CRANE TRAVEL - FUEL HANDLING BUILDING

LIMITING CONDITION FOR OPERATION

3.9.7 Loads in excess of 2430 pounds shall be prohibited from travel over fuel assemblies in the spent fuel pool, cask pit*, or transfer pit.

APPLICABILITY: With fuel assemblies and water in the spent fuel pool, cask pit, or transfer pit.

ACTION:

With the requirements of the above specification not satisfied, place the crane load in a safe condition. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.7 The weight of each load, other than a fuel assembly, shall be verified to be ≤ 2430 pounds prior to moving it over fuel assemblies in the spent fuel pool, cask pit*, or transfer pit.

* An impact cover weighing in excess of 2430 pounds may be moved over fuel assemblies in the cask pit provided that administrative controls are established. Other loads in excess of 2430 pounds may be moved over fuel assemblies in the cask pit provided: 1) an impact cover is installed, and 2) administrative controls are established to limit the load to 17,530 pounds and to limit the height that the load may travel over the impact cover.

STORAGE POOL WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.11 As a minimum, 23 feet of water shall be maintained over the top of irradiated fuel assemblies seated in the storage racks in the spent fuel pool, cask pit, or transfer pit.

APPLICABILITY: Whenever irradiated fuel assemblies are in the spent fuel pool, cask pit, or transfer pit.

ACTION:

With the requirement of the specification not satisfied, suspend all movement of fuel and crane operations with loads in the fuel storage area and restore the water level to within its limit within 4 hours. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.11 The water level in the spent fuel pool, cask pit, and transfer pit shall be determined to be at least its minimum required depth at least once per 7 days when irradiated fuel assemblies are in these locations.

STORAGE POOL VENTILATION

LIMITING CONDITION FOR OPERATION

3.9.12 Two independent emergency ventilation systems servicing the storage pool area shall be OPERABLE.

APPLICABILITY: Whenever irradiated fuel is in the spent fuel pool, cask pit, or transfer pit.

ACTION:

a. With one emergency ventilation system servicing the storage pool area inoperable, fuel movement within the spent fuel pool, cask pit, or transfer pit, or crane operation with loads over the spent fuel pool, cask pit, or transfer pit, may proceed provided the OPERABLE emergency ventilation system servicing the storage pool area is in operation and discharging through at least one train of HEPA filters and charcoal adsorbers.

b. With no emergency ventilation system servicing the storage pool area OPERABLE, suspend all operations involving movement of fuel within the spent fuel pool, cask pit, or transfer pit, or crane operation with loads over the spent fuel pool, cask pit, or transfer pit, until at least one system is restored to OPERABLE status.

c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.12.1 The above required emergency ventilation system servicing the storage pool area shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.6.5.1, and at least once each REFUELING INTERVAL by verifying that the emergency ventilation system servicing the storage pool area maintains the storage pool area at a negative pressure of $\geq$ 1/8 inches Water Gauge relative to the outside atmosphere during system operation.

4.9.12.2 The normal storage pool ventilation system shall be demonstrated OPERABLE at least once each REFUELING INTERVAL by verifying that the system fans stop automatically and that dampers automatically divert flow into the emergency ventilation system on a fuel storage area high radiation test signal.

SPENT FUEL ASSEMBLY STORAGE

LIMITING CONDITION FOR OPERATION

3.9.13 Fuel assemblies shall be placed in the spent fuel storage racks in accordance with the following criteria:

a. Fuel assemblies stored in the spent fuel pool shall meet the criteria shown in Figure 3.9-1, when located in the low density spent fuel storage racks.

b. Fuel assemblies stored in the cask pit shall meet the criteria shown in Figure 3.9-2, when located in the high density spent fuel storage racks.

c. Fuel assemblies stored in the spent fuel pool or transfer pit shall meet the criteria shown in Figure 3.9-3, when located in the high density spent fuel storage racks.

APPLICABILITY: Whenever fuel assemblies are in the spent fuel pool, cask pit, or transfer pit.

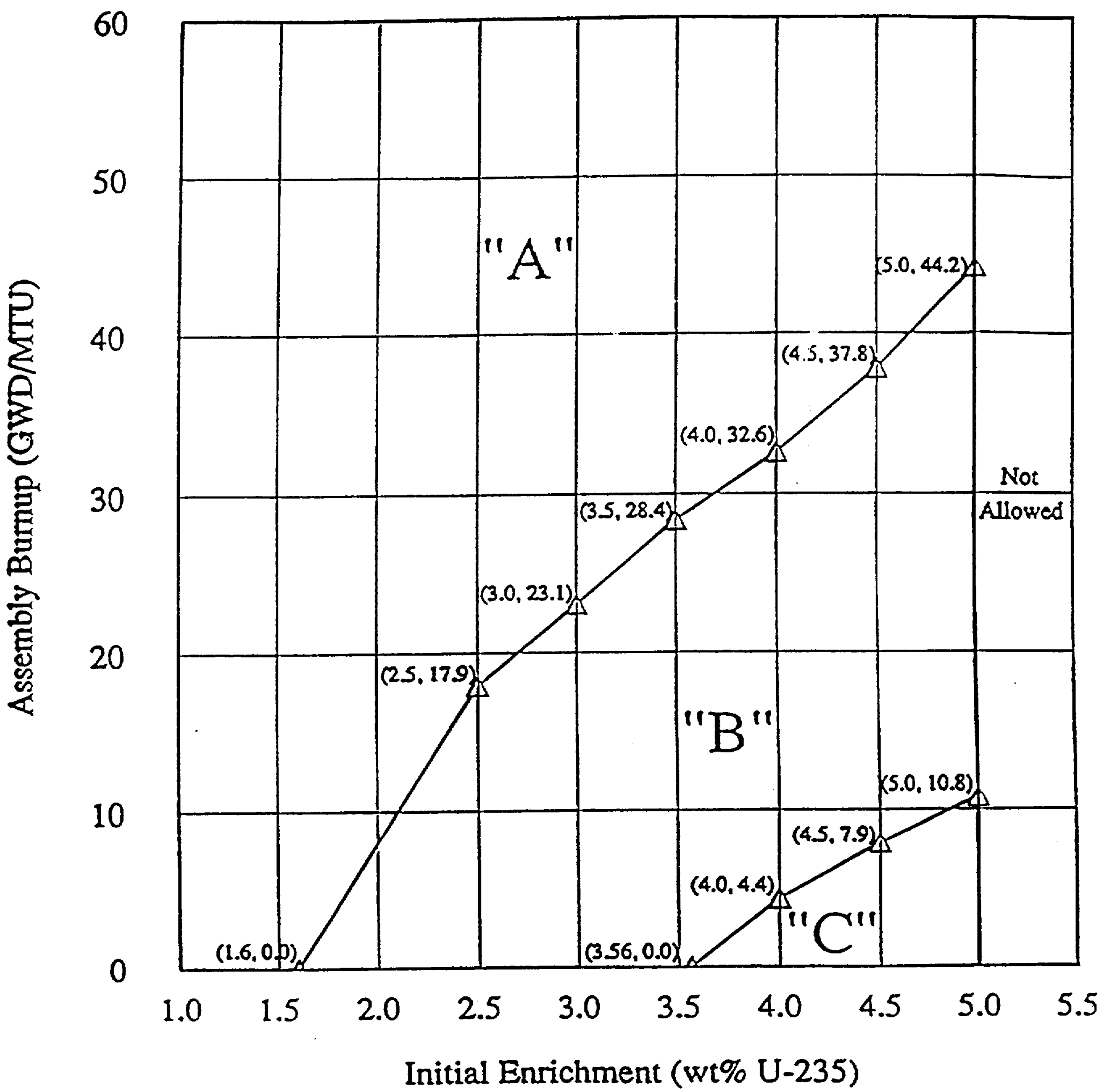
ACTION:

With the requirements of the above specification not satisfied, suspend all other fuel movement within the spent fuel pool, cask pit, or transfer pit and move the non-complying fuel assemblies to allowable locations in accordance with Figure 3.9-1, Figure 3.9-2, or Figure 3.9-3, as appropriate. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

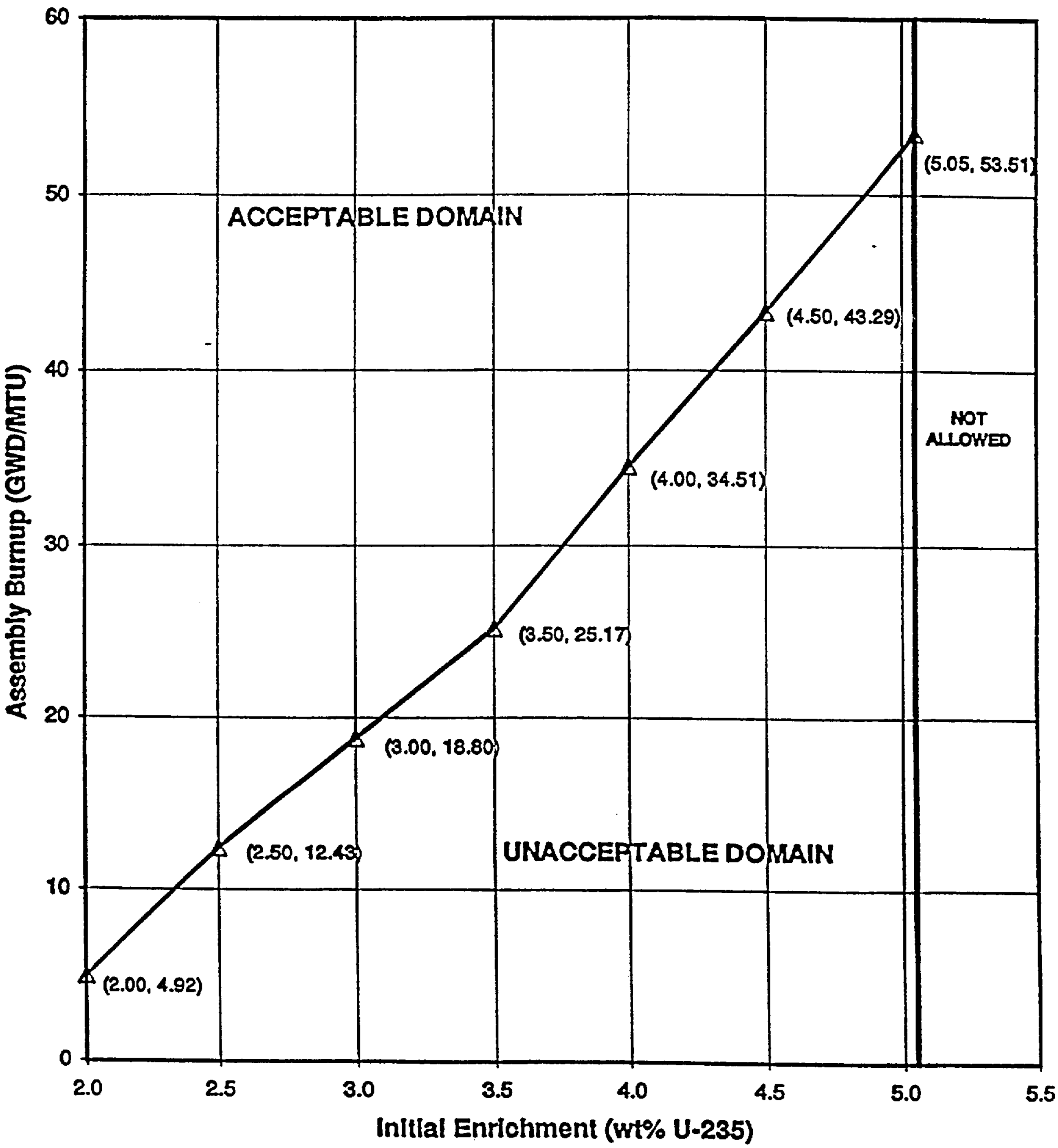
4.9.13.1 Prior to storing a fuel assembly in the spent fuel pool, cask pit, or transfer pit, verify by administrative means that the initial enrichment and burnup of the fuel assembly are in accordance with Figure 3.9-1, Figure 3.9-2, or Figure 3.9-3, as appropriate.

Figure 3.9-1
Burnup vs. Enrichment Curves
For the Davis-Besse Low Density
Spent Fuel Pool Storage Racks



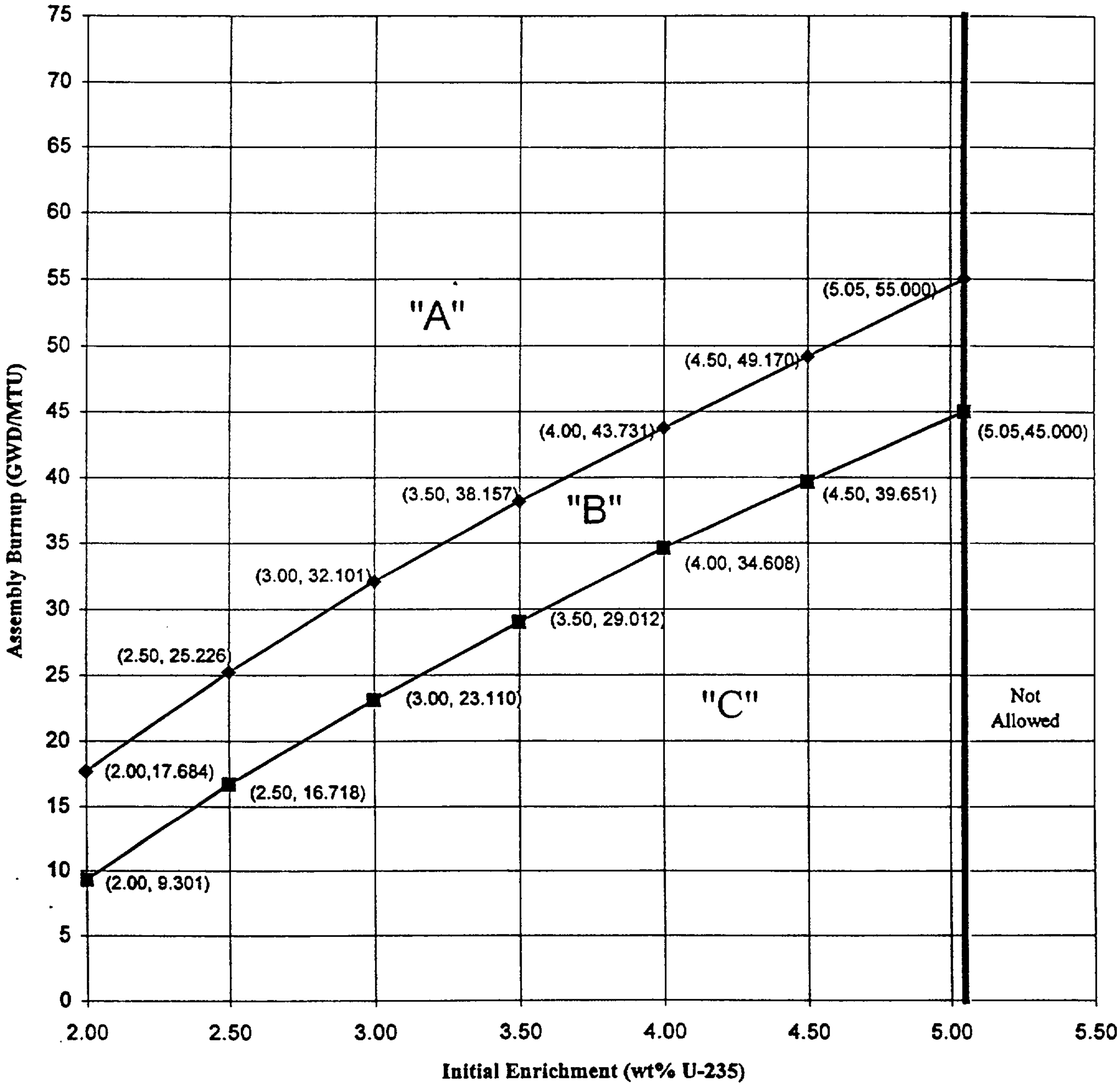
Category "A": May be placed in any rack location
Category "B": Must not be placed directly adjacent to Category "C" assemblies
Category "C": May only be placed directly adjacent to Category "A" assemblies or non-fuel locations

Figure 3.9-2
Burnup vs. Enrichment Curve
For the Davis-Besse High Density
Cask Pit Storage Racks



Note: Fuel assemblies with initial enrichments less than 2.0 wt% ^{235}U will conservatively be required to meet the burnup requirements of 2.0 wt% ^{235}U assemblies).

Figure 3.9-3
Burnup vs. Enrichment Curves
For the Davis-Besse High Density
Spent Fuel Pool and Transfer Pit Storage Racks



Notes: Fuel assemblies with initial enrichments less than 2 wt% U-235 will conservatively be required to meet the burnup requirements of 2.0 wt% U-235 assemblies.
Loading pattern considerations applicable to Category "A", "B", and "C" assemblies are described in the Bases.

3/4.9.6 FUEL HANDLING BRIDGE OPERABILITY

The OPERABILITY requirements of the hoist bridges used for movement of fuel assemblies ensures that: 1) fuel handling bridges will be used for movement of control rods and fuel assemblies, 2) each hoist has sufficient load capacity to lift a fuel element, and 3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL – FUEL HANDLING BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel assembly in a failed fuel container over other fuel assemblies in the spent fuel pool, cask pit, or transfer pit ensures that in the event this load is dropped (1) the activity release will not exceed the source term assumed in the design basis fuel handling accident for outside containment, and (2) any possible distortion of fuel in the storage racks will not result in a critical array.

During spent fuel pool re-racking activities, if it is necessary to move a storage rack over fuel assemblies stored in the cask pit, the 2430 pound weight limitation may be exceeded in order to install or remove an impact cover over the cask pit. The physical design of the impact cover, together with administrative controls established while the cover is being moved, ensure that it can not fall into the cask pit in the unlikely event that it is dropped. Once installed over the cask pit, the impact cover is capable of withstanding a dropped load of up to 17,530 pounds (the heaviest rack, including rigging). The height that such loads may travel over the cover is established by calculation based on the design of the cover. Administrative controls ensure that maximum height and weight restrictions are not exceeded.

3/4.9.8 COOLANT CIRCULATION

The requirement that at least one decay heat removal loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the REFUELING MODE, and (2) 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 DHR loops OPERABLE when there is less than 23 feet of water above the core ensures that a single failure of the operating DHR loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and 23 feet of water above the core, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating DHR loop, adequate time is provided to initiate emergency procedures to cool the core.

In MODE 6, the RCS boron concentration is typically somewhat higher than the boron concentration required by Specification 3.9.1, and could be higher than the boron concentration of normal sources of water addition. The flowrate through the decay heat system may at times be reduced to somewhat less than 2800 gpm. In this situation, if water with a boron concentration equal to or greater than the boron concentration required by Specification 3.9.1 is added to the RCS, the RCS is assured to remain above the Specification 3.9.1 requirement, and a flowrate of less than 2800 gpm is not of concern.

3/4.9.9 CONTAINMENT PURGE AND EXHAUST ISOLATION SYSTEM

Deleted

3/4.9.10 and 3/4.9.11 WATER LEVEL - REACTOR VESSEL AND STORAGE POOL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the safety analysis.

3/4.9.12 STORAGE POOL VENTILATION

The requirements on the emergency ventilation system servicing the storage pool area to be operating or OPERABLE ensure that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. The OPERABILITY of this system and the resulting iodine removal capacity are consistent with the assumptions of the safety analyses.

3/4.9.13 SPENT FUEL ASSEMBLY STORAGE

The restrictions on the placement of fuel assemblies within the spent fuel pool, cask pit, and transfer pit, as dictated by Figure 3.9-1, Figure 3.9-2, and Figure 3.9-3, ensure that the k-effective of the spent fuel pool, cask pit, and transfer pit will always remain less than 0.95 assuming the spent fuel pool, cask pit, and transfer pit to be flooded with non-borated water. The restrictions delineated in Figure 3.9-1, Figure 3.9-2, and Figure 3.9-3, and the action statement, are consistent with the criticality safety analyses performed for the spent fuel pool, cask pit, and transfer pit. The term "directly adjacent" as used in Figure 3.9-1 refers to fuel assemblies stored face-to-face.

The criticality analyses qualify the high density rack modules for storage of fuel assemblies in one of three different loading patterns, subject to certain restrictions: Mixed Zone Three Region, Checkerboard, and Homogeneous Loading. Figure 3.9-3 provides the Category-specific burnup/enrichment limitations. Different loading patterns may be used in different rack modules, provided each rack module contains only one loading pattern. Two different loading patterns may be used in a single rack module, subject to certain additional restrictions. The loading pattern restrictions are maintained in fuel handling administrative procedures.

The design features of the low density spent fuel storage racks are described in Specification 5.6.1.1. The design features of the high density spent fuel storage racks are described in Specification 5.6.1.3.

5.0 DESIGN FEATURES

5.1 Site Location

The Davis-Besse Nuclear Power Station, Unit Number 1, site is located on Lake Erie in Ottawa County, Ohio, approximately six miles northeast from Oak Harbor, Ohio and 21 miles east from Toledo, Ohio. The exclusion area boundary has a minimum radius of 2400 feet from the center of the plant.

5.2 (Deleted)

5.3 Reactor Core

5.3.1 Fuel Assemblies

The reactor core shall contain 177 fuel assemblies. Each assembly shall consist of a matrix of zircaloy, M5, or ZIRLO clad 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 non-limiting core regions.

5.3.2 Control Rods

The reactor core shall contain 53 safety and regulating control rod assemblies and 8 axial power shaping rod (APSR) assemblies. The nominal values of absorber material for the safety and regulating control rods shall be 80 percent silver, 15 percent indium and 5 percent cadmium. The absorber material for the APSRs shall be 100 percent Inconel.

5.4 (Deleted)

5.5 (Deleted)

5.6 Fuel Storage

5.6.1 Criticality

5.6.1.1 The low density spent fuel pool storage racks are designed and shall be maintained with:

a. A K_{eff} equivalent to less than or equal to 0.95 when flooded with unborated water, which includes a conservative allowance of 1% delta k/k for calculation uncertainty.

(continued)

5.6 Fuel Storage (continued)

b. A rectangular array of stainless steel cells spaced 12 31/32 inches on centers in one direction and 13 3/16 inches on centers in the other direction. Fuel assemblies stored in the spent fuel pool shall be placed in a stainless steel cell of 0.125 inches nominal thickness or in a failed fuel container.

c. Fuel assemblies stored in the spent fuel pool in accordance with Technical Specification 3.9.13.

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

a. A K_{eff} equivalent to less than or equal to 0.95 when flooded with unborated water, which includes a conservative allowance of 1% delta k/k for uncertainties as described in Section 9.1 of the USAR.

b. A K_{eff} equivalent to less than or equal to 0.98 when immersed in a hydrogenous "mist" of such a density that provides optimum moderation (i.e., highest value of K_{eff}), which includes a conservative allowance of 1% delta k/k for uncertainties as described in Section 9.1 of the USAR.

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

d. Fuel assemblies having a maximum initial enrichment of 5.0 weight percent uranium-235.

5.6.1.3 The high density spent fuel pool storage racks, cask pit storage racks, and transfer pit rack are designed and shall be maintained with:

a. A K_{eff} equivalent to less than or equal to 0.95 when flooded with unborated water, which includes a conservative allowance for manufacturing tolerances and calculation uncertainty.

b. A rectangular array of stainless steel cells with walls of 0.075 inches nominal thickness, spaced a nominal 9.22 inches on center in both directions. Boral neutron absorber material is utilized between each cell for criticality considerations.

c. Fuel assemblies stored in the spent fuel pool, cask pit, or transfer pit in accordance with Technical Specification 3.9.13.

5.6 Fuel Storage (continued)

5.6.2 Drainage

The spent fuel storage pool, cask pit, and transfer pit are designed and shall be maintained to prevent inadvertent draining below 9 feet above the top of the fuel storage racks.

5.6.3 Capacity

a. The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1624 fuel assemblies, less the number of fuel assemblies stored in racks located in the cask pit and transfer pit.

b. The cask pit is designed and shall be maintained with a storage capacity limited to no more than 289 fuel assemblies.

c. The transfer pit is designed and shall be maintained with a storage capacity limited to no more than 90 fuel assemblies.

5.7 (Deleted)