UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE POWER COMPANY

DOCKET NO. 50-369

McGUIRE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 159
License No. NPF-9

1. The Nuclear Regulatory Commission (the Commission) has found that:

A. The application for amendment to the McGuire Nuclear Station, Unit 1 (the facility), Facility Operating License No. NPF-9 filed by the Duke Power Company (licensee) dated June 13, 1994, as supplemented August 15, 1994, March 23, April 18, July 21, and September 22, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-9 is hereby amended to read as follows:

   Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 159 , are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: November 6, 1995

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE POWER COMPANY

DOCKET NO. 50-370

McGUIRE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 141
License No. NPF-17

1. The Nuclear Regulatory Commission (the Commission) has found that:

A. The application for amendment to the McGuire Nuclear Station, Unit 2 (the facility), Facility Operating License No. NPF-17 filed by the Duke Power Company (licensee) dated June 13, 1994, as supplemented August 15, 1994, March 23, April 18, July 21, and September 22, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-17 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 141 , are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: November 6, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 159

FACILITY OPERATING LICENSE NO. NPF-9

DOCKET NO. 50-369

AND

TO LICENSE AMENDMENT NO. 141

FACILITY OPERATING LICENSE NO. NPF-17

DOCKET NO. 50-370

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the areas of change.

| Remove Pages | Insert Pages |
|---|---|
| XV | XV |
| XIX | XIX |
| XX | XX |
| 3/4 9-16 | 3/4 9-16 |
| 3/4 9-17 | 3/4 9-17 |
| - | 3/4 9-18 |
| - | 3/4 9-19 |
| - | 3/4 9-20 |
| - | 3/4 9-21 |
| - | 3/4 9-22 |
| - | 3/4 9-23 |
| - | 3/4 9-24 |
| - | 3/4 9-25 |
| B 3/4 9-3 | B 3/4 9-3 |
| - | B 3/4 9-4 |
| - | B 3/4 9-5 |
| 5-7 | 5-7 |
| 5-7a | 5-7a |

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

BASES

DESIGN FEATURES

## 3/4.9.12 SPENT FUEL POOL BORON CONCENTRATION

### LIMITING CONDITION FOR OPERATION

3.9.12 The boron concentration in the spent fuel pool shall be within the limit specified in the COLR.

### APPLICABILITY:

During storage of fuel in the spent fuel pool.

### ACTION:

a. Immediately suspend movement of fuel assemblies in the spent fuel pool and initiate action to restore the spent fuel pool boron concentration to within its limit.

b. The provisions of Specification 3.0.3 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.9.12 Verify at least once per 7 days that the spent fuel pool boron concentration is within its limit.

## 3/4.9.13 SPENT FUEL ASSEMBLY STORAGE

### LIMITING CONDITION FOR OPERATION

3.9.13 Storage of new or irradiated fuel is limited to the configurations described in this specification.

a. New or irradiated fuel may be stored in Region 1 of the Spent Fuel Pool in accordance with these limits:

1) Unrestricted storage of fuel meeting the criteria of Table 3.9-1; or

2) Restricted storage in accordance with Figure 3.9-1, of fuel which does not meet the criteria of Table 3.9-1.

b. New or irradiated fuel which has decayed at least 16 days may be stored in Region 2 of the Spent Fuel Pool in accordance with these limits:

1) Unrestricted storage of fuel meeting the criteria of Table 3.9-3; or

2) Restricted storage in accordance with Figure 3.9-2, of fuel which meets the criteria of Table 3.9-4; or

3) Checkerboard storage in accordance with Figure 3.9-3 of fuel which does not meet the criteria of Table 3.9-4.

APPLICABILITY:

During storage of fuel in the spent fuel pool.

ACTION:

a. Immediately initiate action to move the noncomplying fuel assembly to the correct location.

b. The provisions of Specification 3.0.3 are not applicable.

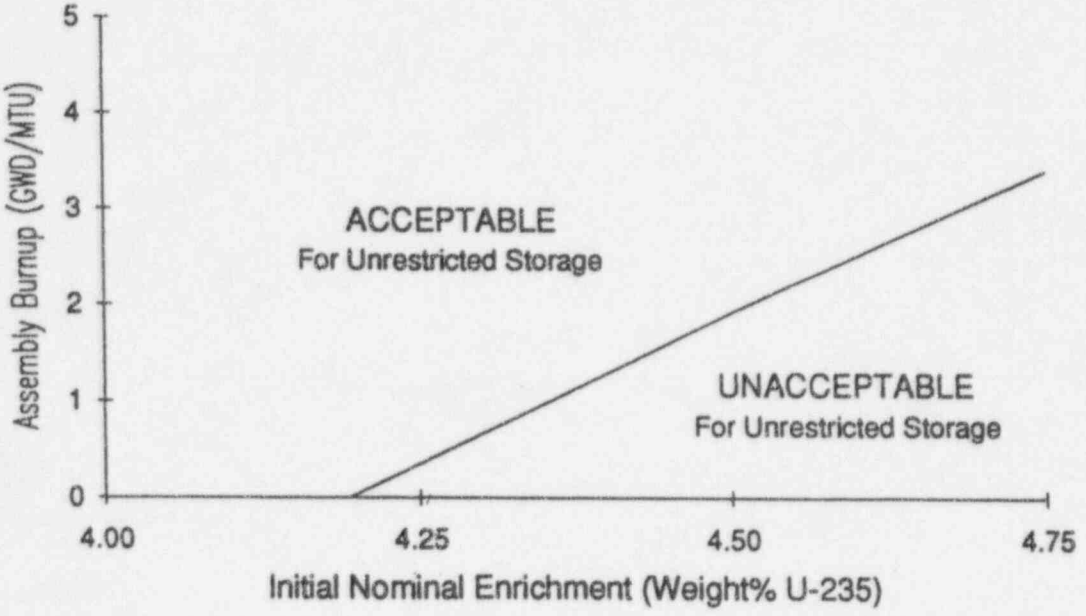
### SURVEILLANCE REQUIREMENTS

4.9.13 Prior to storing a fuel assembly in the spent fuel storage pool, verify by administrative means the initial enrichment and burnup of the fuel assembly are in accordance with Specification 3.9.13.

Table 3.9-1

Minimum Qualifying Burnup Versus Initial Enrichment
for Unrestricted Region 1 Storage

| Initial Nominal Enrichment (Weight% U-235) | Assembly Burnup (GWD/MTU) |
|---|---|
| 4.19(or less) | 0 |
| 4.20 | 0.04 |
| 4.50 | 1.92 |
| 4.75 | 3.40 |



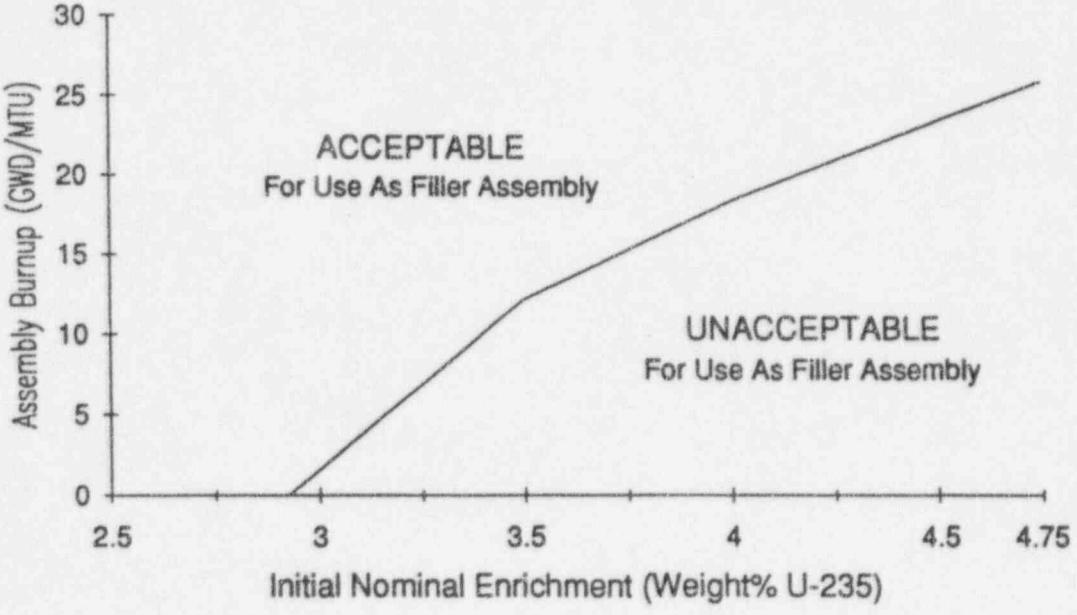

Fuel which differs from those designs used to determine the requirements of Table 3.9-1 may be qualified for Unrestricted Region 1 storage by means of an analysis using NRC approved methodology to assure that $k_{eff}$ is less than or equal to 0.95.

Likewise, previously unanalyzed fuel up to 4.75 weight% U-235 may be qualified for Restricted Region 1 storage by means of an analysis using NRC approved methodology to assure that $k_{eff}$ is less than or equal to 0.95.

Table 3.9-2

Minimum Qualifying Burnup Versus Initial Enrichment
for Region 1 Filler Assemblies

| Initial Nominal Enrichment (Weight% U-235) | Assembly Burnup (GWD/MTU) |
|---|---|
| 2.92(or less) | 0 |
| 3.00 | 1.57 |
| 3.50 | 13.30 |
| 4.00 | 18.32 |
| 4.50 | 23.36 |
| 4.75 | 25.84 |

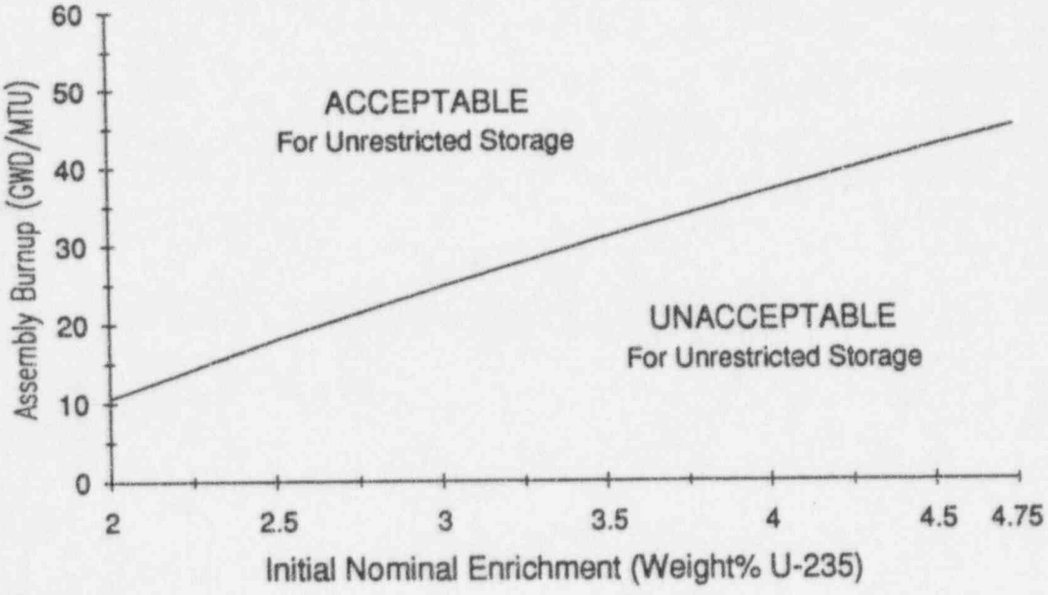



Fuel which differs from those designs used to determine the requirements of Table 3.9-2 may be qualified for use as a Region 1 Filler Assembly by means of an analysis using NRC approved methodology to assure that $k_{eff}$ is less than or equal to 0.95.

Table 3.9-3

Minimum Qualifying Burnup Versus Initial Enrichment
for Unrestricted Region 2 Storage

| Initial Nominal Enrichment (Weight% U-235) | Assembly Burnup (GWD/MTU) |
|---|---|
| 2.00(or less) | 10.54 |
| 2.50 | 17.96 |
| 3.00 | 24.64 |
| 3.50 | 30.86 |
| 4.00 | 36.75 |
| 4.50 | 42.38 |
| 4.75 | 45.10 |

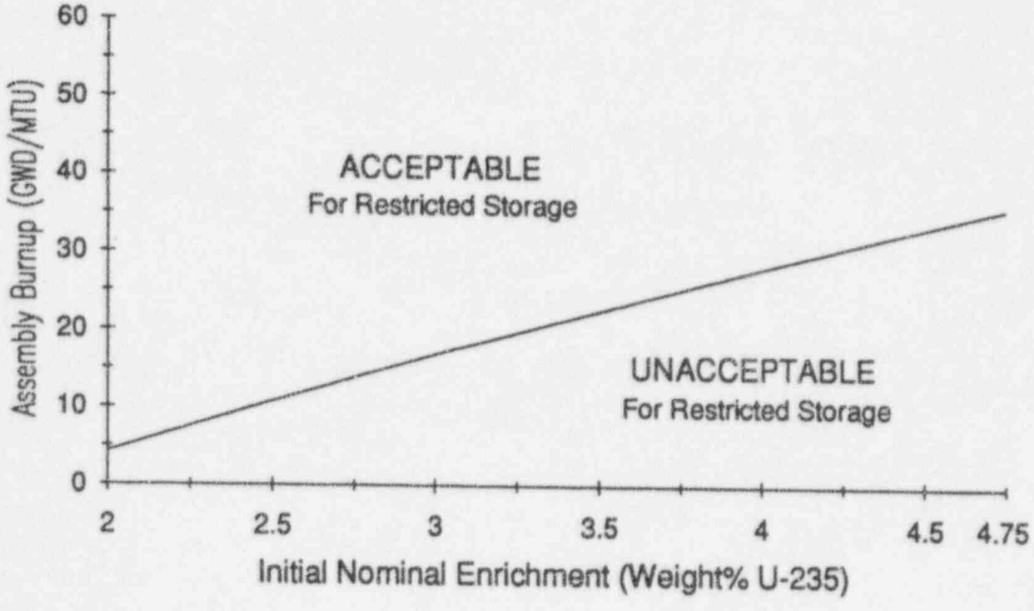



Fuel which differs from those designs used to determine the requirements of Table 3.9-3 may be qualified for Unrestricted Region 2 storage by means of an analysis using NRC approved methodology to assure that $k_{eff}$ is less than or equal to 0.95.

Table 3.9-4

Minimum Qualifying Burnup Versus Initial Enrichment
for Restricted Region 2 Storage with Fillers

| Initial Nominal Enrichment (Weight% U-235) | Assembly Burnup (GWD/MTU) |
|---|---|
| 2.00(or less) | 4.22 |
| 2.50 | 10.75 |
| 3.00 | 16.80 |
| 3.50 | 22.41 |
| 4.00 | 27.92 |
| 4.50 | 33.14 |
| 4.75 | 35.65 |

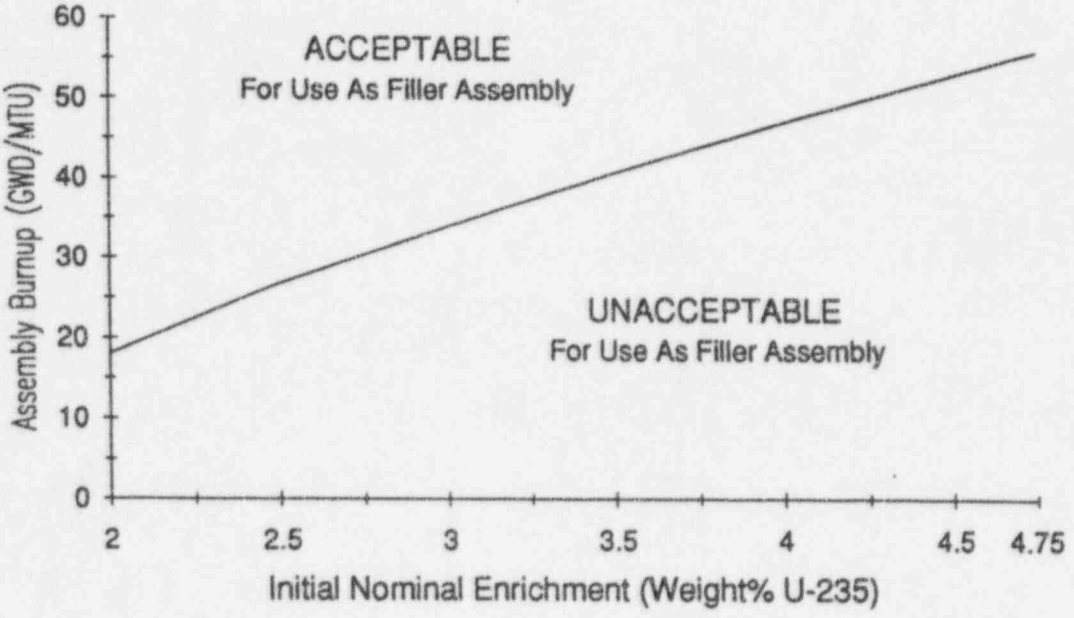



Fuel which differs from those designs used to determine the requirements of Table 3.9-4 may be qualified for Restricted Region 2 Storage by means of an analysis using NRC approved methodology to assure that $k_{eff}$ is less than or equal to 0.95.

Table 3.9-5

Minimum Qualifying Burnup Versus Initial Enrichment for Region 2 Filler Assemblies

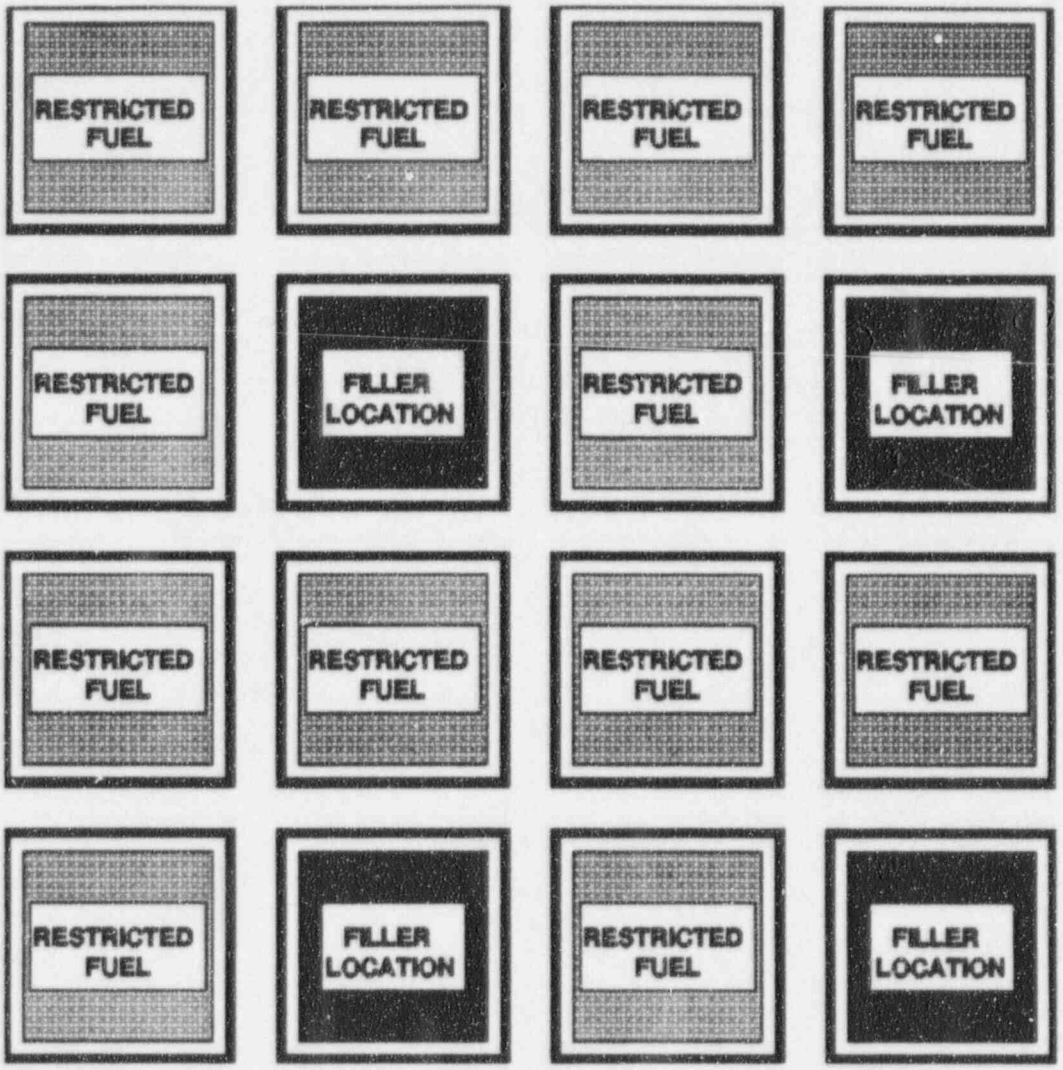
| Initial Nominal Enrichment (Weight% U-235) | Assembly Burnup (GWD/MTU) |
|---|---|
| 2.00(or less) | 18.03 |
| 2.50 | 26.71 |
| 3.00 | 33.79 |
| 3.50 | 40.56 |
| 4.00 | 46.83 |
| 4.50 | 52.86 |
| 4.75 | 55.78 |




Fuel which differs from those designs used to determine the requirements of Table 3.9-5 may be qualified for use as a Region 2 Filler Assembly by means of an analysis using NRC approved methodology to assure that $k_{eff}$ is less than or equal to 0.95.

Figure 3.9-1

Required 3 out of 4 Loading Pattern
for Restricted Region 1 Storage




Restricted Fuel: Fuel which does not meet the minimum burnup requirements of Table 3.9-1. (Fuel which does meet the requirements of Table 3.9-1, or non-fuel components, or an empty location may be placed in restricted fuel locations as needed)

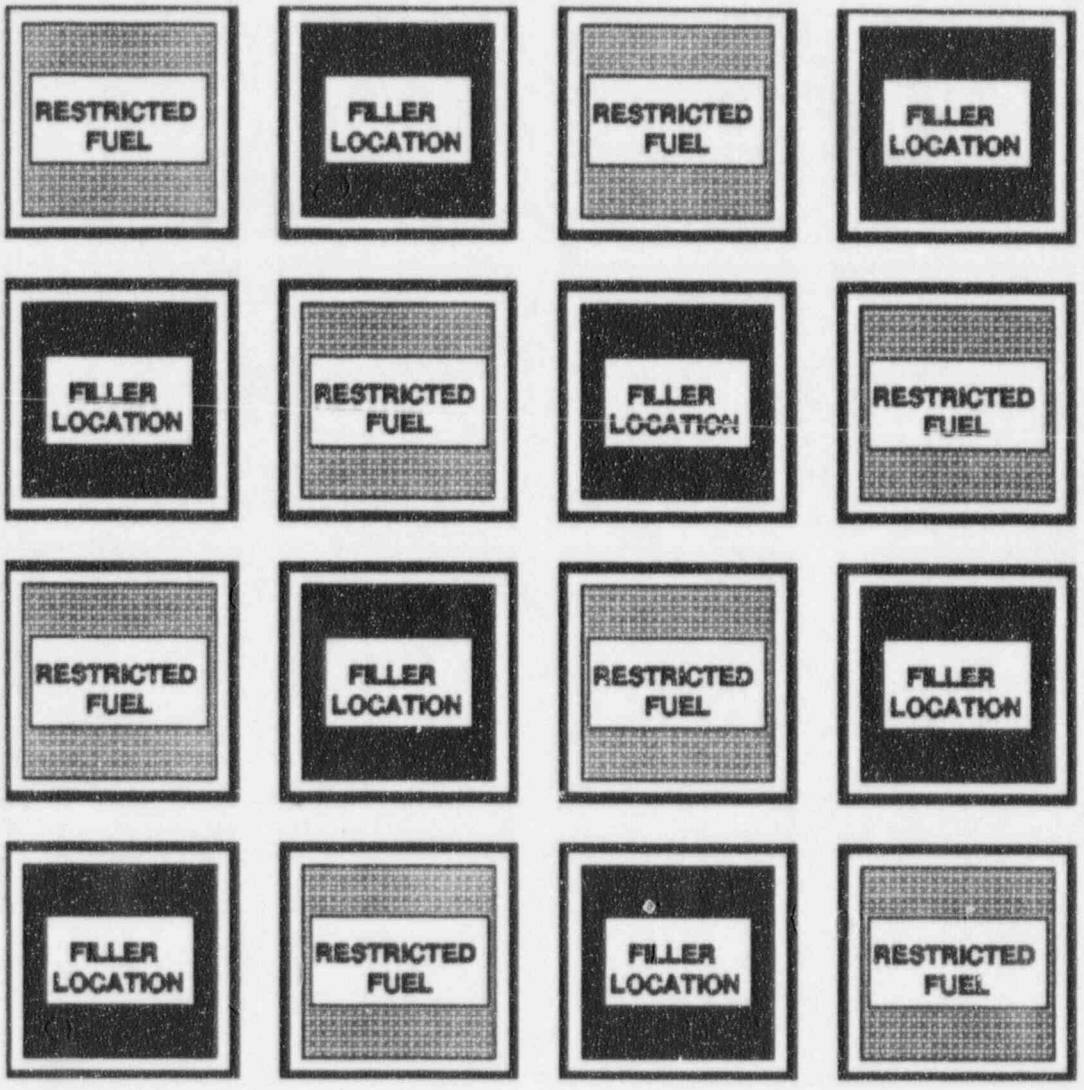
Filler Location: Either fuel which meets the minimum burnup requirements of Table 3.9-2, or an empty cell.

Boundary Condition: Any row bounded by a Region 1 Unrestricted Storage Area shall contain a combination of restricted fuel assemblies and filler locations arranged such that no restricted fuel assemblies are adjacent to each other.

Example: In the figure above, row 1 or column 1 can not be adjacent to a Region 1 Unrestricted Storage Area, but row 4 or column 4 can be.

Figure 3.9-2

Required 2 out of 4 Loading Pattern
for Restricted Region 2 Storage



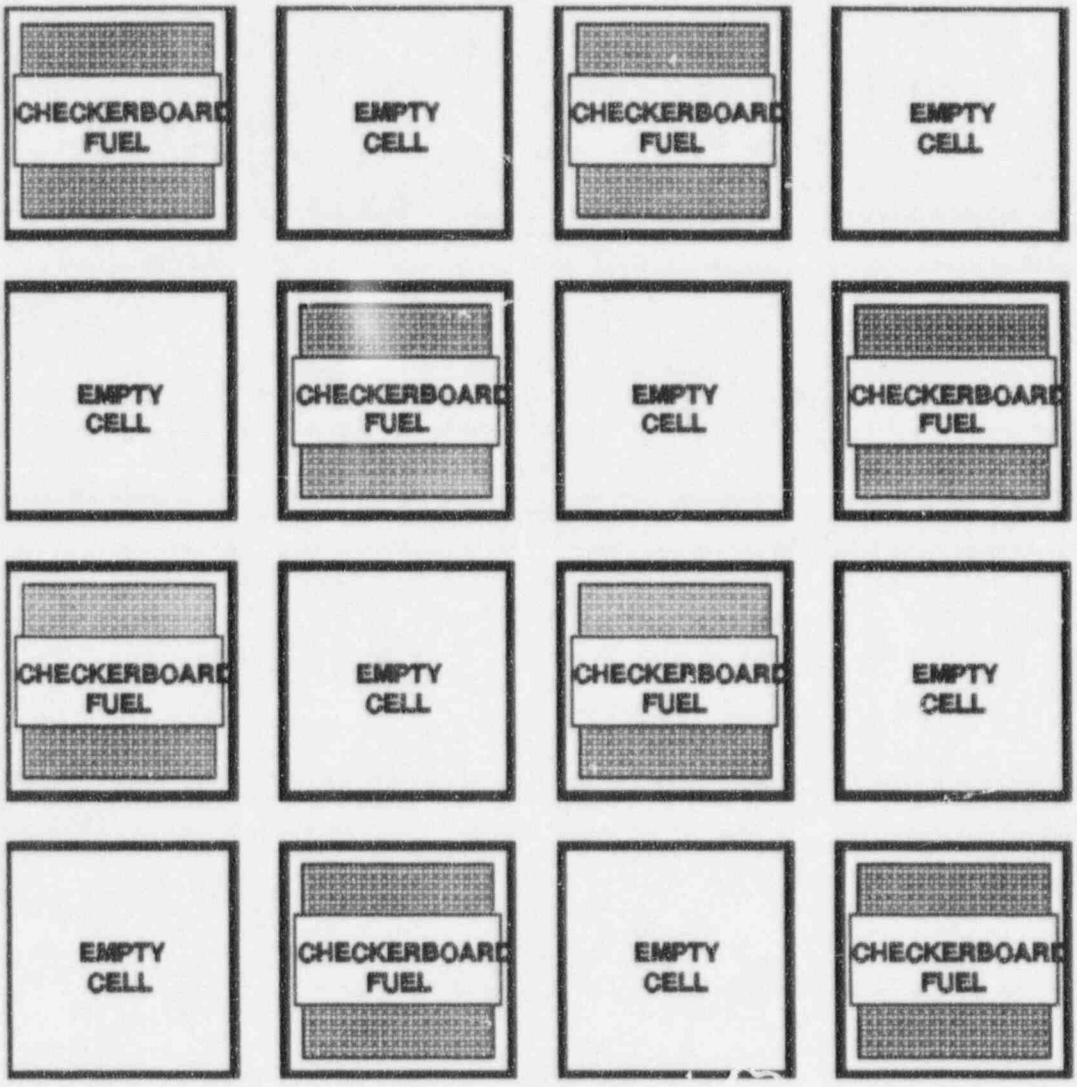

Restricted Fuel: Fuel which meets the minimum burnup requirements of Table 3.9-4, or non-fuel components, or an empty location.

Filler Location: Either fuel which meets the minimum burnup requirements of Table 3.9-5, or an empty cell.

Boundary Condition: No restrictions on boundary assemblies.

Figure 3.9-3

Required 2 out of 4 Loading Pattern
for Checkerboard Region 2 Storage




Checkerboard Fuel: Fuel which does not meet the minimum burnup requirements of Table 3.9-4. (Fuel which does meet the requirements of Table 3.9-4, or non-fuel components, or an empty location may be placed in restricted fuel locations as needed)

Boundary Condition: At least two opposite sides shall be bounded by either an empty row of cells, or a spent fuel pool wall.

3/4.9.9 and 3/4.9.10 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 assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

3/4.9.11 FUEL HANDLING VENTILATION EXHAUST SYSTEM

The limitations on the Fuel Handling Ventilation Exhaust System ensure that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorbers prior to discharge to the atmosphere. The OPERABILITY of this system and the resulting iodine removal capacity are consistent with the assumptions of the accident analyses. ANSI N510-1975 will be used as a procedural guide for surveillance testing. The methyl iodide penetration test criteria for the carbon samples have been made more restrictive than required for the assumed iodine removal in the accident analysis because the humidity to be seen by the charcoal adsorbers may be greater than 70% under normal operating conditions.

3/4.9.12 and 3/4.9.13 SPENT FUEL POOL BORON CONCENTRATION and SPENT FUEL ASSEMBLY STORAGE

The requirements for spent fuel pool boron concentration specified in Specification 3.9.12 ensure that a minimum boron concentration is maintained in the pool. The requirements for spent fuel assembly storage specified in Specification 3.9.13 ensure that the pool remains subcritical. The water in the spent fuel storage pool normally contains soluble boron, which results in large subcriticality margins under actual operating conditions. However, the NRC guidelines based upon the accident condition in which all soluble poison is assumed to have been lost, specify that the limiting $k_{eff}$ of 0.95 be evaluated in the absence of soluble boron. Hence the design of the spent fuel storage racks is based on the use of unborated water, which maintains each region in a subcritical condition during normal operation with the spent fuel pool fully loaded. The double contingency principle discussed in ANSI N-16.1-1975 and the April 1978 NRC letter (Ref. 4) allows credit for soluble boron under other abnormal or accident conditions, since only a single accident need be considered at one time. For example, the most severe accident scenario is associated with the movement of fuel from Region 1 to Region 2, and accidental misloading of a fuel assembly in Region 1 or Region 2. This could increase the reactivity of the spent fuel pool. To mitigate these postulated criticality related accidents, boron is dissolved in the pool water.

Tables 3.9-1 through 3.9-5 allow for specific criticality analyses for fuel which does not meet the requirements for storage defined in these tables. These analyses would require using NRC approved methodology to ensure that $k_{eff} \leq 0.95$ with a 95 percent probability at a 95 percent confidence level as described in Section 9.1 of the FSAR. This option is intended to be used for fuel not included in previous criticality analyses. Fuel storage is still limited to the configurations defined in TS 3.9-13. The use of specific analyses for qualification of previously unanalyzed fuel includes, but is not

3/4.9.12 and 3/4.9.13 SPENT FUEL POOL BORON CONCENTRATION and SPENT FUEL ASSEMBLY STORAGE (Continued)

limited to, fuel assembly designs not previously analyzed which may be as a result of new fuel designs or fuel shipments from another facility. Another more likely, and expected use of this specific analysis provision would be to analyze movement and storage of individual fuel pins as a result of reconstitution activities.

In verifying the design criteria of $k_{eff} \leq 0.95$, the criticality analysis assumed the most conservative conditions, i.e. fuel of the maximum permissible reactivity for a given configuration. Since the data presented in Specification 3.9.13.a and 3.9.13.b represents the maximum reactivity requirements for acceptable storage, substitutions of less reactive components would also meet the $k_{eff} \leq 0.95$ criteria. Hence, any non-fuel component may be placed in a designated empty cell location. Likewise, an empty cell, or a non-fuel component may be substituted for any designated fuel assembly location. These, or other substitutions which will decrease the reactivity of a particular storage cell will only decrease the overall reactivity of the spent fuel storage pool.

If both restricted and unrestricted storage is used in Region 1, an additional criteria has been imposed to ensure that the boundary row between these two configurations would not locally increase the reactivity above the required limit. Likewise if checkerboard storage is used in Region 2, an additional restriction has been imposed on the boundaries of the checkerboard storage region to ensure that the reactivity would not increase above the required limit. No other restrictions on region interfaces are necessary.

For storage in Region 2 requiring loading pattern restrictions, (per Specifications 3.9.13.b.2 or 3.9.13.b.3) fuel may be stored in either the "cell" or "non-cell" locations. "Cell" locations are the areas inside the fabricated storage cells and "non-cell" locations are the storage locations created by arranging the fabricated storage cells in a checkerboard configuration. Hence the "non-cell" locations are the areas defined by the outside walls of the 4 adjacent "cell" locations.

The action statement applicable to fuel storage in the spent fuel pool requires that action must be taken to preclude the occurrence of an accident or to mitigate the consequences of an accident in progress. This is most efficiently achieved by immediately suspending the movement of fuel assemblies. Prior to the resumption of fuel movement, the requirements of the LCOs must be met. This requires restoring the soluble boron concentration and the correct fuel storage configuration to within the corresponding limits. This does not preclude movement of a fuel assembly to a safe position.

The surveillance requirements ensure that the requirements of the two LCOs are satisfied, namely boron concentration and fuel placement. The boron concentration in the spent fuel pool is verified to be greater than or equal to the minimum limit. The fuel assemblies are verified to meet the subcriticality requirement by meeting either the initial enrichment and burnup

3/4.9.12 and 3/4.9.13 SPENT FUEL POOL BORON CONCENTRATION and SPENT FUEL ASSEMBLY STORAGE (Continued)

requirements of Table 3.9-1 through 3.9-5, or by using NRC approved methodology to ensure that $k_{eff} \leq 0.95$. By meeting either of these requirements, the analyzed accidents are fully addressed.

The fuel storage requirements and restrictions discussed here and applied in section 3.9.13 are based on a maximum allowable fuel enrichment of 4.75 weight% U-235. The enrichments listed in Tables 3.9-1 through 3.9-5 are nominal enrichments and include uncertainties to account for the tolerance on the as built enrichment. Hence the as built enrichments may exceed the enrichments listed in the tables by up to 0.05 weight% U-235. Qualifying burnups for enrichments not listed in the tables may be linearly interpolated between the enrichments provided. This is because the reactivity of an assembly varies linearly for small ranges of enrichment.

REFERENCES

1. "Regulatory Guide 1.13: Spent Fuei Storage Facility Design Basis", U.S. Nuclear Regulatory Commission, Office of Standards Development, Revision 1, December 1976.

2. "Design Objectives for Light Water Reactor Spent Fuel Storage Facilities at Nuclear Power Stations", American Nuclear Society, ANSI N210-1976/ANS-57.2, April 1976.

3. FSAR, Section 9.1.

4. Double contingency principle of ANSI N16.1-1975, as specified in the April 14, 1978 NRC letter (Section 1.2) and implied in the proposed revision to Regulatory Guide 1.13 (Section 1.4, Appendix A).

## 5.4 REACTOR COOLANT SYSTEM

### DESIGN PRESSURE AND TEMPERATURE

5.4.1 The Reactor Coolant System is designed and shall be maintained:

a. In accordance with the Code requirements specified in Section 5.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,

b. For a pressure of 2485 psig, and

c. For a temperature of 650°F, except for the pressurizer which is 680°F.

### VOLUME

5.4.2 The total water and steam volume of the Reactor Coolant System is 12,040 $\pm$ 100 cubic feet at a nominal $T_{avg}$ of 525°F.

## 5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown on Figure 5.1-1.

## 5.6 FUEL STORAGE

### CRITICALITY

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

1) $k_{eff} \leq 0.95$ if fully flooded with unborated water as described in Section 9.1 of the FSAR; and

2) A nominal 10.4" center to center distance between fuel assemblies placed in Region 1; and

3) A nominal 9.125" center to center distance between fuel assemblies placed in Region 2.

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

1) $k_{eff} \leq 0.95$ if fully flooded with unborated water as described in Section 9.1 of the FSAR; and

2) $k_{eff} \leq 0.98$ if moderated by aqueous foam as described in Section 9.1 of the FSAR; and

3) A nominal 21" center to center distance between fuel assemblies placed in the storage racks.

5.6 FUEL STORAGE (Continued)

DRAINAGE

5.6.2 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 745 ft. 7 in.

CAPACITY

5.6.3 The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1463 fuel assemblies (286 spaces in Region 1 and 1177 spaces in Region 2).

5.7 COMPONENT CYCLIC OR TRANSIENT LIMIT

5.7.1 The components identified in Table 5.7-1 are designed and shall be maintained within the cyclic or transient limits of Table 5.7-1.