ATTACHMENT 1 TO AEP:NRC:1146

10 CFR 50.92 ANALYSIS FOR CHANGES TO

THE DONALD C. COOK NUCLEAR PLANT

UNITS 1 AND 2

TECHNICAL SPECIFICATIONS

1.0 Sections to be Changed

A. Unit 1

1. License Condition 2.c(5) - page 4 of 6
2. T/S 3/4.9.3 - page 3/4 9-3
3. T/S 3/4.9.15 - page 3/4 9-19
4. T/S 5.6.1.1.b - page 5-5
5. T/S 5.6.1.1.c - page 5-5
6. T/S Figure 5.6-1 - page 5-5a
7. T/S 5.6.1.2 - page 5-6
8. T/S 5.3.1 - page 5-4
9. T/S 5.6.4 - page 5-7

B. Unit 2

1. License Condition 2.c(3)(S) - page 6 of 11
2. T/S 3/4.9.3 - page 3/4 9-3
3. T/S 3/4.9.15 - page 3/4 9-18
4. T/S 5.6.1.1.b - page 5-5
5. T/S 5.6.1.1.c - page 5-5
6. T/S Figure 5.6-1 - page 5-5a
7. T/S 5.6.1.2 - page 5-5
8. T/S 5.3.1 - page 5-4
9. T/S 5.6.4 - page 5-6

2.0 Extent of Change

The changes requested allow more compact storage of spent fuel (to be accomplished by the reracking), and achieve consistency with the assumptions of the thermal-hydraulic and criticality analyses performed by Holtec International. The changes, which are discussed below, accomplish the following:

1. Increase the authorized storage capacity of the storage pool (changes #1 and #9, above).

2. Increase the amount of time the reactor must be subcritical before refueling (changes #2, above).

3. Change the applicability condition for spent fuel pool boron concentration requirements (changes #3, above).

4. Decrease the nominal center-to-center distance between fuel assemblies placed in the storage racks (changes #4, above).

5. Modify the burnup and enrichment storage configuration requirements for fuel assemblies (changes #5 and #6, above).

6. Increase the maximum nominal fuel assembly enrichment for Exxon/ANF fuel assemblies stored in the spent fuel pool (changes #7, above).

7. Achieve consistency between the maximum enrichment limit of fuel assemblies throughout the T/Ss (changes #1 and #8, above).

3.0 Specific Changes Requested

(The change numbers in the following discussion refer to those in Section 1.0, above.)

#1, #9. The authorized storage capacity of the spent fuel pool is increased from 2050 to 3613 assemblies. Additionally, as currently worded the license conditions allow storage of Unit 1 or Unit 2, new or irradiated assemblies, in any combination. We are proposing to strike the words "in any combination," to reflect storage configuration restrictions discussed under changes #5 and #6. Lastly, we are indicating that the 4.95 wt. % U-235 enrichment limit is a nominal value.

#2. The amount of time the reactor must be subcritical before movement of irradiated fuel is increased from 100 hours to 168 hours.

#3. As presently worded, T/S 3.9.15 requires a minimum 2,400 ppm of boron in the spent fuel pool whenever fuel assemblies with enrichment greater than 3.95 weight percent U-235 and with burnup less than 5,550 MWD/MTU are in the spent fuel pool. We are proposing to change this applicability to "at all times."

#4. The nominal center-to-center distance between fuel assemblies placed in the storage racks is decreased from 10.5 inches to 8.97 inches.

#5, #6. The current storage configuration restrictions for storage of Westinghouse fuel with nominal enrichment greater than 3.95 weight percent U-235 and burnup less than 5,550 MWD/MTU are superseded. The present 2 regions are replaced with 3 regions. The definitions of the regions are no longer dependent on fuel vendor (Westinghouse vs. Exxon/ANF.) Two options for storage patterns are provided as Figures 5.6-1 and 5.6-2 of the proposed T/S. A graphical representation of the regional definitions is provided as Figure 5.6-3 of the proposed T/S.

#7. The maximum nominal fuel assembly enrichment for fuel

stored in the spent fuel pool racks is increased from 3.50 to 4.95 wt. % U-235 for Exxon/ANF 15 X 15 assemblies, and from 4.23 to 4.95 wt.% U-235 for Exxon/ANF 17 X 17 assemblies.

#8. The enrichment limit for Unit 2 fuel assemblies is modified to indicate that the 4.95 wt. % value is a nominal value. The Unit 1 enrichment is modified from 4.0 wt. % U-235 to a nominal value of 4.95 wt. % U-235.

4.0 Discussion

The present spent fuel pool racks allow storage of up to 2050 assemblies. This includes 193 storage locations designated for a full core off-load, should this become necessary. With the anticipated refueling outage schedule, the full core off-load capability will be lost in early 1995 and nominal refueling discharge capability (80 assemblies) will be lost in 1996. The full core off-load capability could, however, be lost as early as 1994 depending upon unit operation and the necessity to store miscellaneous items, such as old thimble tubes, in storage cells in the spent fuel pool. Our review of the various options available led to the conclusion that increasing the storage capacity of the existing storage pool represents the least cost option. As discussed in the cover letter, the NRC has determined, in NUREG 0575, that this option involves minimal environmental impact.

We are proposing to increase the storage capacity of the pool from 2050 assemblies to 3613 assemblies. The existing racks will be replaced with 23 free-standing poisoned rack modules. These modules contain a total of 3616 storage cells, including 3 triangular cells located in corners of the pool. The reracking will extend the date until loss of full core discharge capability through the year 2008.

Attachment 4 contains a licensing report on the reracking prepared by our contractor, Holtec International. The report contains the following chapters:

1. Introduction
2. Module Data
3. Construction of Rack Modules
4. Criticality Safety Analyses
5. Thermal-Hydraulic Considerations
6. Rack Structural Considerations
7. Accident Analysis and Miscellaneous Structural Evaluations
8. Static and Dynamic Analyses of Fuel Pool Structure
9. Radiological Evaluation
10. In-service Surveillance Program

11. Cost/Benefit Analysis

Justification for Changes

(The change numbers in the following discussion refer to those in Section 1.0, above.)

#1, #9. The increase in the storage capacity from 2050 to 3613 assemblies is the purpose of the reracking effort and is supported by the Holtec Licensing Report. The spent fuel pool will contain 3616 storage locations after reracking. Three of these locations are triangular in shape and therefore will not hold a complete assembly. Thus, the total complete assembly storage capacity is 3613 assemblies.

We have also proposed to modify the wording of the license conditions such that the conditions no longer permit storage of fuel "in any combination." As discussed in changes #5 and #6, there are limits to placement of fuel in the new racks based on initial assembly enrichment and burnup.

The change to indicate that the 4.95 wt. % U-235 enrichment limit is a nominal value is an editorial change, to more accurately describe the limit and be consistent with T/S 5.6.2.2.

#2. The amount of time the reactor must be subcritical before movement of irradiated fuel is conservatively increased from 100 hours to 168 hours. This is to achieve consistency with the thermal-hydraulic analyses performed by Holtec, discussed in Chapter 5 of the licensing report. (The fuel handling accident analysis, presented in Chapter 9 of the Holtec report, assumed 100 hours of decay time. This is conservative with respect to the proposed change.)

#3. The applicability for the requirement to maintain 2,400 ppm of boron in the spent fuel pool is modified from "whenever fuel assemblies with enrichment greater than 3.95 wt. % U-235 and enrichment greater than 5,550 MWD/MTU are in the fuel storage pool" to "at all times."

The criticality analyses demonstrate k_{eff} less than 0.95 in the racks with no boron in the spent fuel pool. Credit for soluble boron is necessary only for abnormal events such as mislocation of a fuel assembly. The previous criticality analyses, approved by T/S Amendments 136 (Unit 1) and 121 (Unit 2), determined that no soluble boron was necessary to maintain k_{eff} below 0.95 for the case of a misloaded fuel assembly, provided the initial

assembly enrichment was below 3.95 wt. % U-235 and the assembly burnup was greater than 5,550 MWD/MTU. The

applicable criticality analyses presented in Chapter 4 of the Holtec report conservatively assumed all assemblies were enriched to 4.95 wt. % U-235, and did not establish a burnup beyond which soluble boron was unnecessary. Therefore, we are conservatively changing the applicability requirement of the soluble boron T/S to "at all times."

#4. The nominal center-to-center spacing between fuel assemblies placed in the storage racks is decreased from 10.5 to 8.97 inches. This is consistent with the design of the new racks and has been used in the various Holtec analyses.

#5, #6. The present T/S establishes limits on acceptable storage locations for Westinghouse fuel with nominal enrichment above 3.95 wt% U-235 and with burnup less than 5,550 MWD/MTU. Storage of assemblies meeting these requirements must be in a checkerboard configuration. We are proposing to supersede these requirements with new requirements that are consistent with the criticality analyses presented in Chapter 4 of the Holtec report. Three "regions" of fuel are defined. The regions are determined on the basis of burnup and initial assembly enrichment. (Ref: Section 4.2 of the Holtec report.) Proposed T/S Figure 5.6-3 includes a graphical depiction of the 3 regions. Two fuel assembly layout schemes are included in the proposed T/Ss, as Figures 5.6-1 and 5.6-2. The first is a scheme whereby all cells can be filled. A second scheme is included which more easily facilitates a full core off-load. This scheme is considered an "interim" scheme, which may be used before the pool is approaching its full capacity. These two loading schemes are discussed in Section 4.2 of the Holtec report. Loading of assemblies into either scheme will be administratively controlled by Cook Nuclear Plant Procedures.

#7. The maximum nominal fuel assembly enrichment for fuel stored in the spent fuel pool racks is increased from 3.50 to 4.95 wt. % U-235 for Exxon/ANF 15 X 15 assemblies, and from 4.23 to 4.95 wt. % U-235 for Exxon/ANF 17 X 17 assemblies.

Holtec determined that the Westinghouse 15 X 15 assemblies with initial enrichment of 4.95 Wt % U-235 was the most reactive fuel type. This assembly was therefore used as the "design basis" fuel assembly for the criticality analyses in Section 4 of the Holtec report. In making this

conservative determination, Holtec considered all fuel types listed in the present T/S 5.6.1.2, assuming nominal enrichments of 4.95 wt. % U-235.

Therefore, the criticality analyses bound the Exxon/ANF fuel assemblies for enrichments up to 4.95 wt. % U-235*.

The nominal enrichment of 4.95 wt. % U-235 is also consistent with the fuel handling accident evaluation assumptions, documented in Section 9.1 of the Holtec report.

#8. The enrichment limit is expressed as a nominal value to achieve consistency throughout the T/Ss (see the justification for change #2, above). The change in the Unit 1 T/S 5.3.1 enrichment limit from 4.0 to 4.95 wt. % U-235 is intended to achieve consistency with Unit 2 T/S 5.3.1.

The limit on fuel assembly enrichment has historically been maintained consistent with the T/S 5.6.1.2 spent fuel pool limits. In Unit 2, for example, the highest enrichment for 17 X 17 assemblies in T/S 5.6.1.2 is 4.95 wt. %, which matches the Unit 2 T/S 5.3.1 value. (Currently, the highest enriched Unit 2 assemblies are only 4.13 nominal wt. % U-235. Assemblies with nominal 4.4 wt. % U-235 enrichment are, however, planned to be loaded in 1992). In Unit 1, however, the highest enrichment for 15 X 15 assemblies is 4.95 wt. % U-235 in T/S 5.6.1.2, but T/S 5.3.1 has an enrichment limit of 4.0 wt. % U-235. (Currently, the highest enriched Unit 1 assemblies are only 3.6 nominal wt. % U-235.) This administrative change corrects an oversight in our letter AEP:NRC:1071F, dated December 8, 1989, which proposed the T/S changes that were approved as Amendment 136 for Unit 1 and 121 for Unit 2.

5.0 No Significant Hazards Determination

We have evaluated the proposed T/S changes and have determined that the changes should not involve a significant hazards consideration based on the criteria established in 10 CFR 50.92(c). Operation of the Cook Nuclear Plant in accordance with the proposed amendment will not:

*We are currently purchasing fuel assemblies from Westinghouse. There are currently no Exxon/ANF assemblies in either the spent fuel pool or the reactors with nominal enrichments greater than 4.1

wt % U-235.

(1) Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated.

The analyses performed by Holtec have demonstrated the acceptability of the proposed reracking from a variety of perspectives. For example, the analyses demonstrate that k_{eff} will remain within acceptable limits even if an abnormal event, such as a fuel assembly misloading or assembly drop, should occur. It has also been demonstrated that the spent fuel pool cooling system is adequate to maintain acceptable cooling of the stored assemblies, and that adequate time would exist to take appropriate corrective action should all cooling be inadvertently lost. The racks are designed to seismic Class I requirements. An assembly dropped on the racks would not distort the racks such that they would not perform their function. The radiological consequences of a fuel handling accident remain within previously established limits.

During the reracking effort, all movement of fuel assemblies and racks will be performed in accordance with our commitments to NUREG 0612, entitled "Control of Heavy Loads At Nuclear Power Plants." Thus, the probability of an accident involving assembly damage will not significantly be increased.

Based on these considerations, it is concluded that the probability or consequences of a previously evaluated accident is not significantly increased.

(2) Create the Possibility of a New or Different Kind of Accident From Any Previously Analyzed.

No unproven technology is involved either in the installation process or in the analytical techniques necessary to justify the planned fuel storage expansion. In fact, the basic reracking technology has been developed and demonstrated in over 80 applications for fuel pool capacity increases which have already received NRC approval.

The change to a mixed zone storage in the spent fuel pool requires the performance of additional evaluations to ensure that the criticality criteria is maintained. These include the evaluation for the limiting criticality condition, i.e., misplacement of an unirradiated (fresh) fuel assembly into a burned fuel storage cell. The

evaluation for this case shows that when the boron concentration is at least 550 ppm, the criticality criterion is satisfied. We have proposed a T/S change to require 2,400 ppm boron, at all times, in the spent fuel pool. Therefore, protection against inadvertent mispositioning will be ensured.

During installation all movement of spent fuel pool assemblies and racks will be in accordance with our commitments to NUREG 0612, to prevent any damage to fuel assemblies stored in the spent fuel pool.

Based on the foregoing discussion, it is concluded that the reracking does not create the possibility of a new or different accident from any previously evaluated.

(3) Involve a Significant Reduction in a Margin of Safety

The Holtec report demonstrates the acceptability of the reracking from a variety of perspectives, including criticality, thermal-hydraulic, radiological, seismic, and structural considerations. The results of these analyses provide the basis for our conclusion that the changes do not involve a significant reduction in a margin of safety.

We note that the NRC has published examples of amendments considered not likely to involve significant hazards consideration in the Federal Register (Volume 51, No. 44, March 6, 1986). The tenth example concerns an expansion of the storage capacity of a spent fuel pool, and specifies criteria that must be satisfied.

Criterion (1):

The storage expansion method consists of either replacing existing racks with a design which allows closer spacing between stored spent fuel assemblies or placing additional racks of the original design on the pool floor if space permits.

Response:

The Cook Nuclear Plant fuel pool reracking involves both replacing existing and adding new racks where space permits.

Criterion (2):

The storage expansion method does not involve rod consolidation or double-tiering.

Response:

The Cook Nuclear Plant racks are not double-tiered and all racks will sit on the spent fuel pool floor. Additionally, the amendment

application does not involve consolidation of spent fuel.

Criterion (3):

The k_{eff} of the pool is maintained less than or equal to 0.95.

Response:

The design of the new spent fuel racks contains a neutron absorber, Boral, to allow close storage of spent fuel assemblies while ensuring that the k_{eff} remains less than 0.95 under normal conditions with pure water in the pool, and less than 0.95 under abnormal conditions with soluble boron.

Criterion (4):

No new technology or unproven technology is utilized in either the construction process or the analytical techniques necessary to justify the expansion.

Response:

The rack designer, Holtec International, has licensed at least 10 other racks of the same design. The construction processes and analytical techniques remain substantially the same as these other 10 rack installations. Thus, no new or unproven technology is utilized in the construction or analysis of the high density Cook Nuclear Plant spent fuel racks.

Thus, it is concluded that the example cited is relevant and that the proposed amendment does not involve significant hazards considerations.

6.0 Pending T/S Proposals Impacting This Submittal

The changes proposed in this letter will supersede those proposed in our letter AEP:NRC:1071N, dated February 15, 1991.

ATTACHMENT 2 to AEP:NRC: 1146

EXISTING TECHNICAL SPECIFICATIONS
PAGES MARKED TO REFLECT PROPOSED CHANGES

Amendment No. 31

2.C(4) The licensee may proceed with and is required to complete the modifications identified in Table 1 of the Fire Protection Safety Evaluation Report for the Donald C. Cook Nuclear Plant dated June 4, 1979. These modifications shall be completed in accordance with the dates contained in Table 1 of that SER or Supplements thereto. Administrative controls for fire protection as described in the licensee's submittals dated January 31, 1977 and October 27, 1977 shall be implemented and maintained.

(5) Spent Fuel Pool Storage

Amendment No. 118,136

The licensee is authorized to store D. C. Cook, Unit 1 and Unit 2 fuel assemblies, new or irradiated ~~in any combination~~ up to a total of ~~2050~~ 3613 fuel assemblies in the shared spent fuel pool at the Donald C. Cook Nuclear Plant subject to the following conditions:

Fuel stored in the spent fuel pool shall not have ~~an~~ a nominal enrichment greater than 4.95% Uranium-235.

(6) Deleted by Amendment 80.

*2.D Physical Protection

Amendment No. 122

The licensee shall fully implement and maintain in effect all provisions of the Commission-approved physical security, guard training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The plans, which contain Safeguards Information protected under 10 CFR 73.21, are entitled: "Donald C. Cook Nuclear Plant Security Plan," with revisions submitted through July 21, 1988; "Donald C. Cook Nuclear Plant Training and Qualification Plan," with revisions submitted through December 18, 1986; and "Donald C. Cook Nuclear Plant Safeguards Contingency Plan," with revisions submitted through June 10, 1988. Changes made in accordance with 10 CFR 73.55 shall be implemented in accordance with the schedule set forth therein.

DECAY TIME

LIMITING CONDITION FOR OPERATION

3.9.3 The reactor shall be subcritical for at least ~~100~~ 168 hours.

APPLICABILITY: During movement of irradiated fuel in the reactor pressure vessel.

ACTION:

With the reactor subcritical for less than ~~100~~ 168 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.3 The reactor shall be determined to have been subcritical for at least ~~100~~ 168 hours by verification of the date and time of subcriticality prior to movement of irradiated fuel in the reactor pressure vessel.

REFUELING OPERATIONS

STORAGE POOL BORON CONCENTRATION*

LIMITING CONDITION FOR OPERATION

3.9.15 A boron concentration of greater than or equal to to 2,400 ppm shall be maintained in the fuel storage pool.

APPLICABILITY: ~~Whenever fuel assemblies with enrichment greater than 3.95 weight percent U-235 and with burnup less than 5,550 MWD/MTU are in the fuel storage pool.~~ At all times

ACTION:

With the requirements of the specification not satisfied, suspend all movement of fuel assemblies in the fuel storage pool and restore the boron concentration to within its limit prior to resuming fuel movement. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.15 The boron concentration in the fuel storage pool shall be determined to be at least at its minimum required at least once per 7 days. ~~when fuel assemblies with enrichment greater than 3.95 weight percent U-235 and with burnup less than 5,550 MWD/MTU are in the fuel storage pool.~~

*Shared system with Cook Nuclear Plant - Unit 2

DESIGN PRESSURE AND TEMPERATURE

5.2.2 The reactor containment building is designed and shall be maintained in accordance with the original design provisions contained in Section 5.2.2 of the FSAR.

PENETRATIONS

5.2.3 Penetrations through the reactor containment building are designed and shall be maintained in accordance with the original design provisions contained in Section 5.4 of the FSAR with allowance for normal degradation pursuant to the applicable Surveillance Requirements.

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 193 fuel assemblies with each fuel assembly containing 204 fuel rods clad with Zircaloy -4. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment of 3.35 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum nominal enrichment of ~~4.0~~ 4.95 weight percent U-235.

CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 53 full length and no part length control rod assemblies. The full length control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal values of absorber material shall be 80 percent silver, 15 percent indium and 5 percent cadmium. All control rods shall be clad with stainless steel tubing.

5.4 REACTOR COOLANT SYSTEM

DESIGN PRESSURE AND TEMPERATURE

5.4.1 The reactor coolant system is designed and shall be maintained:

DESIGN FEATURES

a. In accordance with the code requirements specified in Section 4.1.6 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 contained volume of the reactor coolant system is 12,612 ± 100 cubic feet at a nominal T_{avg} of 70°F.

5.5 EMERGENCY CORE COOLING SYSTEMS

5.5.1 The emergency core cooling systems are designed and shall be maintained in accordance with the original design provisions contained in Section 6.2 of the FSAR with allowance for normal degradation pursuant to the applicable Surveillance Requirements.

5.6 FUEL STORAGE

CRITICALITY - SPENT FUEL

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

a. A k_{eff} equivalent to less than 0.95 when flooded with unborated water,

b. A nominal ~~10.5~~ 8.97 inch center-to-center distance between fuel assemblies placed in the storage racks.

c. ~~1. A separate region within the spent fuel storage racks (defined as Region 1) shall be established for storage of Westinghouse fuel with nominal enrichment above 3.95 weight percent U-235 and with burnup less than 5,550 MWD/MTU. In Region 1, fuel shall be stored in a three-out-of-four cell configuration with one symmetric cell location of each 2 x 2 cell array vacant.~~

~~2. The boundary between the Region 1 mentioned above and the rest of the spent fuel storage racks (defined as Region 2) shall be such that the three-out-of-four storage requirement shall be carried into Region 2 by, at least, one row as shown in Figure 5.6-1.~~

Replaced with "A"

(A)

~~5.6.1.c~~

c. The fuel assemblies will be ~~stored in the spent~~ classified as acceptable for Region 1, Region 2 or Region 3 storage based upon their assembly average burnup verses initial nominal enrichment. ~~Based upon their classification the spent fuel assemblies shall be~~ Cells acceptable for Region 1, Region 2 and Region 3 assembly storage are indicated in figures 5.6-1 and 5.6-2. Assemblies that are acceptable for storage in Region 1, Region 2 and Region 3 must meet the design criteria that define the regions as follows:

1. Region 1 is designed to accommodate new fuel with a maximum nominal enrichment of 4.95 wt% U-235, or spent fuel regardless of the discharge fuel burnup.

2. Region 2 is designed to accommodate fuel of 4.95% initial nominal enrichment burned to at least 50,000 MWD/MtU, or fuel of other enrichments with equivalent reactivity.

3. Region 3 is designed to accommodate fuel of 4.95% initial nominal enrichment burned to at least 38,000 MWD/MtU, or fuel of other enrichments with equivalent reactivity.

The equivalent reactivity criteria for Region 2 and Region 3 is defined via the following equations and ~~are~~ graphically depicted in figure 5.6-3

For Region 2 Storage

Minimum Assembly Average Burnup in MWD/MTU =

$$- 22,670 + 22,220\ E - 2,260\ E^2 + 149\ E^3$$

For Region 3 Storage

Minimum Assembly Average Burnup in MWD/MTU =

$$- 26,745 + 18,746\ E - \cancel{3,268}\ 1631\ E^2 + 98.4\ E^3$$

where E = Initial Peak Enrichment

Replaced with "B", "C", "D".

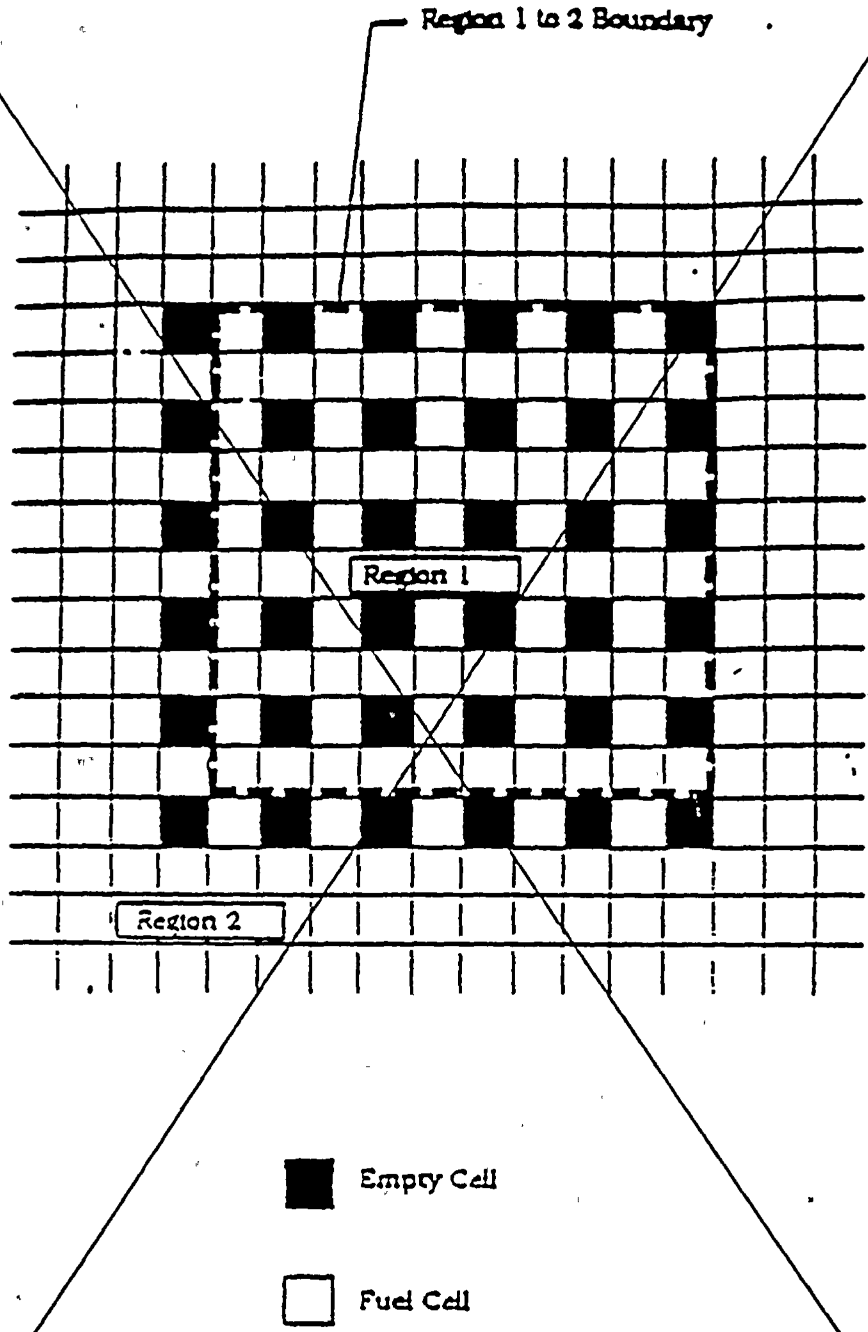


Figure 5.6-2: Donald C. Cook Nuclear Plant Schematic for Fuel Storage Racks Interface Boundary Between Regions 1 and 2

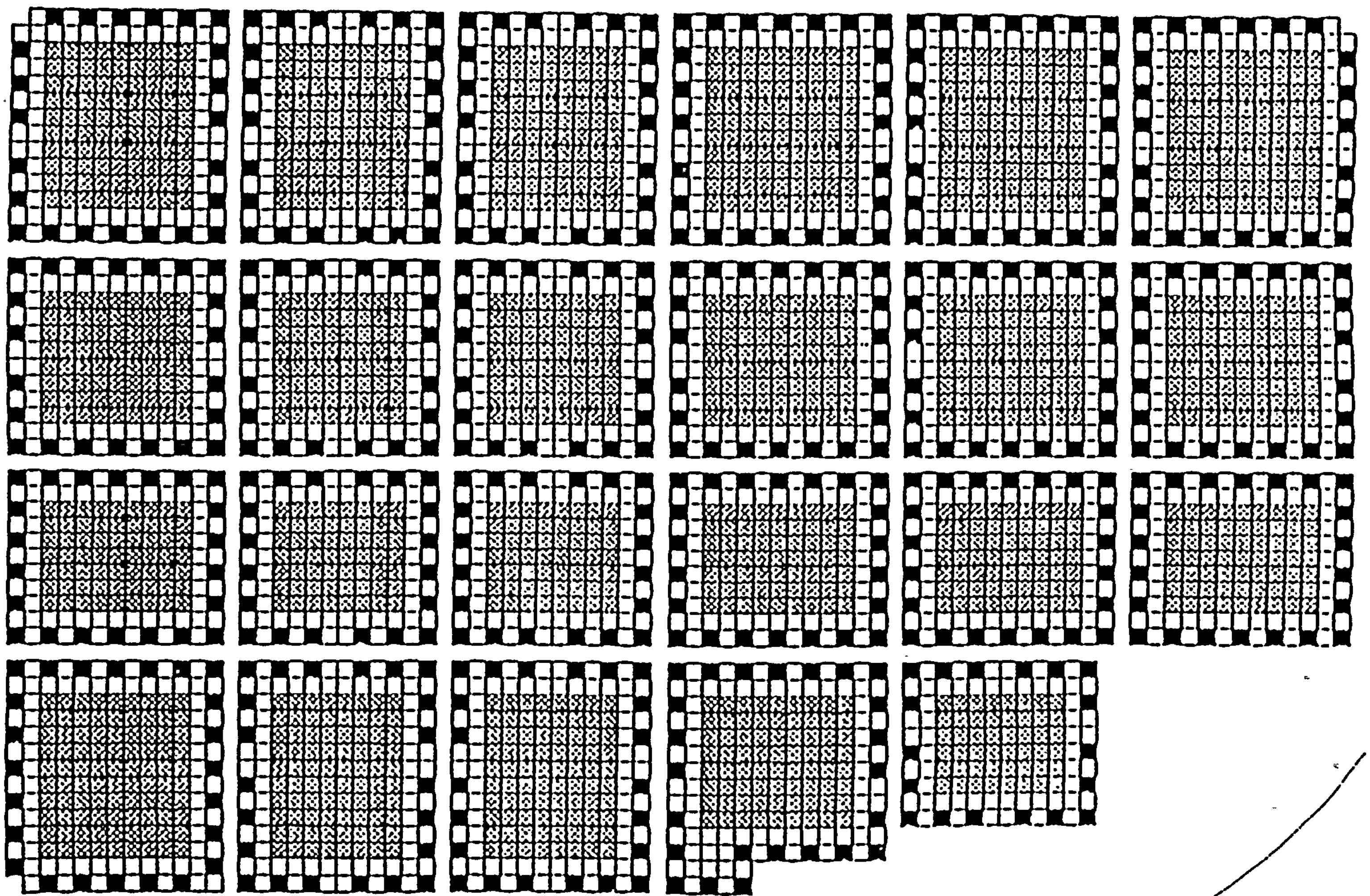


Figure 5.6-1 (B)

~~Fig. 4-1~~ NORMAL STORAGE PATTERN (MIXED THREE ZONE)

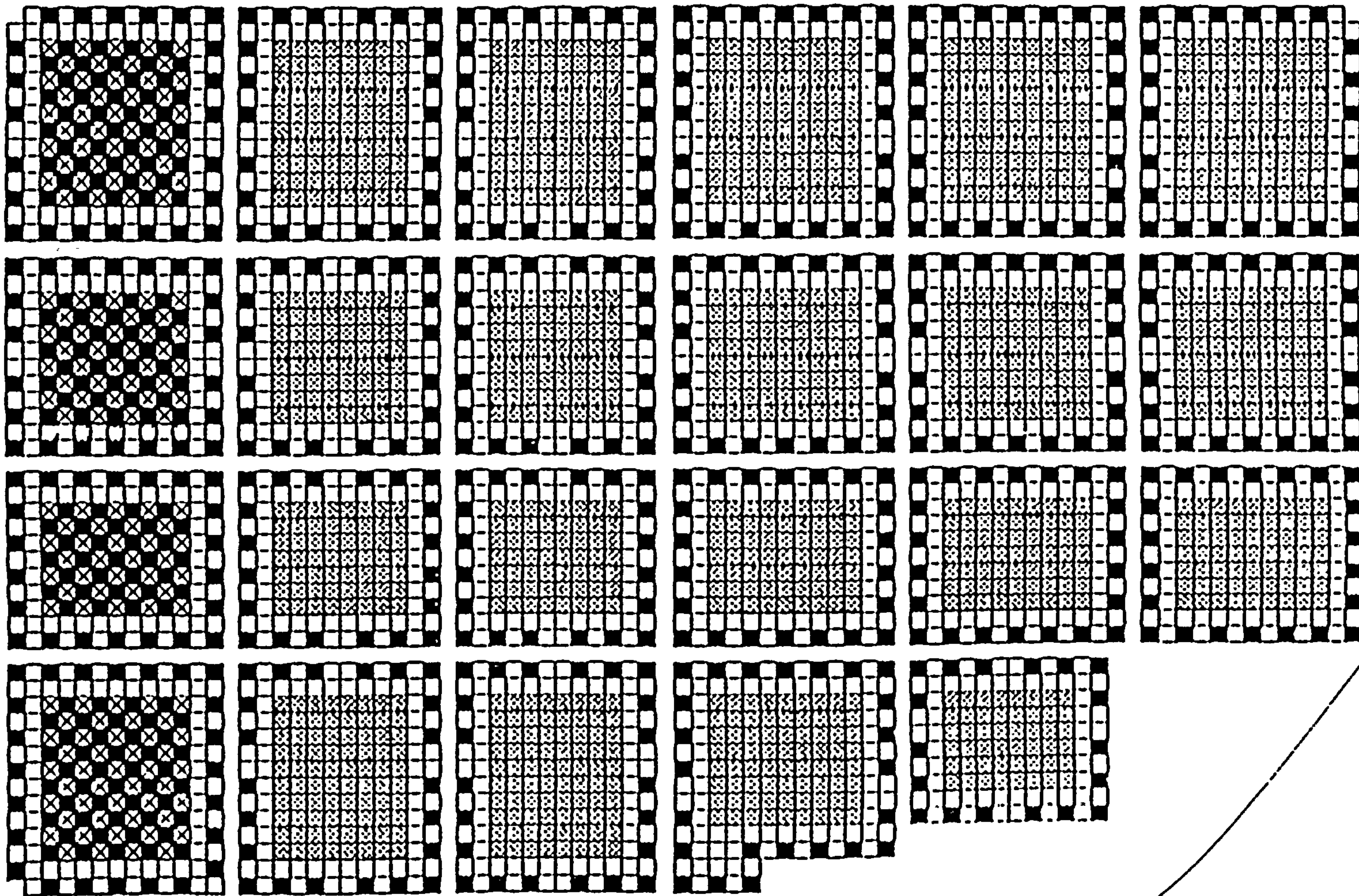
504 REGION 1 CELLS

1415 REGION 2 CELLS

1694 REGION 3 CELLS

4-28

Figure 5.6-2 -



~~Fig. 4-2~~ INTERIM STORAGE PATTERN (CHECKERBOARD)

158 EMPTY LOCATIONS | 661 REGION 1 CELLS | 1415 REGION 2 CELLS | 1379 REGION 3 CELLS

4-29

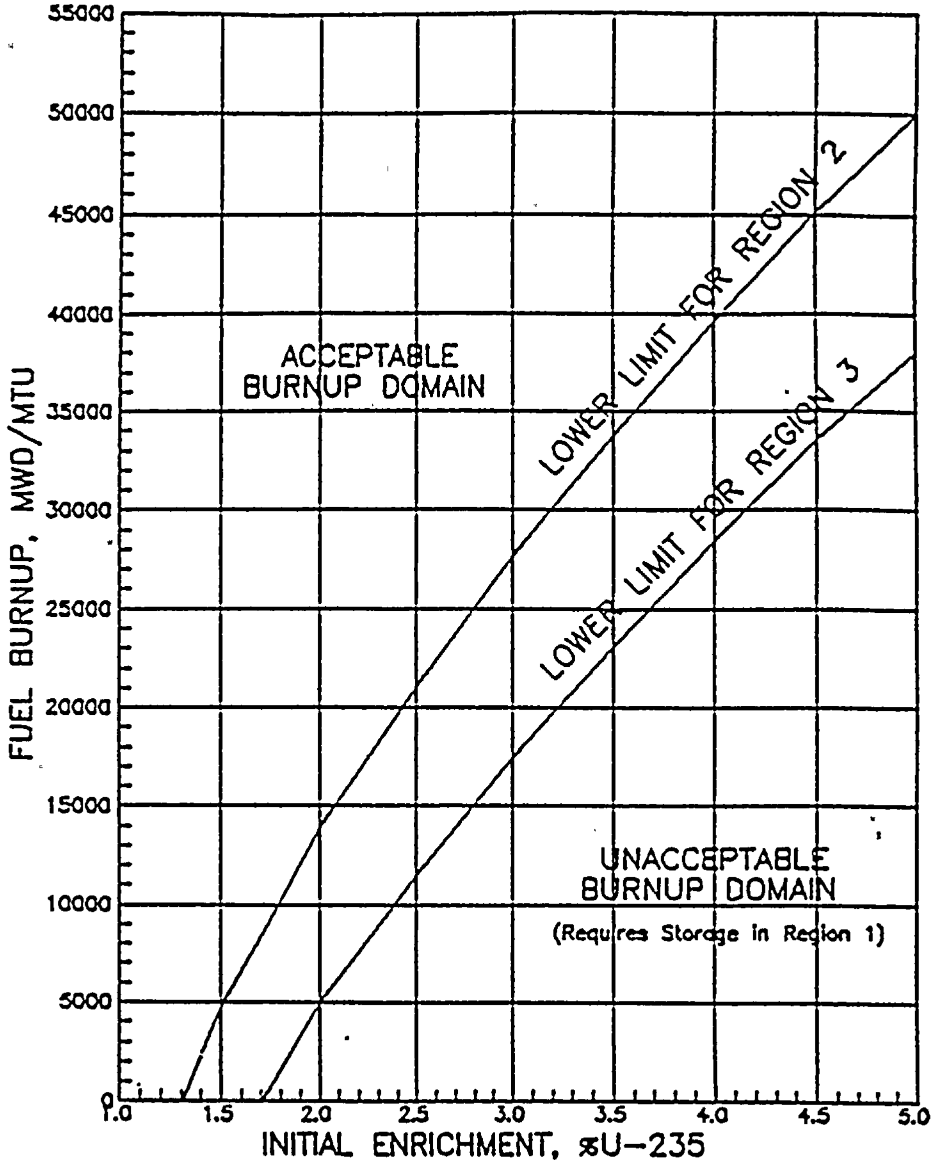


Fig. 4-3 ACCEPTABLE BURNUP DOMAIN IN REGIONS 2 & 3

5.6-3

DESIGN FEATURES

5.6.1.2: Fuel stored in the spent fuel storage racks shall have a maximum nominal fuel assembly enrichment as follows:

Description		Maximum Nominal Fuel Assembly Enrichment Wt. % 235_U
1) Westinghouse	15 x 15 STD 15 x 15 OFA	4.95
2) Exxon/ANF	15 x 15	~~3.50~~ 4.95
3) Westinghouse	17 x 17 STD 17 x 17 OFA 17 x 17 V5	4.95
4) Exxon/ANF	17 x 17	~~4.23~~ 4.95

CRITICALITY-NEW FUEL

5.6.2.1 The new fuel pit storage racks are designed and shall be maintained with a nominal 21 inch center-to-center distance between new fuel assemblies such that k_{eff} will not exceed 0.98 when fuel assemblies are placed in the pit and aqueous foam moderation is assumed.

5.6.2.2 Fuel stored in the new fuel storage racks shall have a maximum nominal fuel assembly enrichment as follows;

Description		Maximum Nominal Fuel Assembly Enrichment Wt. % 235_U
1) Westinghouse	15 x 15 STD 15 x 15 OFA	4.55
2) Exxon/ANF	15 x 15	3.50
3) Westinghouse	17 x 17 STD 17 x 17 OFA 17 x 17 V5	4.55
4) Exxon/ANF	17 x 17	4.23

DRAINAGE

5.6.3 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 629'4".

DESIGN FEATURES

CAPACITY

5.6.4 The fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than ~~2050~~ 3613 fuel assemblies.

5.7 SEISMIC CLASSIFICATION

5.7.1 Those structures, systems and components identified as Category I Items in the FSAR shall be designed and maintained to the original design provisions contained in the FSAR with allowance for normal degradation pursuant to the applicant Surveillance Requirements.

5.8 METEOROLOGICAL TOWER LOCATION

5.8.1 The meteorological tower shall be located as shown in Figure 5.1-1.

5.9 COMPONENT CYCLIC OR TRANSIENT LIMIT

5.9.1 The components identified in Table 5.9-1 are designed and shall be maintained within the cyclic or transient limits of Table 5.9-1.

(q) Deleted by Amendment 2.

(r) Deleted by Amendment 68.

(s) <u>Spent Fuel Pool Storage</u>

3613

Amendment No. 104,121

The licensee is authorized to store D. C. Cook, Unit 1 and Unit 2 fuel assemblies, new or irradiated ~~in any combination,~~ up to a total of ~~2050~~ fuel assemblies in the shared spent fuel pool at the Donald C. Cook Nuclear Plant subject to the following conditions:

a nominal

Fuel stored in the spent fuel pool shall not have ~~an~~ enrichment greater than 4.95% Uranium-235.

*Amendment 3 deleted Paragraph (s). Amendment 13 added a new Paragraph (s).

(t) Deleted by Amendment 63.

2.C.(7) <u>Secondary Water Chemistry Monitoring Program</u>

The licensee shall implement a secondary water chemistry monitoring program to inhibit steam generator tube degradation. This program shall be described in the station chemistry manual and shall include:

Amendment No. 18

1. Identification of a sampling schedule for the critical parameters and control points for these parameters;

2. Identification of the procedures used to measure the values of the critical parameters;

3. Identification of process sampling points;

4. Procedure for the recording and management of data;

5. Procedures defining corrective actions for off control point chemistry conditions; and

6. A procedure identifying (a) the authority responsible for the interpretation of the data, and (b) the sequence and timing of administrative events required to initiate corrective actions.

DECAY TIME

LIMITING CONDITION FOR OPERATION

3.9.3 The reactor shall be subcritical for at least ~~100~~ 168 hours.

APPLICABILITY: During movement of irradiated fuel in the reactor pressure vessel.

ACTION:

With the reactor subcritical for less than ~~100~~ 168 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.3 The reactor shall be determined to have been subcritical for at least ~~100~~ 168 hours by verification of the date and time of subcriticality prior to movement of irradiated fuel in the reactor pressure vessel.

STORAGE POOL BORON CONCENTRATION*

LIMITING CONDITION FOR OPERATION

3.9.15 A boron concentration of greater than or equal to to 2,400 ppm shall be maintained in the fuel storage pool.

APPLICABILITY: ~~Whenever fuel assemblies with enrichment greater than 3.95 weight percent U-235 and with burnup less than 5,550 MWD/MTU are in the fuel storage pool.~~ At all times.

ACTION:

With the requirements of the specification not satisfied, suspend all movement of fuel assemblies in the fuel storage pool and restore the boron concentration to within its limit prior to resuming fuel movement. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.15 The boron concentration in the fuel storage pool shall be determined to be at least at its minimum required at least once per 7 days. ~~when fuel~~ assemblies ~~with enrichment greater than 3.95 weight percent U-235 and with burnup less than 5,550 MWD/MTU are in the fuel storage pool.~~

*Shared system with Cook Nuclear Plant - Unit 1

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 193 fuel assemblies with each fuel assembly containing 264 fuel rods clad with Zircaloy-4. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment of 3.3 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and may be nominally enriched up to 4.95 weight percent U-235.

CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 53 full length and no part length control rod assemblies. The full length control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal values of absorber material shall be 80 percent silver, 15 percent indium and 5 percent cadmium. All control rods shall be clad with stainless steel tubing.

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 4.1.6 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 12,612 ± 100 cubic feet ~~as~~ at a nominal T_{avg} of 70°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 - SPENT FUEL

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

a. A K_{eff} equivalent to less than 0.95 when flooded with unborated water,

b. A nominal ~~10.5~~ 8.97-inch center-to-center distance between fuel assemblies, placed in the storage racks.

c. ~~1. A separate region within the spent fuel storage racks (defined as Region 1) shall be established for storage of Westinghouse fuel with nominal enrichment above 3.95 weight percent U-235 and with burnup less than 5,550 MWD/MTU. In Region 1, fuel shall be stored in a three-out-of-four cell configuration with one symmetric cell location of each 2 x 2 cell array vacant.~~

~~2. The boundary between the Region 1 mentioned above and the rest of the spent fuel storage racks (defined as Region 2) shall be such that the three-out-of-four storage requirement shall be carried into Region 2 by at least, one row as shown in Figure 5.6-1.~~

Replaced with "A"

5.6.1.2 Fuel stored in the spent fuel storage racks shall have a maximum nominal fuel assembly enrichment as follows:

Description		Maximum Nominal Fuel Assembly Enrichment Wt. % 235
1) Westinghouse	15 x 15 STD 15 x 15 OFA	4.95
2) Exxon/ANF	15 x 15	~~3.50~~ 4.95
3) Westinghouse	17 x 17 STD 17 x 17 OFA 17 x 17 V5	4.95
4) Exxon/ANF	17 x 17	~~4.25~~ 4.95

A

5.6.1.1.c

The fuel assemblies will be ~~stored in the spent~~ classified as acceptable for Region 1, Region 2 or Region 3 storage based upon their assembly average burnup verses initial nominal enrichment. ~~Based upon their classification the assemblies shall be~~ Cells acceptable for Region 1, Region 2 and Region 3 assembly storage are indicated in figures 5.6-1 and 5.6-2. Assemblies that are acceptable for storage in Region 1, Region 2 and Region 3 must meet the design criteria that define the regions as follows:

1. Region ~~1~~ is designed to accommodate new fuel with a maximum nominal enrichment of 4.95 wt% U-235, or spent fuel regardless of the discharge fuel burnup.

2. Region 2 is designed to accommodate fuel of 4.95% initial nominal enrichment burned to at least 50,000 MWD/MtU, or fuel of other enrichments with equivalent reactivity.

3. Region 3 is designed to accommodate fuel of 4.95% initial nominal enrichment burned to at least 38,000 MWD/MtU, or fuel of other enrichments with equivalent reactivity.

The equivalent reactivity criteria for Region 2 and Region 3 is defined via the following equations and ~~and~~ graphically depicted in figure 5.6-3

For Region 2 Storage

Minimum Assembly Average Burnup in MWD/MTU =

$$-22{,}670 + 22{,}220\,E - 2{,}260\,E^2 + 149\,E^3$$

For Region 3 Storage

Minimum Assembly Average Burnup in MWD/MTU =

$$-26{,}745 + 18{,}746\,E - 3{,}268\,E^2 + 98.4\,E^3$$

1631

where E = Initial Peak Enrichment

Replaced with "B", "C", "D".

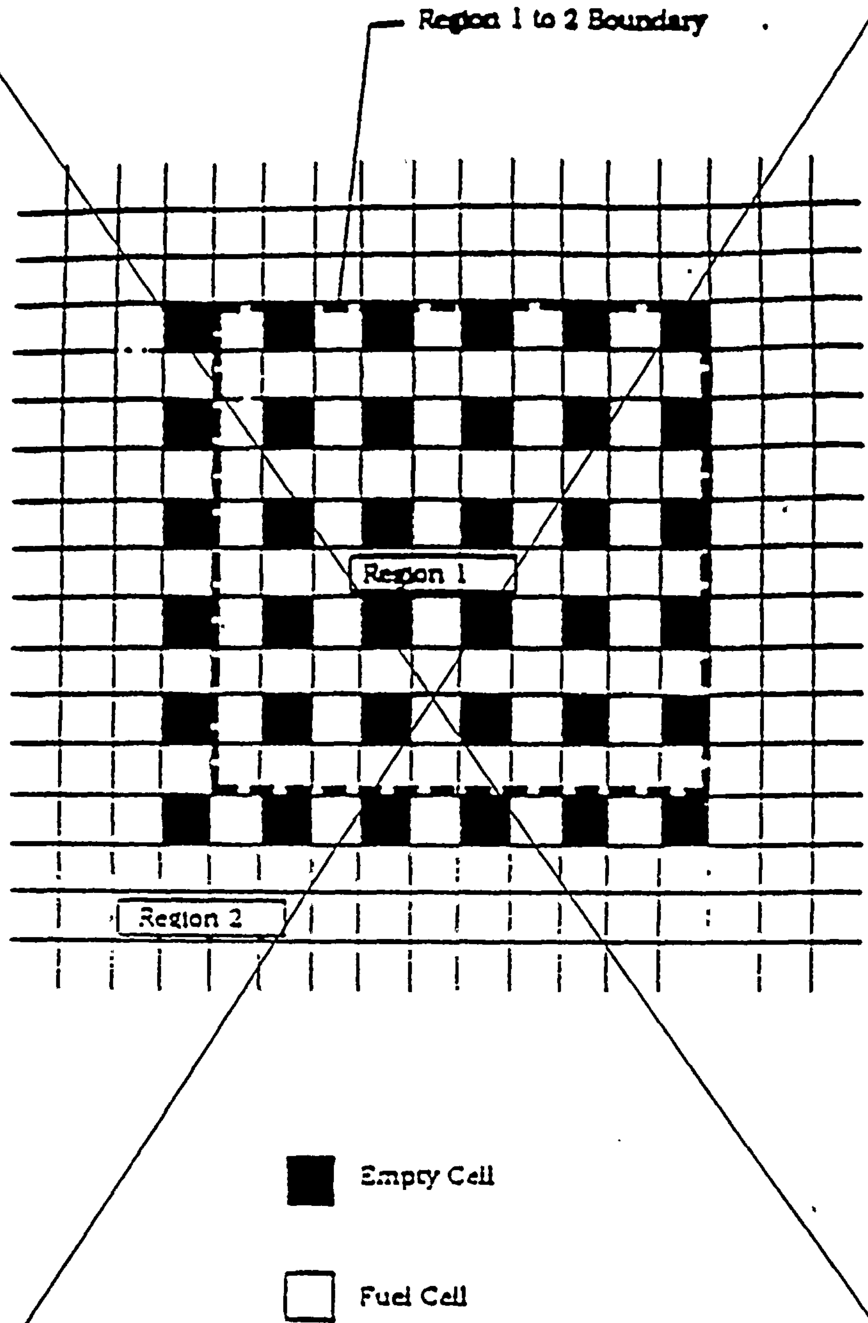


Figure 5.6-1: Donald C. Cook Nuclear Plant Schematic for Fuel Storage Racks
Interface Boundary Between Regions 1 and 2

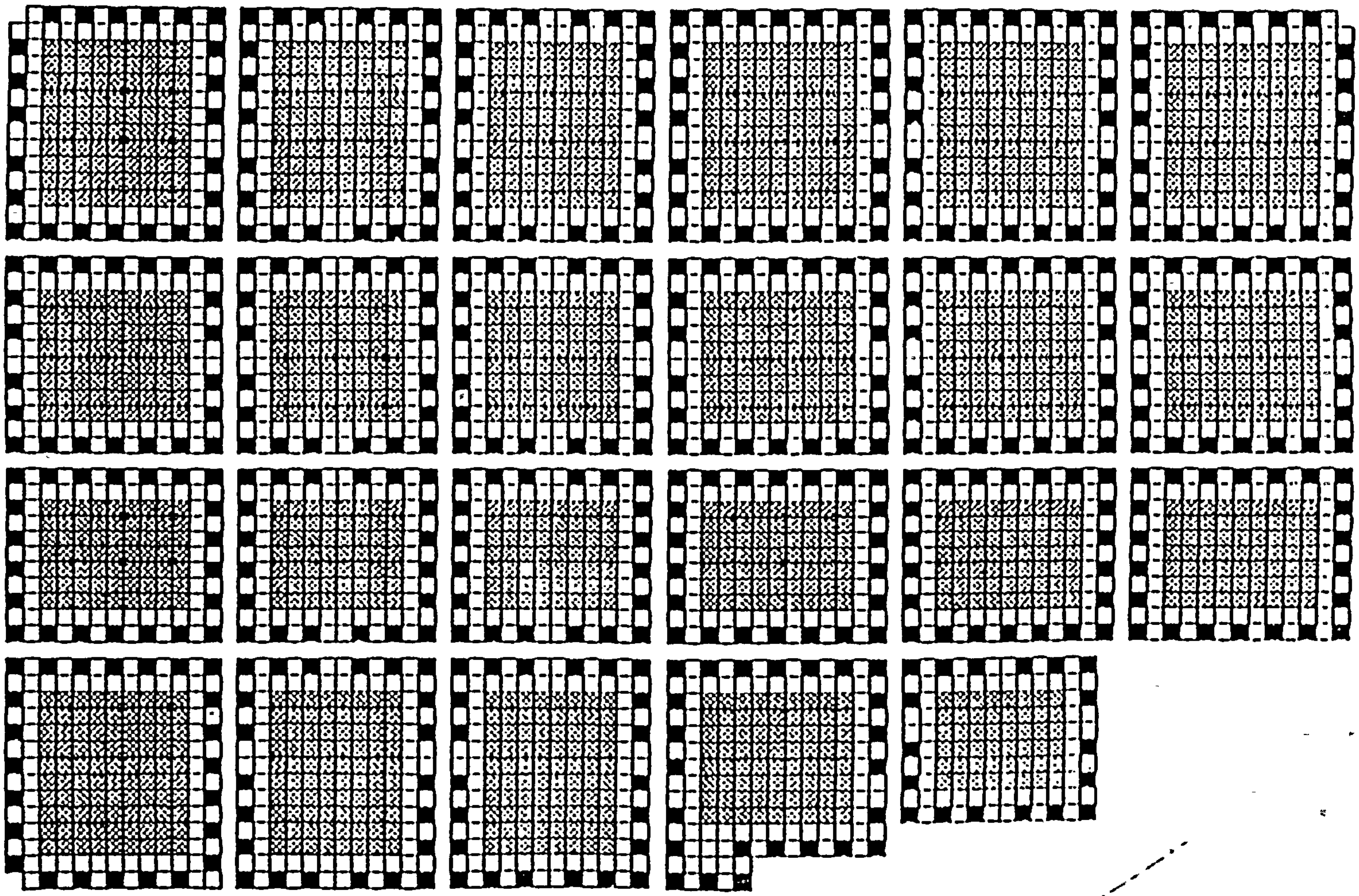
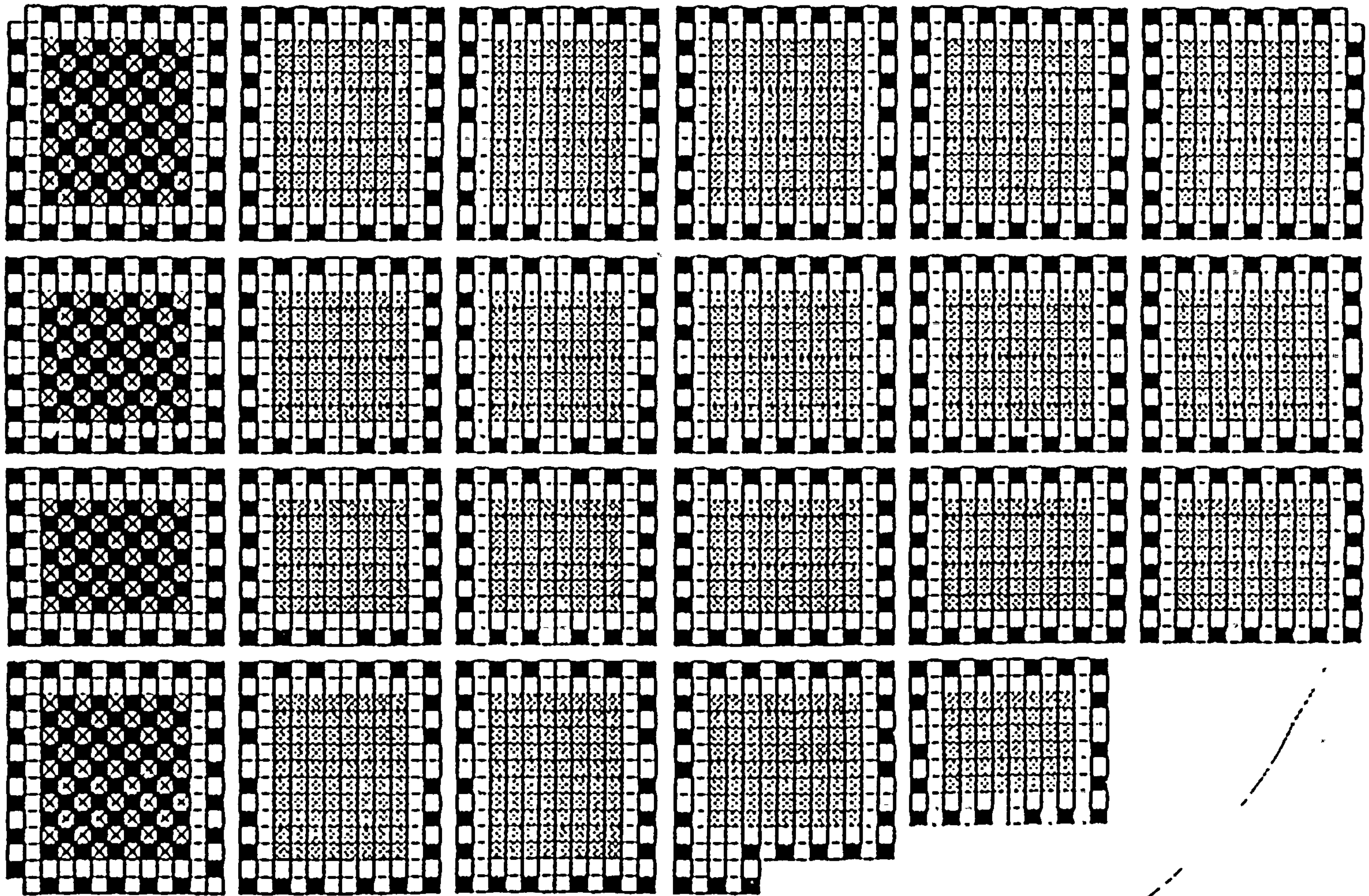


Fig. 4-1 NORMAL STORAGE PATTERN (MIXED THREE ZONE)

504 REGION 1 CELLS   1415 REGION 2 CELLS   1694 REGION 3 CELLS



~~Fig. 4-2~~ INTERIM STORAGE PATTERN (CHECKERBOARD)

Figure 5.6.2 - A

☒ 158 EMPTY LOCATIONS ■ 661 REGION 1 CELLS □ 1415 REGION 2 CELLS ▩ 1379 REGION 3 CELLS

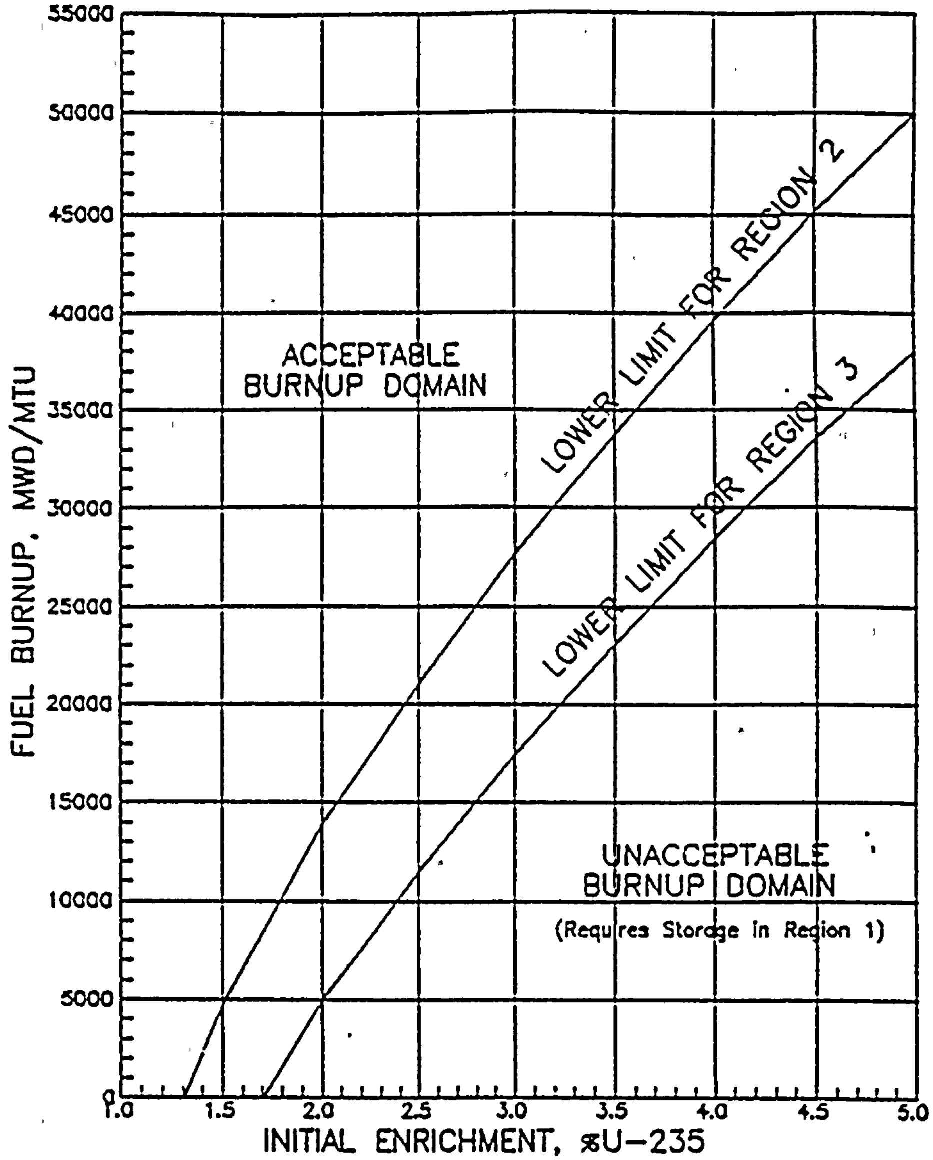


Fig. ~~4-3~~ ACCEPTABLE BURNUP DOMAIN IN REGIONS 2 & 3

5.6-3

DESIGN FEATURES

CRITICALITY-NEW FUEL

5.6.2.1 The new fuel pit storage racks are designed and shall be maintained with a nominal 21 inch center-to-center distance between new fuel assemblies such that K_{eff} will not exceed 0.98 when fuel assemblies are placed in the pit and aqueous foam moderation is assumed.

5.6.2.2 Fuel stored in the new fuel storage racks shall have a maximum nominal fuel assembly enrichment as follows:

Description		Maximum Nominal Fuel Assembly Enrichment Wt. % 235_U
1) Westinghouse	15 x 15 STD 15 x 15 OFA	4.55
2) Exxon/ANF	15 x 15	3.50
3) Westinghouse	17 x 17 STD 17 x 17 OFA 17 x 17 V5	4.55
4) Exxon/ANF	17 x 17	4.23

DRAINAGE

5.6.3 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 629'4".

CAPACITY

5.6.4 The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than ~~2050~~ 3613 fuel assemblies.

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.

ATTACHMENT 3 TO AEP:NRC:1146

PROPOSED REVISED TECHNICAL SPECIFICATION PAGES

Amendment 2.C (4) The licensee may proceed with and is required to complete the No. 31 modifications identified in Table 1 of the Fire Protection Safety Evaluation Report for the Donald C. Cook Nuclear Plant dated June 4, 1979. These modifications shall be completed in accordance with the dates contained Table 1 of that SER or Supplements thereto. Administrative controls for fire protection as described in the licensee's submittals dated January 31, 1977 and October 27, 1977 shall be implemented and maintained.

(5) Spent Fuel Pool Storage

Amendment No. 118, 136

The licensee is authorized to store D. C. Cook, Unit 1 and Unit fuel assemblies, new or irradiated up to a total of 3613 fuel assemblies in the shared spent fuel pool at the Donald C. Cook Nuclear Plant subject to the following conditions:

Fuel stored in the spent fuel pool shall not have a nominal enrichment greater than 4.95% Uranium-235.

(6) Deleted by Amendment 80.

*2.D Physical Protection

Amendment No. 122

The licensee shall fully implement and maintain in effect all provisions of the Commission-approved physical security, guard training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The plans, which contain Safeguards Information protected under 10 CFR 73.21, are entitled: "Donald C. Cook Nuclear Plant Security Plan," with revisions submitted through July 21, 1988; "Donald C. Cook Nuclear Plant Training and Qualification Plan," with revisions submitted through December 18, 1986; and "Donald C. Cook Nuclear Plant Safeguards Contingency Plant," with revisions submitted through June 10, 1988. Changes made in accordance with 10 CFR 73.55 shall be implemented in accordance with the schedule set forth therein.

REFUELING OPERATIONS

DECAY TIME

LIMITING CONDITION FOR OPERATION

3.9.3 The reactor shall be subcritical for at least 168 hours.

APPLICABILITY: During movement of irradiated fuel in the reactor pressure vessel.

ACTION:

With the reactor subcritical for less than 168 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.3 The reactor shall be determined to have been subcritical for at least 168 hours by verification of the date and time of subcriticality prior to movement of irradiated fuel in the reactor pressure vessel.

REFUELING OPERATIONS

STORAGE POOL BORON CONCENTRATION*

LIMITING CONDITION FOR OPERATION

3.9.15 A boron concentration of greater than or equal to 2,400 ppm shall be maintained in the fuel storage pool.

APPLICABILITY: At all times.

ACTION:

With the requirements of the specification not satisfied, suspend all movement of fuel assemblies in the fuel storage pool and restore the boron concentration to within its limit prior to resuming fuel movement. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.15 The boron concentration in the fuel storage pool shall be determined to be at least at its minimum required at least once per 7 days.

*Shared system with Cook Nuclear Plant - Unit 2

DESIGN FEATURES

DESIGN PRESSURE AND TEMPERATURE

5.2.2 The reactor containment building is designed and shall be maintained in accordance with the original design provisions contained in Section 5.2.2 of the FSAR.

PENETRATIONS

5.2.3 Penetrations through the reactor containment building are designed and shall be maintained in accordance with the original design provisions contained in Section 5.4 of the FSAR with allowance for normal degradation pursuant to the applicable Surveillance Requirements.

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 193 fuel assemblies with each fuel assembly containing 204 fuel rods clad with Zircaloy-4. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment of 3.35 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum nominal enrichment of 4.95 weight percent U-235.

CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 53 full length and no part length control rod assemblies. The full length control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal values of absorber material shall be 80 percent silver, 15 percent indium and 5 percent cadmium. All control rods shall be clad with stainless steel tubing.

5.4 REACTOR COOLANT SYSTEM

DESIGN PRESSURE AND TEMPERATURE

5.4.1 The reactor coolant system is designed and shall be maintained:

DESIGN FEATURES

a. In accordance with the code requirements specified in Section 4.1.6 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 contained volume of the reactor coolant system is 12,612 ± 100 cubic feet at a nominal T_{avg} of 70°F.

5.5 EMERGENCY CORE COOLING SYSTEMS

5.5.1 The emergency core cooling systems are designed and shall be maintained in accordance with the original design provisions contained in Section 6.2 of the FSAR with allowance for normal degradation pursuant to the applicable Surveillance Requirements.

5.6 FUEL STORAGE

CRITICALITY - SPENT FUEL

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

a. A k_{eff} equivalent to less than 0.95 when flooded with unborated water,

b. A nominal 8.97 inch center-to-center distance between fuel assemblies placed in the storage racks.

c. The fuel assemblies will be classified as acceptable for Region 1, Region 2, or Region 3 storage based upon their assembly average burnup versus initial nominal enrichment. Cells acceptable for Region 1, Region 2, and Region 3 assembly storage are indicated in Figures 5.6-1 and 5.6-2. Assemblies that are acceptable for storage in Region 1, Region 2, and Region 3 must meet the design criteria that define the regions as follows:

1. Region 1 is designed to accommodate new fuel with a maximum nominal enrichment of 4.95 wt% U-235, or spent fuel regardless of the discharge fuel burnup.

2. Region 2 is designed to accommodate fuel of 4.95% initial nominal enrichment burned to at least 50,000 MWD/MtU, or fuel of other enrichments with equivalent reactivity.

3. Region 3 is designed to accommodate fuel of 4.95% initial nominal enrichment burned to at least 38,000 MWD/MtU, or fuel of other enrichments with equivalent reactivity.

The equivalent reactivity criteria for Region 2 and Region 3 is defined via the following equations and graphically depicted in Figure 5.6-3.

For Region 2 Storage

Minimum Assembly Average Burnup in MWD/MTU =

$$- 22,670 + 22,220 E - 2,260 E^2 + 149 E^3$$

For Region 3 Storage

Minimum Assembly Average Burnup in MWD/MTU =

$$- 26,745 + 18,746 E - 1,631 E^2 + 98.4 E^3$$

Where E = Initial Peak Enrichment

FIGURE 5.6-1: Normal Storage Pattern (Mixed Three Zone)

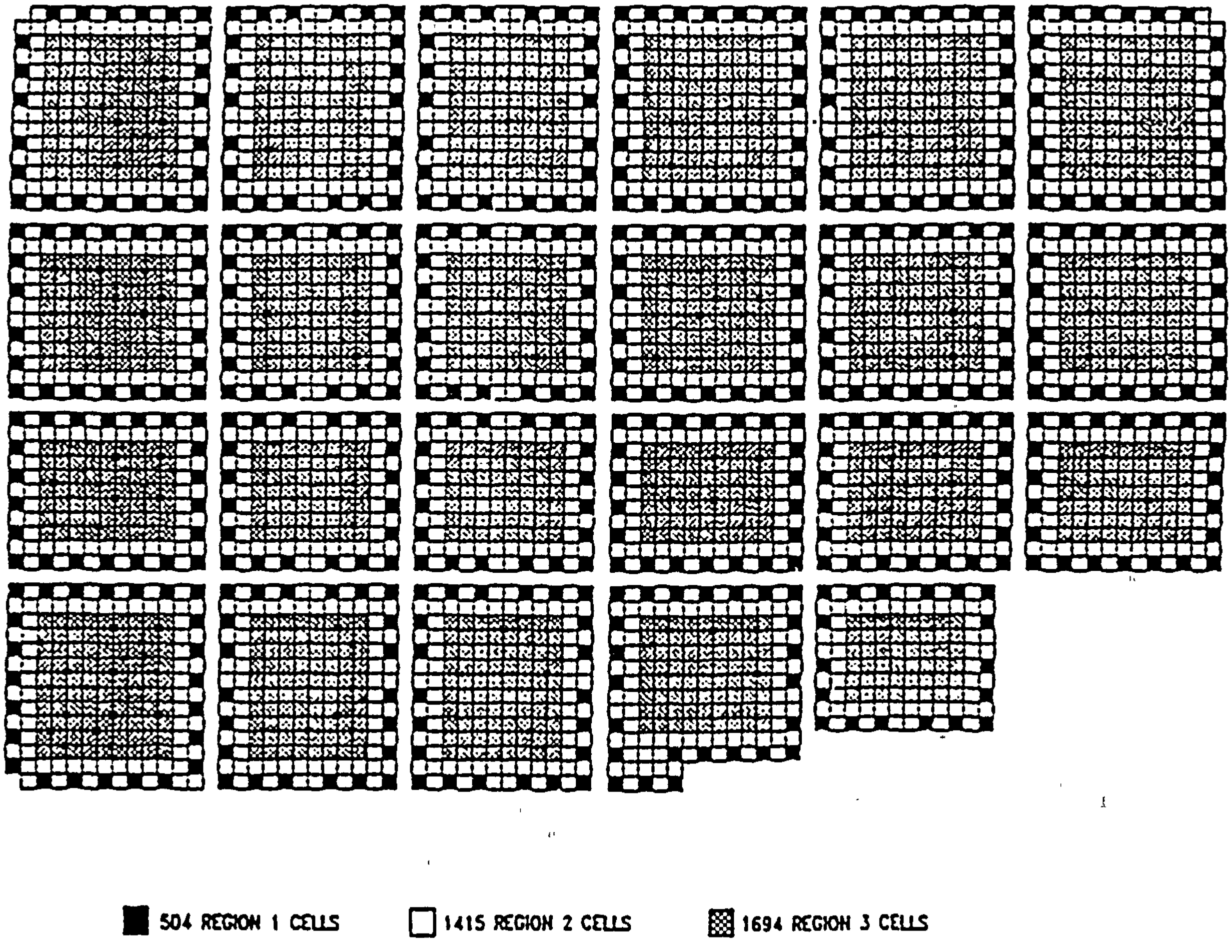
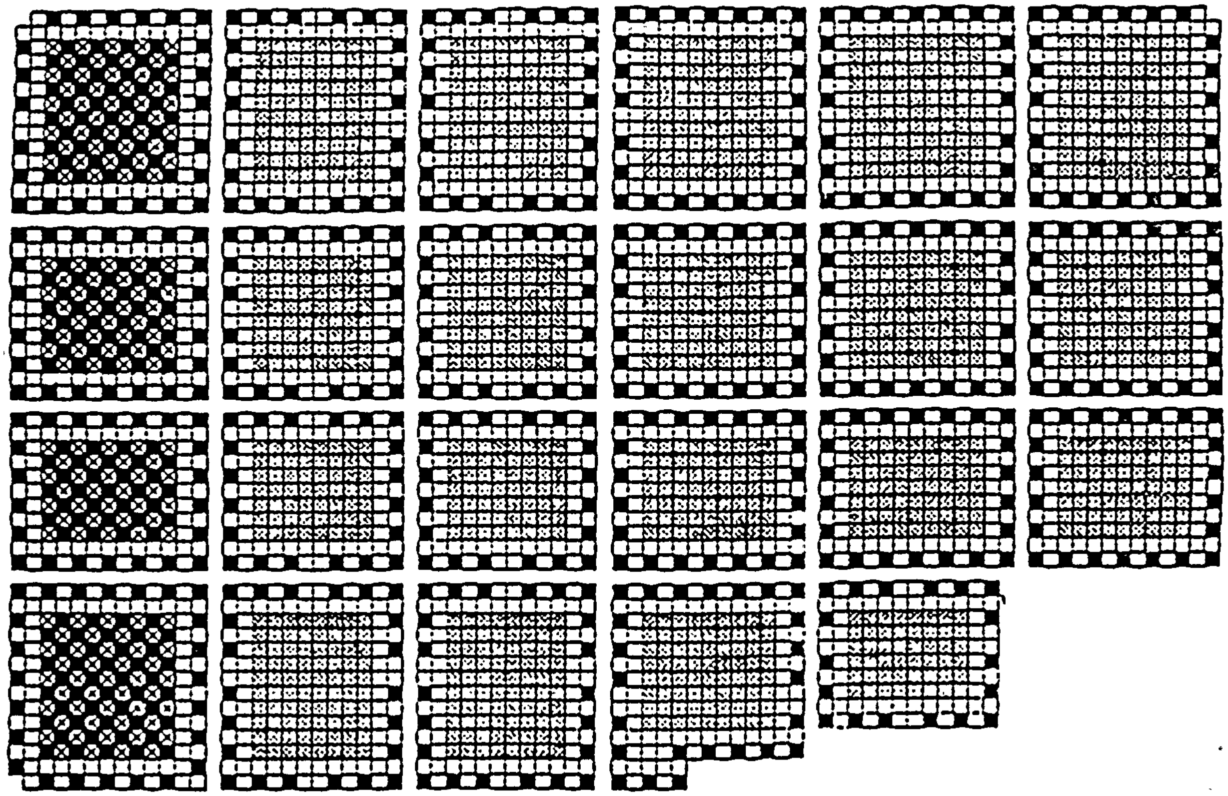
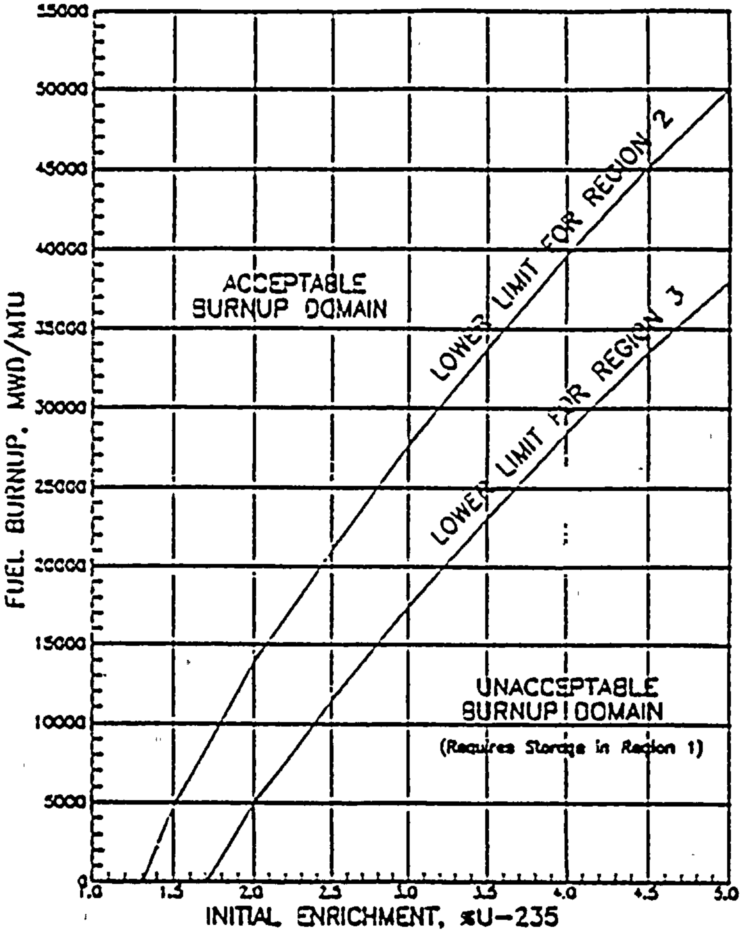


Figure 5.6-2: Interim Storage Pattern (Checkerboard)



☒ 158 EMPTY LOCATIONS ■ 661 REGION 1 CELLS □ 1415 REGION 2 CELLS ▩ 1379 REGION 3 CELLS

Figure 5.6-3: Acceptable Burnup Domain in Regions 2 & 3



DESIGN FEATURES

5.6.1.2: Fuel stored in the spent fuel storage racks shall have a maximum nominal fuel assembly enrichment as follows:

Description			Maximum Nominal Fuel Assembly Enrichment Wt. % 235_U
1)	Westinghouse	15 x 15 STD 15 x 15 OFA	4.95
2)	Exxon/ANF	15 x 15	4.95
3)	Westinghouse	17 x 17 STD 17 x 17 OFA 17 x 17 V5	4.95
4)	Exxon/ANF	17 x 17	4.95

CRITICALITY - NEW FUEL

5.6.2.1 The new fuel pit storage racks are designed and shall be maintained with a nominal 21 inch center-to-center distance between new fuel assemblies such that k_{eff} will not exceed 0.98 when fuel assemblies are placed in the pit and aqueous foam moderation is assumed.

5.6.2.2 Fuel stored in the new fuel storage racks shall have a maximum nominal fuel assembly enrichment as follows:

Description			Maximum Nominal Fuel Assembly Enrichment Wt. % 235_U
1)	Westinghouse	15 x 15 STD 15 x 15 OFA	4.55
2)	Exxon/ANF	15 x 15	3.50
3)	Westinghouse	17 x 17 STD 17 x 17 OFA 17 x 17 V5	4.55
4)	Exxon/ANF	17 x 17	4.23

DRAINAGE

5.6.3 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 629'4".

DESIGN FEATURES

CAPACITY

5.6.4 The fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 3613 fuel assemblies.

5.7 SEISMIC CLASSIFICATION

5.7.1 Those structures, systems and components identified as Category I Items in the FSAR shall be designed and maintained to the original design provisions contained in the FSAR with allowance for normal degradation pursuant to the applicant Surveillance Requirements.

5.8 METEOROLOGICAL TOWER LOCATION

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

5.9 COMPONENT CYCLIC OR TRANSIENT LIMIT

5.9.1 The components identified in Table 5.9-1 are designed and shall be maintained within the cyclic or transient limits of Table 5.9-1.

(q) Deleted by Amendment 2.

(r) Deleted by Amendment 68.

(s) Spent Fuel Pool Storage

Amendment
No. 104, 121

The licensee is authorized to store D. C. Cook, Unit 1 and Unit 2 fuel assemblies, new or irradiated up to a total of 3613 fuel assemblies in the shared spent fuel pool at the Donald C. Cook Nuclear Plant subject to the following conditions:

Fuel stored in the spent fuel pool shall not have a nominal enrichment greater than 4.95% Uranium-235.

*Amendment 3 deleted Paragraph (s), Amendment 13 added a new Paragraph (s).

(t) Secondary Water Chemistry Monitoring Program

The licensee shall implement a secondary water chemistry monitoring program to inhibit steam generator tube degradation. This program shall be described in the station chemistry manual and shall include:

1. Identification of a sampling schedule for the critical parameters and control points for these parameters;

2. Identification of the procedures used to measure the values of the critical parameters;

3. Identification of process sampling points;

Amendment
No. 18

4. Procedure for the recording and management of data;

5. Procedures defining corrective actions for off control point chemistry conditions; and

6. A procedure identifying (a) the authority responsible for the interpretation of the data, and (b) the sequence and timing of administrative events required to initiate corrective actions.

REFUELING OPERATIONS

DECAY TIME

LIMITING CONDITION FOR OPERATION

3.9.3 The reactor shall be subcritical for at least 168 hours.

APPLICABILITY: During movement of irradiated fuel in the reactor pressure vessel.

ACTION:

With the reactor subcritical for less than 168 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.3 The reactor shall be determined to have been subcritical for at least 168 hours by verification of the date and time of subcriticality prior to movement of irradiated fuel in the reactor pressure vessel.

REFUELING OPERATIONS

STORAGE POOL BORON CONCENTRATION*

LIMITING CONDITION FOR OPERATION

3.9.15 A boron concentration of greater than or equal to 2,400 ppm shall be maintained in the fuel storage pool.

APPLICABILITY: At all times.

ACTION:

With the requirements of the specification not satisfied, suspend all movement of fuel assemblies in the fuel storage pool and restore the boron concentration to within its limit prior to resuming fuel movement. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.15 The boron concentration in the fuel storage pool shall be determined to be at least at its minimum required at least once per 7 days.

*Shared system with Cook Nuclear Plant - Unit 1

DESIGN FEATURES

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 193 fuel assemblies with each fuel assembly containing 264 fuel rods clad with Zircaloy-4. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment of 3.3 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and may be nominally enriched up to 4.95 weight percent U-235.

CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 53 full length and no part length control rod assemblies. The full length control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal values of absorber material shall be 80 percent silver, 15 percent indium and 5 percent cadmium. All control rods shall be clad with stainless steel tubing.

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 4.1.6 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 12,612 plus or minus 100 cubic feet at a nominal Tavg of 70°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 - SPENT FUEL

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

a. A K_{eff} equivalent to less than 0.95 when flooded with unborated water,

b. A nominal 8.97-inch center-to-center distance between fuel assemblies, placed in the storage racks.

c. The fuel assemblies will be classified as acceptable for Region 1, Region 2, or Region 3 storage based upon their assembly average burnup versus initial nominal enrichment. Cells acceptable for Region 1, Region 2, and Region 3 assembly storage are indicated in Figures 5.6-1 and 5.6-2. Assemblies that are acceptable for storage in Region 1, Region 2, and Region 3 must meet the design criteria that define the regions as follows:

   1. Region 1 is designed to accommodate new fuel with a maximum nominal enrichment of 4.95 wt% U-235, or spent fuel regardless of the discharge fuel burnup.

   2. Region 2 is designed to accommodate fuel of 4.95% initial nominal enrichment burned to at least 50,000 MWD/MTU, or fuel of other enrichments with equivalent reactivity.

   3. Region 3 is designed to accommodate fuel of 4.95% initial nominal enrichment burned to at least 38,000 MWD/MTU, or fuel of other enrichments with equivalent reactivity.

The equivalent reactivity criteria for Region 2 and Region 3 is defined via the following equations and graphically depicted in Figure 5.6-3.

For Region 2 Storage

Minimum Assembly Average Burnup in MWD/MTU =

$$- 22,670 + 22,220\ E - 2,260\ E^2 + 149\ E^3$$

For Region 3 Storage

Minimum Assembly Average Burnup in MWD/MTU =

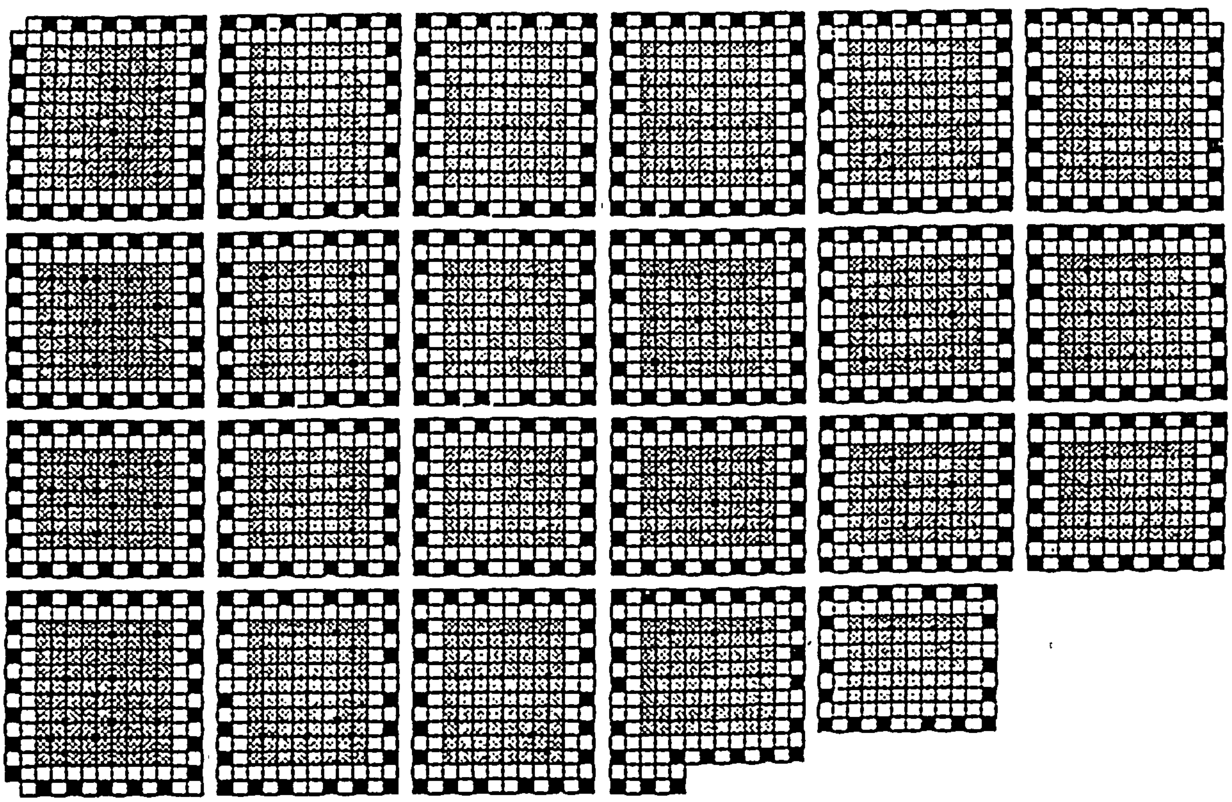
$$- 26,745 + 18,746\ E - 1,631\ E^2 + 98.4\ E^3$$

Where E = Initial Peak Enrichment

5.6.1.2 Fuel stored in the spent fuel storage racks shall have a nominal fuel assembly enrichment as follows:

	Description		Maximum Nominal Fuel Assembly Enrichment Wt. % 235U
1)	Westinghouse	15 x 15 STD 15 x 15 OFA	4.95
2)	Exxon/ANF	15 x 15	4.95
3)	Westinghouse	17 x 17 STD 17 x 17 OFA 17 x 17 V5	4.95
4)	Exxon/ANF	17 x 17	4.95

FIGURE 5.6-1: Normal Storage Pattern (Mixed Three Zone)



■ 504 REGION 1 CELLS □ 1415 REGION 2 CELLS ▩ 1694 REGION 3 CELLS

Figure 5.6-2: Interim Storage Pattern (Checkerboard)

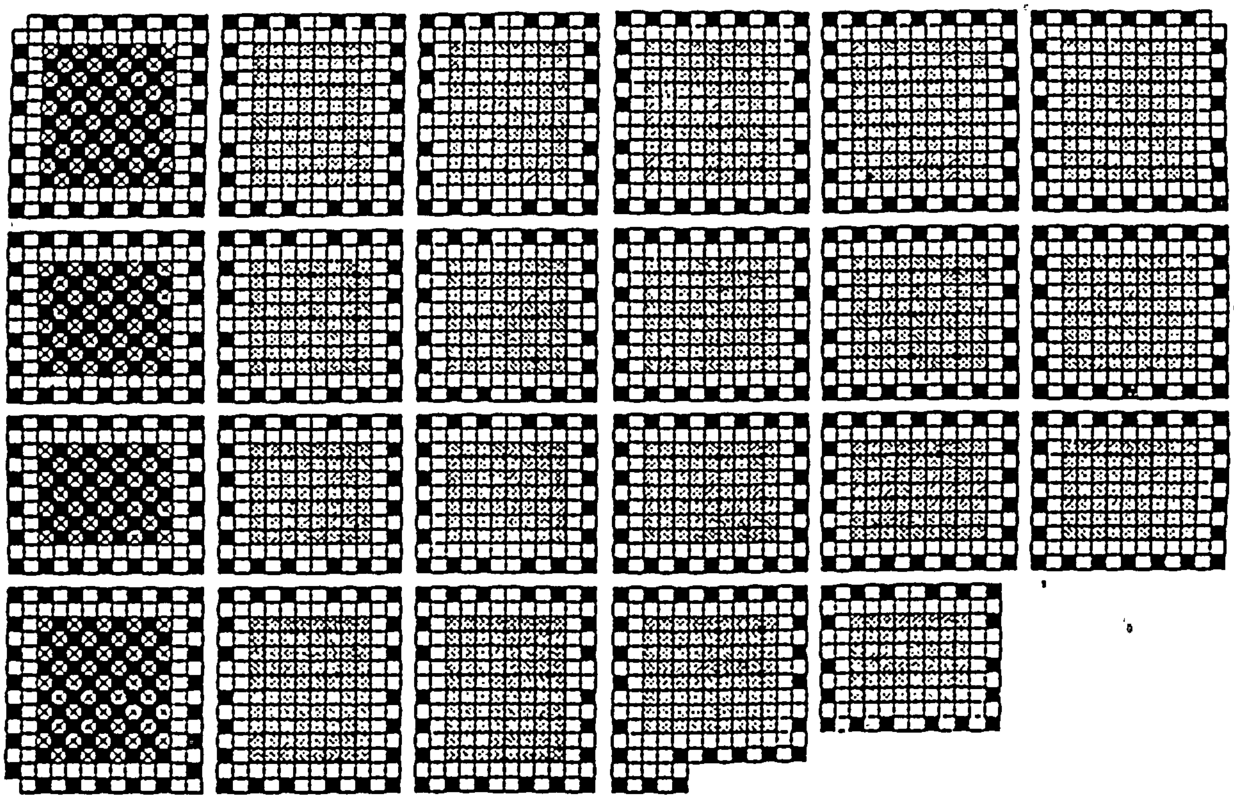
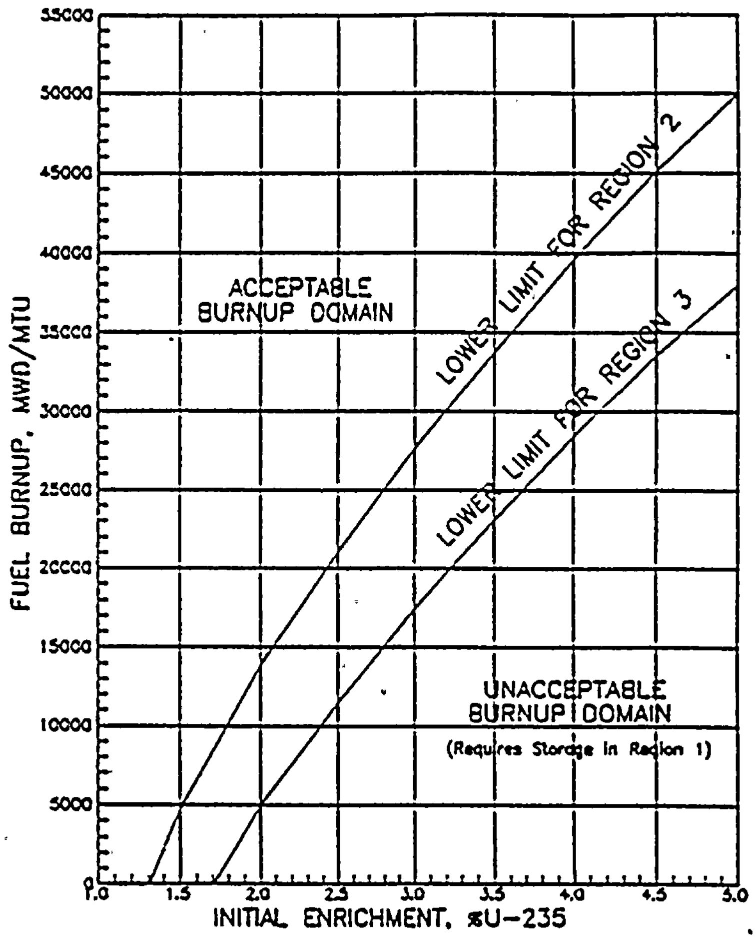


Figure 5.6-3: Acceptable Burnup Domain in Regions 2 & 3



DESIGN FEATURES

CRITICALITY NEW FUEL

5.6.2.1 The new fuel pit storage racks are designed and shall be maintained with a nominal 21 inch center-to-center distance between new fuel assemblies such that K_{eff} will not exceed 0.98 when fuel assemblies are placed in the pit and aqueous foam moderation is assumed.

5.6.2.2 Fuel stored in the new fuel storage racks shall have a maximum nominal fuel assembly enrichment as follows:

	Description		Maximum Nominal Fuel Assembly Enrichment Wt. % 235U
1)	Westinghouse	15 x 15 STD 15 x 15 OFA	4.55
2)	Exxon/ANF	15 x 15	3.50
3)	Westinghouse	17 x 17 STD 17 x 17 OFA 17 x 17 V5	4.55
4)	Exxon/ANF	17 x 17	4.23

DRAINAGE

5.6.3 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 629'4".

CAPACITY

5.6.4 The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 3613 fuel assemblies.

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.

ATTACHMENT 4 TO AEP:NRC:1146

LICENSING REPORT FOR STORAGE DENSIFICATION
OF D. C. COOK SPENT FUEL POOL

[illegible]