4.0 DESIGN FEATURES

4.1 Site

4.1.1 Site and Exclusion Area Boundaries

The site and exclusion area boundaries shall be as shown in Figure 4.1-1.

4.1.2 Low Population Zone (LPZ)

The LPZ shall be as shown in Figure 4.1-2 (within the 3-mile circle).

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 193 fuel assemblies. Each assembly shall consist of a matrix of Zirlo fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions.

4.2.2 Control Rod Assemblies

The reactor core shall contain 57 control rod assemblies. The control material shall be boron carbide with silver indium cadmium tips as approved by the NRC.

(continued)

4.0 DESIGN FEATURES (continued)

4.3 Fuel Storage

4.3.1 Criticality

4.3.1.1 The spent fuel storage racks (shown in Figure 4.3-1) are designed and shall be maintained with:

a. Fuel assemblies having a maximum U-235 enrichment of 4.95 + 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 Sections 4.3.2.7 and 9.1 of the FSAR;

c. Distances between fuel assemblies are a nominal 10.375 inch center-to-center spacing in the twenty-four flux trap rack modules.

d. Fuel assemblies with enrichments less than or equal to 3.80 weight percent U-235 are allowed unrestricted storage.

e. Fuel assemblies with initial enrichments greater than 3.80 weight percent and less than a maximum of 5 percent enrichment (nominally 4.95 $\pm$ 0.05 percent) may be stored in the spent fuel racks in one of four arrangements with specific limits as identified below:

1. Spent fuel assemblies may be stored in the racks without further restrictions provided the burnup of each assembly is in the acceptable domain identified in Figure 4.3-3, depending upon the specified initial enrichment.

2. New and spent fuel assemblies may be stored in a checkerboard arrangement of 2 new and 2 spent assemblies, provided that each spent fuel assembly has accumulated a minimum burnup in the acceptable domain identified in Figure 4.3-4.

3. New fuel assemblies may be stored in 4-cell arrays with 1 of the 4 cells remaining empty of fuel (i.e. containing only water or water with up to 75 percent by volume of non-fuel bearing material.

(continued)

4.0 DESIGN FEATURES (continued)

4.3 Fuel Storage (continued)

4. New fuel assemblies with a minimum of 32 integral fuel burnable absorber (IFBA) rods may be stored without further restriction, provided the loading of ZrB_2 in the coating of each IFBA rod is minimum of 1.25x (1.9625mg/in).

A water cell is less reactive than any cell containing fuel and therefore a water cell may be used at any location in the loading arrangements. A water cell is defined as a cell containing water or non-fissile material with no more than 75 percent of the water displaced.

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

a. Fuel assemblies having a maximum enrichment of 5.0 weight percent U-235 and shall be maintained with the arrangement of 120 storage locations shown in Figure 4.3-2;

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 FSAR;

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 FSAR; and

d. A nominal 21-inch center to center distance between fuel assemblies placed in the storage racks.

4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below Elevation 747 feet - 1 1/2 inches.

4.3.3 Capacity

The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1386 fuel assemblies in 24 flux trap rack modules.

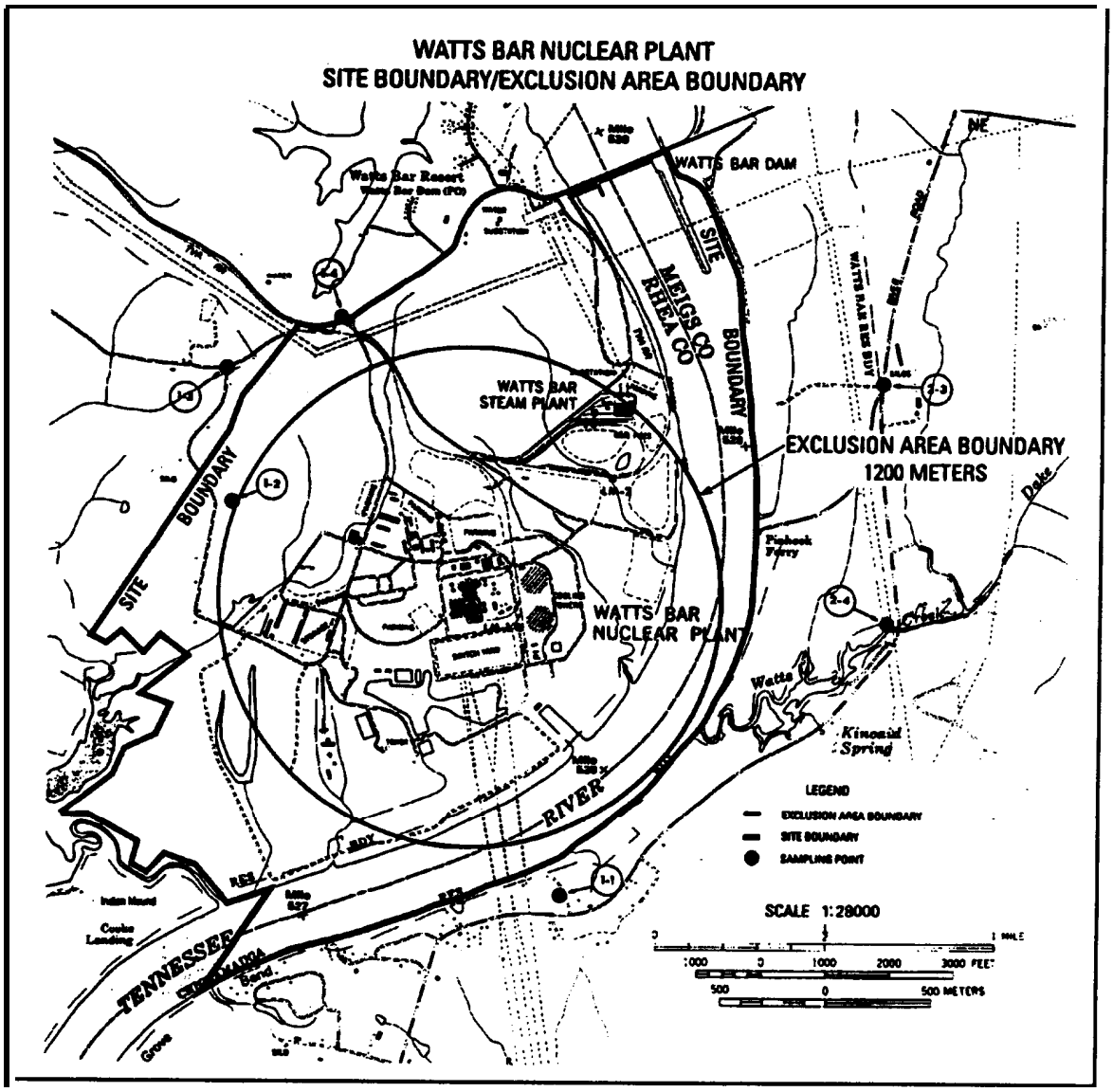

FIGURE 4.1-1 (PAGE 1 OF 1)
SITE AND EXCLUSION AREA BOUNDARIES

(continued)

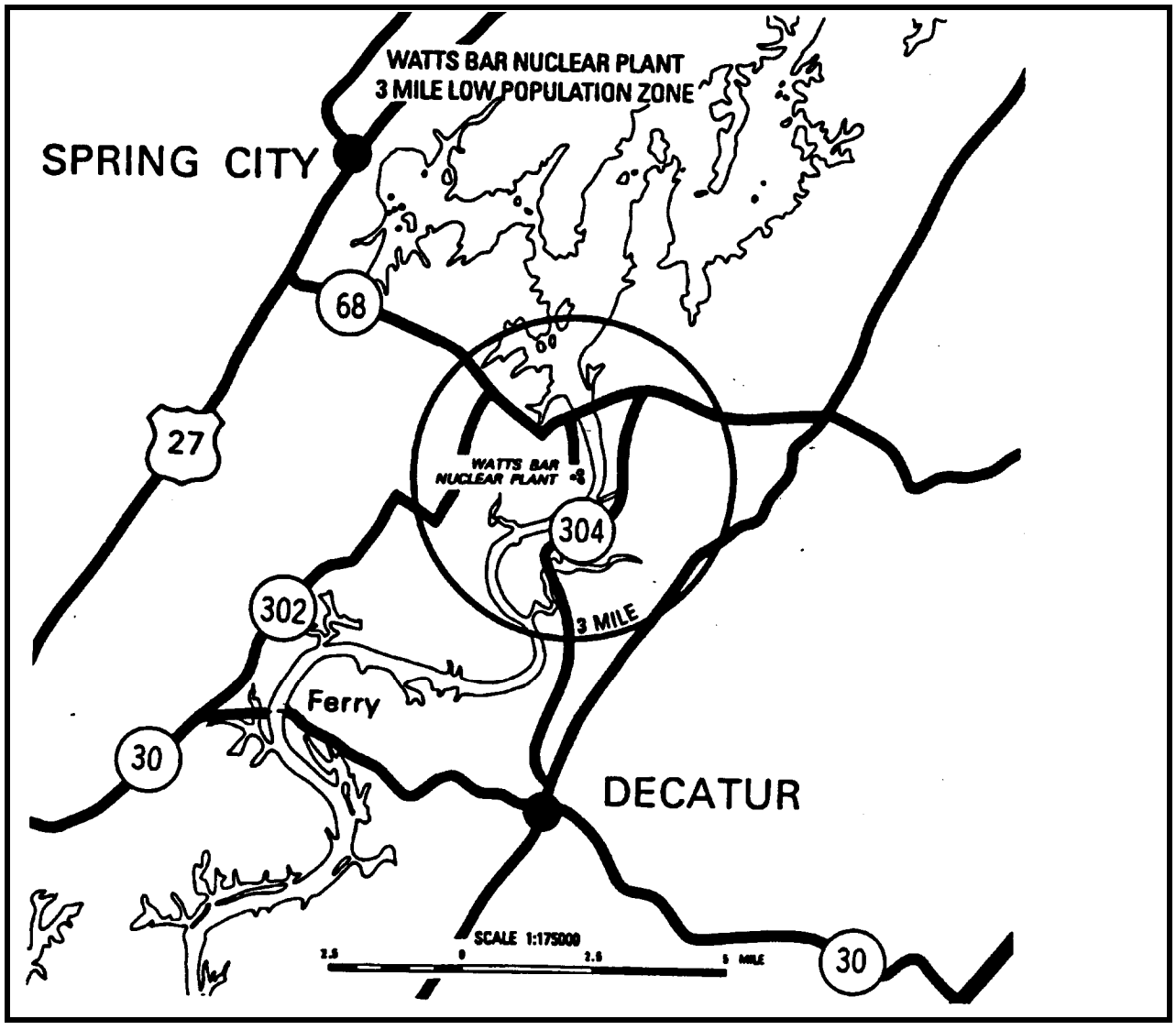

FIGURE 4.1-2 (PAGE 1 OF 1)
LOW POPULATION ZONE

(continued)

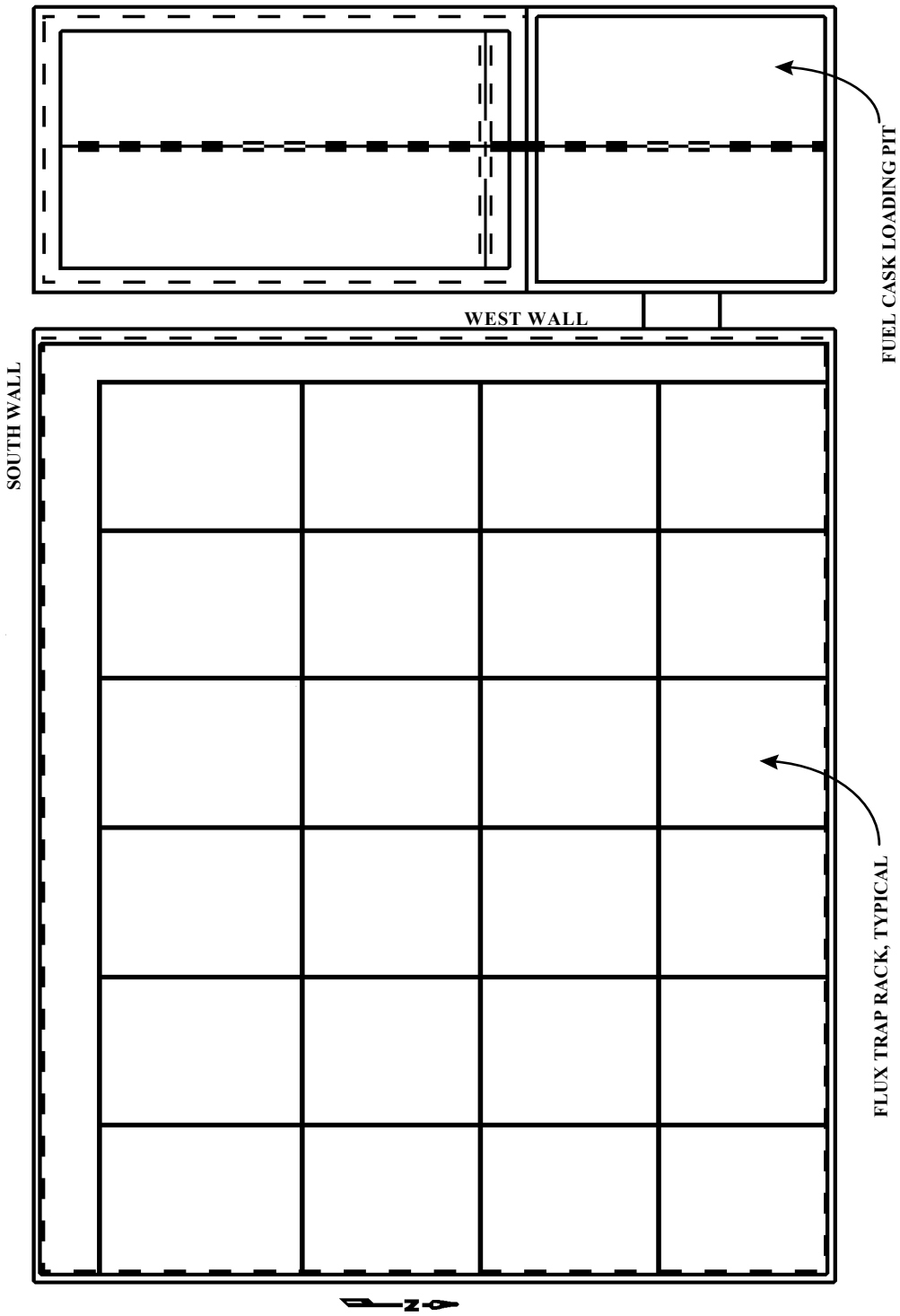

FIGURE 4.3-1
SPENT FUEL STORAGE RACKS
PLAN
SPENT FUEL POOL

(continued)

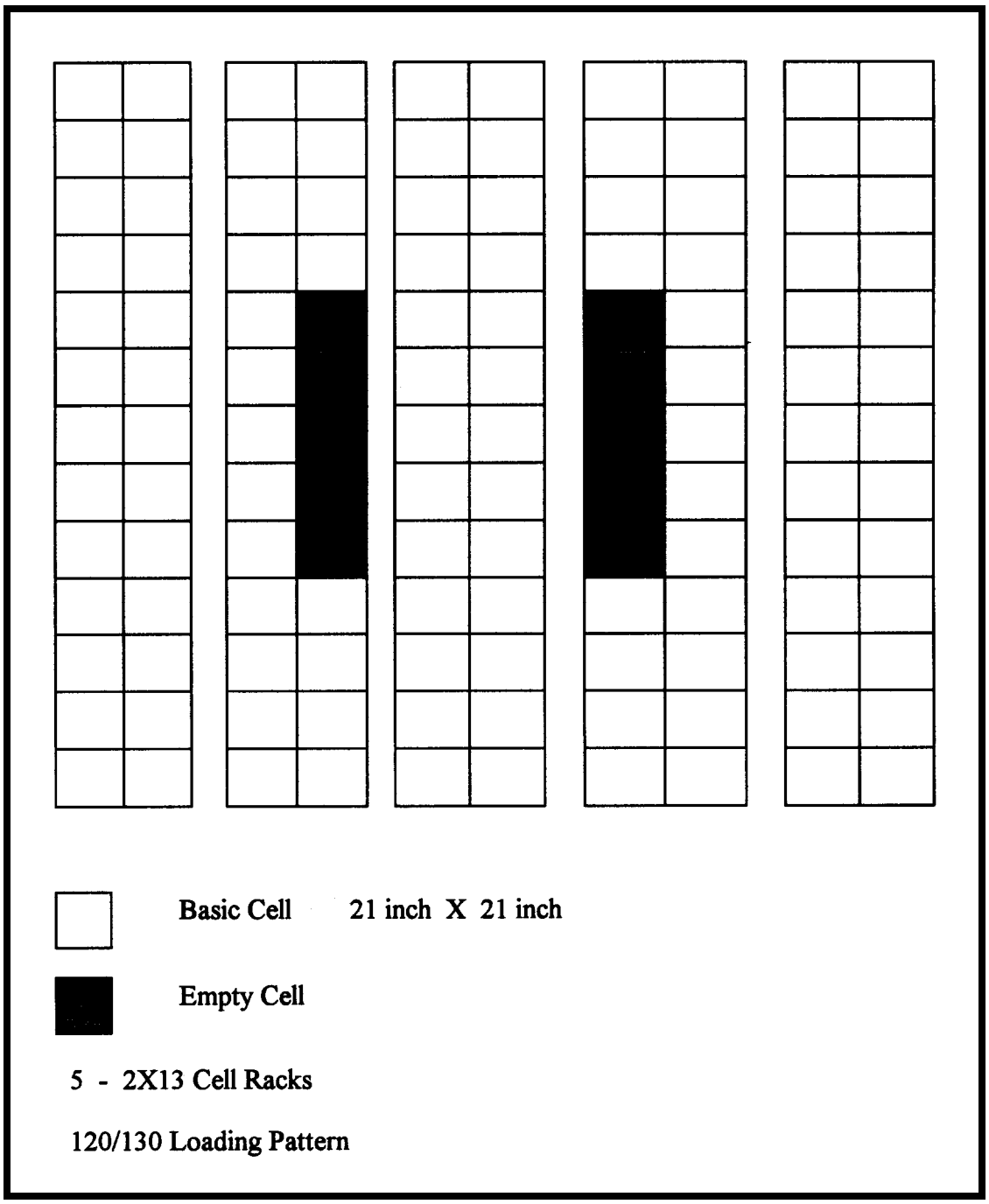

FIGURE 4.3-2
NEW FUEL STORAGE RACK LOADING PATTERN

(continued)

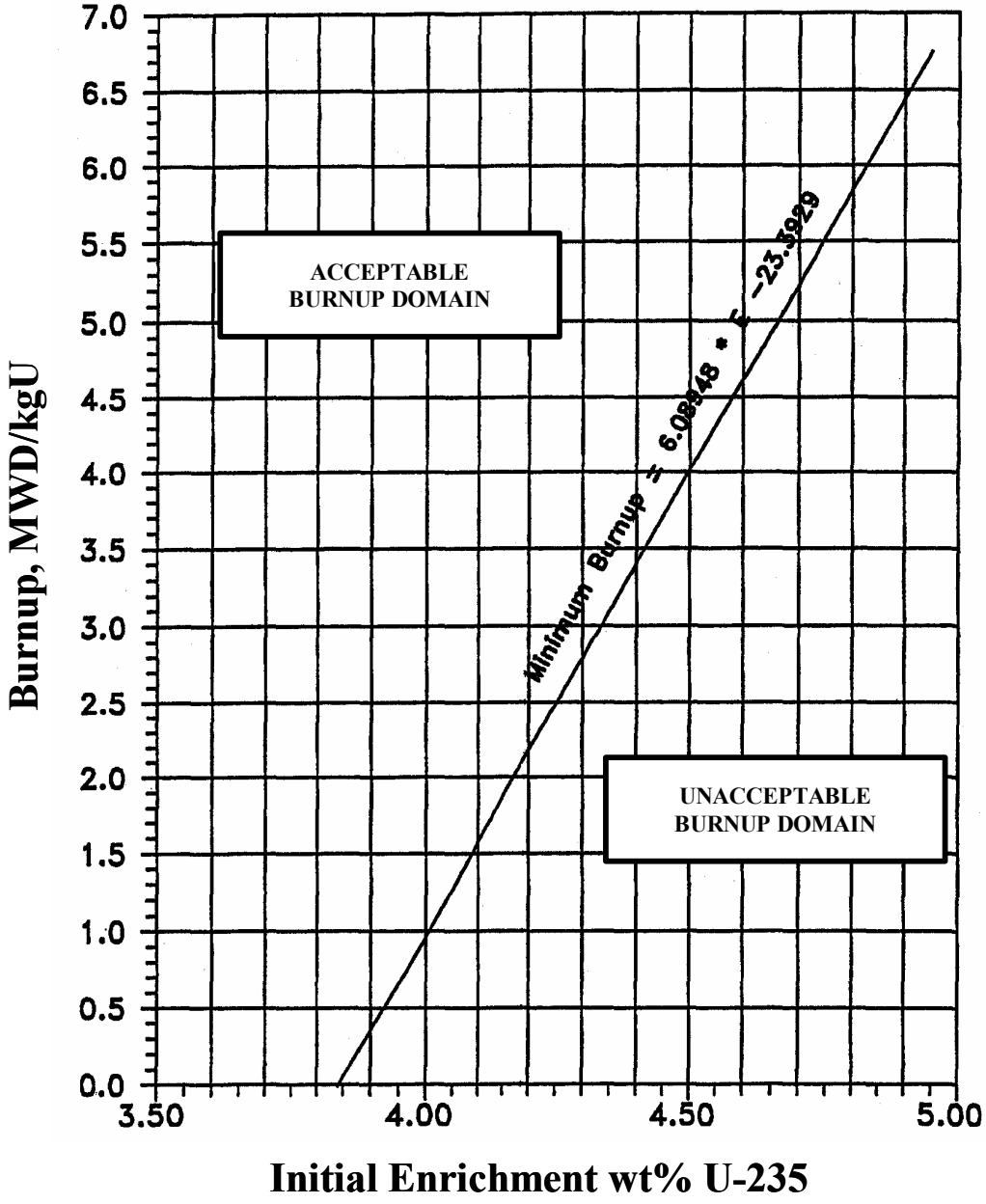

FIGURE 4.3-3
MINIMUM REQUIRED BURNUP FOR UNRESTRICTED STORAGE
OF SPENT FUEL OF VARIOUS INITIAL ENRICHMENTS

(continued)

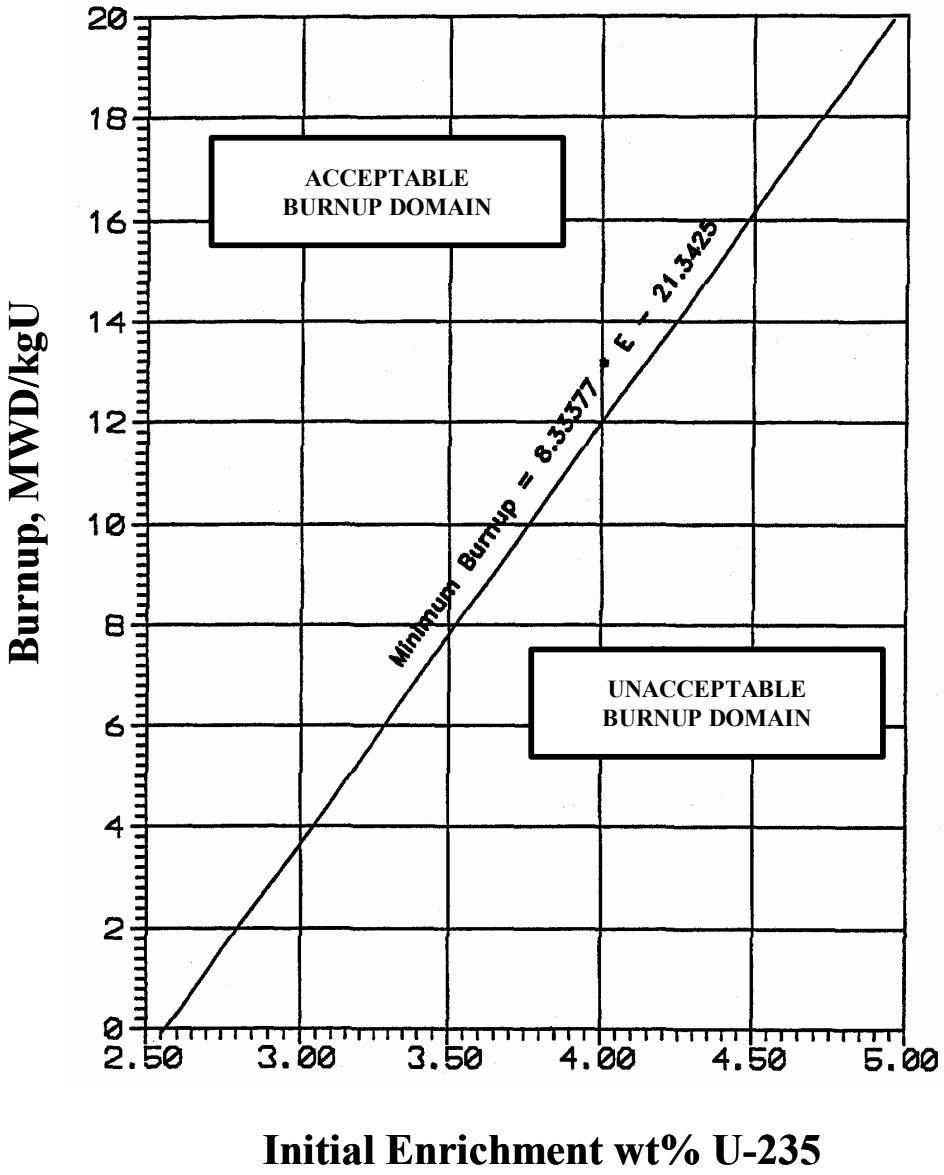

FIGURE 4.3-4
MINIMUM REQUIRED BURNUP FOR 2X2 CHECKERBOARD ARRANGEMENT OF 2 SPENT FUEL ASSEMBLIES WITH 2 NEW FUEL ASSEMBLIES OF 5% ENRICHMENT (MAXIMUM)