LIST OF FIGURES

not be moved on or above El. 95' in the Fuel Storage Building. Additionally, loads in excess of the nominal weight of a fuel and control rod assembly and associated handling tool shall not be moved over spent fuel in the spent fuel pit. The weight of installed crane systems shall not be considered part of these loads.

2. The spent fuel storage pit water level shall be maintained at an elevation of at least 93'2". In the event the level decreases below this value, all movement of fuel assemblies in the spent fuel pool storage pit and crane operations with loads over spent fuel in the spent fuel pit shall cease and water level shall be restored to within its limit within 4 hours.

D. The following conditions are applicable to the spent fuel pit anytime it contains fuel:

1. The spent fuel racks are categorized as either Region 1-1, 1-2, 2-1, or 2-2 as specified in Figure 3.8-1. Fuel assemblies to be stored in the spent fuel storage racks are qualified based on burnup, enrichment, and cooling time as specified in Figures 3.8-2 through 3.8-5.

   a. Storage of fuel in Region 1-1 is restricted to assemblies that meet the burnup criteria in Figure 3.8-2.

   b. Storage of fuel in Region 1-2 is restricted to assemblies with enrichments ≤ 4.5 weight percent (w/o) or < 5.0 w/o with a minimum number of Integral Fuel Burnable Absorbers (IFBA) rods as specified in Figure 3.8-3. Fuel that meets the criteria for Region 1-2 may be stored in Region 1-1 in a checkerboard (1 out of 2 cells with every other cell left vacant) loading configuration.

   c. Storage of fuel in Region 2-1 is restricted to assemblies that meet the burnup criteria in Figure 3.8-4.

   d. Storage of fuel in Region 2-2 is restricted to assemblies that meet the burnup criteria in Figure 3.8-5. Fuel that meets the criteria for Region 2-1 may be stored in Region 2-2 in "peripheral" cells. As shown in Figure 3.8-1, the peripheral cells are located along the west wall and are separated by at least 3 cells.

2. In the event any fuel assembly is found to be stored in a configuration other than specified, immediate action shall be initiated to:

   a. Verify the spent fuel storage pit boron concentration meets the requirements of Specification 3.8.D.3, and

b. Return the stored fuel assembly to the specified configuration.

3. At all times the spent fuel storage pit boron concentration shall be at least 2000 ppm. With the boron concentration less than this value, all fuel movement within the spent fuel storage pit shall cease and immediate action shall be initiated to restore the boron concentration to at least the minimum specified. The required boron concentration shall be verified by chemical analysis at the frequency specified on Table 4.1-2.

4. During operations described in Specification 3.8.B, the spent fuel storage pit boron concentration shall be at least equal to that required in Specification 3.8.B.2. With the boron concentration less than the specified value either:

   a. Isolate the spent fuel storage pit from the refueling cavity, or

   b. Take actions required by Specification 3.8.B.12.

E. Specification 3.0.1 is not applicable to the requirements of Specification 3.8.

<u>Basis</u>

The equipment and general procedures to be utilized during refueling are discussed in the FSAR. Detailed instructions, the above-specified precautions, and the design of the fuel-handling equipment incorporating built-in interlocks and safety features, provide assurance that no incident could occur during the refueling operations that would result in a hazard to public health and safety[(1)]. Whenever changes are not being made in core geometry, one flux monitor is sufficient. This permits maintenance of the instrumentation. Continuous monitoring of radiation levels and neutron flux provides immediate indication of an unsafe condition. The residual heat removal pump is used to maintain a uniform boron concentration.

The shutdown margin requirements will keep the core subcritical. During refueling, the reactor refueling cavity is filled with borated water. The minimum boron concentration of this water is the more restrictive of either 2000 ppm or else sufficient to maintain the reactor subcritical by at least 5% $\Delta k/k$ in the cold shutdown condition with all rods inserted. These limitations are consistent with the initial conditions assumed for the boron dilution incident in the safety analyses. Periodic checks of refueling water boron concentration ensure the proper shutdown margin. The specifications allow the control room operator to inform the manipulator operator of any impending unsafe condition detected from the main control board indicators during fuel movement.

In addition to the above safeguards, interlocks are utilized during refueling to ensure safe handling. An excess weight interlock is provided on the lifting hoist to prevent movement of more than one fuel assembly at a time. The spent fuel transfer mechanism can accommodate only one fuel assembly at a time.

The 100 hour decay time following plant shutdown and the 23 feet of water above the top of the reactor vessel flanges are consistent with the assumptions used in the dose calculations for fuel-handling accidents both inside and outside of the containment. The analysis of the fuel handling accident inside and outside of the containment takes no credit for removal of radioactive iodine by charcoal filters.

The requirement for the fuel storage building charcoal filtration system to be operating when spent fuel movement is being made provides added assurance that the offsite doses will be within acceptable limits in the event of a fuel-handling accident. The additional month of spent fuel decay time will provide the same assurance that the offsite doses are within acceptable limits and therefore the charcoal filtration system would not be required to be operating.

The spent fuel storage pit water level requirement in Specification 3.8.C.2 provides approximately 24 feet of water above fuel assemblies stored in the spent fuel storage racks.

The fuel enrichment and burnup limits in Specification 3.8.D.1, the partial credit taken for Boraflex panels, and the boron requirements in Specification 3.8.D.3 assure the limits assumed in the spent fuel storage safety analysis will not be exceeded. The analysis (Ref. 2) takes credit for the amount of Boraflex predicted to be available through 2006.

The requirement that at least one RHR pump and heat exchanger be in operation ensures that sufficient cooling capacity is available to maintain reactor coolant temperature below 140°F, and sufficient coolant circulation is maintained through the reactor core to minimize the effect of a boron dilution incident and prevent boron stratification.

The requirement to have two RHR pumps and heat exchangers operable when there is less than 23 feet of water above the vessel flange ensures that a single failure will not result in a complete loss of residual heat removal capability. With the head removed and at least 23 feet of water above the flange, a large heat sink is available for core cooling, thus allowing adequate time to initiate actions to cool the core in the event of a single failure.

<u>References</u>

(1) FSAR Section 9.5.2
(2) Northeast Technology Corporation Report NET-173-01, "Criticality Analysis for Soluble Boron and Burnup Credit in the Con Edison Indian Point Unit No. 2 Spent Fuel Storage Racks."

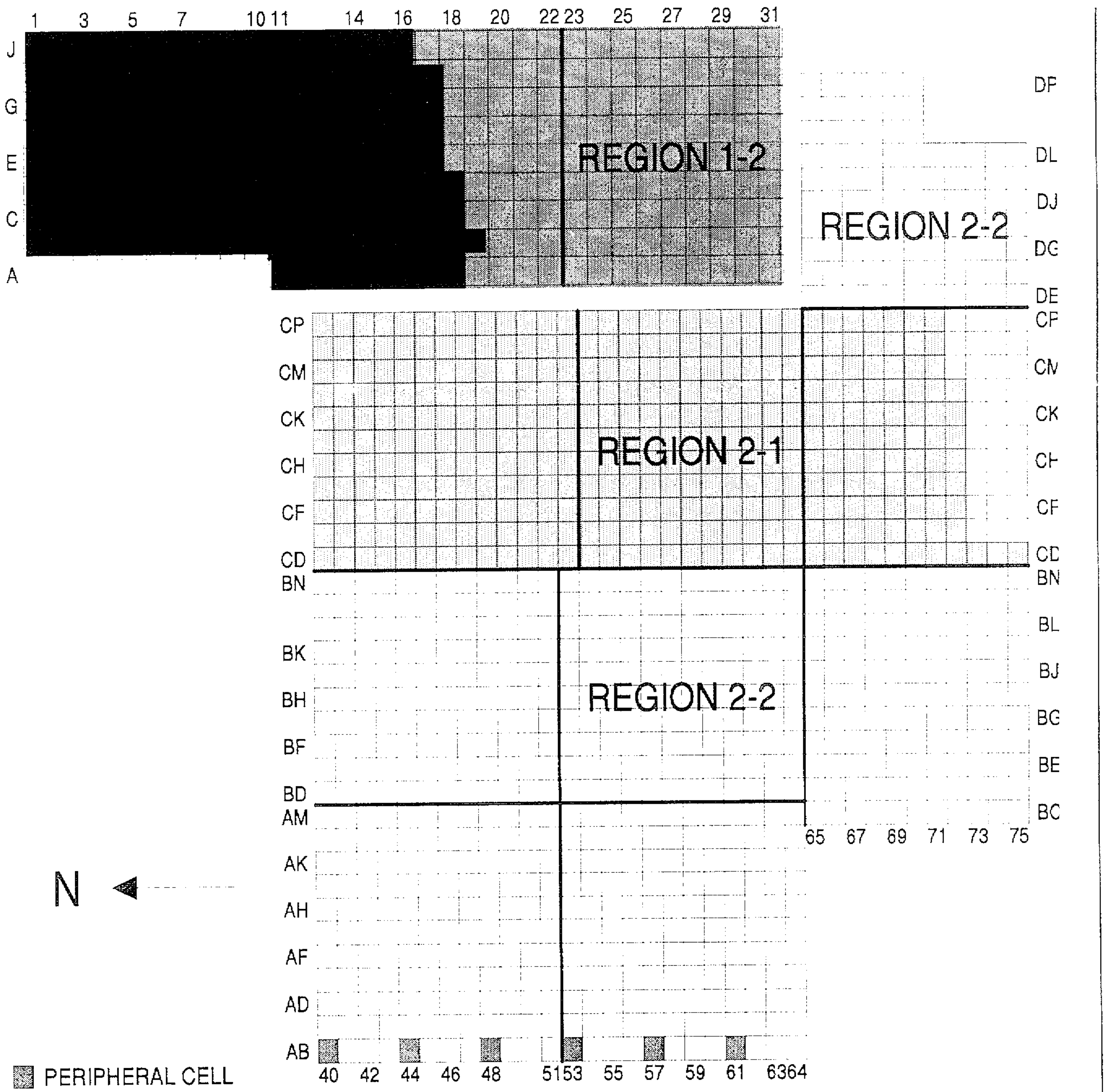

Figure 3.8-1
Spent Fuel Storage Rack Layout

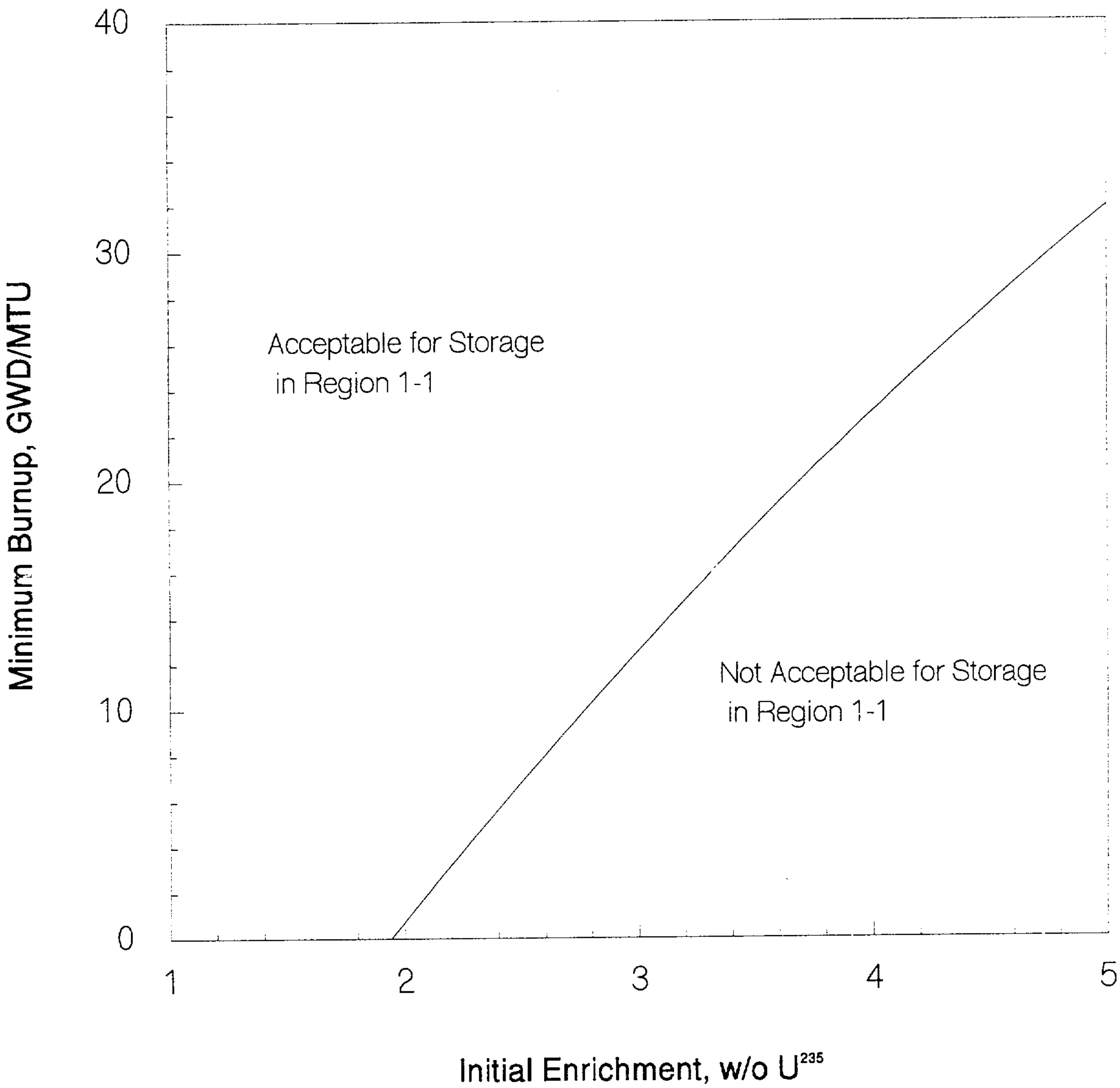

Figure 3.8-2
Region 1-1 - Limiting Burnup versus Initial Enrichment

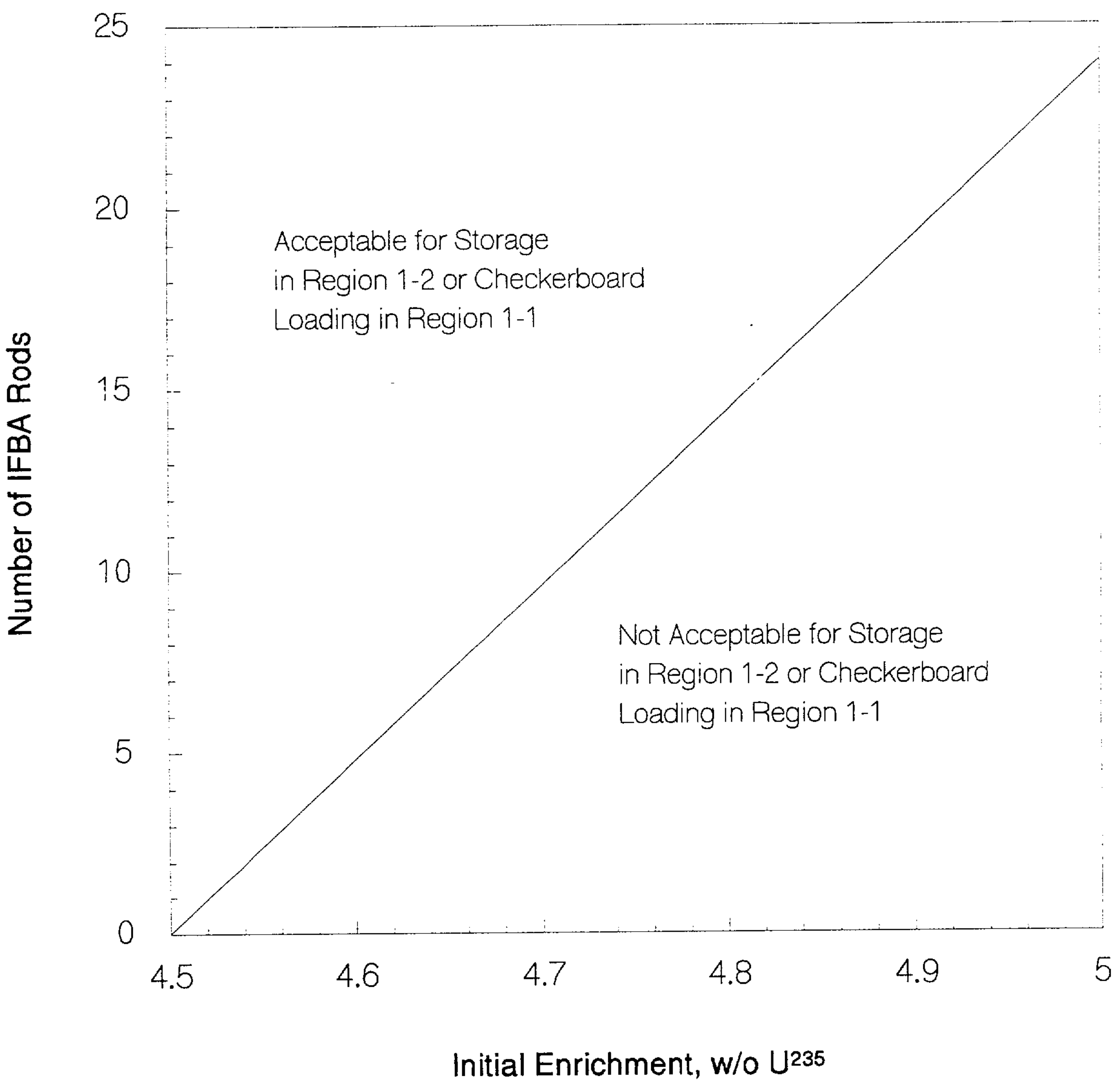

Figure 3.8-3

REGION 1-2 - MINIMUM NUMBER OF IFBA RODS VERSUS INITIAL ENRICHMENT

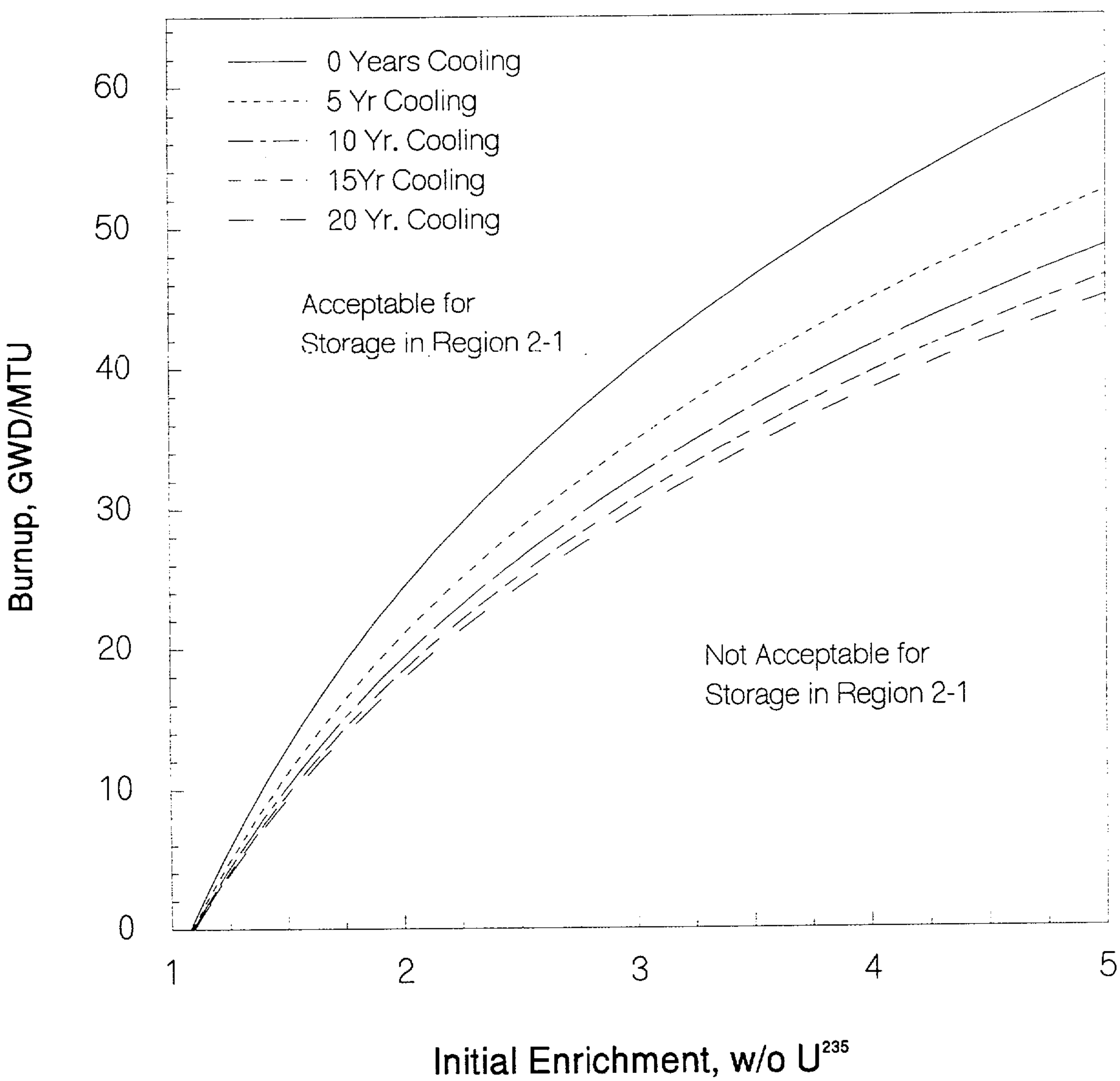

Figure 3.8-4

Region 2-1 - Limiting Burnup versus Initial Enrichment

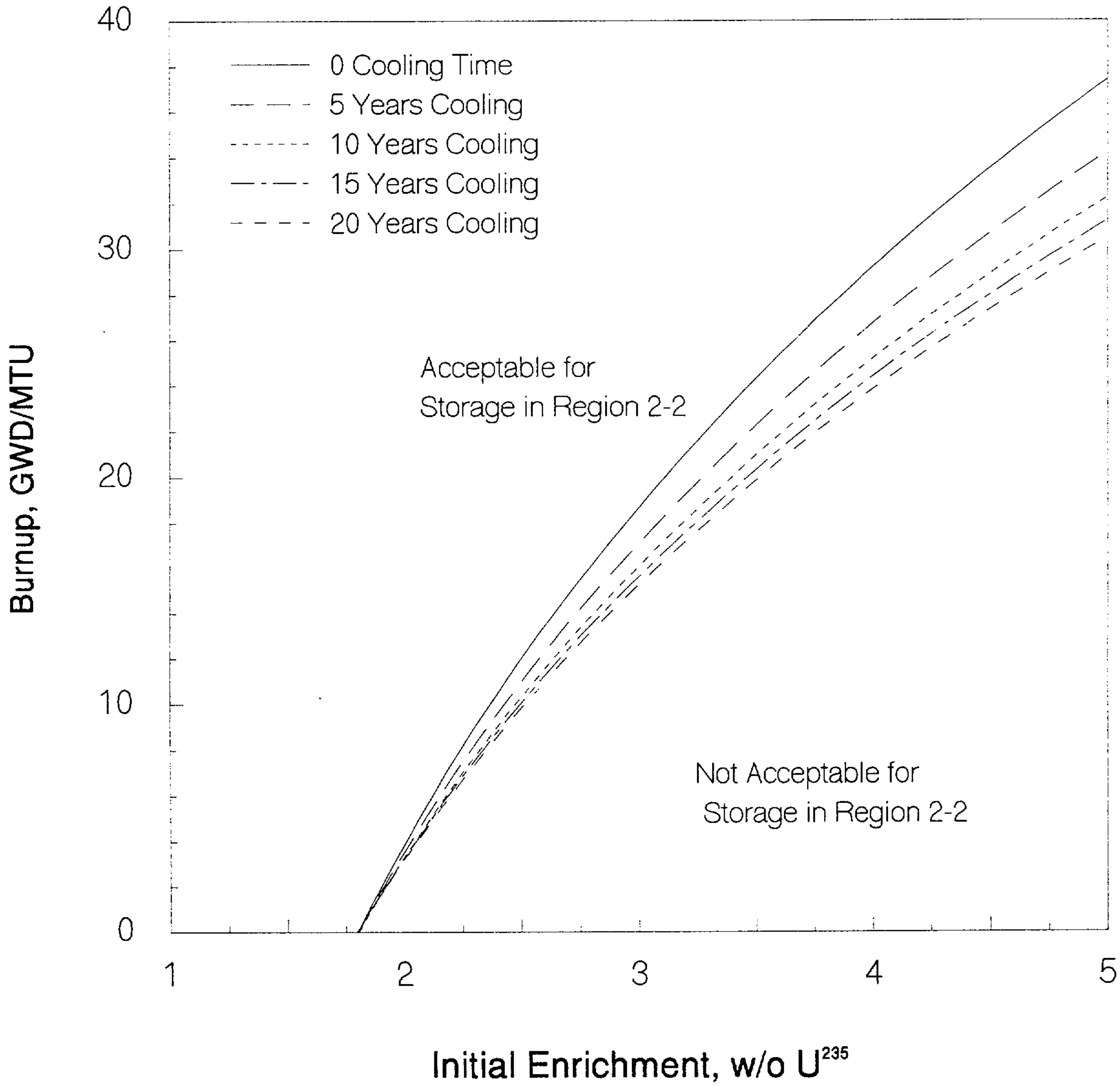

Figure 3.8-5
Region 2-2 - Limiting Burnup versus Initial Enrichment

Table 4.1-2

Frequencies for Sampling Tests

		Check	Frequency	Maximum Time Between Tests
1.	Reactor Coolant Samples	Gross Activity (1)	5 days/week (1)	3 days
		Radiochemical (2)	Monthly	45 days
		$\bar{E}$ Determination	Semi-annually (3)	30 weeks
		Tritium Activity	Weekly (1)	10 days
		F, Cl & O_2	Weekly	10 days
2.	Reactor Coolant Boron	Boron Concentration	Twice/week	5 days
3.	Refueling Water Storage Tank Water Sample	Boron Concentration	Monthly	45 days
4.	Boric Acid Tank	Boron Concentration	Twice/week	5 days
5.	DELETED			
6.	DELETED			
7.	Accumulator	Boron Concentration	Monthly	45 days
8.	Spent Fuel Pit	Boron Concentration	Weekly	10 days
9.	Secondary Coolant	Iodine-131	Weekly (4)	10 days
10.	Containment Iodine Particulate Monitor or Gas Monitor	Iodine-131 and Particulate Activity or Gross Gaseous Activity	Continuous When Above Cold Shutdown (5)	NA*

5.4 FUEL STORAGE

Applicability

Applies to the capacity and storage arrays of new and spent fuel.

Objective

To define those aspects of fuel storage relating to prevention of criticality in fuel storage areas.

Specifications

1. The spent fuel pit structure is designed to withstand the anticipated earthquake loadings as a Class I structure. The spent fuel pit has a stainless steel liner to ensure against loss of water.

2.A. The new fuel storage rack is designed so that it is impossible to insert assemblies in other than an array of vertical fuel assemblies with a sufficient center-to-center distance between assemblies to assure $K_{eff} \leq 0.95$, even if unborated water were used to fill the pit and with fuel assemblies containing a maximum enrichment of 5.0 weight percent U-235, and poisons, if necessary to meet the K_{eff} limit.

2.B. The spent fuel storage racks are designed and their loading maintained within the limits of Technical Specification 3.8.D.1, such that $K_{eff} < 1.0$ in unborated water and $K_{eff} \leq 0.95$ with credit for soluble boron and with the fuel assemblies containing a maximum enrichment of 5.0 weight percent U-235 (or equivalent reactivity).