5.2 CONTAINMENT (Continued)

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, except that limited substitutions of zirconium alloy or stainless steel filler rods, in accordance with NRC-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. 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:

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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, with one exception. This exception is the CVCS boron makeup system and the BIT.

FONT CHANGE

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. 1. 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:

REMOVE (PREVIOUSLY INADVERTENTLY ADDED)

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.

FONT CHANGE

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

<u>For Region 2 Storage</u>

Minimum Assembly Average Burnup in MWD/MTU =

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

<u>For Region 3 Storage</u>

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

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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. % 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

"Wt. % U-235"

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:

REPLACE WITH (A)

	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".

(A)

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

a. Fuel assemblies having a maximum enrichment in accordance with Table 5.6-1;

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.7 of the UFSAR;

c. $k_{eff} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in Section 9.7 of the UFSAR; and

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

Table 5.6-1

MAXIMUM NOMINAL FUEL ASSEMBLY ENRICHMENT FOR NEW FUEL STORAGE RACKS

	Description		Maximum Nominal Fuel Assembly Enrichment Wt. % U-235
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

* A maximum nominal enrichment of 4.95 weight percent U-235 for Westinghouse fuel types is acceptable provided that sufficient integral fuel burnable absorber is present in each fuel assembly stored in the new fuel storage racks such that the maximum reference fuel assembly k_{∞} is less than or equal to 1.4857 at 68°F.

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:

FONT CHANGE

Description		Maximum Nominal Fuel Assembly Enrichment Wt. % 235U
1) Westinghouse	15 x 15 STD 15 x 15 OFA	4.95
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REVISE FOR CONSISTENCY BETWEEN T/Ss TO "Wt. % U-235"

5.6 FUEL STORAGE (Continued)

CRITICALITY - NEW FUEL

REPLACE WITH (A)

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.

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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.

ATTACHMENT 3 TO AEP:NRC:1071U

PROPOSED REVISED
TECHNICAL SPECIFICATION PAGES

5.0 DESIGN FEATURES

5.2 CONTAINMENT (Continued)

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.

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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 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, with one exception. This exception is the CVCS boron makeup system and the BIT.

5.6 FUEL STORAGE

CRITICALITY - SPENT FUEL

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

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5.6 FUEL STORAGE (Continued)

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.

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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 maximum nominal fuel assembly enrichment as follows:

	Description		Maximum Nominal Fuel Assembly Enrichment Wt. % U-235
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

5.6 FUEL STORAGE (Continued)

CRITICALITY - NEW FUEL

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

a. Fuel assemblies having a maximum enrichment in accordance with Table 5.6-1;

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.7 of the UFSAR;

c. $k_{eff} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in Section 9.7 of the UFSAR; and

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

Table 5.6-1

MAXIMUM NOMINAL FUEL ASSEMBLY ENRICHMENT
FOR NEW FUEL STORAGE RACKS

	Description		Maximum Nominal Fuel Assembly Enrichment Wt. % U-235
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".

* A maximum nominal enrichment of 4.95 weight percent U-235 for Westinghouse fuel types is acceptable provided that sufficient integral fuel burnable absorber is present in each fuel assembly stored in the new fuel storage racks such that the maximum reference fuel assembly k_{∞} is less than or equal to 1.4857 at 68°F.

5.6 FUEL STORAGE (Continued)

CRITICALITY - SPENT FUEL (Continued)

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. % U-235
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4)	Exxon/ANF	17 x 17	4.95

5.6 FUEL STORAGE (Continued)

CRITICALITY - NEW FUEL

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

a. Fuel assemblies having a maximum enrichment in accordance with Table 5.6-1;

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.7 of the UFSAR;

c. $k_{eff} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in Section 9.7 of the UFSAR; and

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

Table 5.6-1
MAXIMUM NOMINAL FUEL ASSEMBLY ENRICHMENT
FOR NEW FUEL STORAGE RACKS

	Description		Maximum Nominal Fuel Assembly Enrichment Wt. % U-235
1)	Westinghouse	15 x 15 STD 15 x 15 OFA	4.55*
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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.

* A maximum nominal enrichment of 4.95 weight percent U-235 for Westinghouse fuel types is acceptable provided that sufficient integral fuel burnable absorber is present in each fuel assembly stored in the new fuel storage racks such that the maximum reference fuel assembly k_{∞} is less than or equal to 1.4857 at 68°F.

ATTACHMENT 4 TO AEP:NRC:1071U

CDB-95-175
"CRITICALITY ANALYSIS OF THE
DONALD C. COOK NUCLEAR PLANT
NEW FUEL STORAGE VAULT
WITH CREDIT FOR
INTEGRAL FUEL BURNABLE ABSORBES

NOVEMBER 1995

PREPARED BY
WESTINGHOUSE ELECTRIC CORPORATION

(NON-PROPRIETARY)