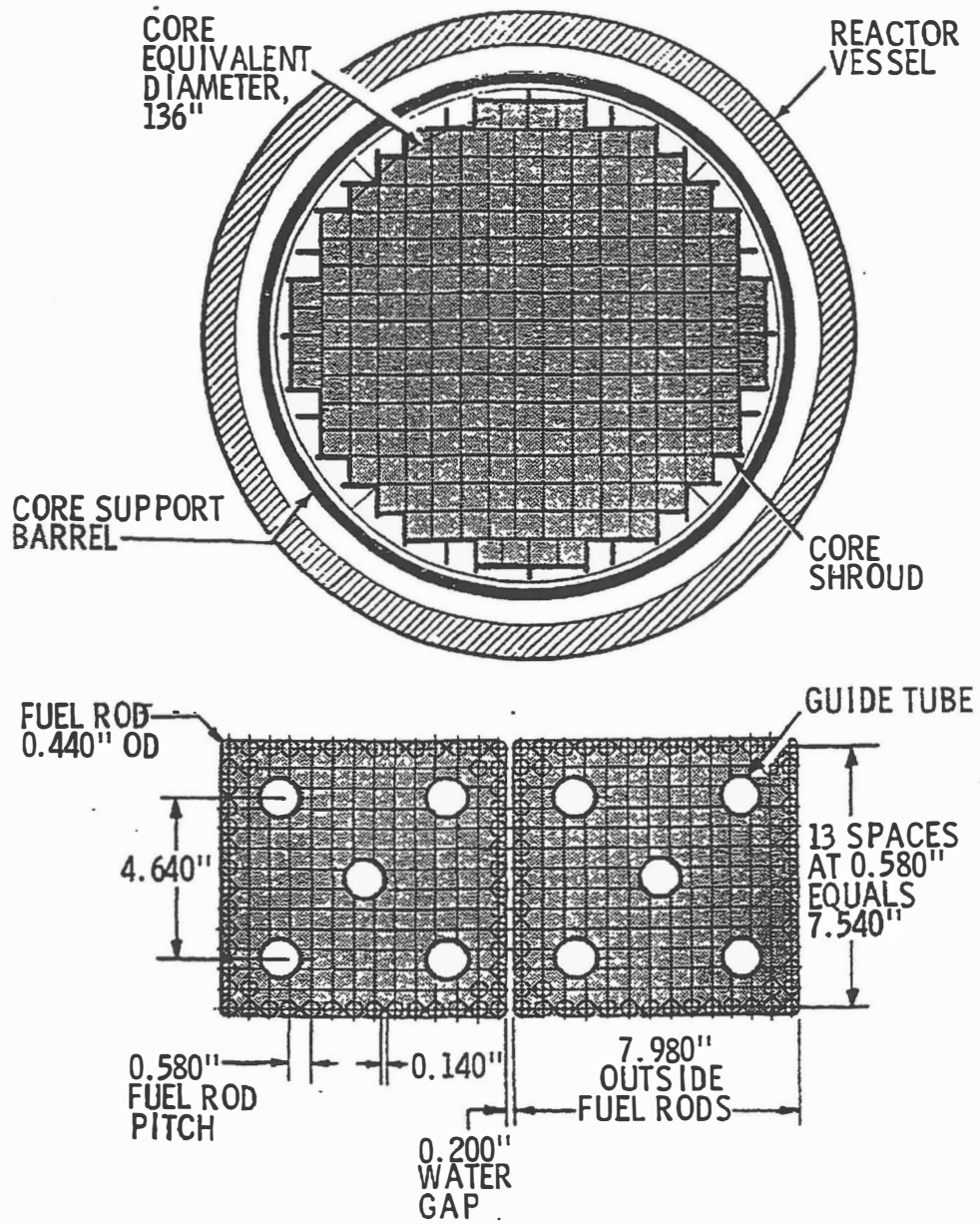


Calvert Cliffs  
Nuclear Power Plant

REACTOR VERTICAL ARRANGEMENT

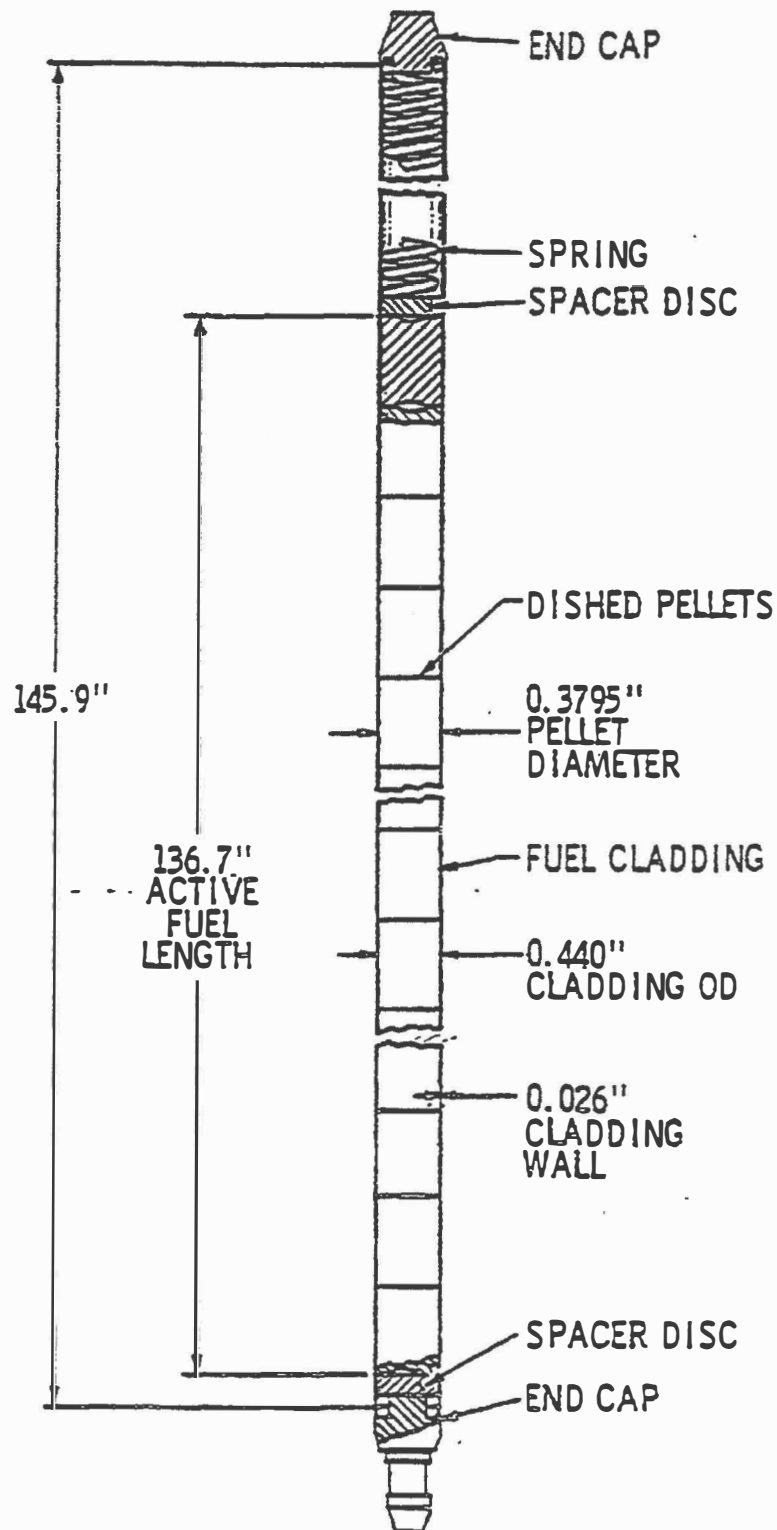
Figure 3.1-1  
Revision 39



BALTIMORE  
GAS & ELECTRIC CO.  
Calvert Cliffs  
Nuclear Power Plant

Reactor Core Cross-Section

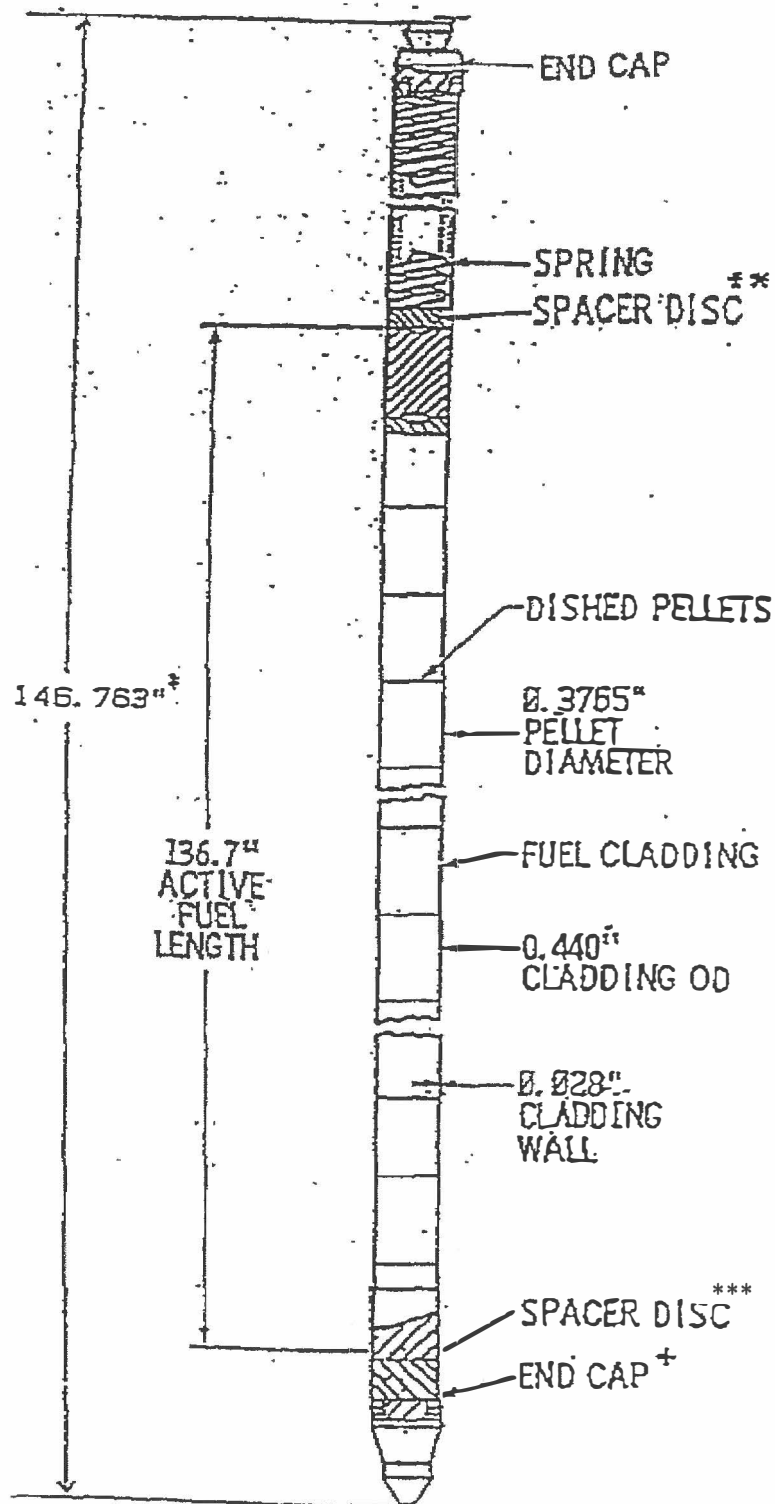
Figure  
3.3-1



BALTIMORE  
GAS & ELECTRIC CO.  
Calvert Cliffs  
Nuclear Power Plant

FIRST CYCLE FUEL ROD

Figure  
3.3-2



The HTP fuel assemblies use a 0.0265" cladding wall, a 0.3805" pellet diameter, and a rod length on 146.67"

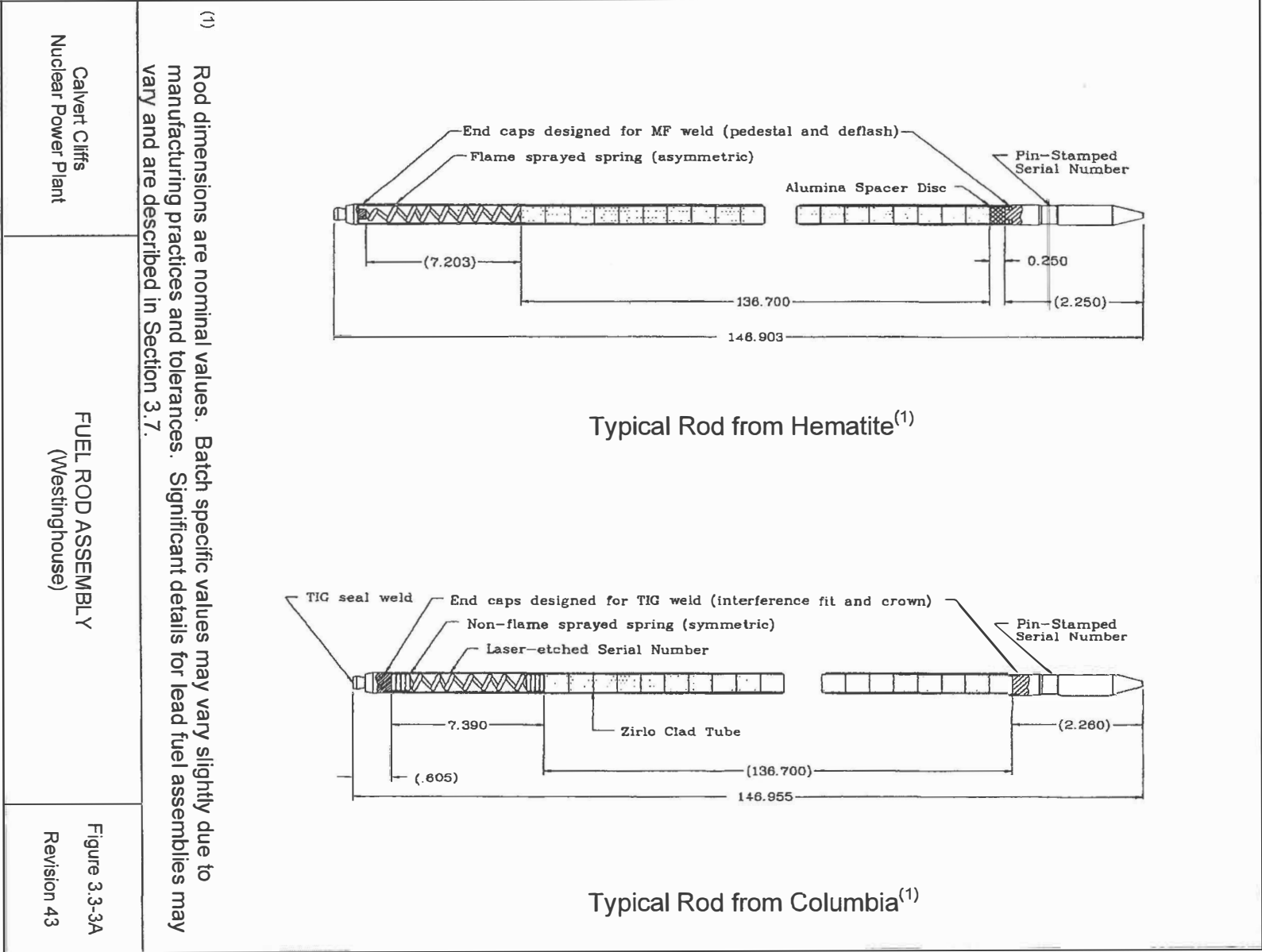
Value Added Pellet fuel assemblies use a 0.026" cladding wall, a 0.3810" pellet diameter, and a rod length of 146.903" (Hematite) and 146.955" (Columbia)

Beginning with Unit 2 Cycle 11 and Unit 1 Cycle 13, the lower end cap was redesigned to one taper, rather than the taper – flat – taper design as shown.

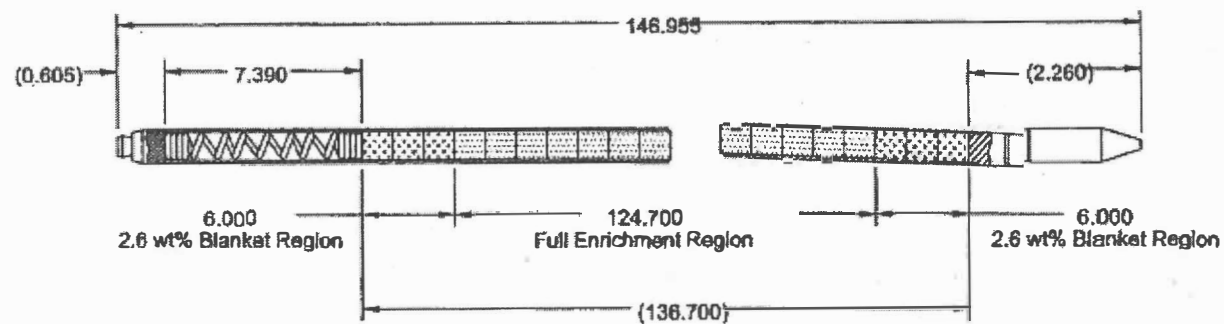
\* The GUARDIAN™ fuel design has a total length of 147.229"

\*\* Upper spacer disc removed beginning with Unit 1 Cycle 12 and Unit 2 Cycle 11.

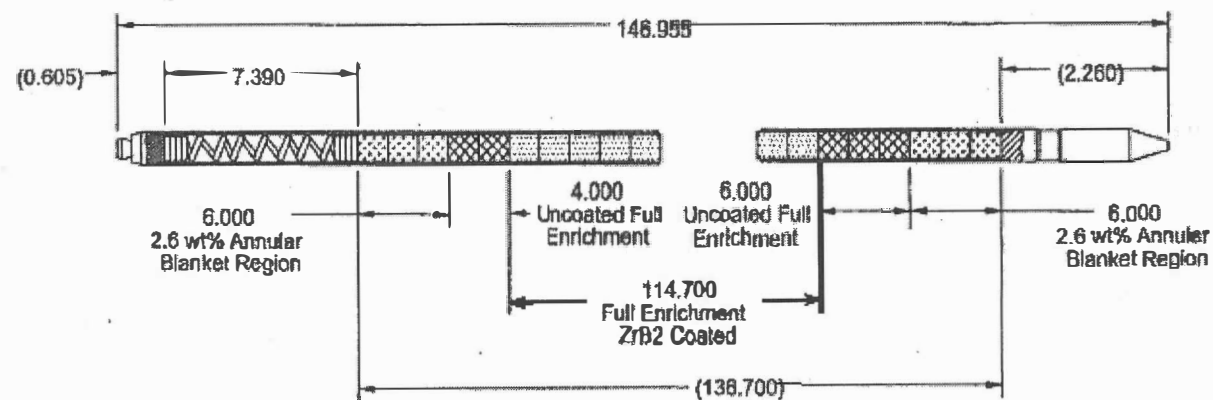
\*\*\* Lower spacer disc removed for rods manufactured at Columbia.



All dimensions are in inches.



Standard Fuel Rod with Axial Blankets

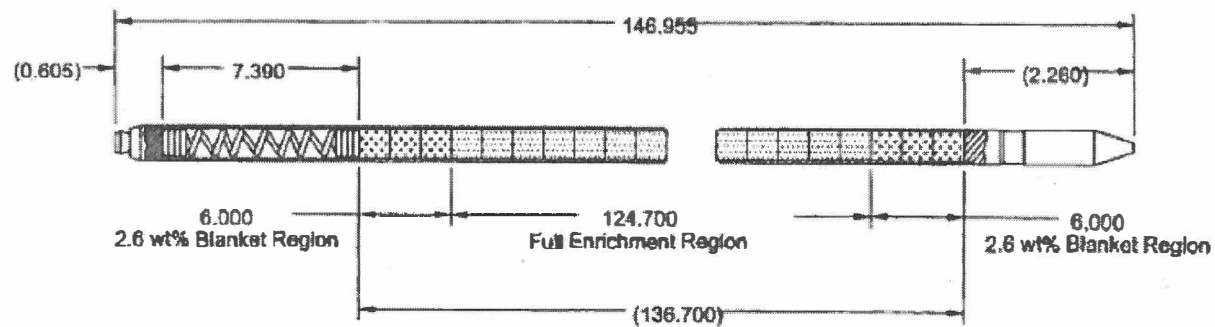


IFBA Fuel Rod with Axial Blankets

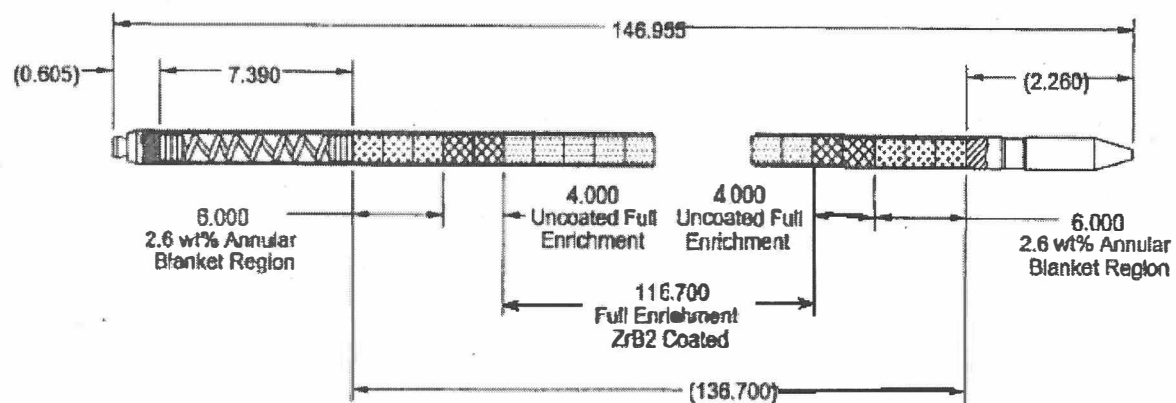
Calvert Cliffs Nuclear  
Power Plant

FUEL ROD DESIGN  
(UNIT 2 CYCLE 16)

Figure 3.3-3B  
Revision 40



Standard Fuel Rod with Axial Blankets



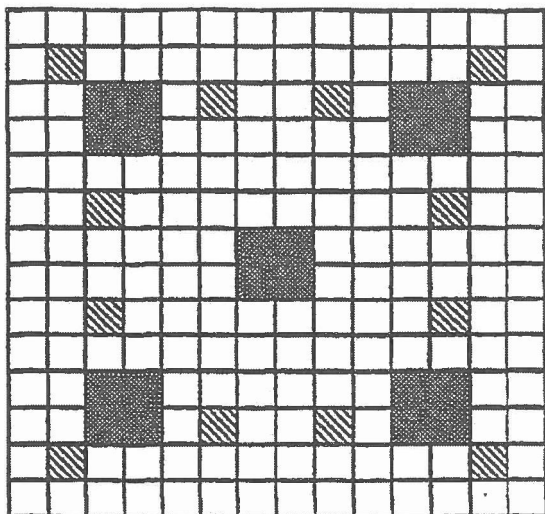
IFBA Fuel Rod with Axial Blankets

All dimensions are in inches.

Calvert Cliffs Nuclear  
Power Plant

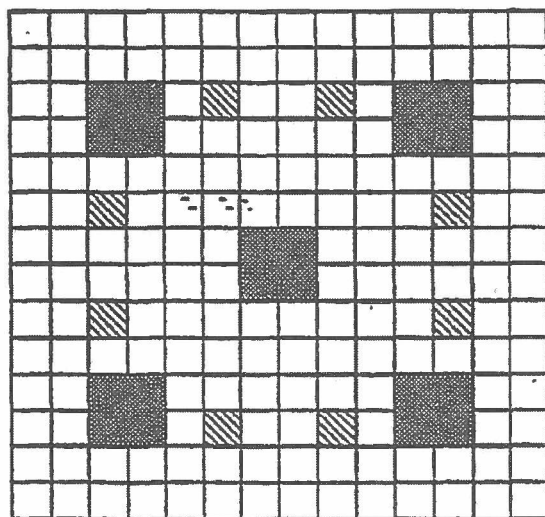
FUEL ROD DESIGN  
(UNIT 1 CYCLES 18, 19, & 20 AND  
UNIT 2 CYCLES 17 & 18)

Figure 3.3-3C  
Revision 42



### 12 POISON ROD ASSEMBLY

BUNDLES	
2K*	1M*
2L*	1MX
2F*	
2M3	



### 8 POISON ROD ASSEMBLY

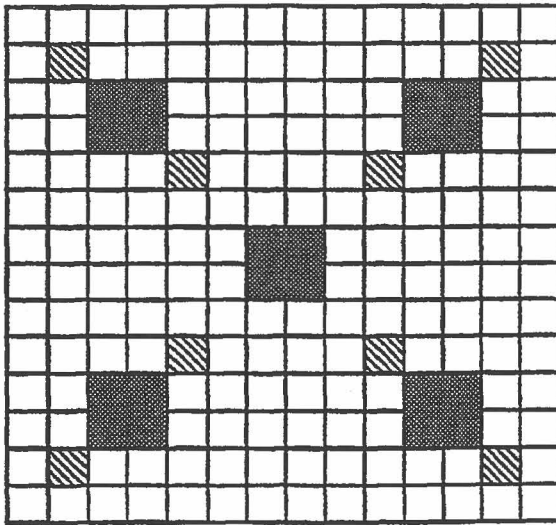
BUNDLES	
1G/ 2F/	

- ☐ Fuel Rod Location
- ☒ Poison Rod Location
- ☒ Guide Tube Location

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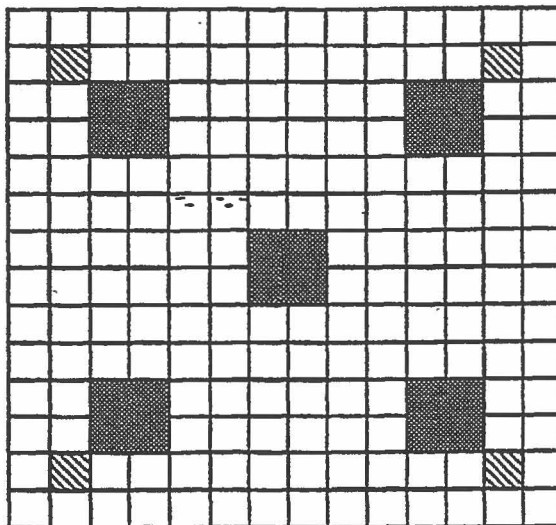
### BURNABLE POISON ROD LOCATION

Figure 3.3-4  
Sheet 1  
Rev. 15



### 8 POISON ROD ASSEMBLY

BUNDLES	
1H/ 2G/ 2K/ 2L/ 1N/	2M2



### 4 POISON ROD ASSEMBLY

BUNDLES	
2LX 1NX 2M1	

- ☐ Fuel Rod Location
- ☒ Poison Rod Location
- ☒ Guide Tube Location

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BURNABLE POISON ROD LOCATION

Figure 3.3-4  
Sheet 2  
Rev. 15

## ERBIUM DEMONSTRATION ASSEMBLY

Z	Z	Z	Z	Z					Z	Z	Z	Z	Z
Z	E	E	E	Z					Z	E	E	E	Z
Z	E	Guide	E						E	Guide	E		Z
Z	E	Tube	E						E	Tube	E		Z
Z	Z	E	E	Z					Z	E	E	Z	Z
					Z	E	E	Z					
					E	Guide	E						
					E	Tube	E						
					Z	E	E	Z					
Z	Z	E	E	Z					Z	E	E	Z	Z
Z	E	Guide	E						E	Guide	E		Z
Z	E	Tube	E						E	Tube	E		Z
Z	E	E	E	Z					Z	E	E	E	Z
Z	Z	Z	Z	Z					Z	Z	Z	Z	Z

Z 3.40 w/o U235 fuel rod

E 3.40 w/o U235 w/ 0.90 w/o  $\text{Er}_2\text{O}_3$  fuel rod

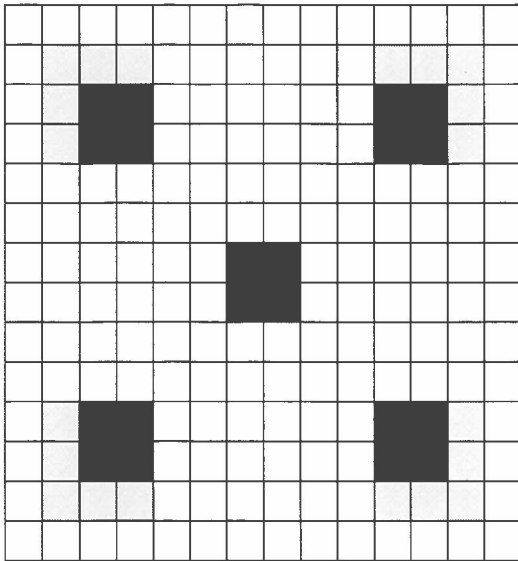
BALTIMORE  
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## BURNABLE POISON ROD LOCATION

Figure 3.3-4  
Sheet 3

Rev. 18

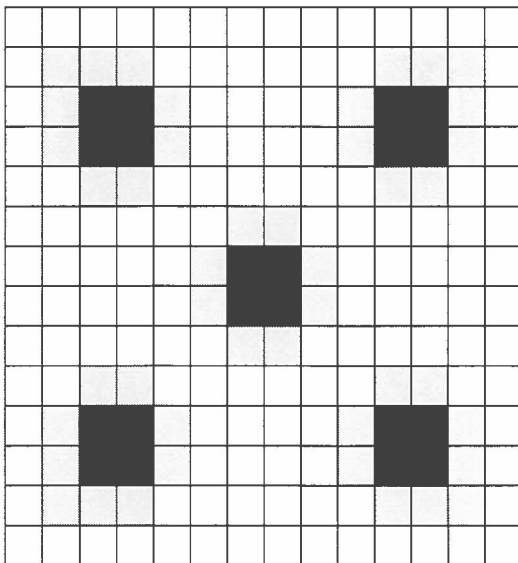
### 20 Pin Erbium Assembly



#### Bundles

1P1	1R0	1S1		
2N2	2P1	2R1	1T1	2S1
2T1	1W1			

### 44 Pin Erbium Assembly

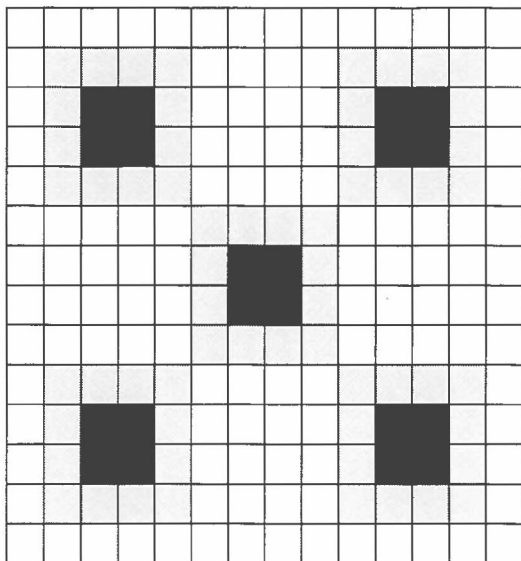


#### Bundles

1P2	1R1	1RT	1S2	
2N4	2NT	2P2	1R2	1T2
2S2	1V1	2T2	1W2	

- ☐ Fuel Rod Location
- ☐ Erbium Rod Location
- ☐ Guide Tube Location

### 60 Pin Erbium Assembly

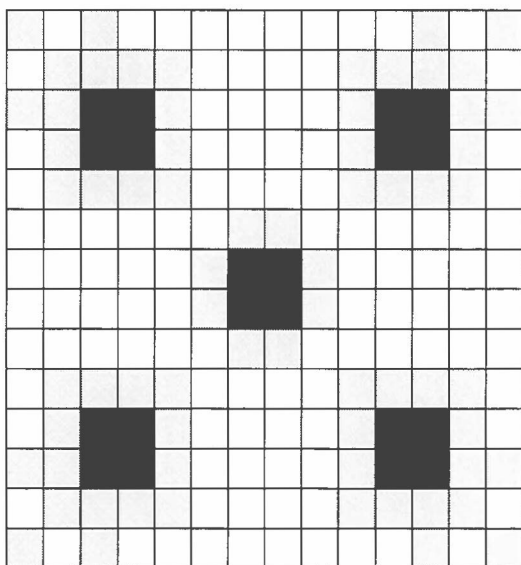


#### Bundles

1P3 1V2

1W3 1W4

### 68 Pin Erbium Assembly



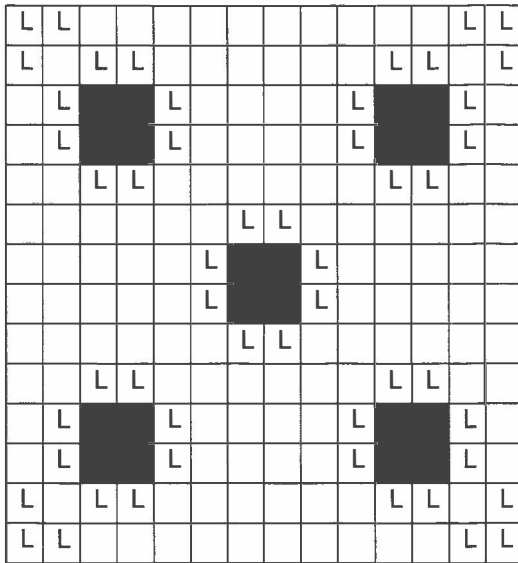
#### Bundles

1R2 1S3

2N6 2R3 2S3 2T3

- ☐ Fuel Rod Location
- ☐ Erbium Rod Location
- ☐ Guide Tube Location

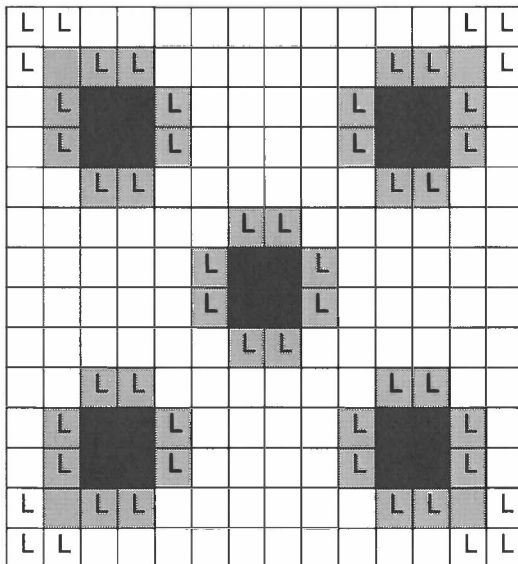
### Radial Zoned Assembly with No IFBA Pins



#### Bundles


2V0, 1Z1


### 44 IFBA Pin Radial Zoned Assembly





#### Bundles

2V1, 1X1, 1Z3

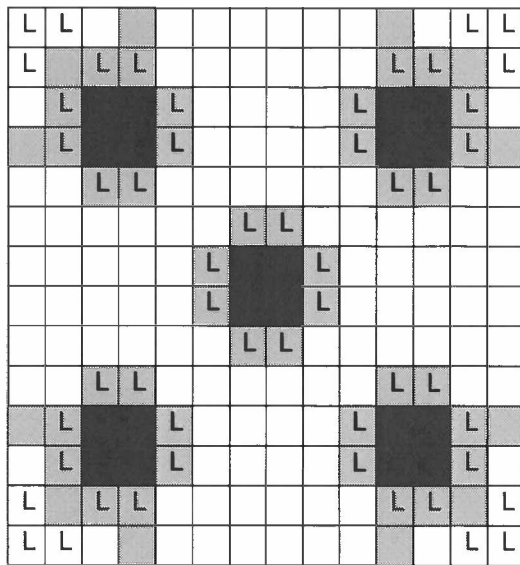
 Low Enriched Rod  
Location with No IFBA

 High Enriched Rod  
Location with No IFBA

 IFBA Low Enriched  
Rod Location

 IFBA High Enriched  
Rod Location

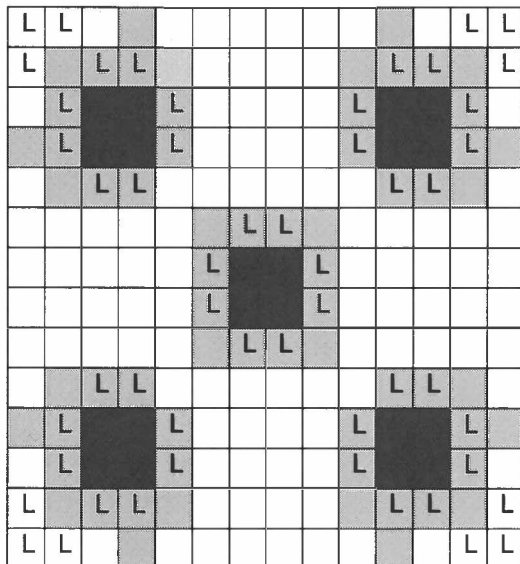
### 52 IFBA Pin Radial Zoned Assembly



#### Bundles

2V2	2X2
1X2	AA2

### 64 IFBA Pin Radial Zoned Assembly



#### Bundles

2V3	2W2
1X3	

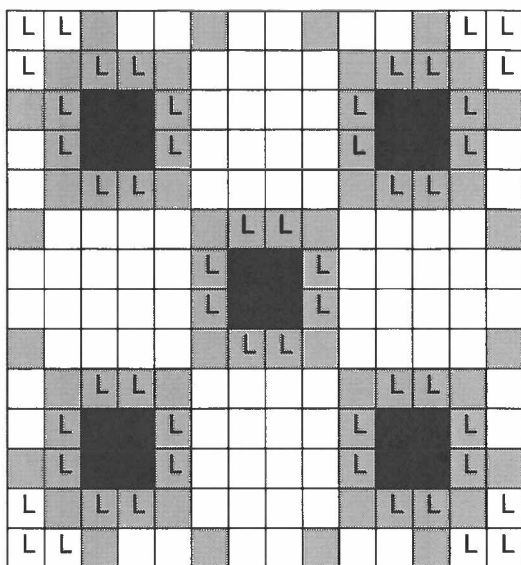
L Low Enriched Rod  
Location with No IFBA

  High Enriched Rod  
Location with No IFBA

L IFBA Low Enriched  
Rod Location

  IFBA High Enriched  
Rod Location

### 76 IFBA Pin Radial Zoned Assembly

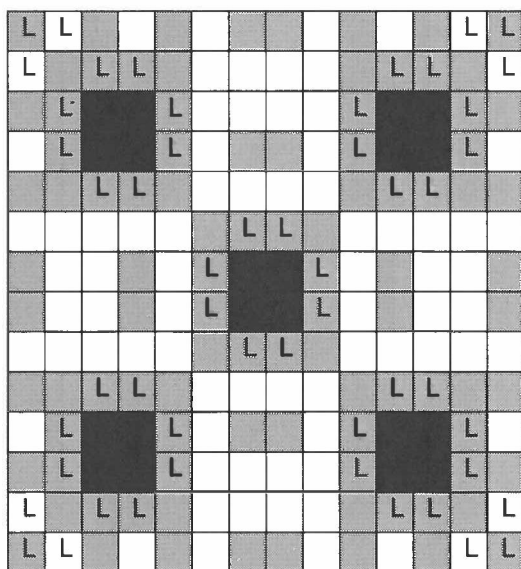


#### Bundles

2V4

1X4

### 96 IFBA Pin Radial Zoned Assembly



#### Bundles

2V5

1X5

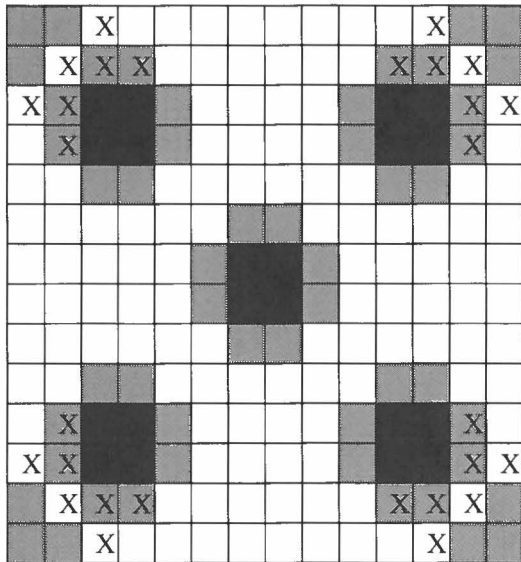
Low Enriched Rod  
Location with No IFBA

High Enriched Rod  
Location with No IFBA

IFBA Low Enriched  
Rod Location

IFBA High Enriched  
Rod Location

## 28 IFBA Pin Radial Zoned Assembly



### Bundles

2W1, 1Z2, 2X1, AA1

 High Enriched Fuel Rod

 High Enriched ZrB<sub>2</sub> Rod

 Low Enriched Fuel Rod

 Low Enriched ZrB<sub>2</sub> Rod

### 52 ZrB<sub>2</sub> Rods

3	3	2	5	2	2	1	1	2	2	5	2	3	3
3	5	6	6	2	1	1	1	1	2	6	6	5	3
2	6			6	1	1	1	1	6			6	2
5	6			6	2	1	1	2	6			6	5
2	2	6	6	2	2	2	2	2	2	6	6	2	2
2	1	1	2	2	2	6	6	2	2	2	1	1	2
1	1	1	1	2	6			6	2	1	1	1	1
1	1	1	1	2	6			6	2	1	1	1	1
2	1	1	2	2	2	6	6	2	2	2	1	1	2
2	2	6	6	2	2	2	2	2	2	6	6	2	2
5	6			6	2	1	1	2	6			6	5
2	6			6	1	1	1	1	6			6	2
3	5	6	6	2	1	1	1	1	2	6	6	5	3
3	3	2	5	2	2	1	1	2	2	5	2	3	3

#### Legend:

1. High Enriched Fuel
2. Medium Enriched Fuel
3. Low Enriched Fuel
4. High Enriched with ZrB<sub>2</sub>
5. Medium Enriched with ZrB<sub>2</sub>
6. Low Enriched with ZrB<sub>2</sub>

#### Bundles

2W3

### 64 ZrB<sub>2</sub> Rods

3	3	2	5	2	2	1	1	2	2	5	2	3	3
3	5	6	6	5	1	1	1	1	5	6	6	5	3
2	6			6	1	1	1	1	6			6	2
5	6			6	2	1	1	2	6			6	5
2	5	6	6	2	2	2	2	2	2	6	6	5	2
2	1	1	2	2	5	6	6	5	2	2	1	1	2
1	1	1	1	2	6			6	2	1	1	1	1
1	1	1	1	2	6			6	2	1	1	1	1
2	1	1	2	2	5	6	6	5	2	2	1	1	2
2	5	6	6	2	2	2	2	2	2	6	6	5	2
5	6			6	2	1	1	2	6			6	5
2	6			6	1	1	1	1	6			6	2
3	5	6	6	5	1	1	1	1	5	6	6	5	3
3	3	2	5	2	2	1	1	2	2	5	2	3	3

#### Bundles

2W4, 1Z4, 2X3, 2X6, AA3

### 76 ZrB<sub>2</sub> Rods

3	3	5	2	2	5	1	1	5	2	2	5	3	3
3	5	6	6	5	1	1	1	1	5	6	6	5	3
5	6			6	1	1	1	1	6			6	5
2	6			6	2	1	1	2	6			6	2
2	5	6	6	5	2	2	2	2	5	6	6	5	2
5	1	1	2	2	5	6	6	5	2	2	1	1	5
1	1	1	1	2	6			6	2	1	1	1	1
1	1	1	1	2	6			6	2	1	1	1	1
5	1	1	2	2	5	6	6	5	2	2	1	1	5
2	5	6	6	5	2	2	2	2	5	6	6	5	2
2	6			6	2	1	1	2	6			6	2
5	6			6	1	1	1	1	6			6	5
3	5	6	6	5	1	1	1	1	5	6	6	5	3
3	3	5	2	2	5	1	1	5	2	2	5	3	3

#### Legend:

1. High Enriched Fuel
2. Medium Enriched Fuel
3. Low Enriched Fuel
4. High Enriched with ZrB<sub>2</sub>
5. Medium Enriched with ZrB<sub>2</sub>
6. Low Enriched with ZrB<sub>2</sub>

#### Bundles

2W5, 1Z5, 2X4, AA4

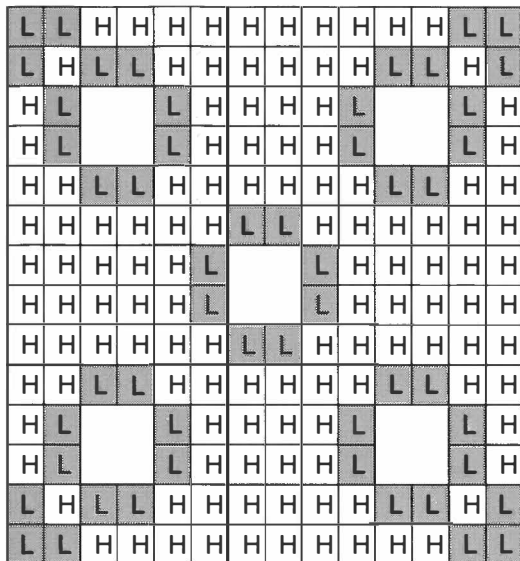
### 96 ZrB<sub>2</sub> Rods

6	3	5	2	5	2	4	4	2	5	2	5	3	6
3	5	6	6	5	1	1	1	1	5	6	6	5	3
5	6			6	1	1	1	1	6			6	5
2	6			6	2	1	1	2	6			6	2
5	5	6	6	5	5	2	2	5	5	6	6	5	5
2	1	1	2	5	5	6	6	5	5	2	1	1	2
4	1	1	1	2	6			6	2	1	1	1	4
4	1	1	1	2	6			6	2	1	1	1	4
2	1	1	2	5	5	6	6	5	5	2	1	1	2
5	5	6	6	5	5	2	2	5	5	6	6	5	5
2	6			6	2	1	1	2	6			6	2
5	6			6	1	1	1	1	6			6	5
3	5	6	6	5	1	1	1	1	5	6	6	5	3
6	3	5	2	5	2	4	4	2	5	2	5	3	6

#### Bundles

2W6, 1Z6, 2X5, AA5

### 0 Gd<sub>2</sub>O<sub>3</sub> Rods



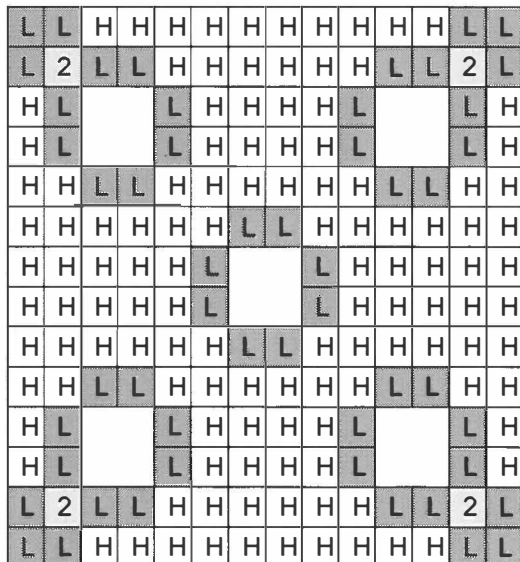
#### Legend:

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

#### Bundles

2Z1

### 4 Gd<sub>2</sub>O<sub>3</sub> Rods



#### Bundles

2Z2

### 16 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	2	L	L	H	H	H	H	H	H	L	L	2	L
H	L			L	6	H	H	6	L			L	H
H	L			L	H	H	H	H	L			L	H
H	H	L	L	6	H	H	H	H	6	L	L	H	H
H	H	6	H	H	H	L	L	H	H	H	6	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	6	H	H	H	L	L	H	H	H	6	H	H
H	H	L	L	6	H	H	H	H	6	L	L	H	H
H	L			L	H	H	H	H	L			L	H
H	L			L	6	H	H	6	L			L	H
L	2	L	L	H	H	H	H	H	H	L	L	2	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

#### Legend:

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

#### Bundles

2Z3

### 16 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	8	L	L	H	H	H	H	H	H	L	L	8	L
H	L			L	8	H	H	8	L			L	H
H	L			L	H	H	H	H	L			L	H
H	H	L	L	8	H	H	H	H	8	L	L	H	H
H	H	8	H	H	H	L	L	H	H	H	8	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	8	H	H	H	L	L	H	H	H	8	H	H
H	H	L	L	8	H	H	H	H	8	L	L	H	H
H	L			L	H	H	H	H	L			L	H
H	L			L	8	H	H	8	L			L	H
L	8	L	L	H	H	H	H	H	H	L	L	8	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

#### Bundles

2Z4

## 12 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	8	L	L	H	H	H	H	H	H	L	L	8	L
H	L			L	H	H	H	H	L			L	H
H	L			L	8	H	H	8	L			L	H
H	H	L	L	H	H	H	H	H	H	L	L	H	H
H	H	H	8	H	H	L	L	H	H	8	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	8	H	H	L	L	H	H	8	H	H	H
H	H	L	L	H	H	H	H	H	H	L	L	H	H
H	L			L	8	H	H	8	L			L	H
H	L			L	H	H	H	H	L			L	H
L	8	L	L	H	H	H	H	H	H	L	L	8	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

### Legend:

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

### Bundles

2Z5

### 16 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	4	L	L	H	H	H	H	H	H	L	L	4	L
H	L			L	8	H	H	8	L			L	H
H	L			L	H	H	H	H	L			L	H
H	H	L	L	8	H	H	H	H	8	L	L	H	H
H	H	8	H	H	H	L	L	H	H	H	8	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	8	H	H	H	L	L	H	H	H	8	H	H
H	H	L	L	8	H	H	H	H	8	L	L	H	H
H	L			L	H	H	H	H	L			L	H
H	L			L	8	H	H	8	L			L	H
L	4	L	L	H	H	H	H	H	H	L	L	4	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

#### Legend:

- H High Enriched Fuel
- L Low Enriched Fuel
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

#### Bundles

AB1

### 16 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	4	L	L	H	H	H	H	H	H	L	L	4	L
H	L			L	6	H	H	6	L			L	H
H	L			L	H	H	H	H	L			L	H
H	H	L	L	6	H	H	H	H	6	L	L	H	H
H	H	6	H	H	H	L	L	H	H	H	6	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	6	H	H	H	L	L	H	H	H	6	H	H
H	H	L	L	6	H	H	H	H	6	L	L	H	H
H	L			L	H	H	H	H	L			L	H
H	L			L	6	H	H	6	L			L	H
L	4	L	L	H	H	H	H	H	H	L	L	4	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

#### Bundles

AB2

## 12 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	4	L	L	H	H	H	H	H	H	L	L	4	L
H	L			L	H	H	H	H	L			L	H
H	L			L	4	H	H	4	L			L	H
H	H	L	L	H	H	H	H	H	L	L	H	H	
H	H	H	4	H	H	L	L	H	H	4	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	4	H	H	L	L	H	H	4	H	H	H
H	H	L	L	H	H	H	H	H	H	L	L	H	H
H	L			L	4	H	H	4	L			L	H
H	L			L	H	H	H	H	L			L	H
L	4	L	L	H	H	H	H	H	H	L	L	4	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

### Legend:

H High Enriched Fuel  
L Low Enriched Fuel  
4 4 w/o Gd<sub>2</sub>O<sub>3</sub>

### Bundles

AB3

### No Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	H	L	L	H	H	H	H	H	L	L	H	L	
H	L			L	H	H	H	H	L		L	H	
H	L			L	H	H	H	H	L		L	H	
H	H	L	L	H	H	H	H	H	L	L	H	H	
H	H	H	H	H	L	L	H	H	H	H	H	H	
H	H	H	H	H	L			L	H	H	H	H	
H	H	H	H	H	L			L	H	H	H	H	
H	H	H	H	H	L	L	H	H	H	H	H	H	
H	H	L	L	H	H	H	H	H	L	L	H	H	
H	L			L	H	H	H	H	L		L	H	
H	L			L	H	H	H	H	L		L	H	
L	H	L	L	H	H	H	H	H	L	L	H	L	
L	L	H	H	H	H	H	H	H	H	H	L	L	

#### Legend:

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

#### Bundles

BA1

### 4 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	4	L	L	H	H	H	H	H	L	L	4	L	
H	L			L	H	H	H	H	L		L	H	
H	L			L	H	H	H	H	L		L	H	
H	H	L	L	H	H	H	H	H	L	L	H	H	
H	H	H	H	H	L	L	H	H	H	H	H	H	
H	H	H	H	H	L			L	H	H	H	H	
H	H	H	H	H	L			L	H	H	H	H	
H	H	L	L	H	H	H	H	H	L	L	H	H	
H	L			L	H	H	H	H	L		L	H	
H	L			L	H	H	H	H	L		L	H	
L	4	L	L	H	H	H	H	H	L	L	4	L	
L	L	H	H	H	H	H	H	H	H	H	L	L	

#### Bundles

BA2

### 16 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	2	L	L	H	H	H	H	H	L	L	2	L	L
H	L			L	4	H	H	4	L			L	H
H	L			L	H	H	H	H	L			L	H
H	H	L	L	4	H	H	H	H	4	L	L	H	H
H	H	4	H	H	H	L	L	H	H	H	4	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	4	H	H	H	L	L	H	H	H	4	H	H
H	H	L	L	4	H	H	H	H	4	L	L	H	H
H	L			L	H	H	H	H	L			L	H
H	L			L	4	H	H	4	L			L	H
L	2	L	L	H	H	H	H	H	H	L	L	2	L
L	L	H	H	H	H	H	H	H	H	H	L	L	L

#### Legend:

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

#### Bundles

BA3

### 16 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	4	L	L	H	H	H	H	H	L	L	4	L	L
H	L			L	6	H	H	6	L			L	H
H	L			L	H	H	H	H	L			L	H
H	H	L	L	6	H	H	H	H	6	L	L	H	H
H	H	6	H	H	H	L	L	H	H	H	6	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	6	H	H	H	L	L	H	H	H	6	H	H
H	H	L	L	6	H	H	H	H	6	L	L	H	H
H	L			L	H	H	H	H	L			L	H
H	L			L	6	H	H	6	L			L	H
L	4	L	L	H	H	H	H	H	H	L	L	4	L
L	L	H	H	H	H	H	H	H	H	H	L	L	L

#### Bundles

BA4

### 20 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	6	L	L	H	2	H	H	2	H	L	L	6	L
H	L			L	H	H	H	H	L			L	H
H	L			L	6	H	H	6	L			L	H
H	H	L	L	H	H	H	H	H	H	L	L	H	H
H	2	H	6	H	H	L	L	H	H	6	H	2	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	2	H	6	H	H	L	L	H	H	6	H	2	H
H	H	L	L	H	H	H	H	H	H	L	L	H	H
H	L			L	6	H	H	6	L			L	H
H	L			L	H	H	H	H	L			L	H
L	6	L	L	H	2	H	H	2	H	L	L	6	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

#### Legend:

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

#### Bundles

BA5

### 12 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	4	L	L	H	H	H	H	H	H	L	L	4	L
H	L			L	H	H	H	H	L			L	H
H	L			L	8	H	H	8	L			L	H
H	H	L	L	H	H	H	H	H	H	L	L	H	H
H	H	H	8	H	H	L	L	H	H	8	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	8	H	H	L	L	H	H	8	H	H	H
H	H	L	L	H	H	H	H	H	H	L	L	H	H
H	L			L	8	H	H	8	L			L	H
H	L			L	H	H	H	H	L			L	H
L	4	L	L	H	H	H	H	H	H	L	L	4	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

#### Bundles

BA6

# 16 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	4	L	L	H	H	H	H	H	H	L	L	4	L
H	L			L	6	H	H	6	L			L	H
H	L			L	H	H	H	H	L			L	H
H	H	L	L	6	H	H	H	H	6	L	L	H	H
H	H	6	H	H	H	L	L	H	H	H	6	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	6	H	H	H	L	L	H	H	H	6	H	H
H	H	L	L	6	H	H	H	H	6	L	L	H	H
H	L			L	H	H	H	H	L			L	H
H	L			L	6	H	H	6	L			L	H
L	4	L	L	H	H	H	H	H	H	L	L	4	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

## Legend:

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

## Bundles

BA7

### 16 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	4	L	L	H	H	H	H	H	H	L	L	4	L
H	L			L	8	H	H	8	L			L	H
H	L			L	H	H	H	H	L			L	H
H	H	L	L	8	H	H	H	H	8	L	L	H	H
H	H	8	H	H	H	L	L	H	H	H	8	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	8	H	H	H	L	L	H	H	H	8	H	H
H	H	L	L	8	H	H	H	H	8	L	L	H	H
H	L			L	H	H	H	H	L			L	H
H	L			L	8	H	H	8	L			L	H
L	4	L	L	H	H	H	H	H	H	L	L	4	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

#### Legend:

- H High Enriched Fuel
- L Low Enriched Fuel
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

#### Bundles

AC1

### 12 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	6	L	L	H	H	H	H	H	H	L	L	6	L
H	L			L	H	H	H	H	L			L	H
H	L			L	6	H	H	6	L			L	H
H	H	L	L	H	H	H	H	H	L	L	H	H	H
H	H	H	6	H	H	L	L	H	H	6	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	6	H	H	L	L	H	H	6	H	H	H
H	H	L	L	H	H	H	H	H	L	L	H	H	H
H	L			L	6	H	H	6	L			L	H
H	L			L	H	H	H	H	L			L	H
L	6	L	L	H	H	H	H	H	H	L	L	6	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

#### Bundles

AC2

# 16 Gd<sub>2</sub>O<sub>3</sub> Rods

L	L	H	H	H	H	H	H	H	H	H	H	L	L
L	4	L	L	H	H	H	H	H	H	L	L	4	L
H	L			L	H	H	H	H	L			L	H
H	L			L	H	H	H	H	L			L	H
H	H	L	L	4	H	H	H	H	4	L	L	H	H
H	H	H	H	H	H	L	L	H	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	L			L	H	H	H	H	H
H	H	H	H	H	H	L	L	H	H	H	H	H	H
H	H	L	L	4	H	H	H	H	4	L	L	H	H
H	L			L	H	H	H	H	L			L	H
H	L			L	H	H	H	H	L			L	H
L	4	L	L	H	H	H	H	H	H	L	L	4	L
L	L	H	H	H	H	H	H	H	H	H	H	L	L

## Legend:

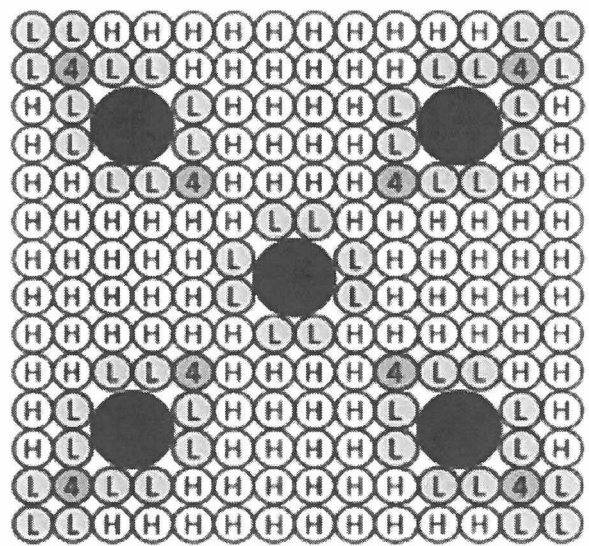
- H High Enriched Fuel
- L Low Enriched Fuel
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

## Bundles

AC3

**Bundles: BB1**

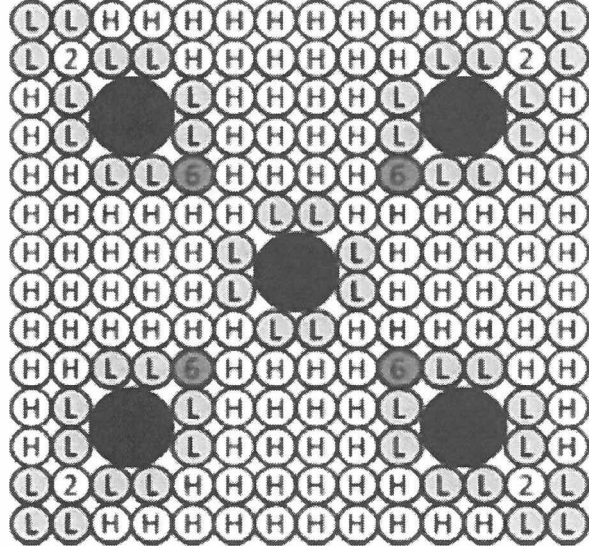
**8 Gd<sub>2</sub>O<sub>3</sub> Rods**



Legend	
H	High Enriched Fuel
L	Low Enriched Fuel
2	2 w/d Gd <sub>2</sub> O <sub>3</sub>
4	4 w/d Gd <sub>2</sub> O <sub>3</sub>
6	6 w/d Gd <sub>2</sub> O <sub>3</sub>
8	8 w/d Gd <sub>2</sub> O <sub>3</sub>

**Bundles: BB2**

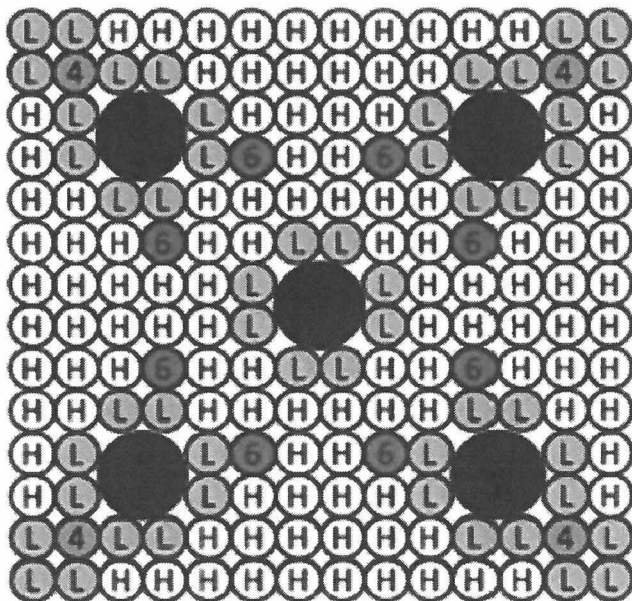
**8 Gd<sub>2</sub>O<sub>3</sub> Rods**



Legend	
H	High Enriched Fuel
L	Low Enriched Fuel
2	2 w/d Gd <sub>2</sub> O <sub>3</sub>
4	4 w/d Gd <sub>2</sub> O <sub>3</sub>
6	6 w/d Gd <sub>2</sub> O <sub>3</sub>
8	8 w/d Gd <sub>2</sub> O <sub>3</sub>

**Bundles: BB3**

**12 Gd<sub>2</sub>O<sub>3</sub> Rods**

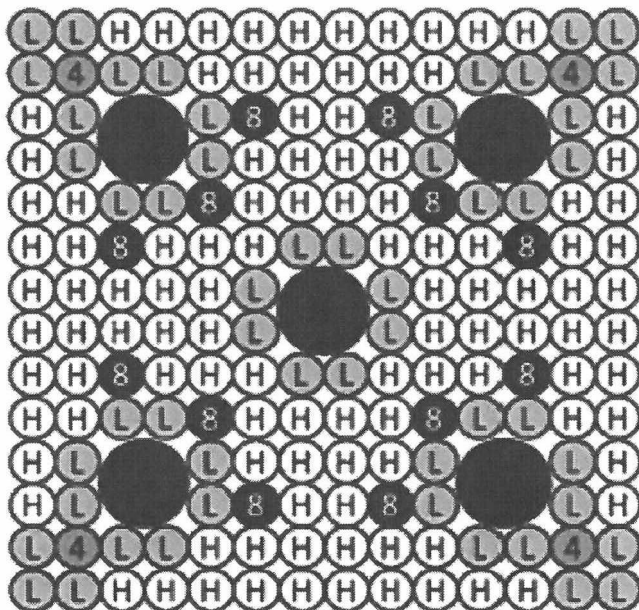


**Legend:**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: BB4**

**16 Gd<sub>2</sub>O<sub>3</sub> Rods**

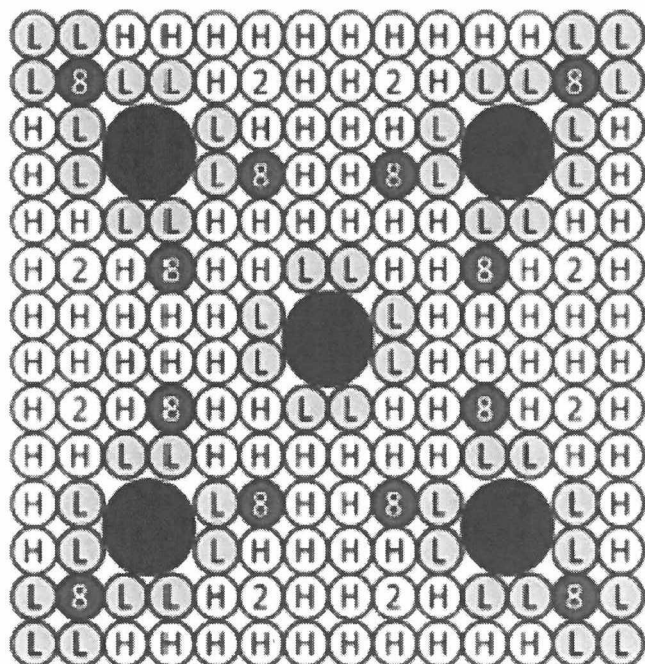


**Legend:**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: BB5**

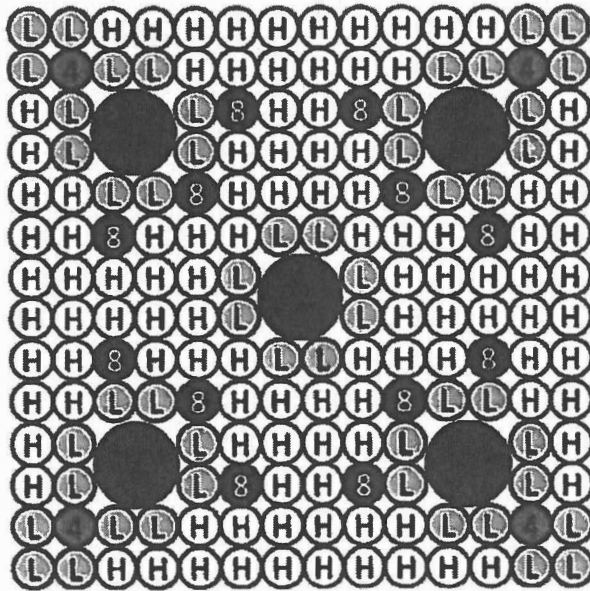
**20 Gd<sub>2</sub>O<sub>3</sub> Rods**



Legend	
H	High Enriched Fuel
L	Low Enriched Fuel
2	2 w/o Gd <sub>2</sub> O <sub>3</sub>
4	4 w/o Gd <sub>2</sub> O <sub>3</sub>
6	6 w/o Gd <sub>2</sub> O <sub>3</sub>
8	8 w/o Gd <sub>2</sub> O <sub>3</sub>

**Bundles: AD1**

**16 Gd<sub>2</sub>O<sub>3</sub> Rods**

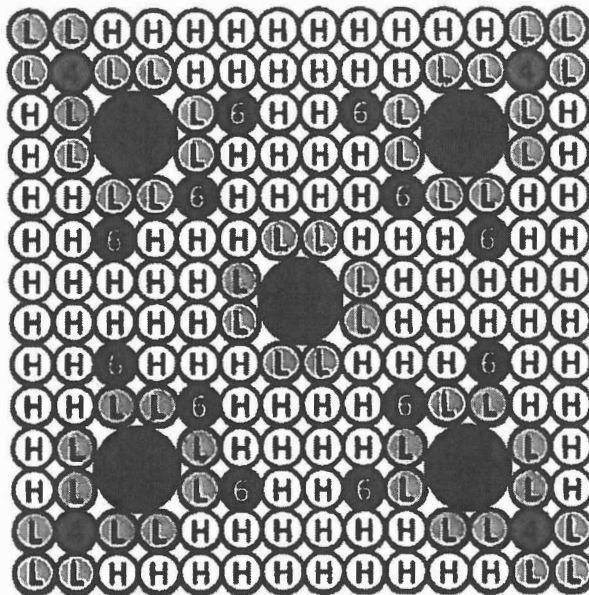


**Legend.**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: AD2**

**16 Gd<sub>2</sub>O<sub>3</sub> Rods**

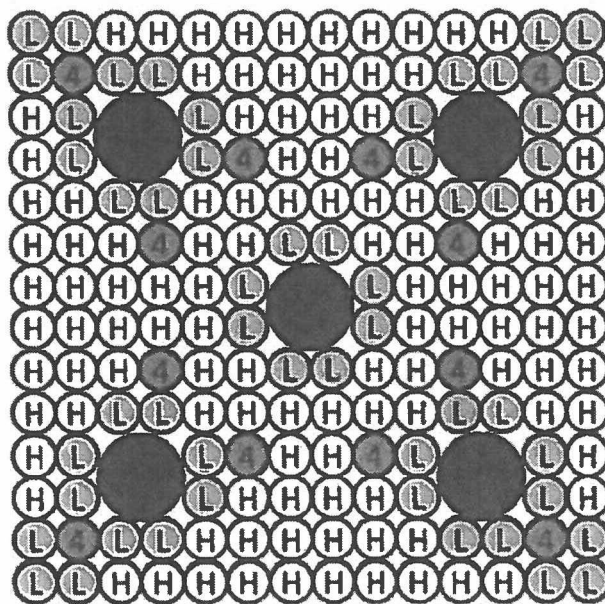


**Legend.**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: AD3**

**12 Gd<sub>2</sub>O<sub>3</sub> Rods**

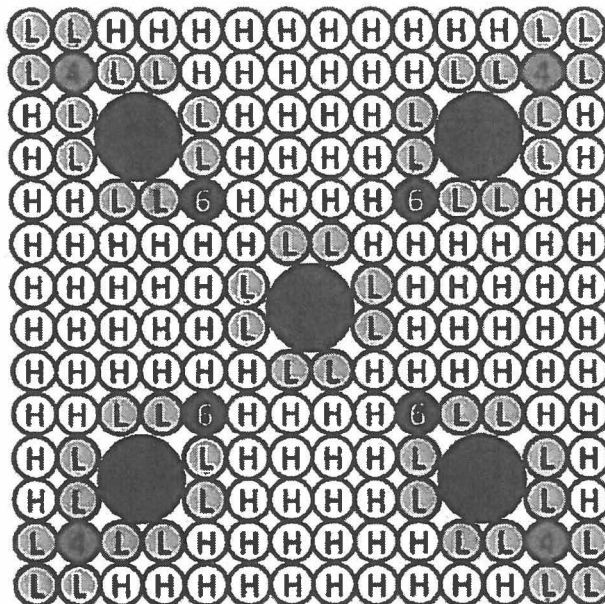


**Legend:**

H High Enriched Fuel  
L Low Enriched Fuel  
2 2 w/o Gd<sub>2</sub>O<sub>3</sub>  
4 4 w/o Gd<sub>2</sub>O<sub>3</sub>  
6 6 w/o Gd<sub>2</sub>O<sub>3</sub>  
8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: AD4**

**8 Gd<sub>2</sub>O<sub>3</sub> Rods**

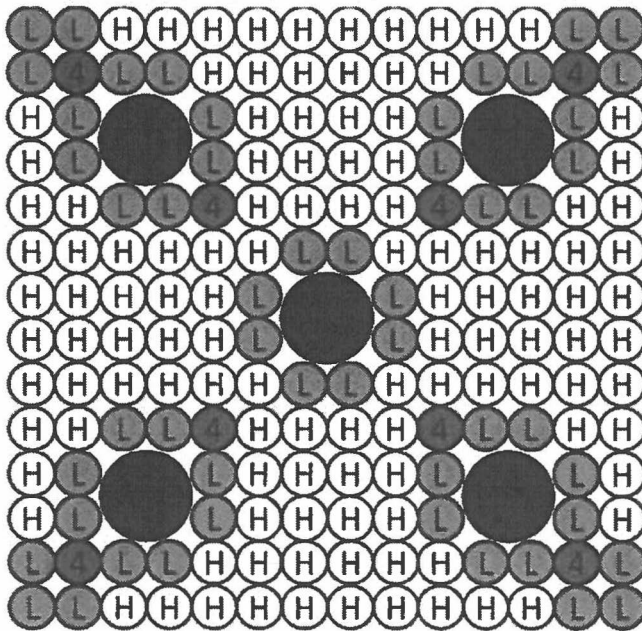


**Legend:**

H High Enriched Fuel  
L Low Enriched Fuel  
2 2 w/o Gd<sub>2</sub>O<sub>3</sub>  
4 4 w/o Gd<sub>2</sub>O<sub>3</sub>  
6 6 w/o Gd<sub>2</sub>O<sub>3</sub>  
8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: BC1**

**8 Gd<sub>2</sub>O<sub>3</sub> Rods**

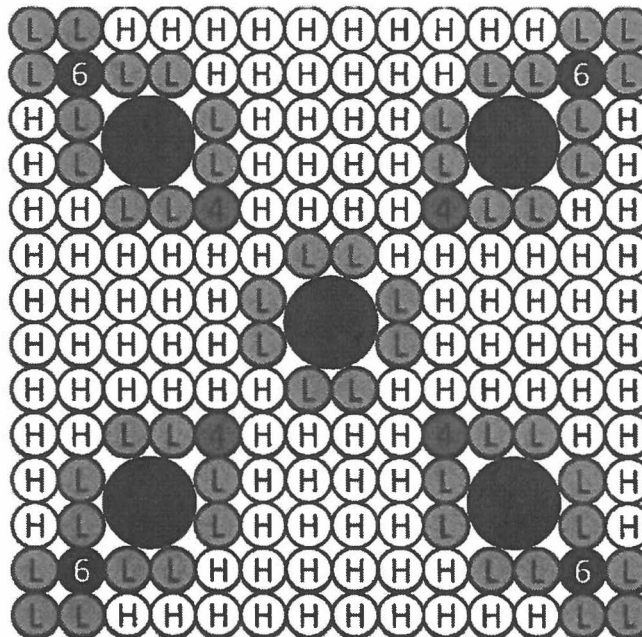


**Legend:**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: BC2**

**8 Gd<sub>2</sub>O<sub>3</sub> Rods**



**Legend:**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**BURNABLE POISON ROD LOCATION**

Figure 3-3-4

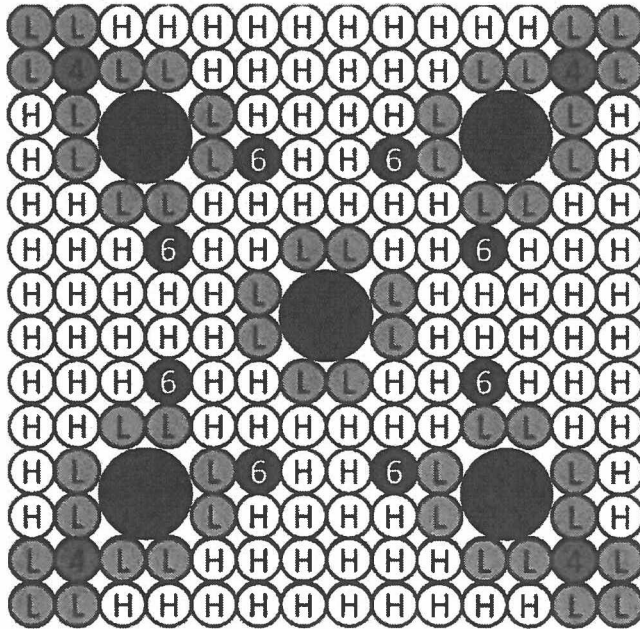
Calvert Cliffs Nuclear Power  
Plant

SHEET 28

Revision 49

**Bundles: BC3**

**12 Gd<sub>2</sub>O<sub>3</sub> Rods**

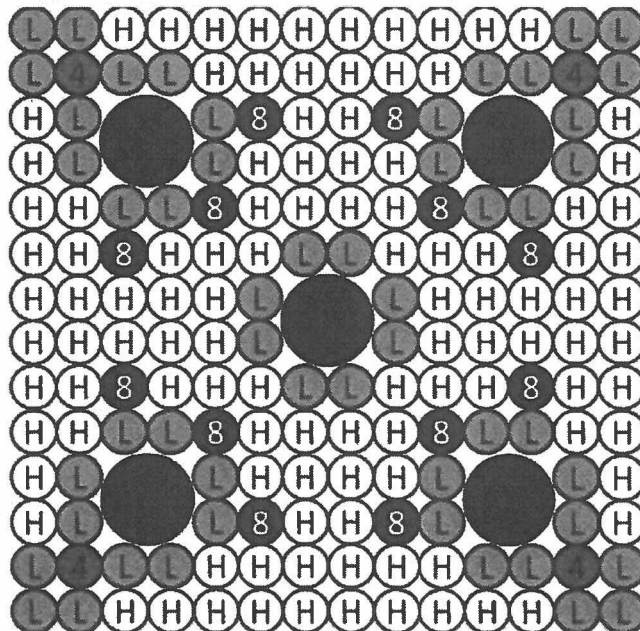


**Legend:**

H High Enriched Fuel  
 L Low Enriched Fuel  
 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>  
 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>  
 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>  
 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: BC4**

**16 Gd<sub>2</sub>O<sub>3</sub> Rods**



**Legend:**

H High Enriched Fuel  
 L Low Enriched Fuel  
 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>  
 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>  
 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>  
 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**BURNABLE POISON ROD LOCATION**

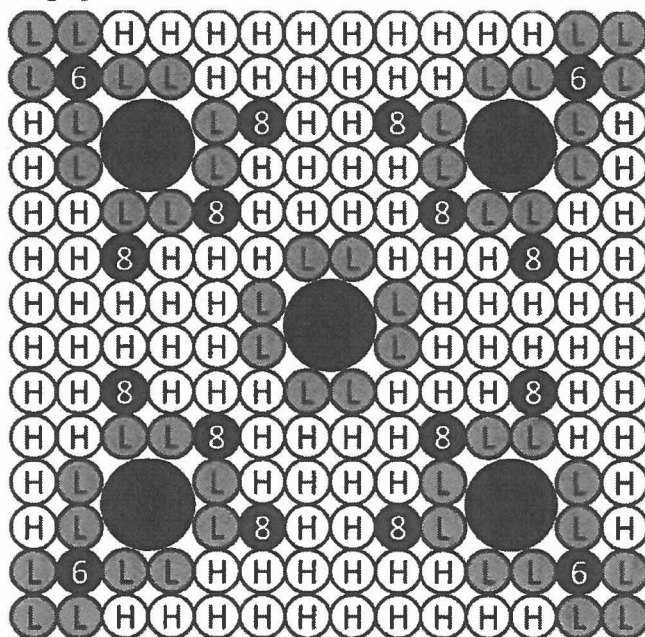
Figure 3-3-4

Calvert Cliffs Nuclear Power  
 Plant

SHEET 29

Revision 49

**Bundles: BC5**  
**16 Gd<sub>2</sub>O<sub>3</sub> Rods**



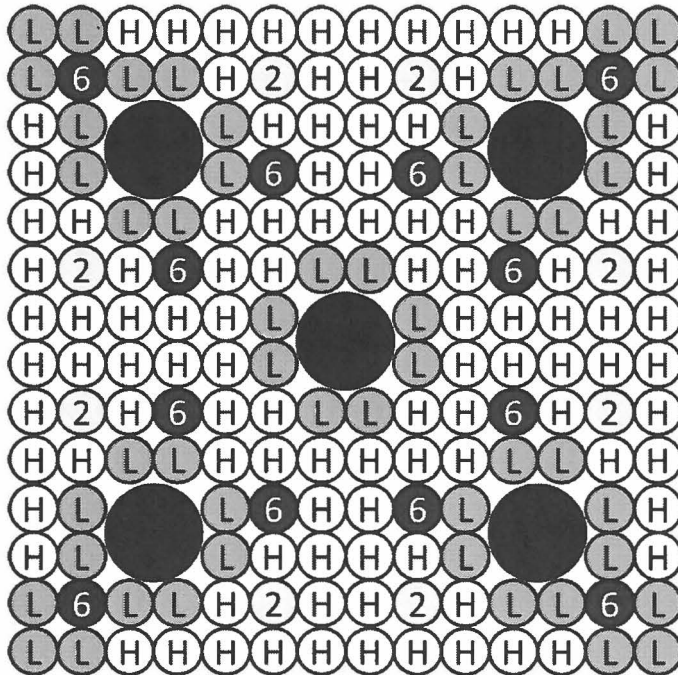
**Legend:**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

Calvert Cliffs Nuclear Power Plant	BURNABLE POISON ROD LOCATION  SHEET 30	Figure 3-3-4  Revision 49
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**Bundles: AE1**

**20 Gd<sub>2</sub>O<sub>3</sub> Rods**

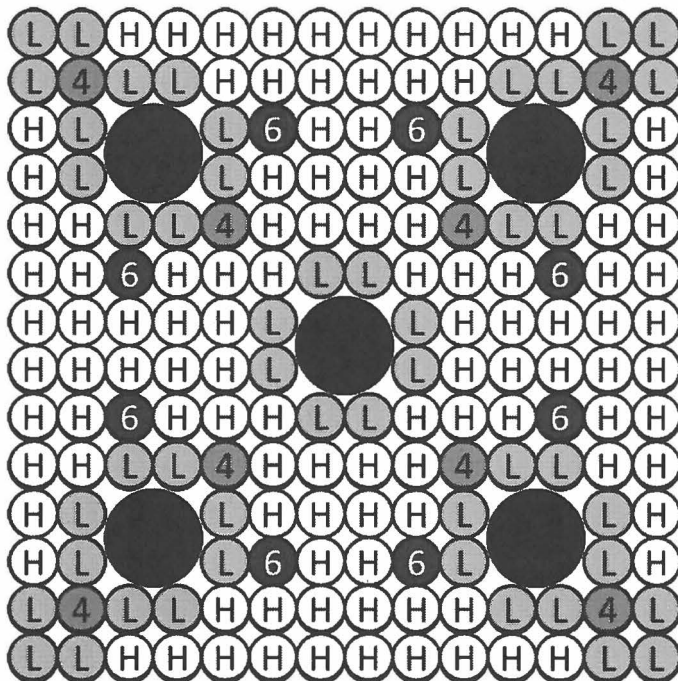


**Legend:**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: AE2**

**16 Gd<sub>2</sub>O<sub>3</sub> Rods**

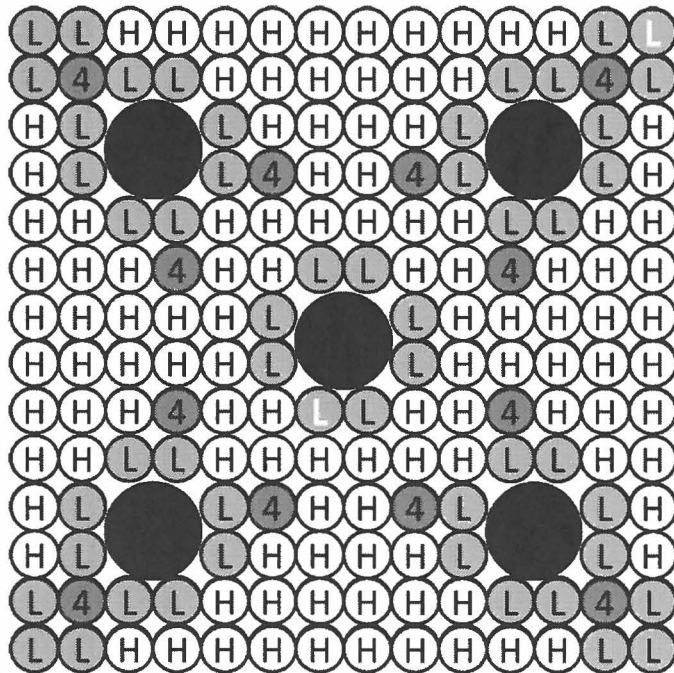


**Legend:**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: AE3**

**12 Gd<sub>2</sub>O<sub>3</sub> Rods**

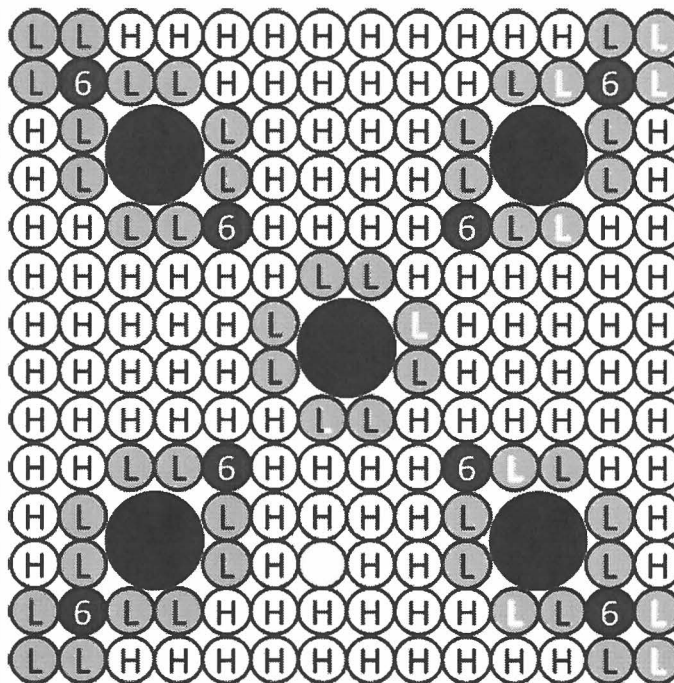


**Legend:**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: AE4**

**8 Gd<sub>2</sub>O<sub>3</sub> Rods**

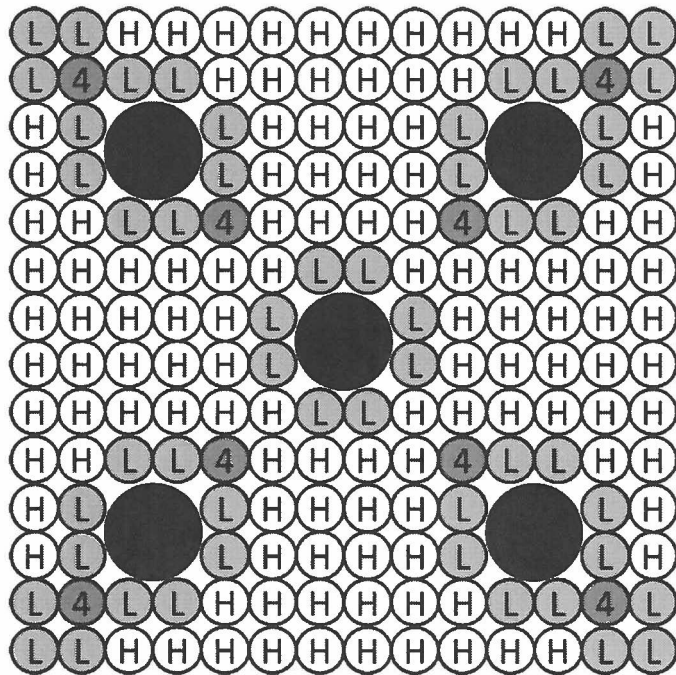


**Legend:**

- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Bundles: AE5**

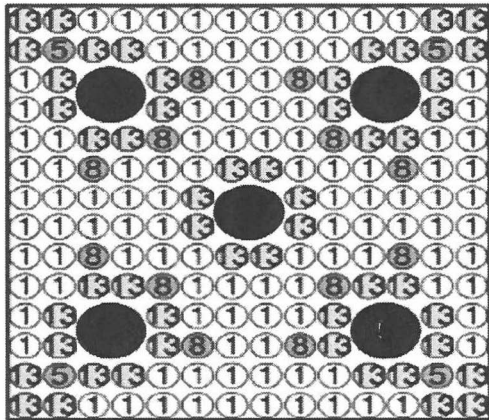
**8 Gd<sub>2</sub>O<sub>3</sub> Rods**



Legend:

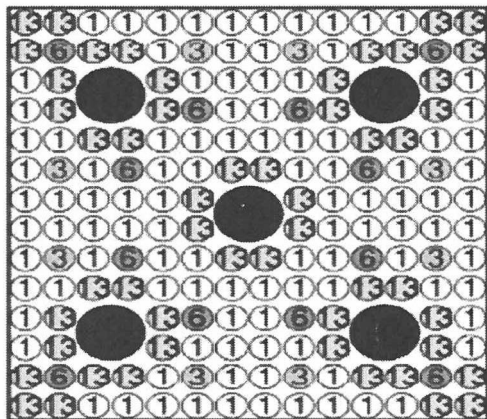
- H High Enriched Fuel
- L Low Enriched Fuel
- 2 2 w/o Gd<sub>2</sub>O<sub>3</sub>
- 4 4 w/o Gd<sub>2</sub>O<sub>3</sub>
- 6 6 w/o Gd<sub>2</sub>O<sub>3</sub>
- 8 8 w/o Gd<sub>2</sub>O<sub>3</sub>

**Sub-Batch: BD1**



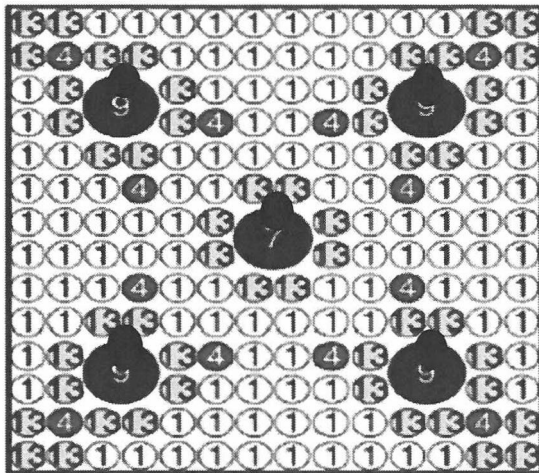
Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	108	4.91	-
5	4	3.60	5
8	12	2.95	7
13	52	4.33	-

**Sub-Batch: BD2**



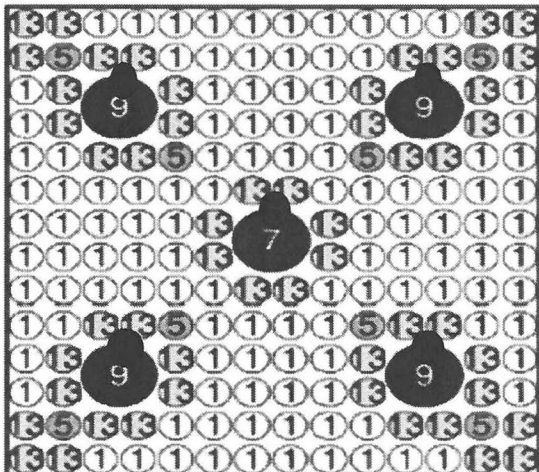
Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	104	4.91	-
3	8	4.33	2
6	12	2.95	6
13	52	4.33	-

**Sub-Batch: BD3**



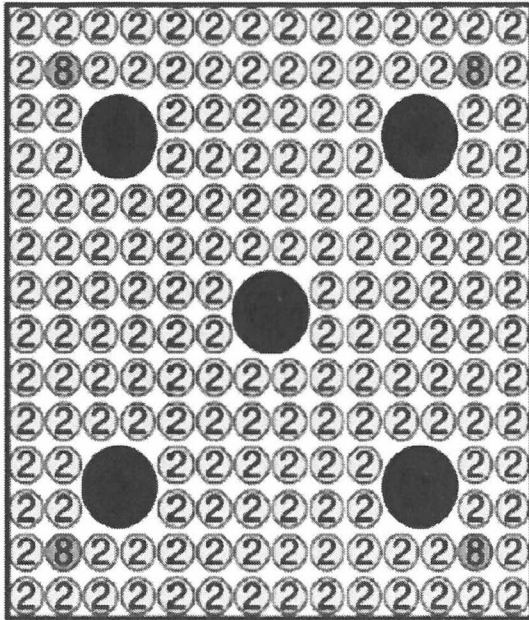
Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	112	4.91	-
4	12	3.60	4
13	52	4.33	-

**Sub-Batch: BD4**



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	116	4.91	-
5	8	3.60	5
13	52	4.33	-

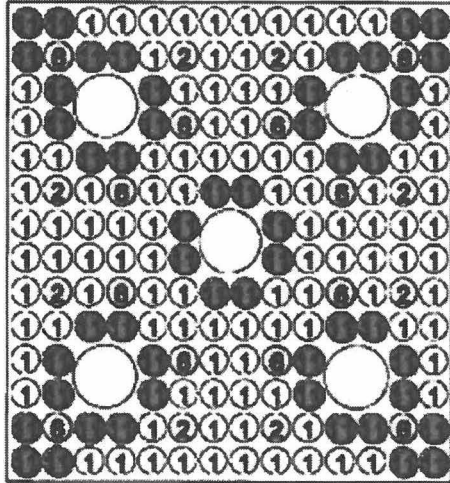
**Sub-Batch: BD5**



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
2	172	2.95	-
8	4	2.95	7

**Sub-Batch: AF1**

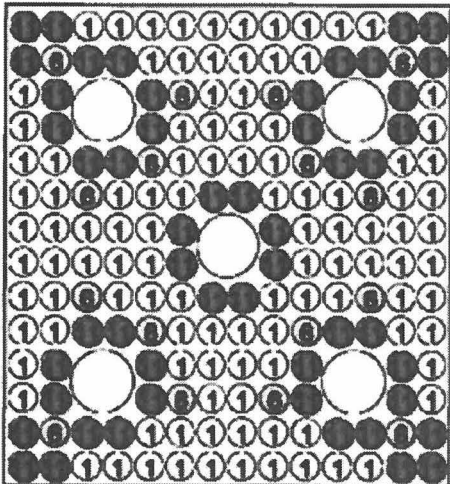
**AF1**



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	104	4.92	-
11	52	4.31	-
2	8	4.31	2
6	12	3.40	6

**Sub-Batch: AF2**

**AF2**



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	108	4.92	-
11	52	4.31	-
6	16	3.40	6

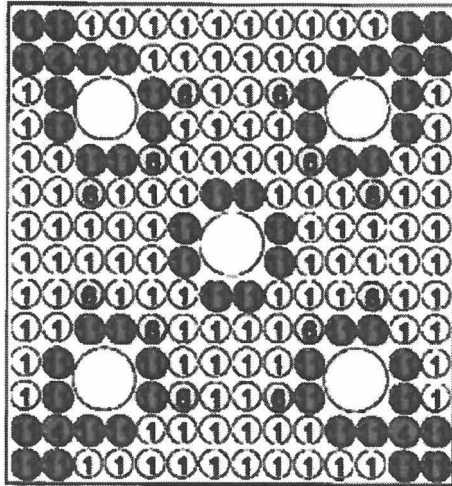
Calvert Cliffs  
Nuclear Power Plant

Burnable-Position Rod Location  
Sheet 37

Figure 3.3-4  
Revision 52

**Sub-Batch: AF3**

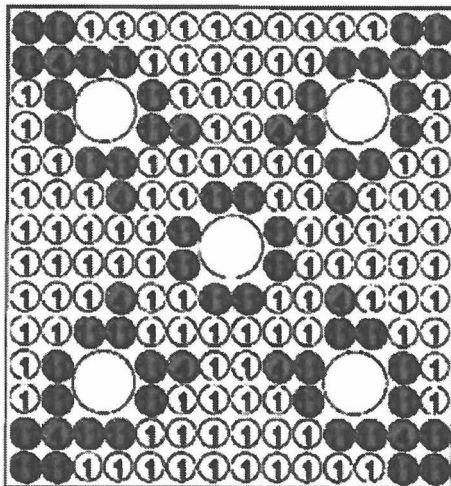
**AF3**



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	108	4.92	-
11	52	4.31	-
4	4	3.80	4
6	12	3.40	6

**Sub-Batch: AF4**

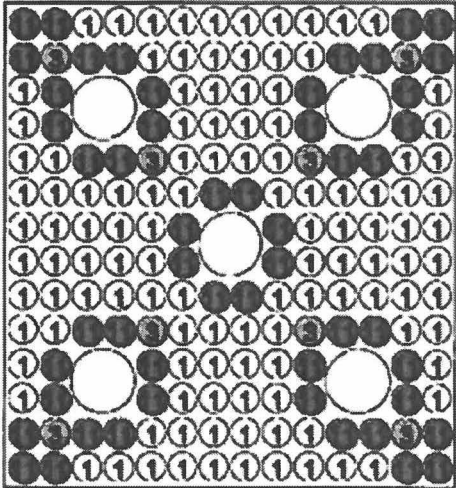
**AF4**



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	112	4.92	-
11	52	4.31	-
4	12	3.80	4

Sub-Batch: AF5

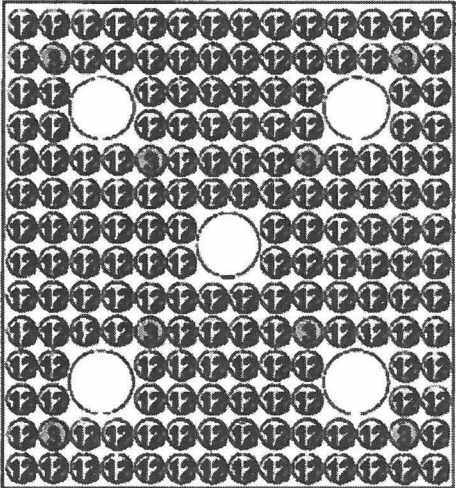
AF5



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	116	4.92	-
11	52	4.31	-
3	8	2.95	4

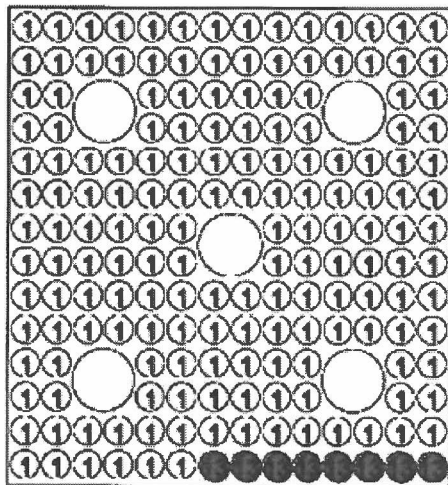
Sub-Batch: AF6

AF6



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
12	168	2.95	-
3	8	2.95	4

**AF7**



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
1	168	2.00	-
13	8	Inert rod	-

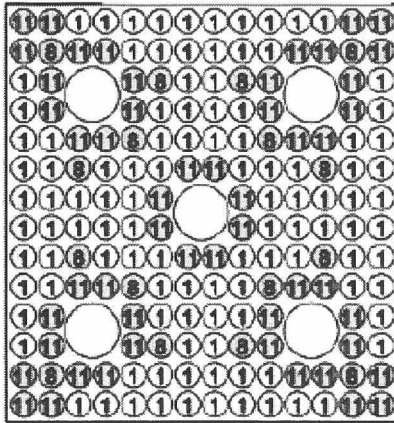
Calvert Cliffs  
Nuclear Power Plant

Burnable-Position Rod Location  
Sheet 40

Figure 3.3-4  
Revision 52

Sub-Batch: BE1

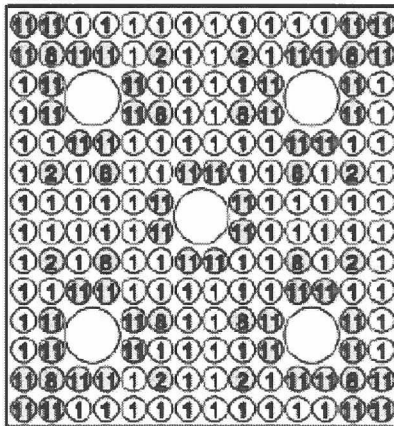
BE1



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	108	4.87	-
8	16	2.90	8

Sub-Batch: BE2

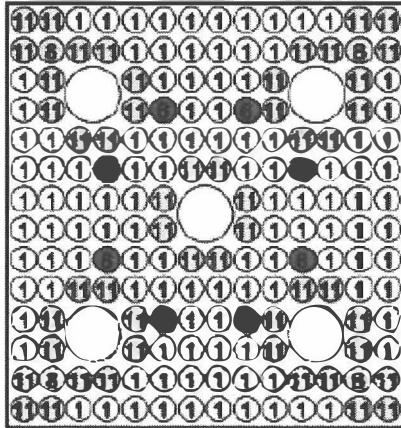
BE2



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	104	4.87	-
8	12	2.90	8
2	8	4.27	2

Sub-Batch: BE3

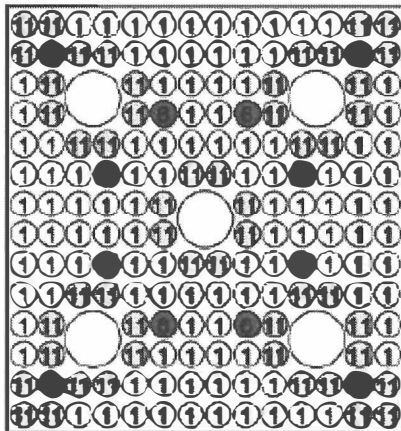
BE3



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	112	4.87	-
6	8	3.20	6
8	4	2.90	8

Sub-Batch: BE4

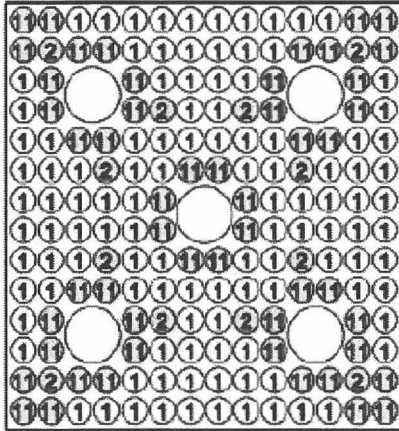
BE4



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	112	4.87	-
6	12	3.20	6

Sub-Batch: BE5

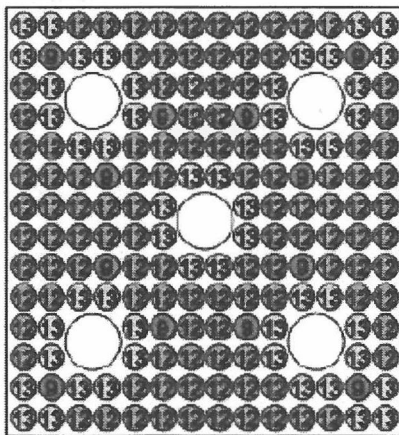
BE5



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	112	4.87	-
2	12	4.27	2

Sub-Batch: BE6

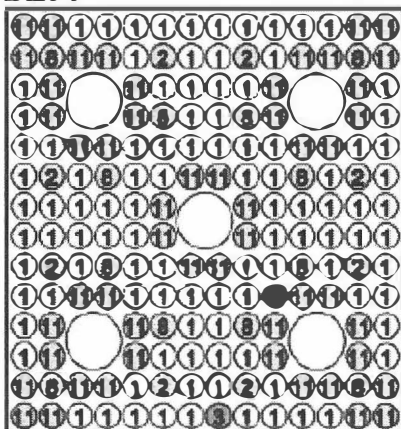
BE6



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
13	52	4.27	-
12	112	4.87	-
9	12	4.27	2

Sub-Batch: BE71

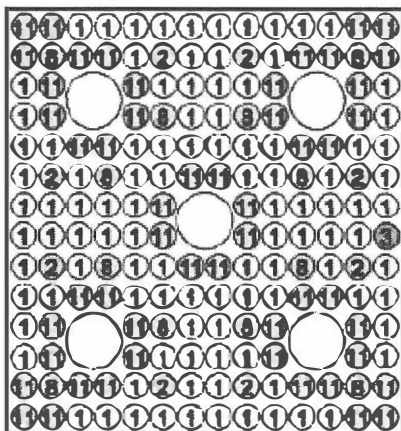
BE71



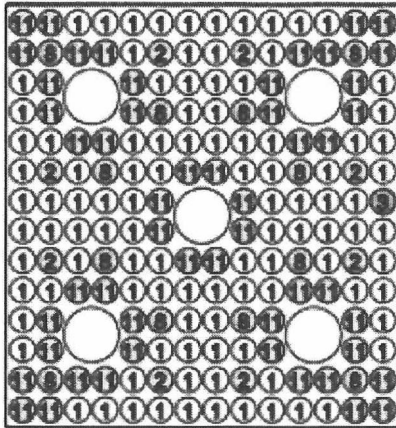
Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	103	4.87	-
8	12	2.90	8
2	8	4.27	2
3	1	Inert Rod	-

Sub-Batch: BE72

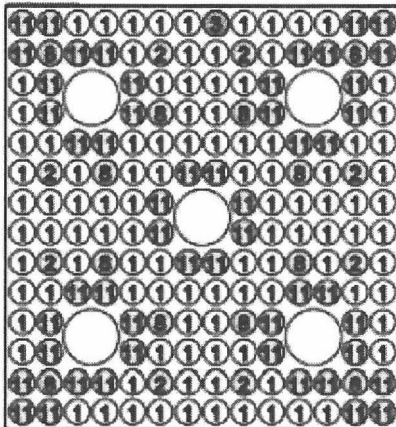
BE72



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	103	4.87	-
8	12	2.90	8
2	8	4.27	2
3	1	Inert Rod	-

**BE73****Sub-Batch: BE73**

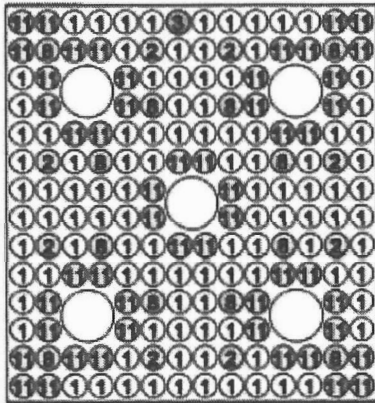
Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	103	4.87	-
8	12	2.90	8
2	8	4.27	2
3	1	Inert Rod	-

**Sub-Batch: BE74****BE74**

Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	103	4.87	-
3	1	Inert Rod	-
8	12	2.90	8
2	8	4.27	2

# BE75

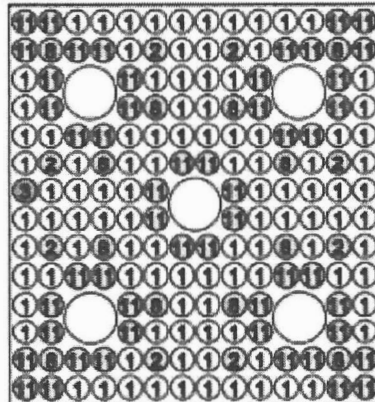
## Sub-Batch: BE75



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	103	4.87	-
3	1	Inert rod	-
8	12	2.90	8
2	8	4.27	2

## Sub-Batch: BE76

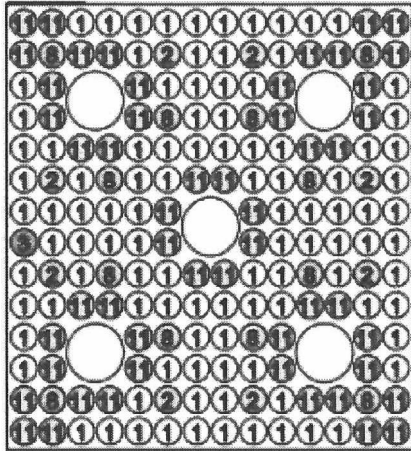
# BE76



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	103	4.87	-
8	12	2.90	8
2	8	4.27	2
3	1	Inert rod	-

Sub-Batch: BE77

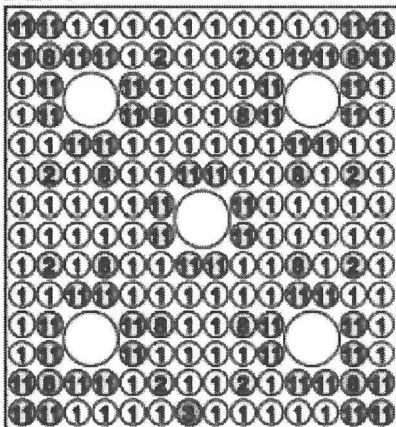
BE77



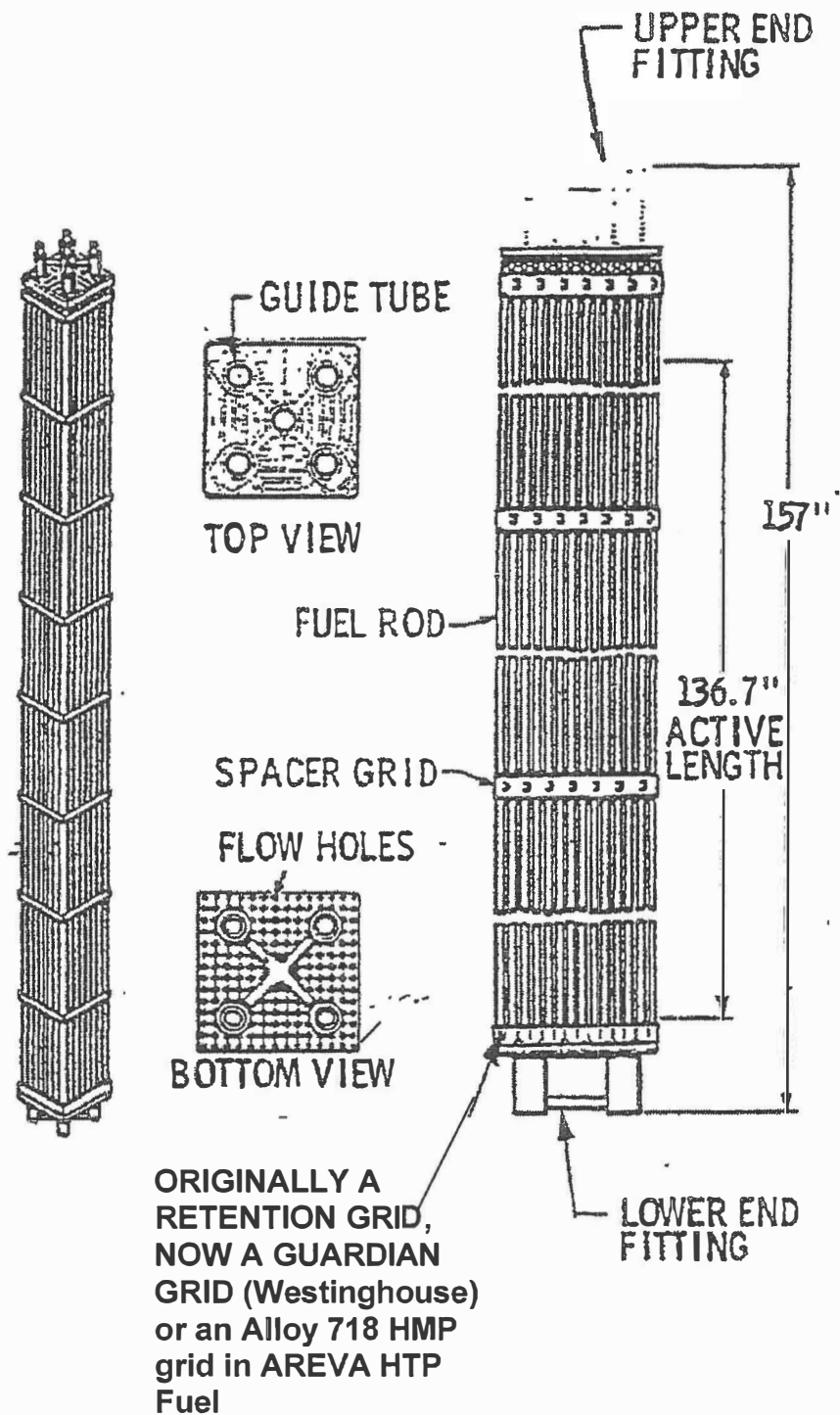
Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	103	4.87	-
8	12	2.90	8
2	8	4.27	2
3	1	Inert rod	-

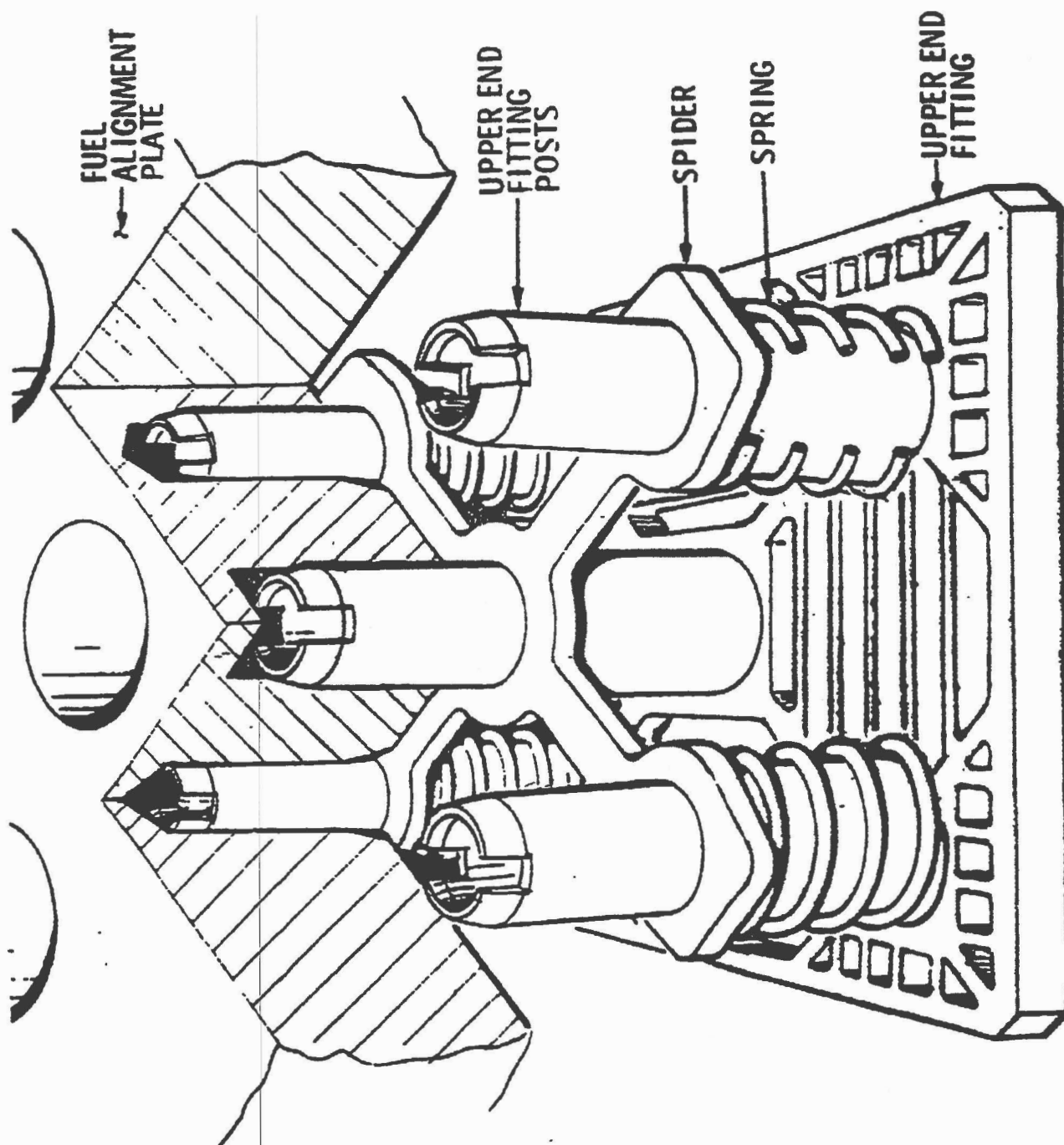
Sub-Batch: BE78

BE78



Type	# Rods	U <sup>235</sup> %	Gd <sub>2</sub> O <sub>3</sub> %
11	52	4.27	-
1	103	4.87	-
8	12	2.90	8
2	8	4.27	2
3	1	Inert rod	-

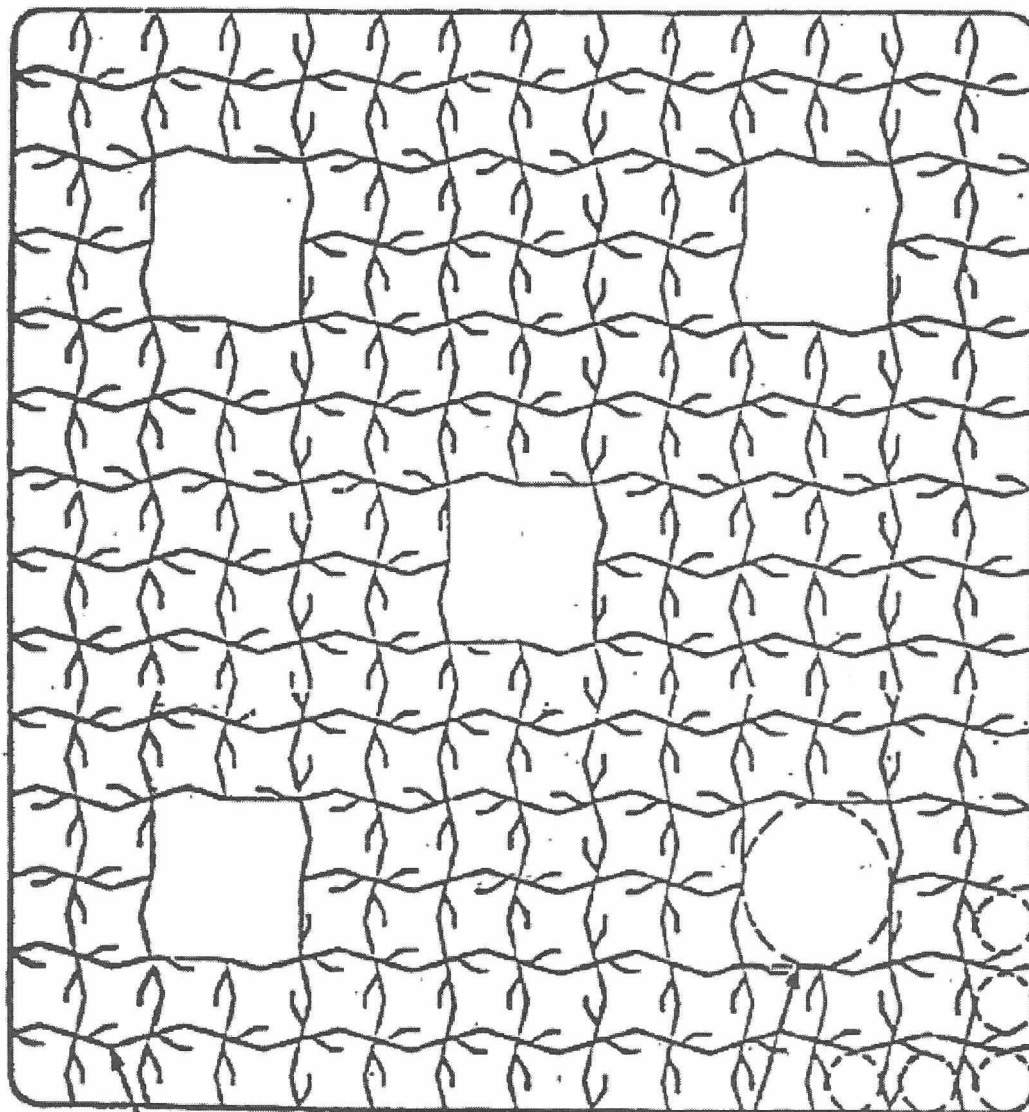




BALTIMORE  
GAS & ELECTRIC CO.  
Calvert Cliffs  
Nuclear Power Plant

Fuel Assembly Hold Down

Figure  
3.3-6



Grid  
Spring

Grid  
Perimeter  
Strip

CEA  
Guide Tube  
Location

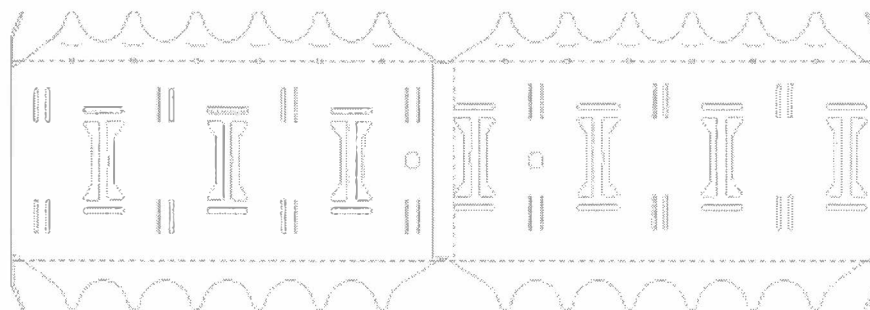
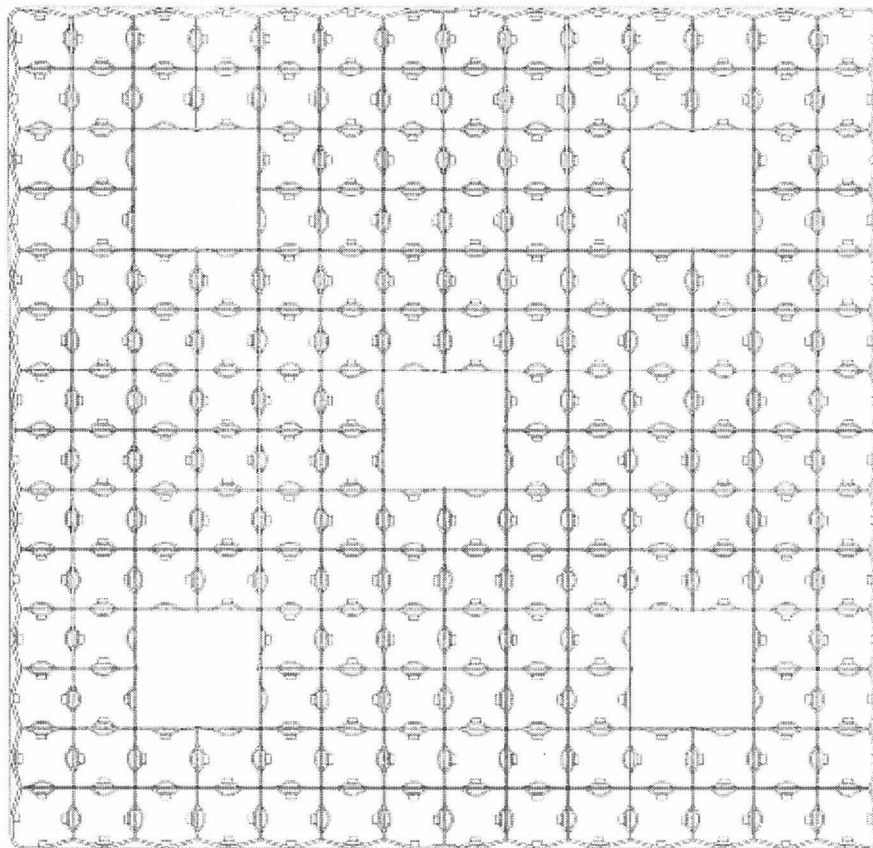
Fuel  
Rod

Calvert Cliffs  
Nuclear Power Plant

CANTILEVER TAB FUEL SPACER GRID

Figure 3.3-7

Revision 32

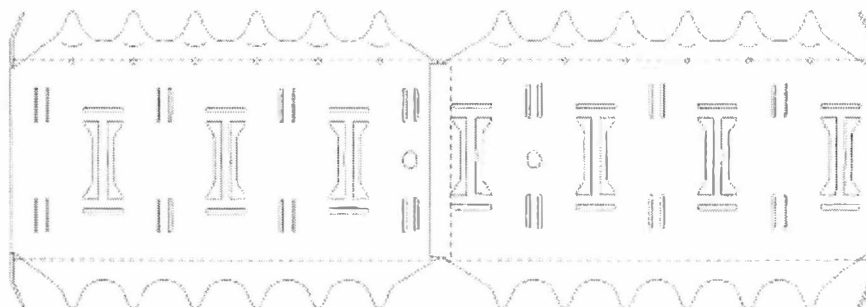
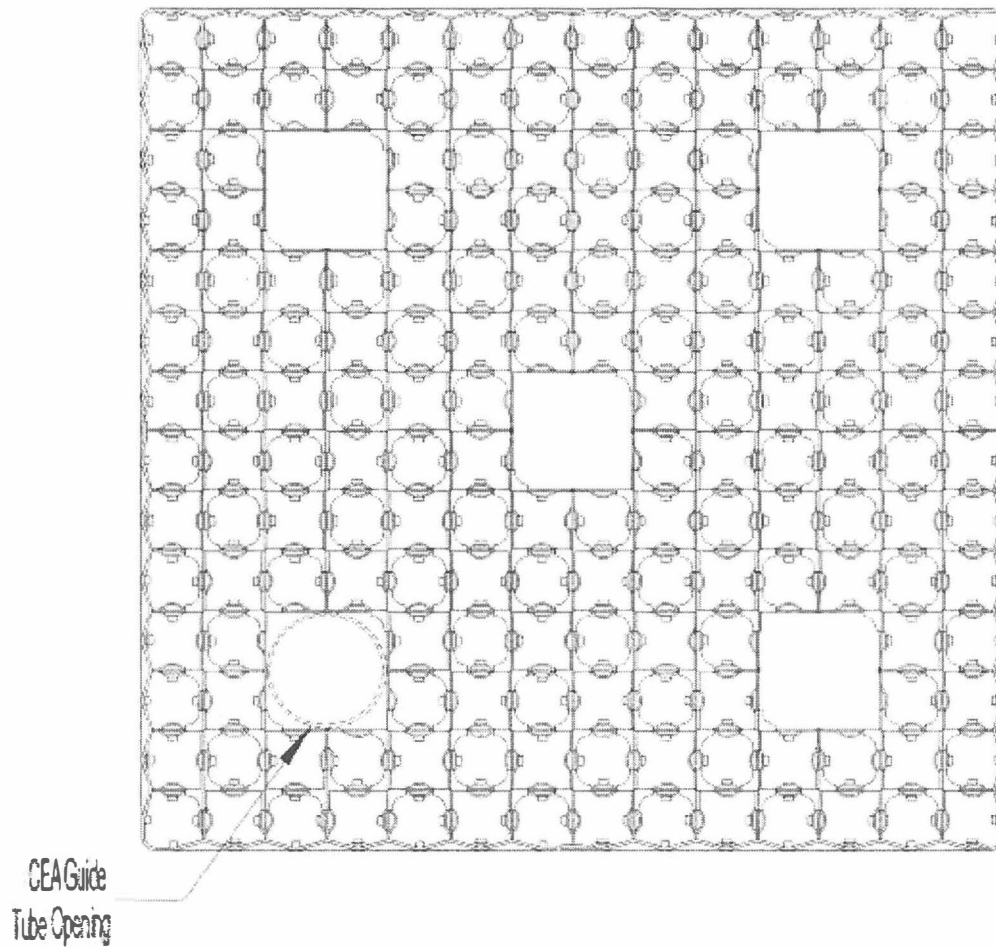


Calvert Cliffs  
Nuclear Power Plant

I-SPRING UNVANED SPACER GRID (TURBO)

Figure 3.3-7A

Revision 32

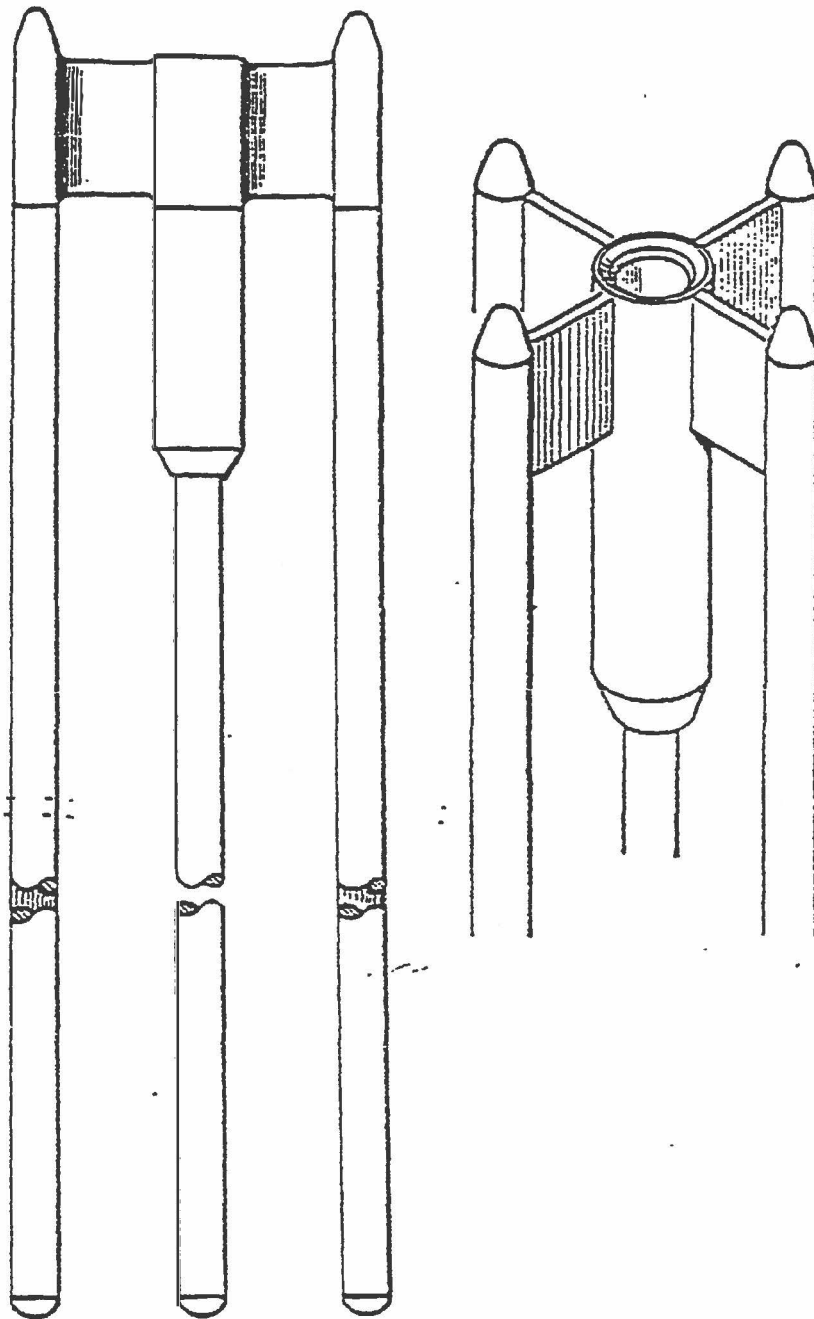


Calvert Cliffs  
Nuclear Power Plant

I-SPRING VANED SPACER GRID (TURBO)

Figure 3.3-7B

Revision 32

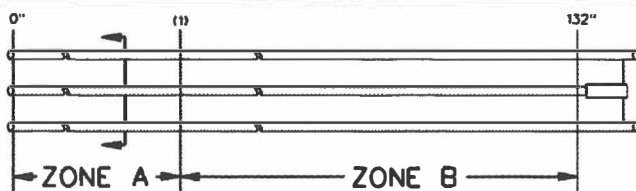
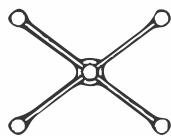


BALTIMORE  
GAS & ELECTRIC CO.  
Calvert Cliffs  
Nuclear Power Plant

CONTROL ELEMENT ASSEMBLY (CEA)

FIGURE  
3.3-8

Rev. 0 1/82



# ABBREVIATIONS FULL LENGTH

FLCEA1  
(STANDARD)

FLCEA2  
(RECONSTITUTABLE  
CORNER FINGERS)

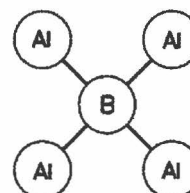
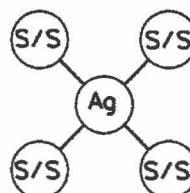
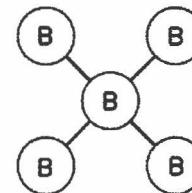
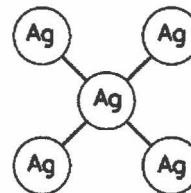
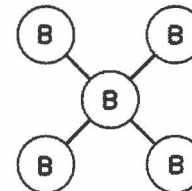
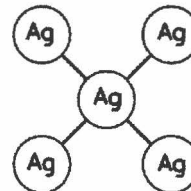
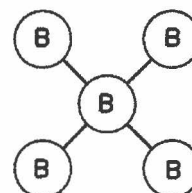
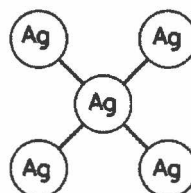
FLCEA8  
(NON-RECONSTITUTABLE)

FLCEA7  
(NON-RECONSTITUTABLE)

## MATERIALS<sup>(2)</sup>

### ZONE A

### ZONE B



## NOTES:

(1) ZONE "A" IS 8" FOR FLCEA1, FLCEA2, AND FLCEA7, AND 12" FOR FLCEA8.

(2) B=B<sub>4</sub>C Ag=Ag-In-Cd Al=Al<sub>2</sub>O<sub>3</sub> S/S=Stainless Steel

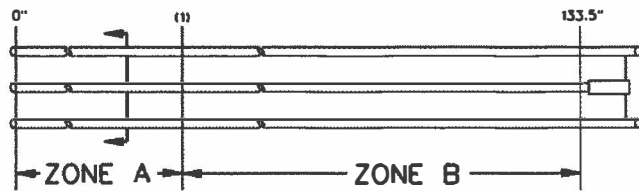
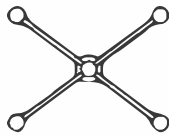
FSAR 3.3-9A.DGN

Calvert Cliffs Nuclear Power  
Plant

WESTINGHOUSE/ABB-CE  
CONTROL ELEMENT ASSEMBLIES

Figure 3.3-9A

Revision 49



# ABBREVIATIONS

## FULL LENGTH

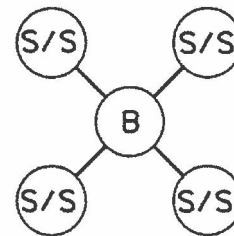
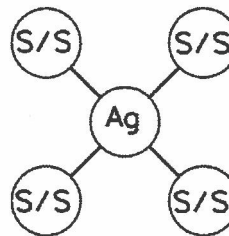
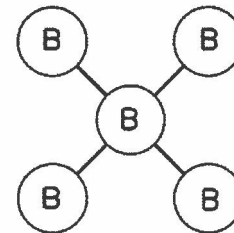
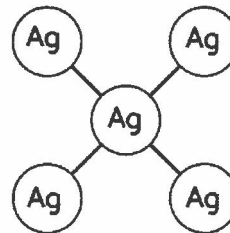
FLCEA10  
(AREVA Full Strength)  
(Non-Reconstitutable)

FLCEA9  
(AREVA Part Strength)  
(Non-Reconstitutable)

## ZONE A

## MATERIALS<sup>(2)</sup>

## ZONE B<sup>(3)</sup>



## NOTES:

- (1) ZONE "A" IS 12.5" FOR FLCEA10 AND FLCEA9
- (2) B=B<sub>4</sub>C Ag=Ag-In-Cd S/S=Stainless Steel
- (3) ZONE "B" STARTS 0.355" ABOVE ZONE "A" FOR ALL FLCEA10 RODS AND ONLY THE CENTER ROD FOR FLCEA9

FSAR 3.3-9B.DGN

Calvert Cliffs Nuclear Power  
Plant

AREVA /FRAMATOME  
CONTROL ELEMENT ASSEMBLIES

Figure 3.3-9B

Revision 49

BALTIMORE  
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Calver Cliffs  
Nuclear Power Plant

# CEA GROUP IDENTIFICATION

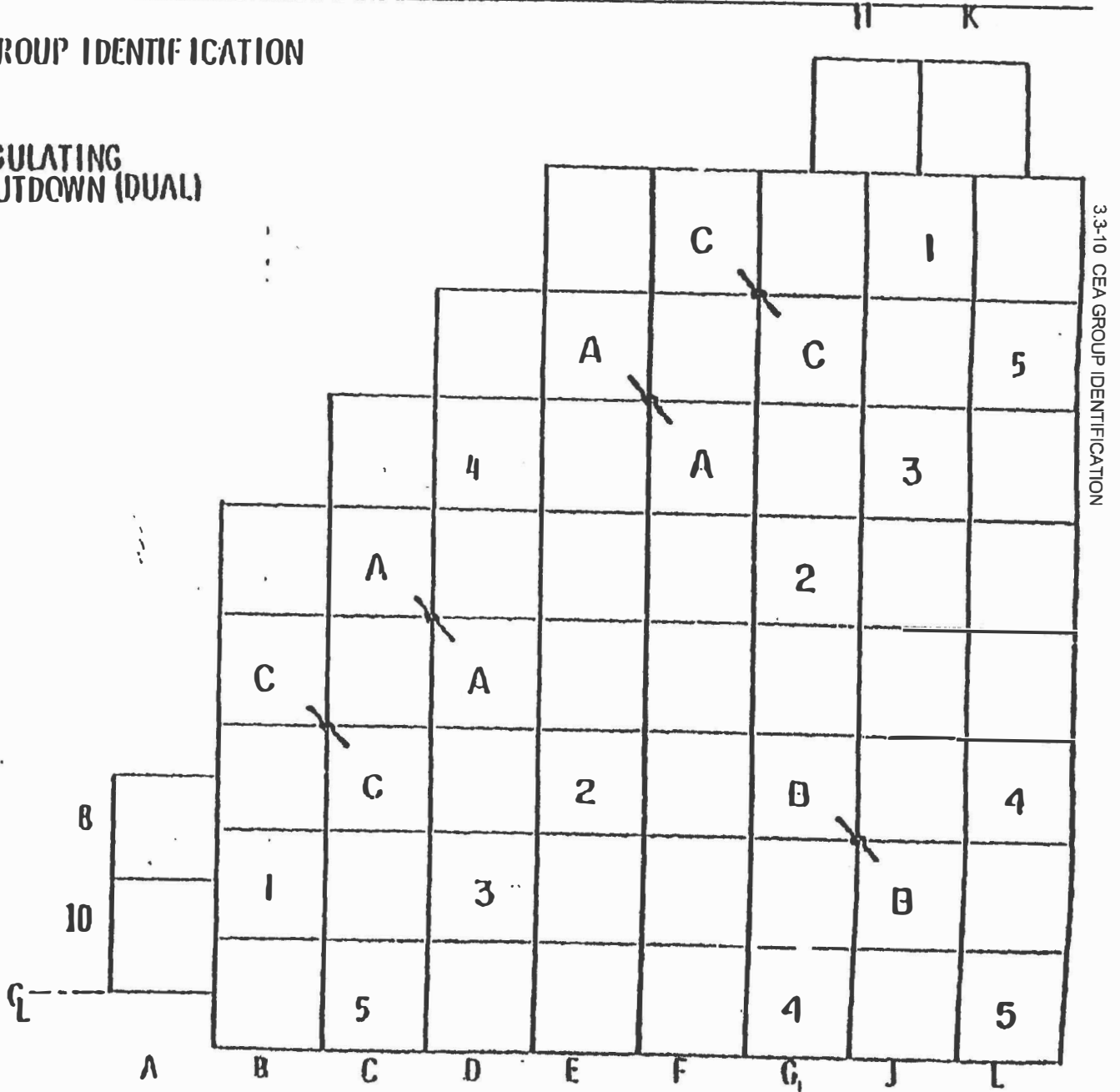
Figure  
3.3-1B

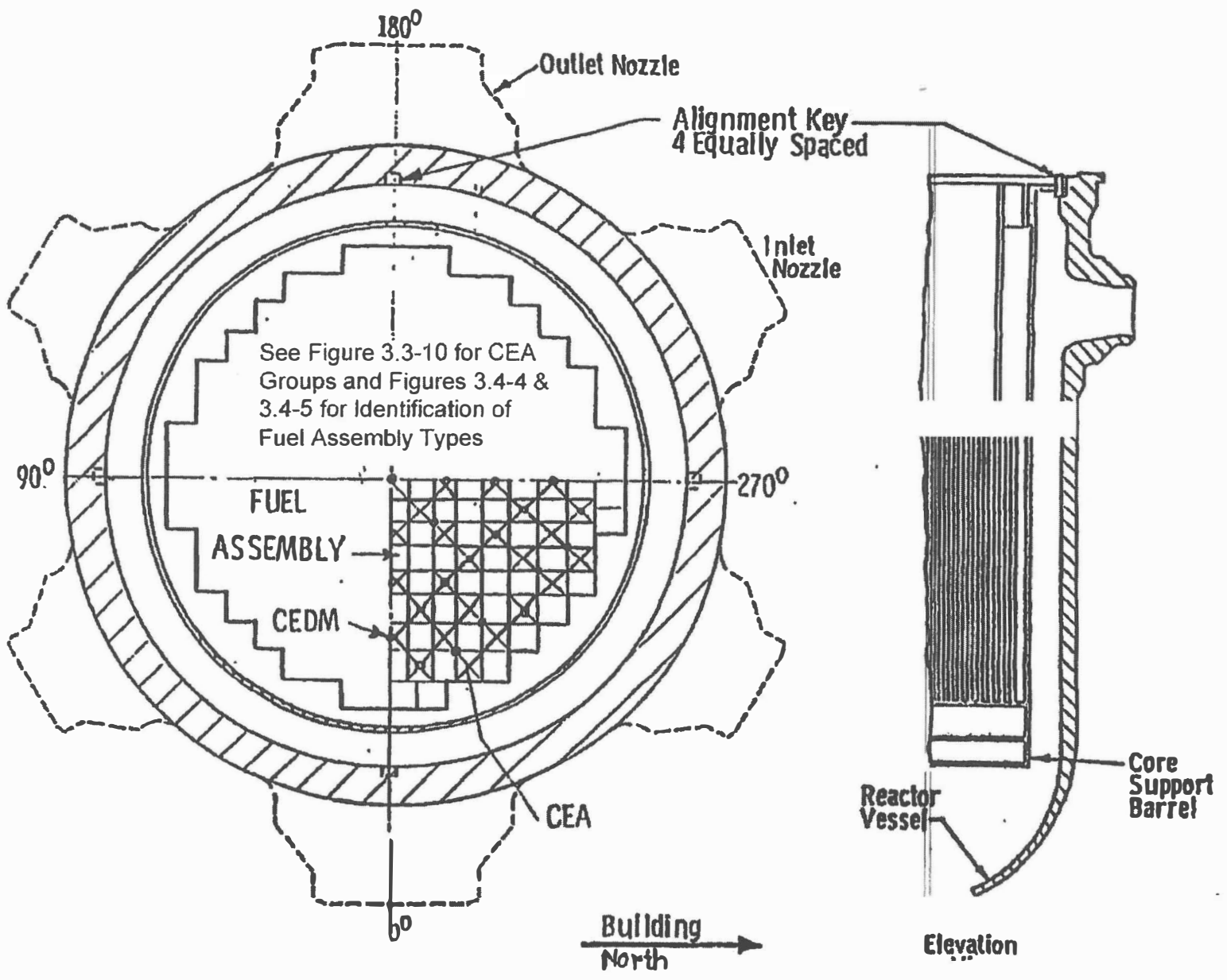
REV. 5

 - CEA GROUP IDENTIFICATION

1, 2, 3, 4, 5  
A, B, C

REGULATING  
SHUTDOWN (DUAL)

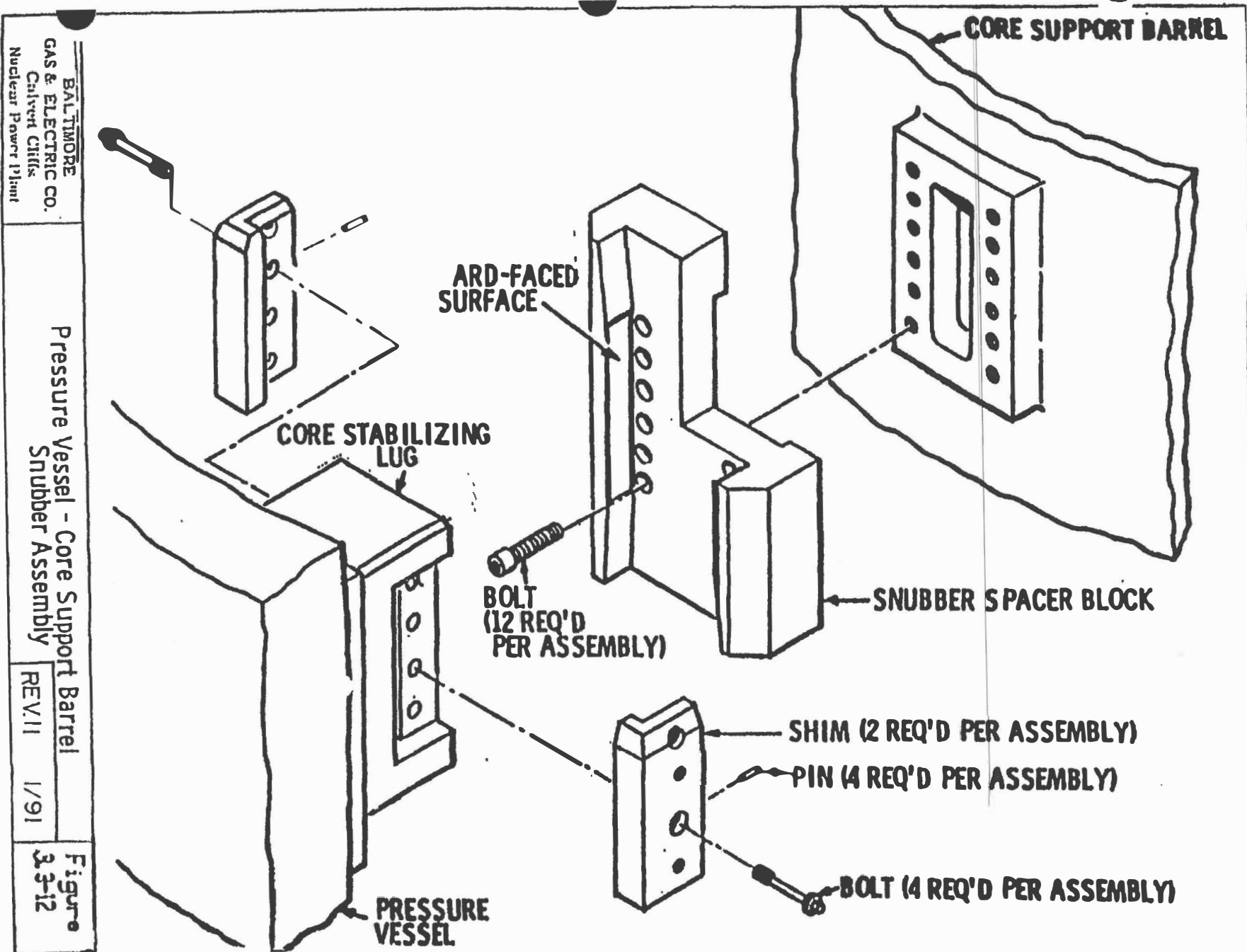




BALTIMORE  
GAS & ELECTRIC CO.  
Calvert Cliffs  
Nuclear Power Plant

Core Orientation

Figure  
3.3-11

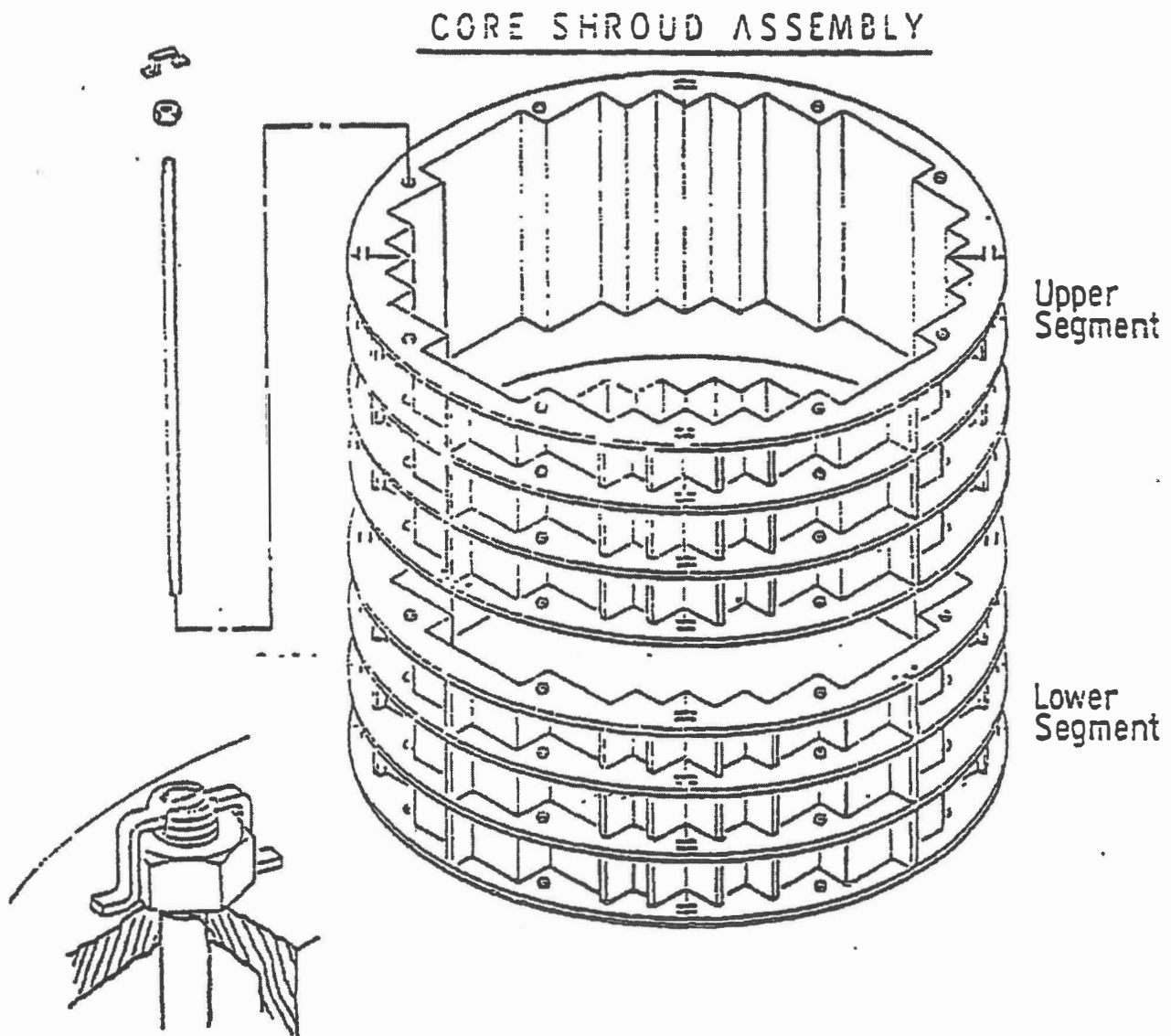


BALTIMORE  
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Nuclear Power Plant

Pressure Vessel - Core Support Barrel  
Snubber Assembly

REV.11 1/91

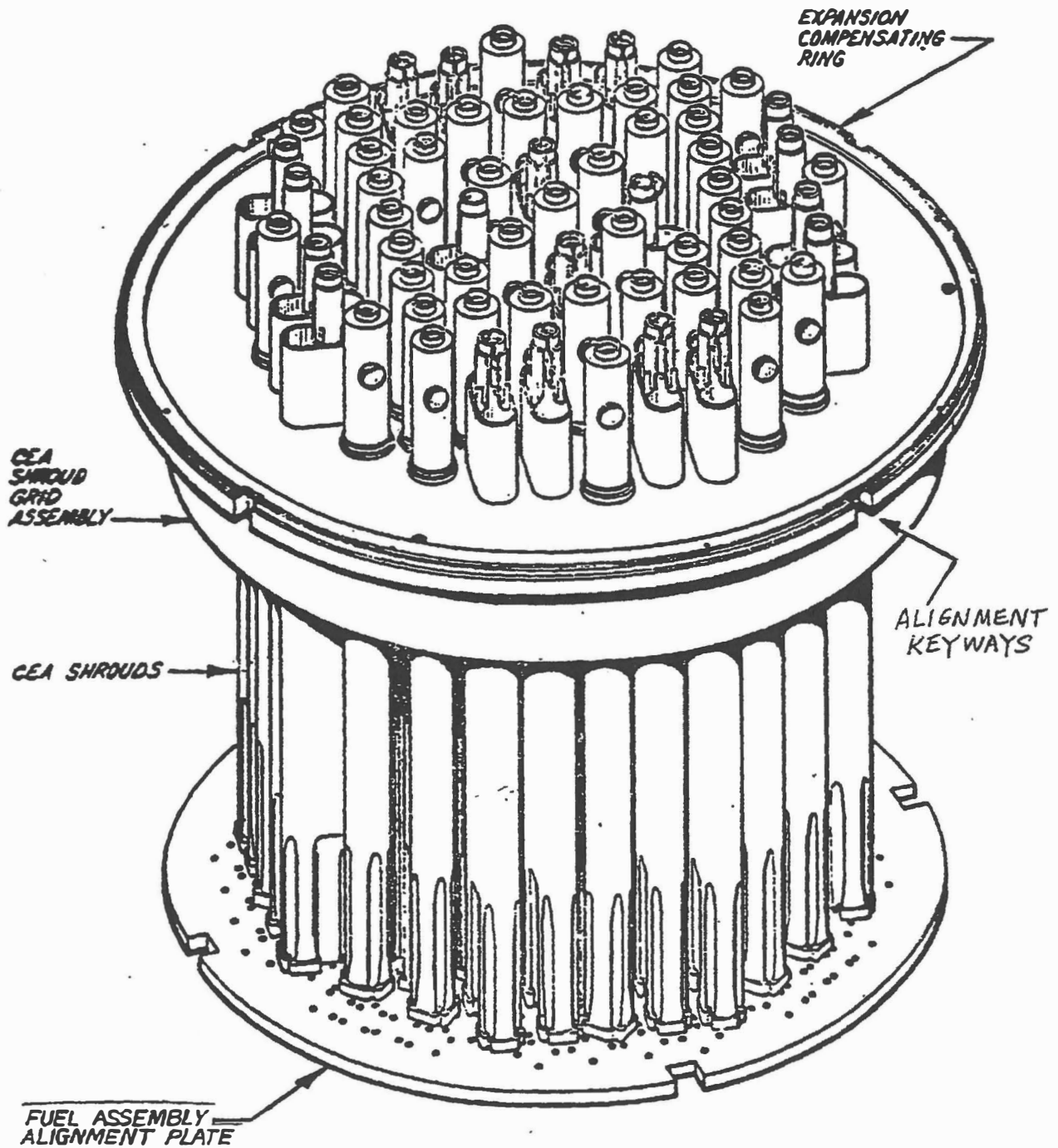
Figure  
3.3-12



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Balto. Office  
Nuclear Power Plant

CORE SHROUD ASSEMBLY

Figure  
3.3-13

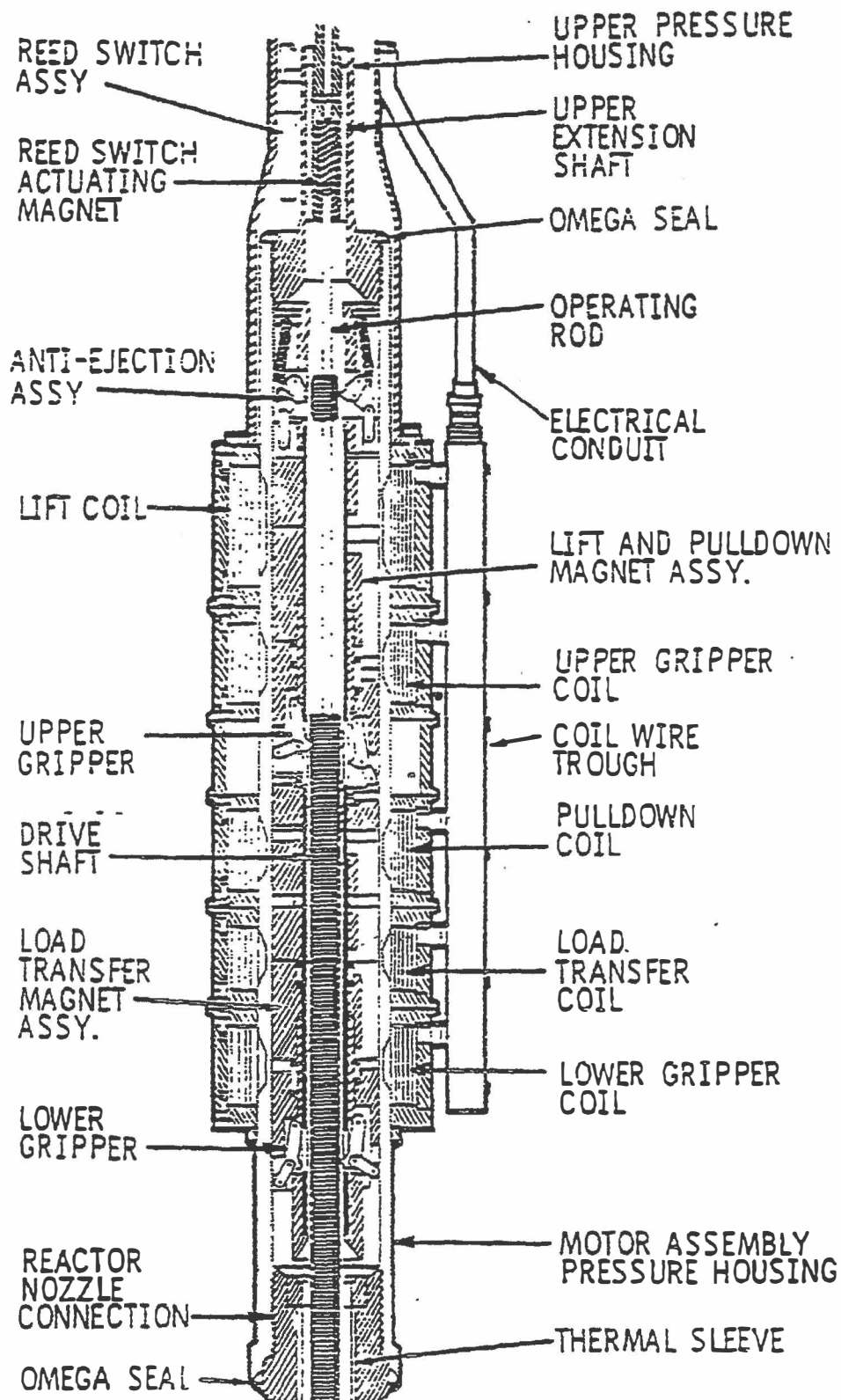


BALTIMORE  
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Calvert Cliffs  
Nuclear Power Plant

# UPPER GUIDE STRUCTURE ASSEMBLY

Figure  
3.3-14

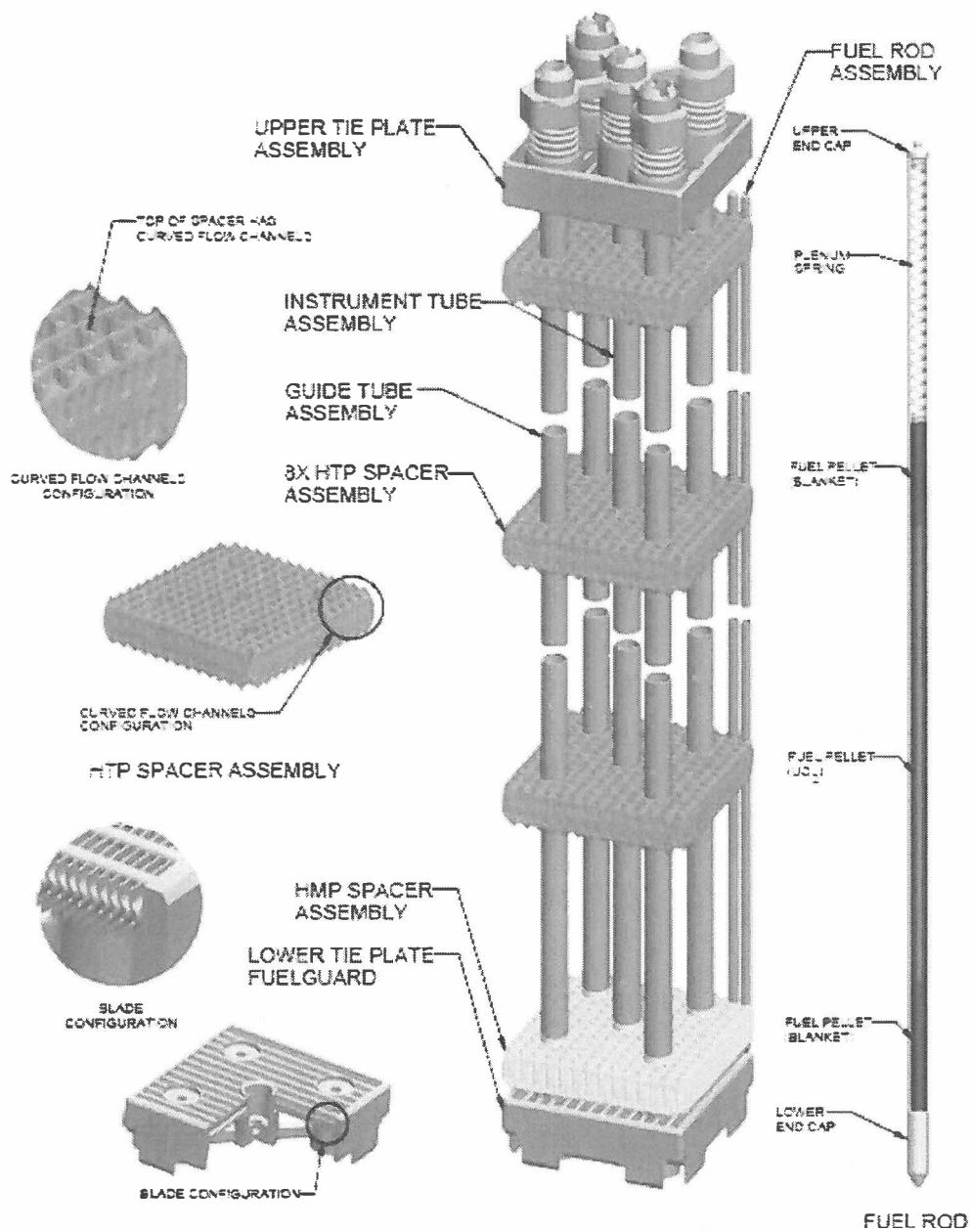
Revision 21



BALTIMORE  
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Nuclear Power Plant

CONTROL ELEMENT DRIVE MECHANISM  
MAGNETIC JACK

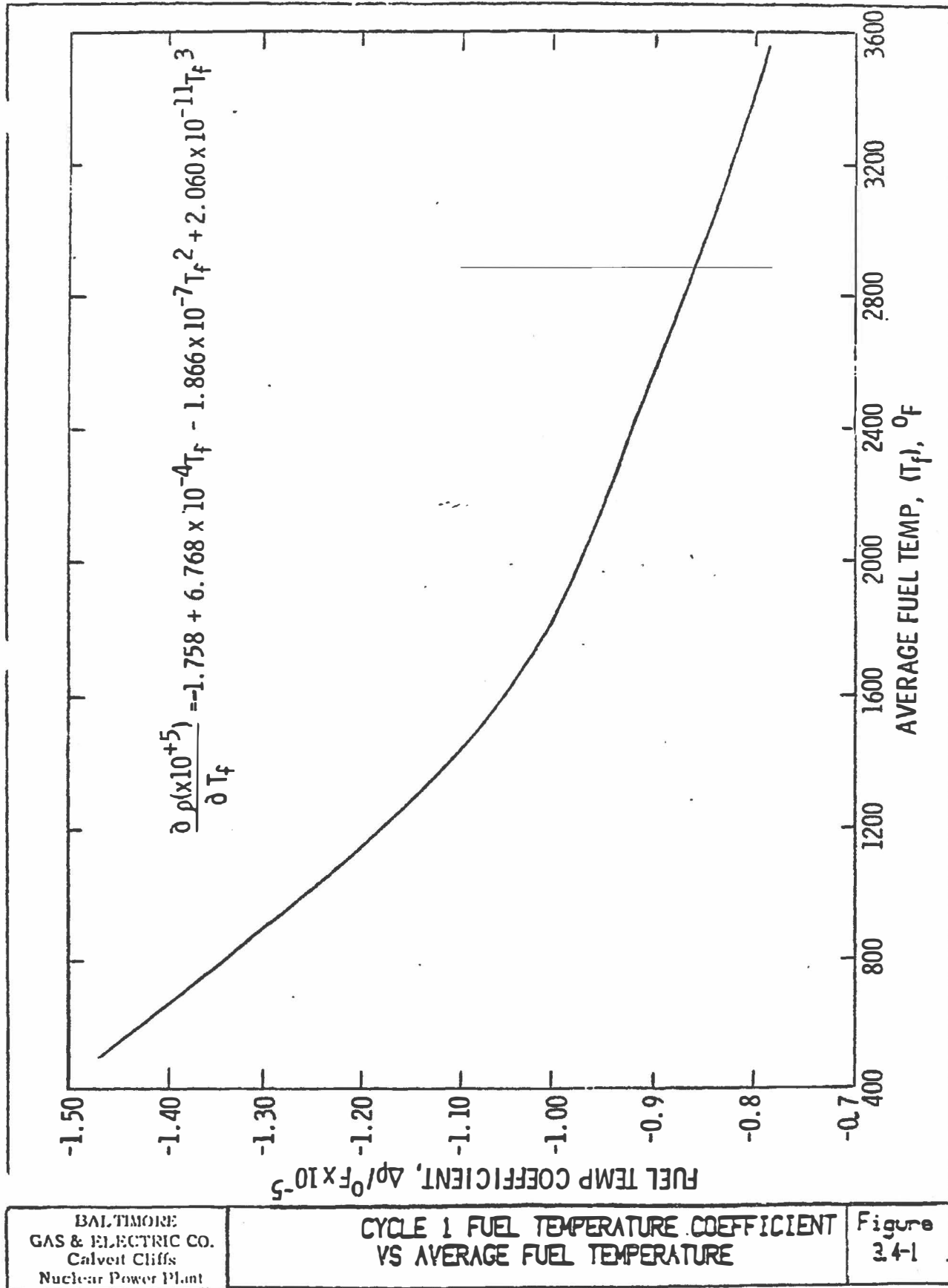
Figure  
3.3-15

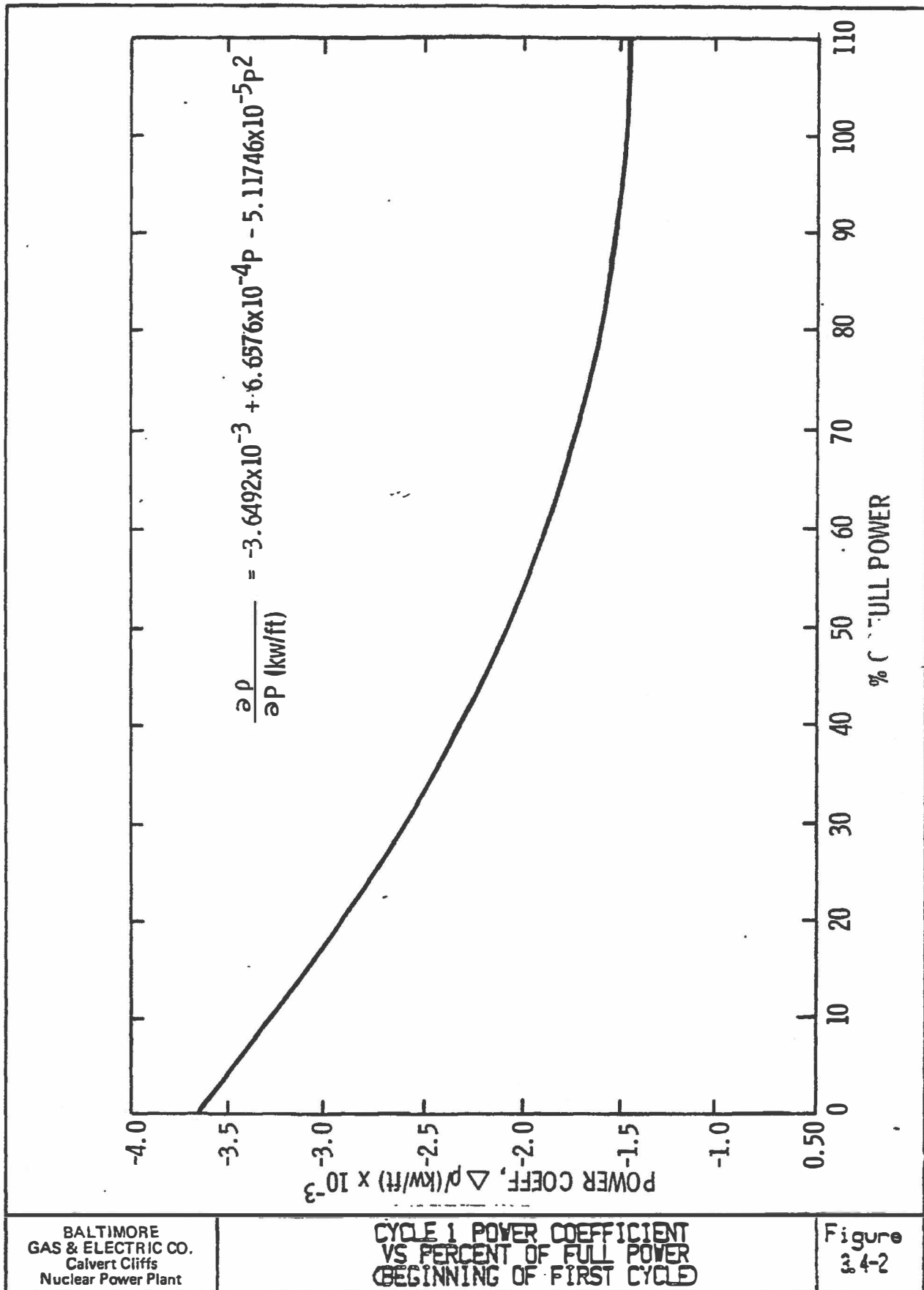


Calvert Cliffs Nuclear  
Power Plant

AREVA/FRAMATOME HTP FUEL ASSEMBLY, FUEL ROD,  
AND SPACER GRIDS

Figure 3.3-16  
Revision 51





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Calvert Cliffs  
Nuclear Power Plant

CYCLE 1 POWER COEFFICIENT  
VS PERCENT OF FULL POWER  
(BEGINNING OF FIRST CYCLE)

Figure  
3.4-2



X	X – Box Number
Y	Y – Batch

1	2
AD4	BB4

				3	4	5	6	7
				AD4	AE1	AF72	AF5	AF4
		8	9	10	11	12	13	
		AD4	AF5	AF4	AF4	AE4	AE5	
	14	15	16	17	18	19	20	
	AD4	AF5	AE5	AF1	AE2	AF1	AE3	
21	22	23	24	25	26	27	28	
AD4	AF5	AE5	AF3	AE3	AF1	AE1	AF1	
29	30	31	32	33	34	35	36	
AE1	AF4	AF1	AE3	AF3	AE2	AF3	AE2	
37	38	39	40	41	42	43	44	
BB5	AF4	AE1	AF1	AE1	AF1	AE3	AF3	
45	46	47	48	49	50	51	52	53
BA6	AF5	AE4	AF1	AE1	AF3	AE3	AF2	AE1
54	55	56	57	58	59	60	61	62
AB1	AF4	AE5	AE3	AF1	AE2	AF3	AE1	AF6

\* Due to core redesign, Unit 1 Cycle 25 will not be quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 1 Cycle 25  
Quarter-Core Assembly Map

Figure 3.4-4  
Revision 52

X	X – Box Number					1	2				
	Y	Y – Batch					BB1	BD3			
			3	4	5	6	7				
			AC1	BD3	AE1	BE4	BE5				
			8	9	10	11	12	13			
			BC2	BE5	BE3	BE3	BD4	BD4			
			14	15	16	17	18	19	20		
			BB1	BE5	BD4	BE1	BD2	BE2	BD1		
			21	22	23	24	25	26	27	28	
			AB1	BE5	BD4	BE2	BD2	BE75	BD1	BE2	
			29	30	31	32	33	34	35	36	
			BD3	BE3	BE1	BD1	BE1	BD2	BE1	BD3	
			37	38	39	40	41	42	43	44	
			AE1	BE3	BD2	BE76	BD2	BE1	BD2	BE1	
45				46	47	48	49	50	51	52	53
BB5				BE4	BD4	BE2	BD1	BE1	BD2	BE2	BD3
54				55	56	57	58	59	60	61	62
BD1				BE5	BD4	BD1	BE2	BD3	BE1	BD3	BD5

\*Unit 2 Cycle 24 is not quarter core symmetric. The LTA is in location L-20 (not shown).

Calvert Cliffs  
Nuclear Power Plant

UNIT 2 Cycle 24  
Quarter-Core Assembly Map

Figure 3.4-5  
Revision 52

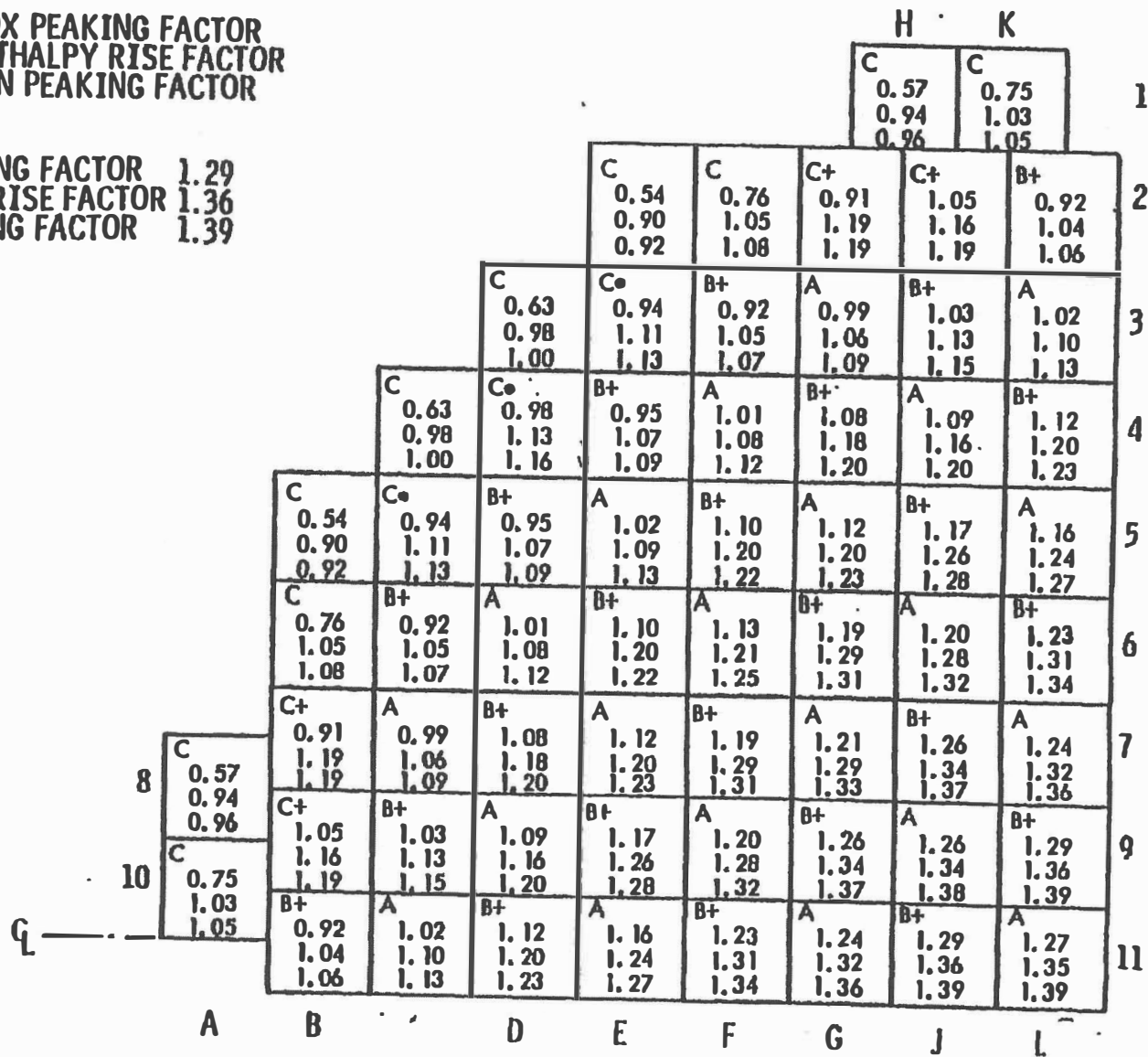
**CYCLE 1 CORE POWER DISTRIBUTION 2560 MWt  
(BEGINNING-OF-LIFE) NO XENON**

**Figure 3.4-6**  
**Rev. 0**

**-BOX PEAKING FACTOR**  
**-ENTHALPY RISE FACTOR**  
**-PIN PEAKING FACTOR**

**MAXIMA**

BOX PEAKING FACTOR	1.29
ENTHALPY RISE FACTOR	1.36
PIN PEAKING FACTOR	1.39



X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density			1		2	
				AD4 0.237		BB4 0.339	
			3 AD4 0.260	4 AE1 0.489	5 AF72 0.598	6 AF5 1.103	7 AF4 1.119
		8 AD4 0.355	9 AF5 0.984	10 AF4 1.194	11 AF4 1.305	12 AE4 1.169	13 AE5 1.182
	14 AD4 0.355	15 AF5 1.035	16 AE5 1.127	17 AF1 1.267	18 AE2 1.105	19 AF1 1.258	20 AE3 1.162
21 AD4 0.261	22 AF5 0.983	23 AE5 1.126	24 AF3 1.290	25 AE3 1.149	26 AF1 1.253	27 AE1 1.085	28 AF1 1.254
29 AE1 0.480	30 AF4 1.187	31 AF1 1.264	32 AE3 1.148	33 AF3 1.302 X	34 AE2 1.100	35 AF3 1.283	36 AE2 1.113
37 BB5 0.649	38 AF4 1.272	39 AE1 1.103	40 AF1 1.255	41 AE1 1.103	42 AF1 1.262	43 AE3 1.138	44 AF3 1.302
46 AF5 1.083	47 AE4 1.172	48 AF1 1.262	49 AE1 1.088	50 AF3 1.286	51 AE3 1.139	52 AF2 1.288	53 AE1 1.095
55 AF4 1.132	56 AE5 1.189	57 AE3 1.166	58 AF1 1.256	59 AE2 1.114	60 AF3 1.303	61 AE1 1.095	62 AF6 1.107

Long N-1 Burnup (21.715 GWd/MTU)

Note: X = Maximum Fr Value = 1.544

\* Due to core redesign, Unit 1 Cycle 25 will not be quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 1 Cycle 25  
Assembly Relative Power Density at BOC, HFP, ARO,  
Equilibrium Xenon

Figure 3.4-7  
Revision 52

X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density					1 BB1 0.248	2 BD3 0.443				
						3 AC1 0.275	4 BD3 0.515	5 AE1 0.661	6 BE4 1.041	7 BE5 1.176	
					8 BC2 0.332	9 BE5 0.946	10 BE3 1.190	11 BE3 1.282	12 BD4 1.187	13 BD4 1.199	
					14 BB1 0.334	15 BE5 0.968	16 BD4 1.129	17 BE1 1.294	18 BD2 1.131	19 BE2 1.265	20 BD1 1.105
45 BB5 0.259	21 AB1 0.268	22 BE5 0.944	23 BD4 1.128	24 BE2 1.257	25 BD2 1.110	26 BE75 1.236	27 BD1 1.097	28 BE2 1.247			
	29 BD3 0.516	30 BE3 1.189	31 BE1 1.294 X	32 BD1 1.115	33 BE1 1.268	34 BD2 1.102	35 BE1 1.270	36 BD3 1.144			
	37 AE1 0.663	38 BE3 1.280	39 BD2 1.130	40 BE76 1.241	41 BD2 1.116	42 BE1 1.268	43 BD2 1.100	44 BE1 1.274			
	46 BE4 1.038	47 BD4 1.179	48 BE2 1.261	49 BD1 1.099	50 BE1 1.274	51 BD2 1.100	52 BE2 1.230	53 BD3 1.131			
	55 BE5 1.177	56 BD4 1.200	57 BD1 1.105	58 BE2 1.247	59 BD3 1.143	60 BE1 1.274	61 BD3 1.132	62 BD5 0.872			
54 BD1 0.431											

Long N-1 Burnup (22.080 GWd/MTU)

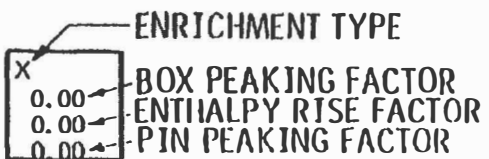
Note: X = Maximum Fr Value = 1.550

\* Unit 2 Cycle 24 is not quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 2 Cycle 24  
Assembly Relative Power Density at BOC, HFP, ARO,  
Equilibrium Xenon\*

Figure 3.4-8  
Revision 52



MAXIMA

BOX PEAKING FACTOR 1.31  
ENTHALPY RISE FACTOR 1.38  
PIN PEAKING FACTOR 1.41

		H		K						
		C		C		C		C		
		0.54		0.71		0.90		0.98		1
		0.92		1.00						
		C	C	C+	C+	B+				2
		0.53	0.74	0.89	1.03	0.91				
		0.87	1.02	1.17	1.15	1.03				
		0.89	1.05	1.18	1.18	1.05				
		C	C	B+	A	B+	A			3
		0.61	0.93	0.91	0.98	1.03	1.02			
		0.96	1.10	1.06	1.06	1.14	1.10			
		0.98	1.13	1.07	1.10	1.16	1.13			
		C	C	B+	A	B+	B+			4
		0.61	0.96	0.95	1.02	1.09	1.10	1.13		
		0.96	1.13	1.08	1.09	1.19	1.17	1.22		
		0.98	1.16	1.10	1.13	1.21	1.21	1.24		
		C	C	B+	A	B+	A	B+		5
		0.53	0.93	0.95	1.03	1.11	1.14	1.17		
		0.87	1.10	1.08	1.10	1.22	1.21	1.25		
		0.89	1.13	1.10	1.14	1.24	1.25	1.29		
		C	B+	A	B+	A	B+	A		6
		0.74	0.91	1.02	1.11	1.15	1.21	1.25		
		1.02	1.06	1.09	1.22	1.22	1.31	1.29	1.33	
		1.05	1.07	1.13	1.24	1.26	1.33	1.33	1.36	
		C+	A	B+	A	B+	A	B+	A	7
		0.89	0.98	1.09	1.14	1.21	1.23	1.28	1.26	
		1.17	1.06	1.19	1.21	1.31	1.30	1.36	1.33	
		1.18	1.10	1.21	1.25	1.33	1.34	1.39	1.37	
		C	B+	A	B+	A	B+	A	B+	9
		0.54	1.03	1.10	1.19	1.21	1.28	1.27	1.31	
		0.90	1.15	1.17	1.28	1.29	1.36	1.34	1.38	
		0.92	1.18	1.21	1.30	1.33	1.39	1.39	1.41	
		C	A	B+	A	B+	A	B+	A	11
		0.71	0.91	1.13	1.17	1.25	1.26	1.31	1.29	
		0.98	1.03	1.22	1.25	1.33	1.33	1.38	1.36	
		1.00	1.05	1.24	1.29	1.36	1.37	1.41	1.40	
		A	B	C	D	E	F	G	J	L

BALTIMORE  
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Nuclear Power Plant

CYCLE 1 CORE POWER DISTRIBUTION  
2560 MWt  
1000 MWDMTU, EQUILIBRIUM XENON

FIGURE  
3.4.9

Rev. 0 1/82

X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density		1 AD4 0.224		2 BB4 0.318	
		3 AD4 0.268	4 AE1 0.485	5 AF72 0.575	6 AF5 0.983	7 AF4 1.023
		8 AD4 0.346	9 AF5 0.976	10 AF4 1.242	11 AF4 1.282	12 AE4 1.005
		13 AE5 0.981				
14 AD4 0.346		15 AF5 0.982	16 AE5 1.048	17 AF1 1.394	18 AE2 1.068	19 AF1 1.330
20 AE3 1.062						
21 AD4 0.268	22 AF5 0.974	23 AE5 1.048	24 AF3 1.356	25 AE3 1.121	26 AF1 1.402	27 AE1 1.073
28 AF1 1.385						
29 AE1 0.477	30 AF4 1.235	31 AF1 1.392	32 AE3 1.121	33 AF3 1.415	34 AE2 1.096	35 AF3 1.400
36 AE2 1.095						
37 BB5 0.604	38 AF4 1.259	39 AE1 1.065	40 AF1 1.403	41 AE1 1.098	42 AF1 1.417 X	43 AE3 1.114
44 AF3 1.397						
46 AF5 0.967	47 AE4 1.004	48 AF1 1.330	49 AE1 1.073	50 AF3 1.402	51 AE3 1.115	52 AF2 1.374
53 AE1 1.046						
55 AF4 1.031	56 AE5 0.982	57 AE3 1.062	58 AF1 1.385	59 AE2 1.094	60 AF3 1.397	61 AE1 1.046
62 AF6 1.122						

Long N-1 Burnup (21.715 GWd/MTU)

Note: X = Maximum Fr Value = 1.514

Calvert Cliffs  
Nuclear Power Plant

UNIT 1 Cycle 25  
Assembly Relative Power Density at  
10,000MWd/MTU, HFP, ARO, Equilibrium Xenon

Figure 3.4-10  
Revision 52

X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density		1 BB1 0.251		2 BD3 0.432	
		3 AC1 0.309	4 BD3 0.530	5 AE1 0.636	6 BE4 1.002	7 BE5 1.120
	8 BC2 0.369	9 BE5 1.041	10 BE3 1.244	11 BE3 1.274	12 BD4 1.048	13 BD4 1.028
	14 BB1 0.374	15 BE5 1.051	16 BD4 1.100	17 BE1 1.367	18 BD2 1.081	19 BE2 1.318
	21 AB1 0.305	22 BE5 1.042	23 BD4 1.101	24 BE2 1.367	25 BD2 1.082	26 BE75 1.342
	29 BD3 0.533	30 BE3 1.245	31 BE1 1.368 X	32 BD1 1.086	33 BE1 1.325	34 BD2 1.055
	37 AE1 0.638	38 BE3 1.274	39 BD2 1.082	40 BE76 1.346	41 BD2 1.066	42 BE1 1.295
45 BB5 0.262	46 BE4 1.000	47 BD4 1.044	48 BE2 1.315	49 BD1 1.062	50 BE1 1.309	51 BD2 1.038
54 BD1 0.421	55 BE5 1.121	56 BD4 1.028	57 BD1 1.018	58 BE2 1.334	59 BD3 1.081	60 BE1 1.290
					61 BD3 1.047	62 BD5 0.810

Long N-1 Burnup (22.080 GWd/MTU)

Note: X = Maximum Fr Value = 1.501

Unit 2 Cycle 24 is not quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 2 Cycle 24  
Assembly Relative Power Density at  
10,000MWd/MTU, HFP, ARO, Equilibrium Xenon\*

Figure 3.4-11  
Revision 52

BALTIMORE  
GAS & ELECTRIC CO.  
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Nuclear Power Plant

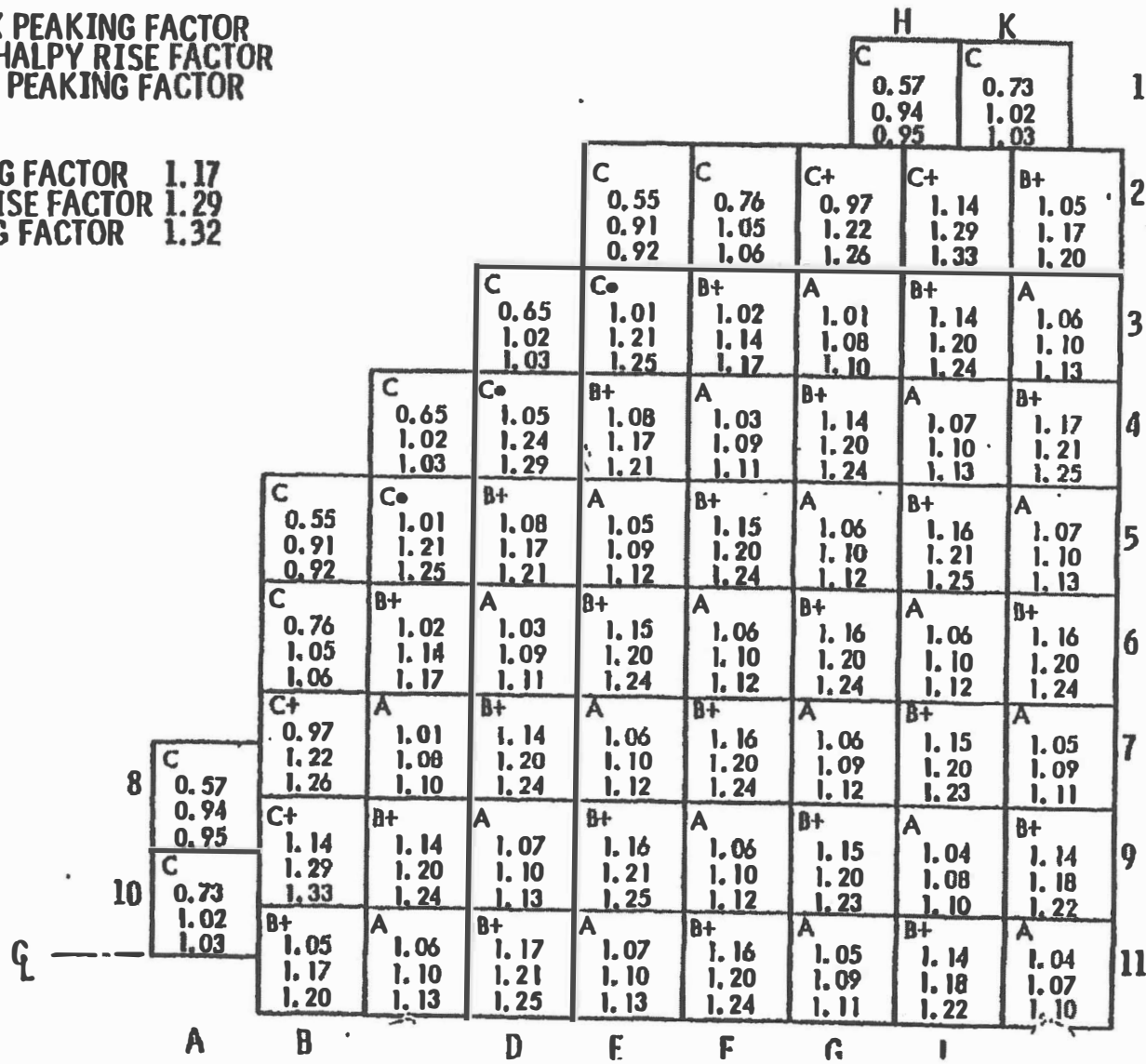
CYCLE 1 CORE POWER DISTRIBUTION 2560 MWt  
END-OF-CYCLE, EQUILIBRIUM XENON

Figure 3.4-12  
Rev. 0

ENRICHMENT TYPE  
X  
0.00  
0.00  
0.00  
BOX PEAKING FACTOR  
ENTHALPY RISE FACTOR  
PIN PEAKING FACTOR

MAXIMA

BOX PEAKING FACTOR 1.17  
ENTHALPY RISE FACTOR 1.29  
PIN PEAKING FACTOR 1.32



X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density		1 AD4 0.332		2 BB4 0.456			
			3 AD4 0.351	4 AE1 0.588	5 AF72 0.704	6 AF5 1.127	7 AF4 1.169	
		8 AD4 0.435	9 AF5 1.044	10 AF4 1.228	11 AF4 1.273	12 AE4 1.056	13 AE5 1.049	
		14 AD4 0.435	15 AF5 1.055	16 AE5 1.051	17 AF1 1.313 X	18 AE2 1.038	19 AF1 1.288	20 AE3 1.054
21 AD4 0.350	22 AF5 1.042	23 AE5 1.051	24 AF3 1.294	25 AE3 1.060	26 AF1 1.293	27 AE1 1.023	28 AF1 1.290	
29 AE1 0.576	30 AF4 1.221	31 AF1 1.311	32 AE3 1.059	33 AF3 1.293	34 AE2 1.024	35 AF3 1.285	36 AE2 1.027	
37 BB5 0.720	38 AF4 1.251	39 AE1 1.034	40 AF1 1.293	41 AE1 1.024	42 AF1 1.284	43 AE3 1.038	44 AF3 1.283	
46 AF5 1.108	47 AE4 1.052	48 AF1 1.286	49 AE1 1.023	50 AF3 1.285	51 AE3 1.038	52 AF2 1.276	53 AE1 0.998	
55 AF4 1.174	56 AE5 1.049	57 AE3 1.054	58 AF1 1.289	59 AE2 1.026	60 AF3 1.283	61 AE1 0.998	62 AF6 1.070	

Long N-1 Burnup (21.715 GWd/MTU)

Note: X = Maximum Fr Value = 1.388

\* Due to core redesign, Unit 1 Cycle 25 will not be quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 1 Cycle 25  
Assembly Relative Power Density at EOC, HFP,  
Equilibrium Xenon

Figure 3.4-13  
Revision 52

X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density					1 BB1 0.335	2 BD3 0.538				
						3 AC1 0.365	4 BD3 0.599	5 AE1 0.714	6 BE4 1.102	7 BE5 1.160	
					8 BC2 0.411	9 BE5 1.024	10 BE3 1.216	11 BE3 1.247	12 BD4 1.042	13 BD4 1.027	
					14 BB1 0.418	15 BE5 1.018	16 BD4 1.037	17 BE1 1.307	18 BD2 1.036	19 BE2 1.277	20 BD1 0.996
21 AB1 0.363	22 BE5 1.025	23 BD4 1.037	24 BE2 1.282	25 BD2 1.032	26 BE75 1.288	27 BD1 1.028	28 BE2 1.291				
29 BD3 0.603	30 BE3 1.217	31 BE1 1.307 X	32 BD1 1.034	33 BE1 1.297	34 BD2 1.034	35 BE1 1.304	36 BD3 1.060				
37 AE1 0.717	38 BE3 1.248	39 BD2 1.036	40 BE76 1.289	41 BD2 1.041	42 BE1 1.305	43 BD2 1.035	44 BE1 1.306				
45 BB5 0.349	46 BE4 1.102	47 BD4 1.040	48 BE2 1.276	49 BD1 1.028	50 BE1 1.304	51 BD2 1.035	52 BE2 1.287	53 BD3 1.046			
54 BD1 0.525	55 BE5 1.160	56 BD4 1.027	57 BD1 0.996	58 BE2 1.291	59 BD3 1.060	60 BE1 1.306	61 BD3 1.047	62 BD5 0.857			

Long N-1 Burnup (22.080 GWd/MTU)

Note: X = Maximum Fr Value = 1.383

\* Unit 2 Cycle 24 is not quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 2 Cycle 24  
Assembly Relative Power Density at EOC, HFP, ARO,  
Equilibrium Xenon\*

Figure 3.4-14  
Revision 52

CORE POWER DISTRIBUTION - CEA GROUP 5  
BEGINNING OF FIRST CYCLE  
NO XENON

**FIGURE  
3.4-15**

X

0.00
0.00
0.00

- BOX PEAKING FACTOR
- ENTHALPY RISE FACTOR
- PIN PEAKING FACTOR

**MAXIMA**

BOX PEAKING FACTOR	1.30
ENTHALPY RISE FACTOR	1.39
PIN PEAKING FACTOR	1.42

CHMENT TYPE

PEAKING FACTOR

ALPY RISE FACTOR

PEAKING FACTOR

FACTOR 1.30

SE FACTOR 1.39

FACTOR 1.42

		H		K	
		C	C	C	C
		0.56	0.73	0.93	0.99
		0.93	0.73	0.99	1.01
		0.95	1.01	1.01	1.01
		0.55	0.79	0.92	1.01
		0.92	1.09	1.19	1.12
		0.94	1.12	1.20	1.15
		0.57	0.94	0.95	1.01
		0.89	1.12	1.10	1.09
		0.91	1.15	1.12	1.11
		0.57	0.93	0.93	1.06
		0.89	0.92	1.11	1.15
		0.91	1.00	1.12	1.19
		0.55	0.94	0.93	1.06
		0.92	1.12	1.11	1.16
		0.94	1.15	1.12	1.20
		0.79	0.95	1.06	1.18
		1.09	1.10	1.15	1.31
		1.12	1.12	1.19	1.33
		0.92	1.01	1.13	1.21
		1.19	1.09	1.24	1.30
		1.20	1.12	1.26	1.34
		1.01	0.95	1.07	1.29
		1.12	1.09	1.17	1.37
		1.15	1.11	1.21	1.41
		0.73	0.93	0.93	1.28
		0.99	0.92	1.11	1.36
		1.01	1.00	1.12	1.41
		0.84	0.70	1.03	1.25
		0.90	0.75	1.20	1.34
		0.94	0.76	1.22	1.38

A B C D E F G H I

X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density					1 AD4 0.227	2 BB4 0.320		
					3 AD4 0.265	4 AE1 0.493	5 AF72 0.588	6 AF5 1.049	7 AF4 1.037
				8 AD4 0.365	9 AF5 1.006	10 AF4 1.208	11 AF4 1.294	12 AE4 1.111	13 AE5 1.023
			14 AD4 0.364	15 AF5 1.063	16 AE5 1.154	17 AF1 1.288	18 AE2 1.108	19 AF1 1.233	20 AE3 1.116
21 AD4 0.265	22 AF5 1.004	23 AE5 1.152	24 AF3 1.321	25 AE3 1.173	26 AF1 1.272	27 AE1 1.092	28 AF1 1.255		
29 AE1 0.483	30 AF4 1.200	31 AF1 1.285	32 AE3 1.173	33 AF3 1.333 X	34 AE2 1.125	35 AF3 1.308	36 AE2 1.133		
37 BB5 0.636	38 AF4 1.260	39 AE1 1.105	40 AF1 1.273	41 AE1 1.128	42 AF1 1.294	43 AE3 1.165	44 AF3 1.332		
46 AF5 1.028	47 AE4 1.112	48 AF1 1.235	49 AE1 1.094	50 AF3 1.312	51 AE3 1.166	52 AF2 1.315	53 AE1 1.114		
55 AF4 1.049	56 AE5 1.029	57 AE3 1.119	58 AF1 1.257	59 AE2 1.134	60 AF3 1.332	61 AE1 1.114	62 AF6 1.079		

Long N-1 Burnup (21.715 GWd/MTU)

Note: X = Maximum Fr Value = 1.581

\* Due to core redesign, Unit 1 Cycle 25 will not be quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 1 Cycle 25  
Assembly Relative Power Density with Bank 5  
Inserted to PDIL at BOC, HFP, Equilibrium Xenon

Figure 3.4-16  
Revision 52

X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density					1 BB1 0.237	2 BD3 0.418				
						3 AC1 0.279	4 BD3 0.517	5 AE1 0.647	6 BE4 0.987	7 BE5 1.091	
					8 BC2 0.341	9 BE5 0.966	10 BE3 1.202	11 BE3 1.270	12 BD4 1.127	13 BD4 1.035	
					14 BB1 0.343	15 BE5 0.995	16 BD4 1.156	17 BE1 1.316	18 BD2 1.133	19 BE2 1.238	20 BD1 1.059
21 AB1 0.273	22 BE5 0.964	23 BD4 1.155	24 BE2 1.288	25 BD2 1.134	26 BE75 1.255	27 BD1 1.103	28 BE2 1.249				
29 BD3 0.519	30 BE3 1.202	31 BE1 1.316 X	32 BD1 1.140	33 BE1 1.300	34 BD2 1.128	35 BE1 1.297	36 BD3 1.166				
37 AE1 0.649	38 BE3 1.269	39 BD2 1.133	40 BE76 1.261	41 BD2 1.142	42 BE1 1.301	43 BD2 1.129	44 BE1 1.306				
45 BB5 0.248	46 BE4 0.985	47 BD4 1.120	48 BE2 1.235	49 BD1 1.105	50 BE1 1.301	51 BD2 1.129	52 BE2 1.261	53 BD3 1.156			
54 BD1 0.407	55 BE5 1.092	56 BD4 1.036	57 BD1 1.059	58 BE2 1.249	59 BD3 1.165	60 BE1 1.306	61 BD3 1.156	62 BD5 0.853			

Long N-1 Burnup (22.080 GWd/MTU)

Note: X = Maximum Fr Value = 1.577

\* Unit 2 Cycle 24 is not quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 2 Cycle 24  
Assembly Relative Power Density with Bank 5  
Inserted to PDIL at BOC, HFP, Equilibrium Xenon\*

Figure 3.4-17  
Revision 52

BALTIMORE  
GAS & ELECTRIC CO.  
Calvert Cliffs  
Nuclear Power Plant

CORE POWER DISTRIBUTION - CEA GROUP 5  
END-OF-CYCLE 1, EQUILIBRIUM

Figure 3.4-18  
Rev. 5

ENRICHMENT TYPE  
X  
0.00 → BOX PEAKING FACTOR  
0.00 → ENTHALPY RISE FACTOR  
0.00 → PIN PEAKING FACTOR

MAXIMA

BOX PEAKING FACTOR 1.27  
ENTHALPY RISE FACTOR 1.33  
PIN PEAKING FACTOR 1.37

PEAKING FACTOR ALPY RISE FACTOR PEAKING FACTOR		H		K					
		C		C					
		0.57		0.71		1			
		0.92		0.97					
		0.93		0.98					
FACTOR 1.27		C	C	C+	C+	B+	2		
SE FACTOR 1.33		0.56	0.78	0.97	1.09	0.96			
FACTOR 1.37		0.93	1.08	1.22	1.22	1.03			
		0.94	1.10	1.26	1.26	1.06			
		C	C	B+	A	B+	A	3	
		0.58	1.00	1.05	1.03	1.05	0.73		
		0.91	1.21	1.19	1.10	1.17	0.85		
		0.92	1.26	1.22	1.12	1.20	0.87		
		C	C	B+	A	B+	B+	4	
		0.58	0.77	1.05	1.08	1.19	1.05	1.07	
		0.91	0.98	1.20	1.16	1.27	1.14	1.20	
		0.92	1.10	1.24	1.18	1.31	1.16	1.24	
		C	C	B+	A	B+	B+	5	
		0.56	1.00	1.05	1.08	1.24	1.15	1.23	
		0.93	1.21	1.20	1.17	1.31	1.20	1.30	
		0.94	1.26	1.24	1.19	1.36	1.23	1.34	
		C	B+	A	B+	A	B+	6	
		0.78	1.05	1.08	1.24	1.17	1.27	1.14	
		1.08	1.19	1.16	1.31	1.21	1.33	1.19	
		1.10	1.22	1.18	1.36	1.24	1.37	1.22	
		C+	A	B+	A	B+	A	B+	7
		0.97	1.03	1.19	1.15	1.27	1.14	1.20	1.08
		1.22	1.10	1.27	1.20	1.33	1.20	1.29	1.15
		1.26	1.12	1.31	1.23	1.37	1.23	1.33	1.17
8	C	C+	B+	A	B+	A	B+	A	9
	0.57	1.09	1.05	1.05	1.14	1.20	1.14	1.00	0.99
	0.92	1.22	1.17	1.14	1.19	1.29	1.10	1.10	1.14
	0.93	1.26	1.20	1.16	1.22	1.33	1.13	1.13	1.17
10	C	B+	A	B+	A	B+	B+	A	11
	0.71	0.96	0.73	1.07	1.11	1.24	1.08	0.99	0.55
	0.97	1.03	0.85	1.20	1.17	1.29	1.15	1.14	0.68
	0.98	1.06	0.87	1.24	1.19	1.33	1.17	1.17	0.74
	A	B	D	E	F	G	J		

X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density					1 AD4 0.320	2 BB4 0.434
	3 AD4 0.358		4 AE1 0.592	5 AF72 0.694	6 AF5 1.076	7 AF4 1.088	
8 AD4 0.447		9 AF5 1.068	10 AF4 1.242	11 AF4 1.264	12 AE4 1.005	13 AE5 0.900	
14 AD4 0.447		15 AF5 1.083	16 AE5 1.075	17 AF1 1.334 X	18 AE2 1.042	19 AF1 1.264	20 AE3 1.014
21 AD4 0.357	22 AF5 1.064	23 AE5 1.075	24 AF3 1.324	25 AE3 1.082	26 AF1 1.312	27 AE1 1.030	28 AF1 1.292
29 AE1 0.580	30 AF4 1.234	31 AF1 1.331	32 AE3 1.081	33 AF3 1.323	34 AE2 1.046	35 AF3 1.309	36 AE2 1.044
37 BB5 0.708	38 AF4 1.241	39 AE1 1.037	40 AF1 1.311	41 AE1 1.046	42 AF1 1.314	43 AE3 1.061	44 AF3 1.310
46 AF5 1.056	47 AE4 0.999	48 AF1 1.262	49 AE1 1.029	50 AF3 1.309	51 AE3 1.061	52 AF2 1.298	53 AE1 1.012
55 AF4 1.093	56 AE5 0.900	57 AE3 1.013	58 AF1 1.291	59 AE2 1.044	60 AF3 1.309	61 AE1 1.011	62 AF6 1.034

Long N-1 Burnup (21.715 GWd/MTU)

Note: X = Maximum Fr Value = 1.407

\* Due to core redesign, Unit 1 Cycle 25 will not be quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 1 Cycle 25  
Assembly Relative Power Density with Bank 5  
Inserted to PDIL at EOC, HFP, Equilibrium Xenon

Figure 3.4-19  
Revision 52

X Y XXX	X – Box Number Y – Batch XXX – Assembly Relative Power Density			1 BB1 0.323	2 BD3 0.512				
				3 AC1 0.372	4 BD3 0.603	5 AE1 0.702	6 BE4 1.051	7 BE5 1.081	
			8 BC2 0.421	9 BE5 1.044	10 BE3 1.228	11 BE3 1.237	12 BD4 0.991	13 BD4 0.880	
			14 BB1 0.428	15 BE5 1.043	16 BD4 1.059	17 BE1 1.327	18 BD2 1.039	19 BE2 1.253	20 BD1 0.958
21 AB1 0.370	22 BE5 1.046	23 BD4 1.060	24 BE2 1.311	25 BD2 1.053	26 BE75 1.307	27 BD1 1.034	28 BE2 1.294		
29 BD3 0.607	30 BE3 1.229	31 BE1 1.327	32 BD1 1.055	33 BE1 1.326	34 BD2 1.057	35 BE1 1.328	36 BD3 1.079		
37 AE1 0.706	38 BE3 1.238	39 BD2 1.039	40 BE76 1.307	41 BD2 1.064	42 BE1 1.336 X	43 BD2 1.059	44 BE1 1.334		
45 BB5 0.337	46 BE4 1.052	47 BD4 0.990	48 BE2 1.253	49 BD1 1.035	50 BE1 1.329	51 BD2 1.059	52 BE2 1.314	53 BD3 1.065	
54 BD1 0.500	55 BE5 1.081	56 BD4 0.880	57 BD1 0.957	58 BE2 1.294	59 BD3 1.079	60 BE1 1.334	61 BD3 1.065	62 BD5 0.832	

Long N-1 Burnup (22,060 GWd/MTU)

Note: X = Maximum Fr Value = 1.407

\* Unit 2 Cycle 24 is not quarter core symmetric.

Calvert Cliffs  
Nuclear Power Plant

UNIT 2 Cycle 24  
Assembly Relative Power Density with Bank 5  
Inserted to PDIL at EOC, HFP, Equilibrium Xenon\*

Figure 3.4-20  
Revision 52

X
0.00
0.00
0.00

- BOX PEAKING FACTOR
- ENTHALPY RISE FACTOR
- PIN PEAKING FACTOR

MAXIMA

BOX PEAKING FACTOR	1.23
ENTHALPY RISE FACTOR	1.31
PIN PEAKING FACTOR	1.35

H K

C	C
0.63	0.83
1.04	1.13
1.07	1.16

[illegible]

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Nuclear Power Plant

CORE POWER DISTRIBUTION - PART LENGTH CEA  
P-1, BEGINNING OF FIRST CYCLE,  
EQUILIBRIUM XENON

Figure  
3.4-22

ENRICHMENT TYPE  
X  
0.00 → BOX PEAKING FACTOR  
0.00 → ENTHALPY RISE FACTOR  
0.00 → PIN PEAKING FACTOR

MAXIMA

BOX PEAKING FACTOR 1.23  
ENTHALPY RISE FACTOR 1.42  
PIN PEAKING FACTOR 1.47

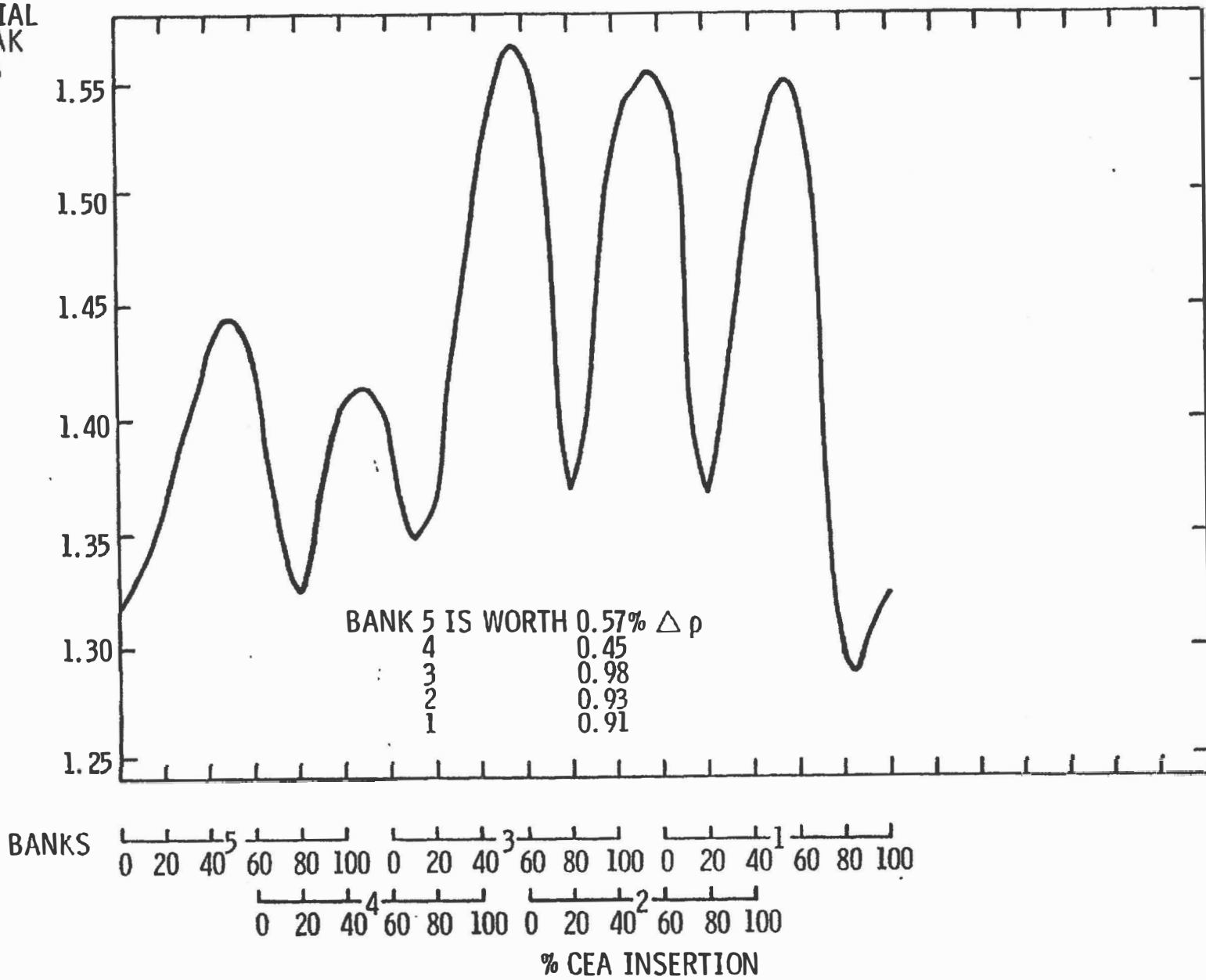
		H		K				
		C	C	C	C	B+		1
		0.64	0.81	1.03	1.11	1.12		
		1.04	1.12					
		C	C	C+	C+	B+		2
		0.63	0.85	1.06	1.23	1.12		
		1.04	1.16	1.32	1.36	1.22		
		1.05	1.18	1.36	1.40	1.26		
		C	C	B+	A	B+	A	3
		0.76	1.16	1.14	1.08	1.16	1.06	
		1.18	1.37	1.25	1.13	1.23	1.12	
		1.19	1.42	1.28	1.15	1.27	1.15	
		C	C	A	B+	A	B+	4
		0.76	1.22	1.12	1.16	0.97	0.96	
		1.18	1.42	1.18	1.24	1.07	1.12	
		1.19	1.47	1.20	1.28	1.10	1.14	
		C	C	B+	A	B+	A	5
		0.63	1.16	1.22	1.15	1.03	0.51	
		1.04	1.37	1.30	1.19	1.11	0.65	
		1.05	1.42	1.34	1.22	1.13	0.71	
		C	B+	A	B+	A	B+	6
		0.85	1.14	1.12	1.21	1.09	0.88	
		1.16	1.25	1.18	1.29	1.18	1.00	
		1.18	1.28	1.20	1.33	1.22	1.03	
		C+	A	B+	A	B+	A	7
		1.06	1.08	1.16	1.03	0.98	0.93	
		1.32	1.13	1.24	1.11	1.04	0.98	
		1.36	1.15	1.28	1.13	1.06	1.00	
		C+	B+	A	B+	A	B+	9
		1.23	1.16	0.97	0.93	1.04	1.05	
		1.35	1.23	1.07	1.09	1.09	1.10	
		1.40	1.27	1.10	1.12	1.13	1.14	
		B+	A	B+	A	B+	A	11
		1.12	1.06	0.96	0.51	0.93	0.97	
		1.22	1.12	1.12	0.65	0.98	1.00	
		1.26	1.15	1.14	0.71	1.00	1.02	

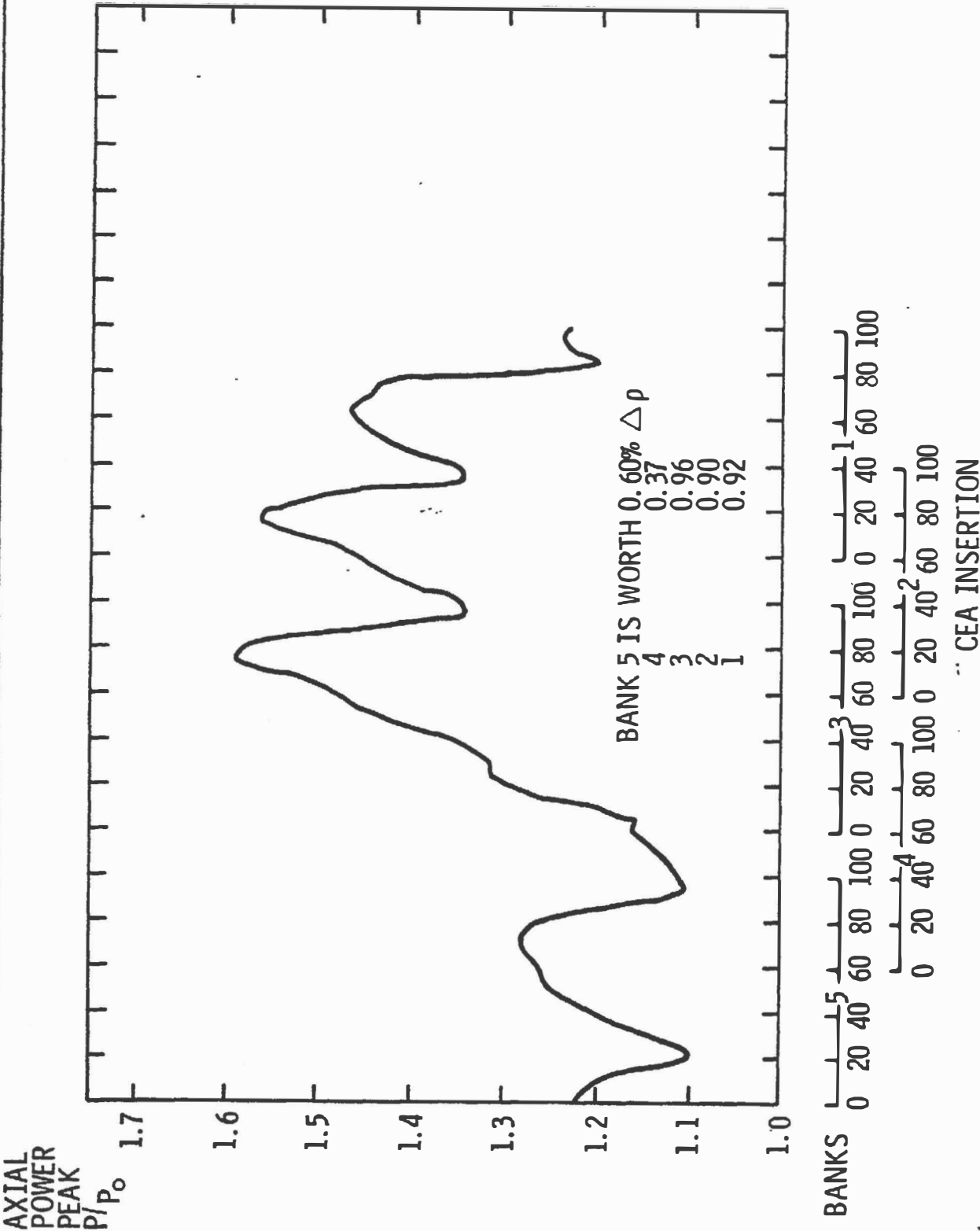
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Calvert Cliffs  
Nuclear Power Plant

AXIAL PEAK vs % CEA INSERTION  
(BEGINNING OF FIRST CYCLE)

Figure  
3.4-23

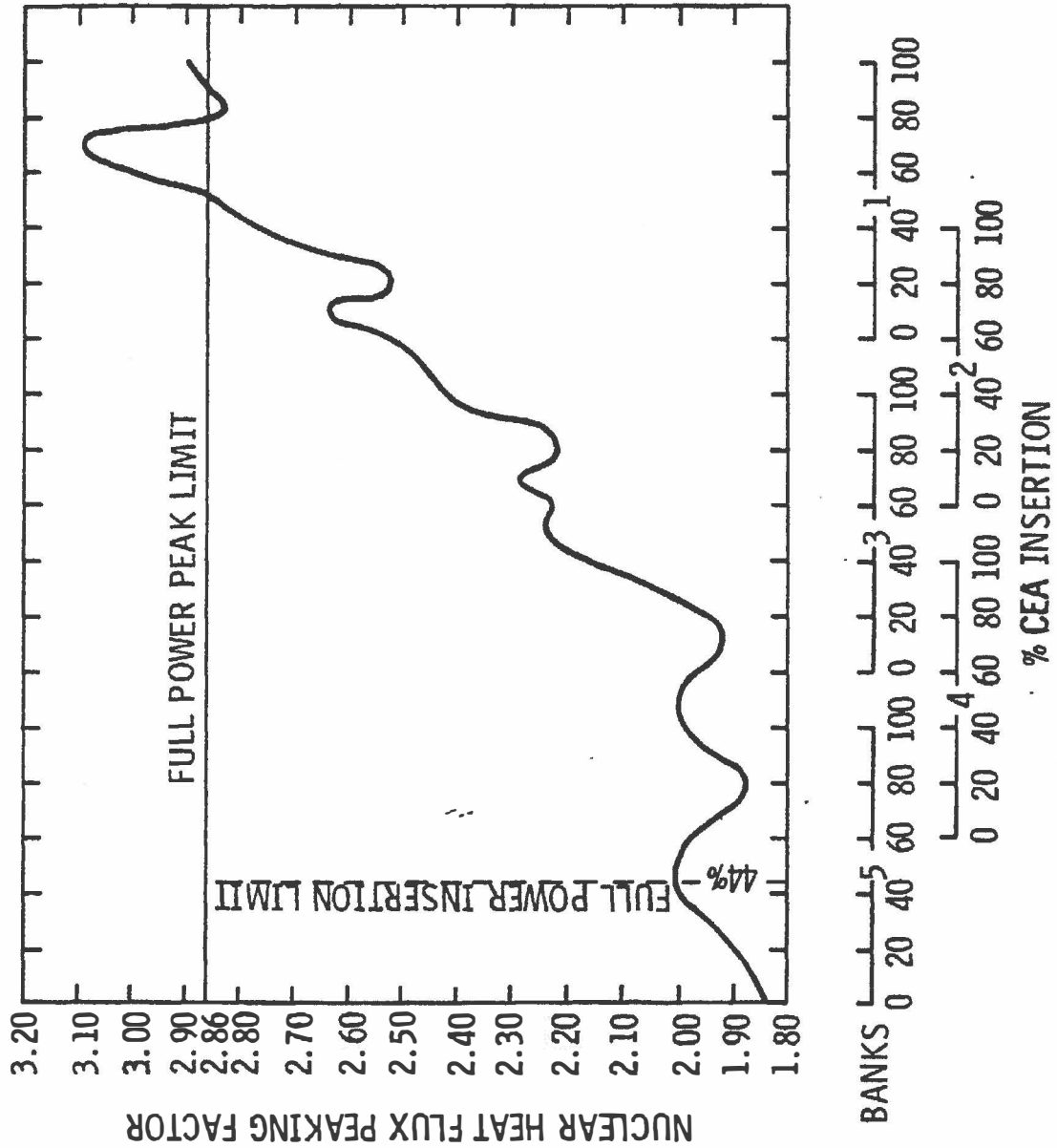
AXIAL  
PEAK  
 $P/\bar{P}$





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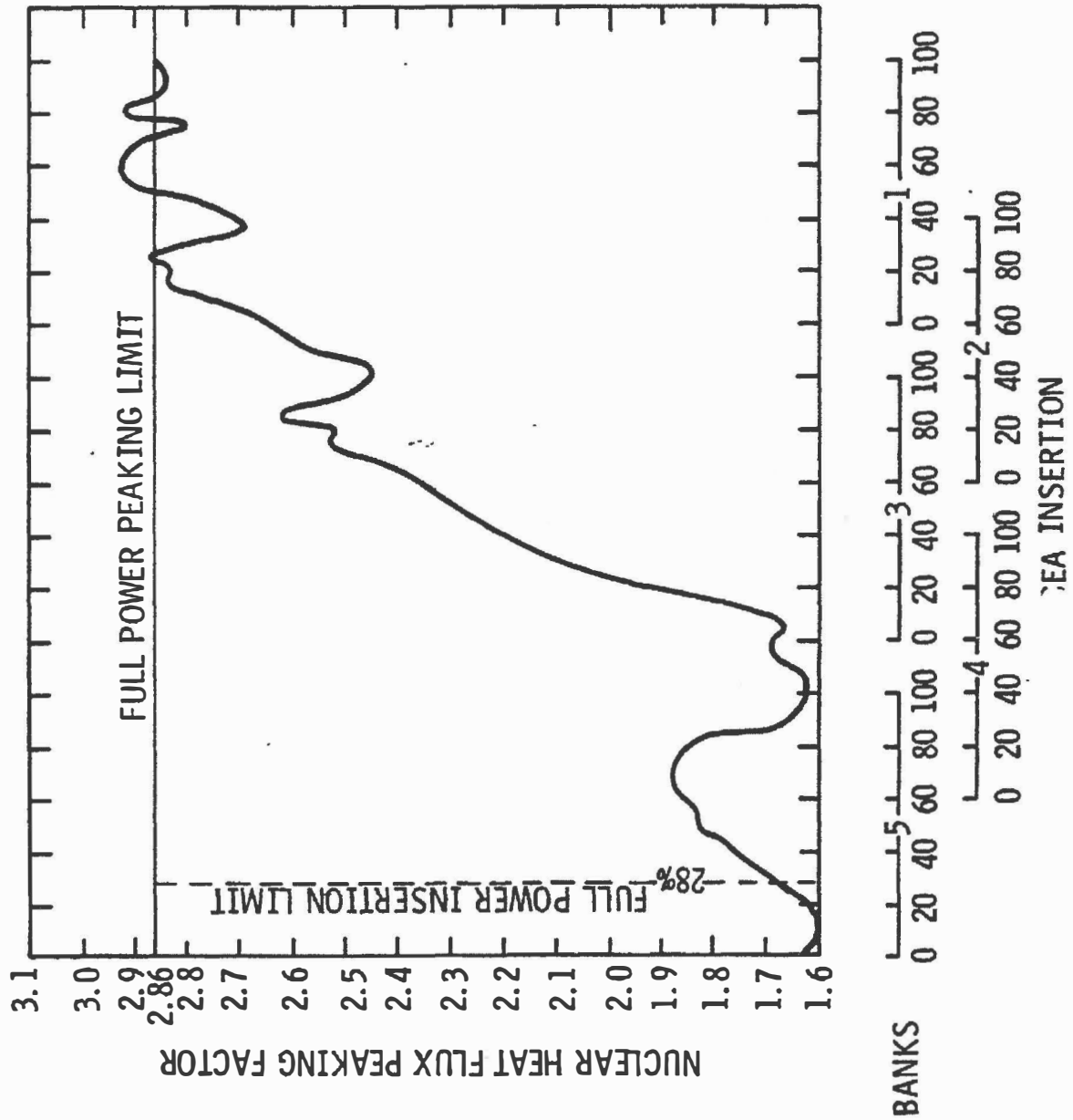
AXIAL PEAK vs CEA INSERTION WITH PART LENGTH  
CEA'S (END OF FIRST CYCLE) Figure 3.4-24



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NUCLEAR HEAT FLUX PEAK vs CEA INSERTION  
(BEGINNING OF FIRST CYCLE)

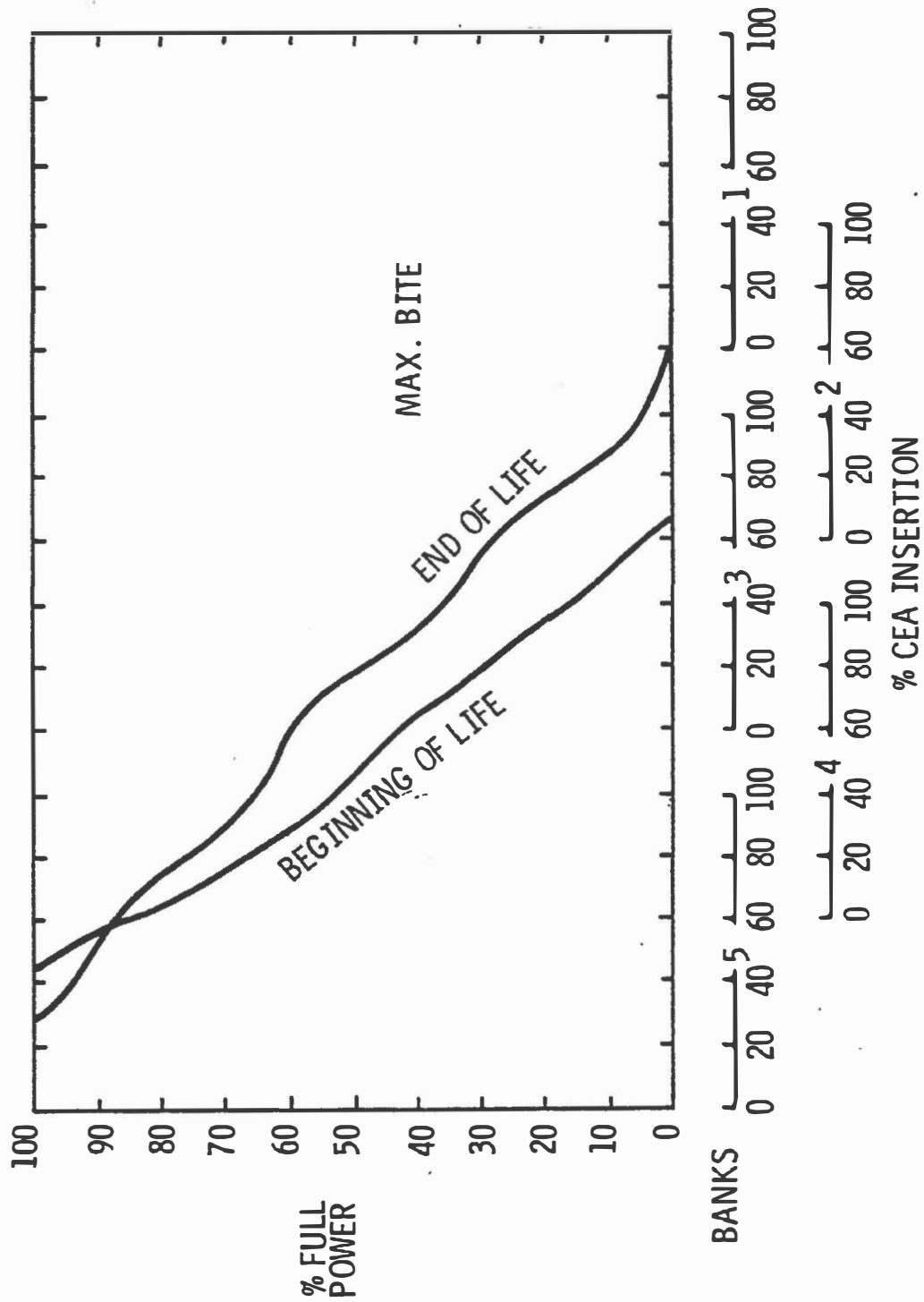
Figure  
3.4-25



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NUCLEAR HEAT FLUX PEAK vs CEA INSERTION  
WITH PART LENGTH CEAs (END OF FIRST CYCLE)

Figure  
3.4-26

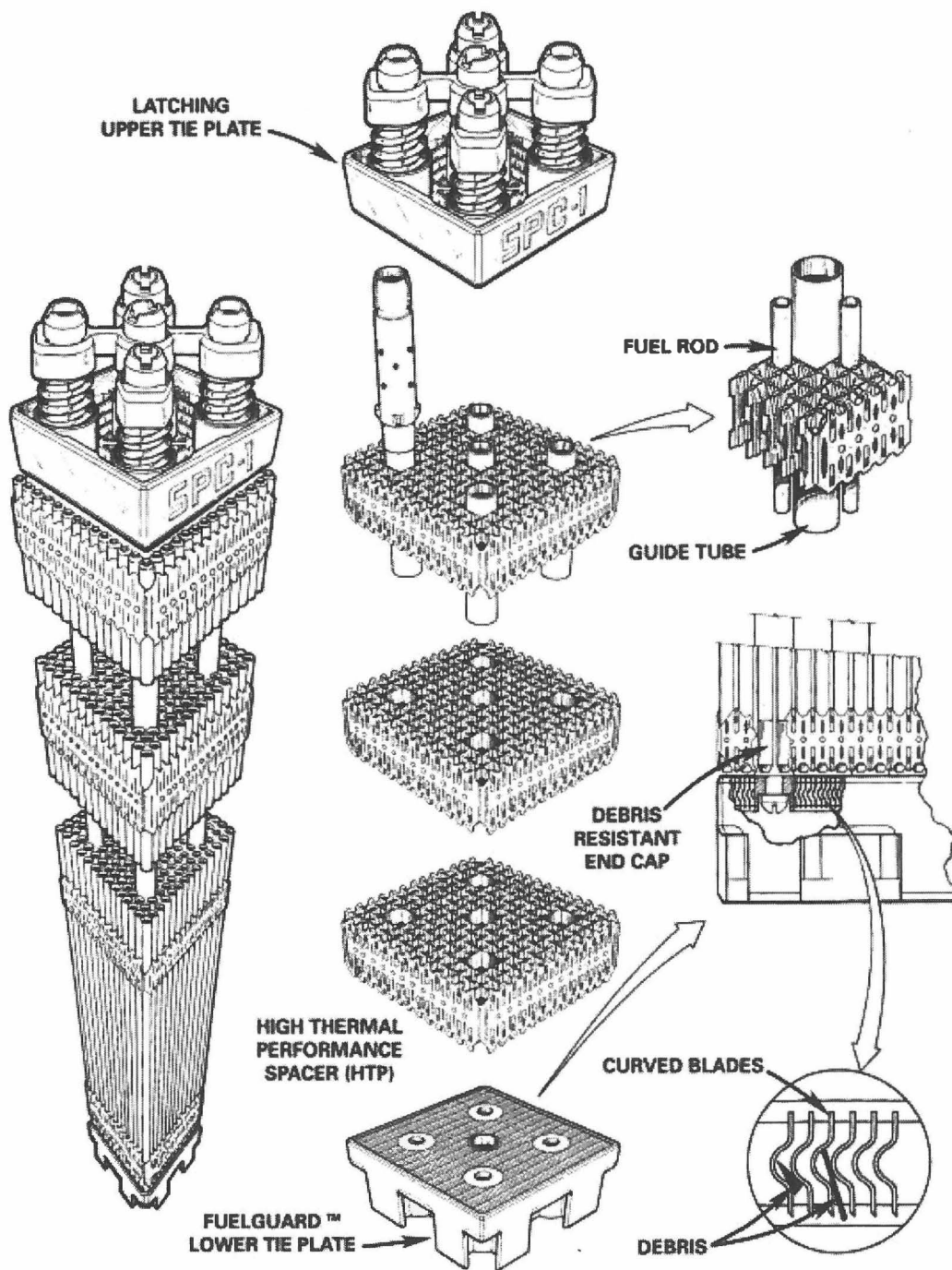


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FIRST CYCLE  
POWER DEPENDENT CEA INSERTION LIMITS

Figure  
3.4-27

# 14x14 PWR FUEL BUNDLE



Calvert Cliffs Nuclear  
Power Plant

Framatome Lead Fuel Assembly

Figure 3.7-1  
Revision 33