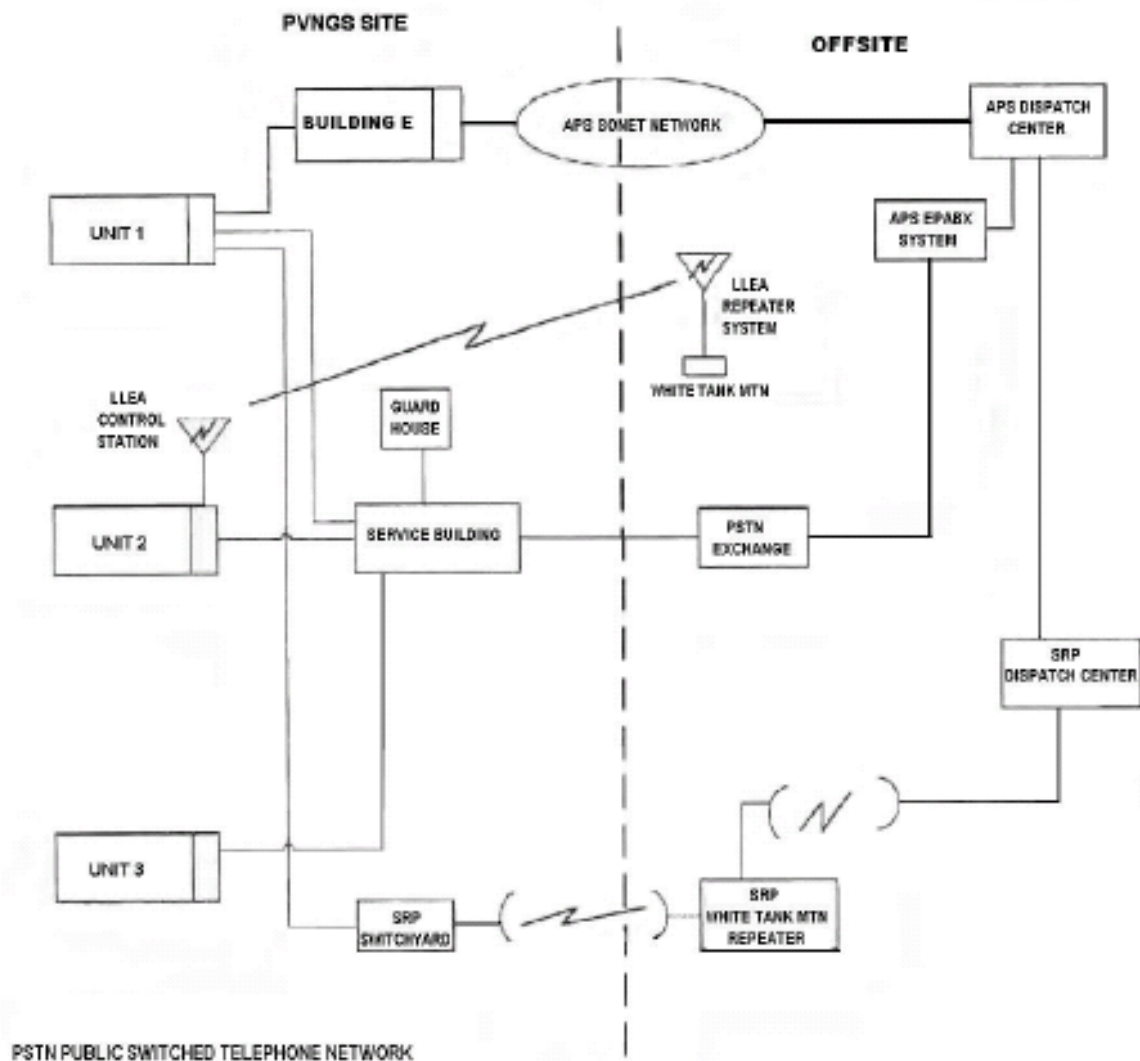
Figure 9.5-2 has been deleted.

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

SCHEMATIC DIAGRAM  
PUBLIC ADDRESS EQUIPMENT  
FIGURE 9.5-2

JUNE 2013

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PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BLOCK DIAGRAM  
NORMAL OFFSITE COMMUNICATIONS

FIGURE 9.5-3

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Figure 9.5-4 has been deleted.

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BLOCK DIAGRAM  
EMERGENCY COMMUNICATION SYSTEM

FIGURE 9.5-4 SHEET 1 OF 2

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Figure 9.5-4 has been deleted.

PALO VERDE NUCLEAR GENERATING STATION  
UPDATED FSAR

BLOCK DIAGRAM  
EMERGENCY COMMUNICATION SYSTEM

FIGURE 9.5-4 SHEET 2 OF 2

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