REFUELING OPERATIONS

FUEL STORAGE

LIMITING CONDITION FOR OPERATION

3.9.12.a Storage in the spent fuel pool shall be restricted to fuel assemblies having initial enrichment less than or equal to 4.55 ± 0.05 w/o U-235. The provisions of Specification 3.0.3 are not applicable.

3.9.12.b Storage in the spent fuel pool shall be further restricted by the limits specified in Figure 3.9.2. The provisions of Specification 3.0.3 are not applicable.

3.9.12.c The boron concentration in the spent fuel pool shall be maintained (at all times) at greater than 2000 parts per million.

APPLICABILITY: During storage of fuel in the spent fuel pool.

ACTION:

Suspend all actions involving the movement of fuel in the spent fuel pool if it is determined a fuel assembly has been placed in an incorrect location until such time as the correct storage location is determined. Move the assembly to its correct location before resumption of any other fuel movement.

Suspend all actions involving the movement of fuel in the spent fuel pool if it is determined the pool boron concentration is less than 2001 ppm, until such time as the boron concentration is increased to 2001 ppm or greater.

SURVEILLANCE REQUIREMENTS

4.9.12.a Verify all fuel assemblies to be placed in the spent fuel pool have an initial enrichment of less than or equal to 4.55 ± 0.05 w/o U-235 by checking the assemblies' design documentation.

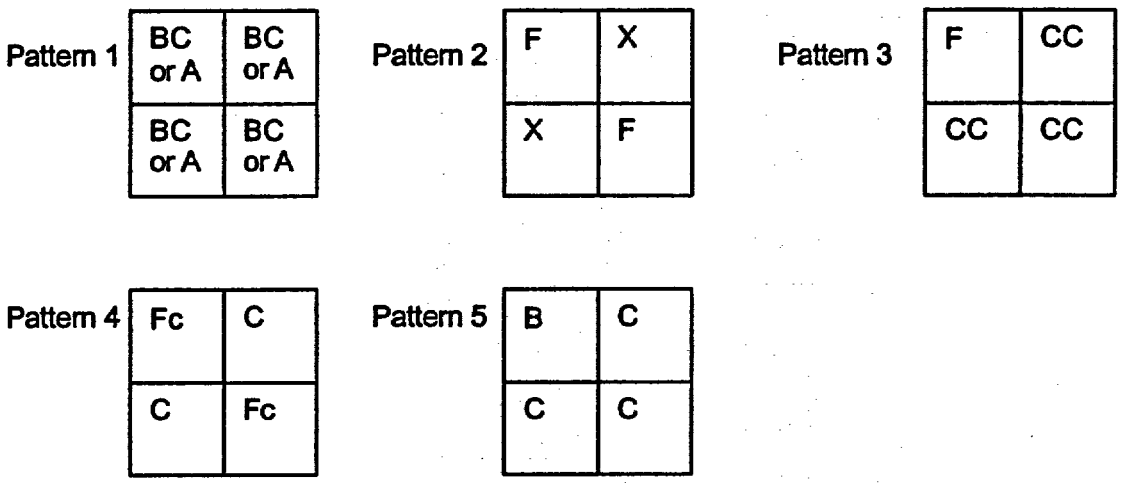
4.9.12.b Verify all fuel assemblies to be placed in the spent fuel pool are within the limits of Figure 3.9.2 by checking the assemblies' design and burnup documentation.

4.9.12.c Verify at least once per 31 days the spent fuel pool boron concentration is greater than 2000 ppm.

Figure 3.9.1

Deleted

Figure 3.9-2



Legend:

1. Type "F" - fresh fuel assemblies with an initial enrichment less than or equal to 4.55±0.05 wt%.
2. Type "B" - an assembly with a maximum initial enrichment of 4.1 wt%, a minimum burnup of 11.3 GWD/MTU and zero years cooling time. Typically "B" type assemblies have only one cycle of burnup.
3. "Fc" - fresh fuel assemblies with an initial enrichment of less than or equal to 4.55±0.05 wt% with a CEA inserted. The CEA must be of the new design.
4. "A" - an assembly that meets specific burnup requirements that are included in Table 1 below.
5. "BC" - a "B" type assembly with a CEA inserted. This CEA may be of the old or new design.
6. "C" - a high burnup assembly that meets specific burnup requirements that are included in Table 2 below. Initial enrichment is less than or equal to 4.50±0.05 wt%.
7. "AC" - an "A" type assembly with a CEA inserted. This CEA may be of the old or new design.
8. "CC" - a "C" type assembly with a CEA inserted. This CEA may be of the old or new design. Initial enrichment is less than or equal to 4.50±0.05 wt%.
9. "X" - a water cell with no fuel.

Note: Any less restrictive assembly may be substituted for another assembly within the pattern. Fuel assembly types are ranked 1 through 9, with the highest reactivity ranking being 1.

Figure 3.9-2

Allowable Pattern Interfaces

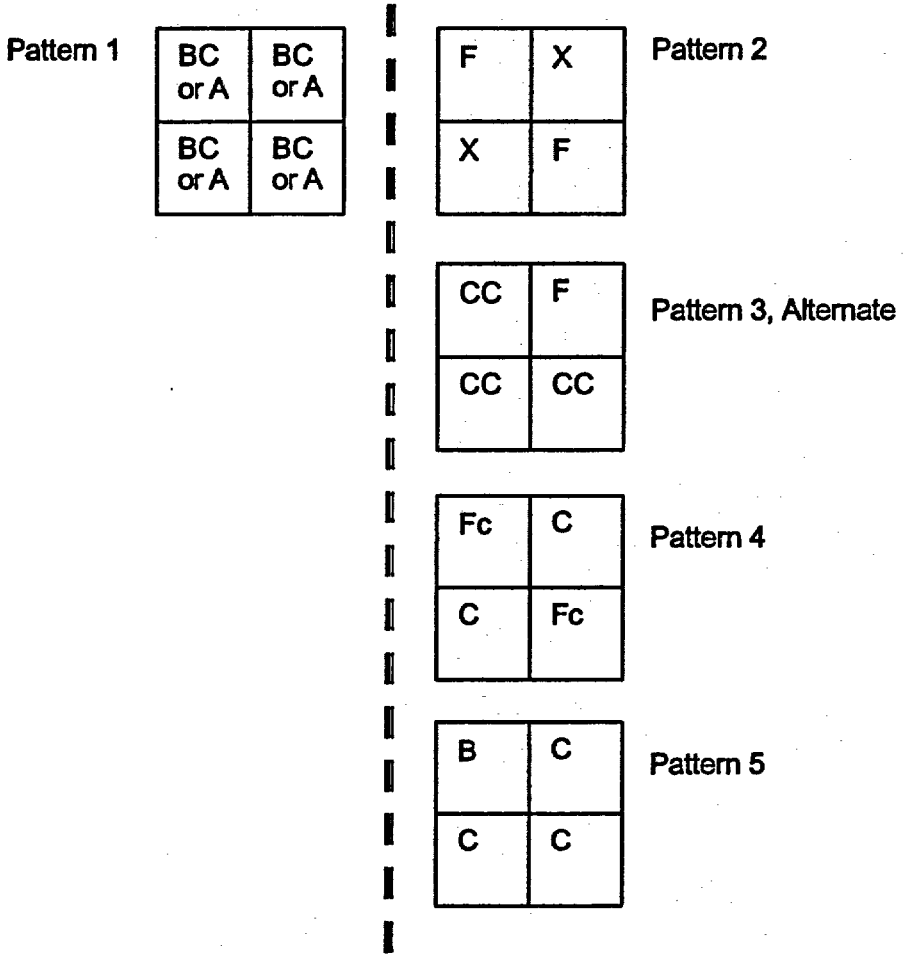


Figure 3.9-2

Allowable Pattern Interfaces

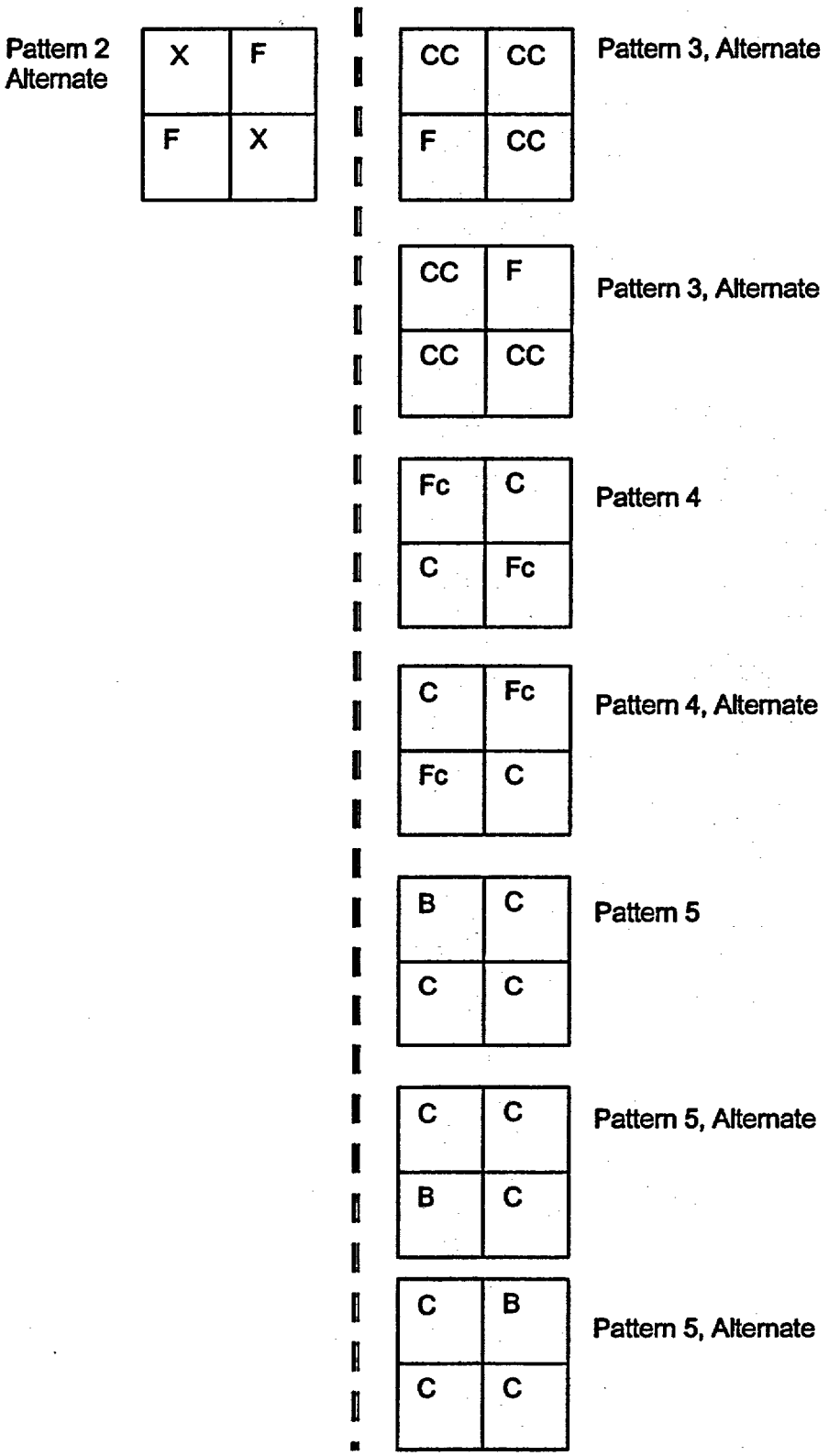


Figure 3.9-2

Allowable Pattern Interfaces

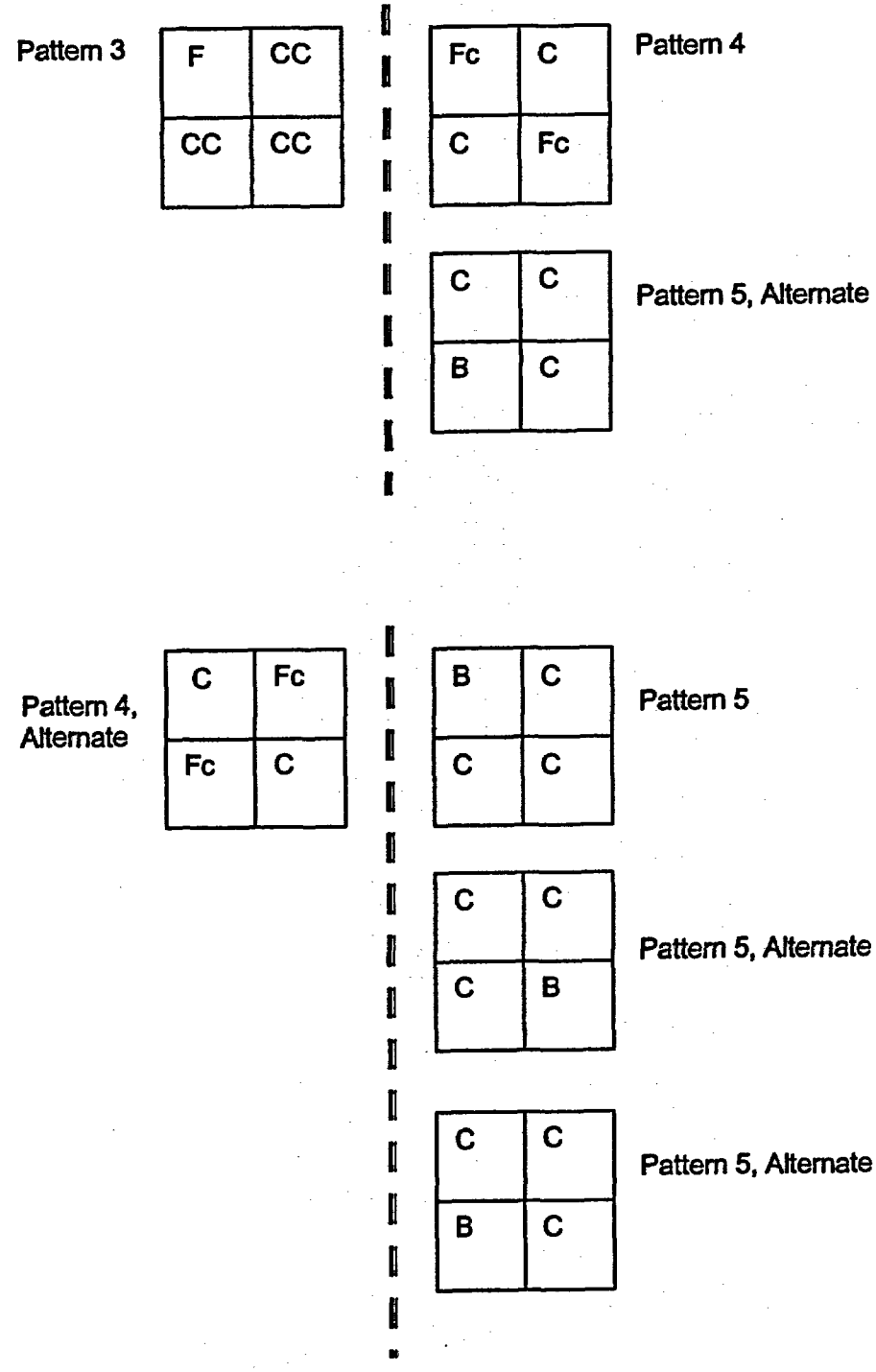


Figure 3.9-2

Table 1
Minimum Burnup Requirements for "A" Assemblies at
Varying Enrichment and Cooling Time

BURNUP, MWD/KgU					
Average Enrichment, wt% U-235	0 Years Cooling Time	5 Years Cooling Time	10 Years Cooling Time	15 Years Cooling Time	20 Years Cooling Time
2	7.56	7.56	7.56	7.56	7.56
2.5	14.94	14.21	13.47	12.74	12.00
3.0	21.30	20.30	19.30	18.30	17.30
3.5	27.10	25.95	24.80	23.65	22.50
4.0	32.67	31.38	30.09	28.79	27.50
4.5	39.30	37.73	36.15	34.58	33.00
4.95	45.00	43.33	41.65	39.98	38.30

Table 1-1

Bounding Polynomial Fits to Determine Minimum Acceptable Burnup
for "A" Type Assemblies
Storage as a Function of Initial Enrichment

Decay Time, Years	Burnup, MWD/KgU
0	$0.68 * E^3 - 7.449 * E^2 + 38.56 * E - 45.20$
5	$0.5489 * E^3 - 5.9344 * E^2 + 32.496 * E - 38.05$
10	$0.4153 * E^3 - 4.3948 * E^2 + 26.356 * E - 30.75$
15	$0.2867 * E^3 - 2.9045 * E^2 + 20.367 * E - 23.80$
20	$0.153 * E^3 - 1.3649 * E^2 + 14.227 * E - 16.60$

Note: E = Initial average enrichment in wt% U-235

Figure 3.9-2

Table 2
Minimum Burnup Requirements for "C" Assemblies at
Varying Enrichment and Cooling Time

BURNUP, MWD/KgU					
Average Enrichment, wt% U-235	0 Years Cooling Time	5 Years Cooling Time	10 Years Cooling Time	15 Years Cooling Time	20 Years Cooling Time
2	17.00	15.00	14.00	13.30	13.00
2.5	25.00	22.00	21.00	20.30	20.00
3.0	32.00	29.00	27.00	26.00	25.00
3.5	37.00	35.00	32.50	31.00	30.00
4.0	43.00	40.00	39.00	38.00	37.00
4.5	49.75	46.00	45.00	44.00	43.00

Table 2-1

Bounding Polynomial Fits to Determine Minimum Acceptable Burnup
for "C" Type Assemblies
Storage as a Function of Initial Enrichment

Decay Time, Years	Burnup, MWD/KgU
0	$1.3148 * E^3 - 13.552 * E^2 + 57.491 * E - 53.6$
5	$0.3704 * E^3 - 4.5397 * E^2 + 29.59 * E - 28.8$
10	$0.6667 * E^3 - 6.5714 * E^2 + 32.976 * E - 30.3$
15	$0.7111 * E^3 - 6.919 * E^2 + 33.634 * E - 31.3$
20	$0.8148 * E^3 - 7.7302 * E^2 + 35.169 * E - 32.0$

Note: E = Initial average enrichment in wt% U-235

5.3 Fuel Storage

5.3.1 Spent Fuel Storage Rack Criticality

The spent fuel storage racks are designed and shall be maintained with:

a. Fuel assemblies stored in the spent fuel pool in accordance with Specification 3.9.12;

b. $k_{eff} \leq 0.95$ if fully flooded with 240 ppm borated water, which includes an allowance for uncertainties as described in Section 9.1 of the SAR; and

c. $k_{eff} < 1.0$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1 of the SAR; and

d. A nominal 9.8 inch center to center distance between fuel assemblies placed in the storage racks.

5.3.2 New Fuel Storage Rack Criticality

The new fuel storage racks are designed and shall be maintained with:

a. Fuel assemblies having a maximum U-235 enrichment of 4.55±0.05 weight percent;

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1 of the SAR;

c. $k_{eff} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in Section 9.1 of the SAR; and

d. A nominal 26 inch center to center distance between fuel assemblies placed in the storage racks.

5.3.3 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 399' 10½".

5.3.4 Capacity

The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 988 fuel assemblies.