Progress Energy

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Progress Energy Carolinas, Inc.

ATTACHMENT 9 CONTAINS PROPRIETARY INFORMATION

SEP 0 1 2005

Serial: HNP-05-103
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
TO CREDIT SOLUBLE BORON FOR FUEL STORAGE POOLS

Ladies and Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Part 50.90, Carolina Power and Light Company (CP&L) doing business as Progress Energy Carolinas, Inc., requests a license amendment to the Technical Specifications (TS) of the Harris Nuclear Plant (HNP). The proposed amendment would modify the TS requirements for Pressurized-Water Reactor (PWR) Boraflex fuel storage racks and add TS requirements for fuel storage pool boron concentration.

Attachment 1 provides the description, background, and technical analysis for the proposed change to TS.

Attachment 2 details, in accordance with 10 CFR 50.91(a), the basis for HNP's determination that the proposed change to the FSAR does not involve a significant hazards consideration.

Attachment 3 provides the proposed TS changes.

Attachment 4 provides the revised TS pages.

Attachment 5 provides the proposed TS Bases changes (for information only).

Attachment 6 provides the Non-Proprietary Version of the Framatome ANP, Inc. Shearon Harris Criticality Evaluation Report No. 77-5069740-NP-00 dated August 2005.

Attachment 7 provides the boron dilution evaluation.

ATTACHMENT 9 CONTAINS PROPRIETARY INFORMATION
WHEN SEPARATED FROM ATTACHMENT 9, THIS DOCUMENT IS DECONTROLLED

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A001

Attachment 8 provides the affidavit, pursuant to 10 CFR 2.390, for the Proprietary Version of the Framatome ANP, Inc. Shearon Harris Criticality Evaluation Report (Attachment 9).

Attachment 9 provides the Proprietary Version of the Framatome ANP, Inc. Shearon Harris Criticality Evaluation Report No. 77-5069740-P-00 dated August 2005.

With respect to this proposed change there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite and there is no significant increase in individual or cumulative occupational radiation exposure. The proposed change to the Technical Specifications meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental assessment or environmental impact statement is required for approval of this application.

In accordance with 10 CFR 50.91(b), HNP is providing the State of North Carolina with a copy of the proposed license amendment.

HNP requests that the proposed amendment be issued prior to March 10, 2006 to support HNP Refueling Outage (RFO)-13, which is scheduled for April 8, 2006.

This document contains no new Regulatory Commitment.

Please refer any question regarding this submittal to Mr. Dave Corlett at (919) 362-3137.

I declare, under penalty of perjury, that the attached information is true and correct (Executed on SEP 01 2005).

Sincerely,

James Scarola

JS/jpy

Attachments:

1. Description, Background, and Technical Analysis
2. 10 CFR 50.92 No Significant Hazards Evaluation
3. Proposed Technical Specifications (TS) Changes
4. Revised Technical Specifications (TS) Pages
5. Proposed Technical Specifications (TS) Bases Changes (For Information Only)

6. Framatome ANP, Inc. Shearon Harris Criticality Evaluation Report No. 77-5069740-NP-00 dated August 2005 (Non-Proprietary Version)
7. Boron Dilution Evaluation
8. Affidavit for Proprietary Information
9. Framatome ANP, Inc. Shearon Harris Criticality Evaluation Report No. 77-5069740-P-00 dated August 2005 (Proprietary Version)

c:
Mr. R. A. Musser, NRC Senior Resident Inspector
Ms. B. O. Hall, N.C. DENR Section Chief
Mr. C. P. Patel, NRC Project Manager
Dr. W. D. Travers, NRC Regional Administrator

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

Description

In accordance with the Code of Federal Regulations, Title 10, Part 50.90, "Application for amendment of license or construction permit," Carolina Power and Light Company (CP&L) doing business as Progress Energy Carolinas, Inc., requests a license amendment to the Technical Specifications (TS) of the Harris Nuclear Plant (HNP). Specifically, HNP proposes the following changes:

1. A new TS 3/4.7.14, "Fuel Storage Pool Boron Concentration," has been added with a Limiting Condition of Operation (LCO) limit of 2000 ppm. The LCO is applicable to any pool that stores nuclear fuel. Compliance with the LCO is required "At ALL TIMES." The ACTION required if the LCO is not met is the immediate suspension of movement of fuel and immediate steps to restore the boron concentration to within the limit. The required surveillance is once per 7 days. Any part of the connected water volumes of the pool may be sampled for the surveillance. In the event a pool containing fuel is isolated, surveillance of the individual pool is required in addition to the balance of the water volume.

2. The existing TS 5.6.1 has been revised so that the requirement and applicability of $k_{eff} \leq 0.95$ when fully flooded with unborated water is removed for the Boraflex PWR racks. The section is reformatted to state that $k_{eff} \leq 0.95$ remains applicable to the BWR racks in Pools "A," "B," and "C," and the PWR racks in Pools "C" and "D." A new subsection is created for the Boraflex racks in Pools "A" and "B." The requirements that apply include:
   - $k_{eff} \leq 0.95$ when flooded with water borated to 2000 ppm.
   - $k_{eff} < 1.0$ when flooded with unborated water.
   - Unrestricted storage is acceptable if a fuel assembly meets a Burnup Credit (BUC) curve.
   - Restricted storage (2-of-4 checkerboard or less dense) applies if a fuel assembly does not meet the BUC curve.
   - A boundary region is required between the restricted and unrestricted storage. The boundary can either be (a) an empty row/column; or (b) a row/column with BUC qualified fuel in a checkerboard. Boundary rows are not required between rack modules (either PWR-PWR or BWR- PWR modules).
   - Non Fuel Bearing Containers (NFBC, e.g., containment trash baskets, specimen baskets and mock fuel assemblies) may be stored 1 of 6 in the empty spaces (water holes) in the 2-of-4 pattern or in place of a fuel assembly location.

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Description (continued)

- A revision to Figure 5.6-1 is made to add the equation for the burnup curve and revise the title so that the existing figure is consistent with the proposed content of new Figure 5.6-2. The curve in Figure 5.6-1 is not changed.
- A new Figure 5.6-2 is added to define the PWR fuel that meets the unrestricted storage in the Boraflex racks in Pools "A" and "B."
- The specifications for the dry storage of new fuel are being added to TS Section 5.6.1.

3. A new TS Bases section has been added for the new TS 3/4.7.14 to provide information related to the criticality analyses and the various analysis assumptions, such as credit being taken for soluble boron for the Boraflex racks. An information copy of the proposed Bases change is also included with this submittal.

Background

The spent fuel pools at the Harris Nuclear Plant (HNP) contain both Pressurized-Water Reactor (PWR) fuel racks and Boiling-Water Reactor (BWR) fuel racks. Both the PWR and BWR racks use a neutron absorber in the rack design for reactivity control. Two types of neutron absorbers, Boral and Boraflex, are used. This proposed license amendment addresses the PWR racks that have a Boraflex absorber, and it does not impact the racks that use Boral or the BWR racks that have a Boraflex absorber. The PWR racks containing Boraflex are referred to as "flux trap" style racks. Fuel is stored in cells that have a center-to-center spacing of 10.5 inches. The total capacity of the "flux trap" racks is 1128 fuel assemblies. These racks are used in Pools "A" and "B." Boraflex racks are also used for dry storage of new fuel. With the exception of the periphery of the rack used for monitoring Boraflex performance, each cell has Boraflex encapsulated in each cell wall.

The water for in-service spent fuel pools (currently Pool D is not used for fuel storage) normally contains soluble boron, which results in large subcriticality margins under actual operating conditions. However, NRC guidelines (NUREG-0800, Standard Review Plan, Section 9.1.2) specify than the limiting k_{eff} of 0.95 be evaluated in the absence of soluble boron. Hence, the design of the racks is based on the use of unborated water, which maintains the fuel in a subcritical condition during normal operation with the racks fully loaded. These analyses took credit for the Boraflex. The analyses include the different PWR fuel types present in the HNP pools. The fuel types include 15 x15 fuel from Robinson Nuclear Plant (RNP), and the different 17 x17 fuel designs that have been used at HNP. The limitation on acceptable fuel design is specified in terms of maximum core geometry k_∞ less than or equal to 1.470 at 68 °F.

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Background (continued)

The monitoring of spent fuel pool boron concentration is determined by plant administrative controls; there is no Technical Specification surveillance on spent fuel pool boron concentration.

The postulated accidents for the PWR Boraflex racks include the drop of a fuel assembly on the top of a rack and drop of a fuel assembly next to the periphery of a rack. Credit is taken for soluble boron for this accident in order to maintain k_{eff} less than or equal to 0.95 for these two events. The credit for soluble boron in the event of a fuel handling accident also applies to other rack designs in Pools "A", "B," and "C."

This proposed TS Amendment is pursuant to the revised criticality analysis as described in HNP's supplemental response to NRC GL 96-04, "Boraflex Degradation in Spent Fuel Pool Storage Racks" (HNP-05-004 dated April 25, 2005).

Technical Analysis

The proposed changes to TS Section 3/4.7.14 apply a restriction that is not contained in the existing TS. The changes require a fuel pool boron concentration of at least 2000 ppm at all times. Additionally, action must be initiated immediately to return the boron concentration to within limits if determined to be below the limit. The proposed TS Surveillance Requirement (SR) 4.7.14 to determine the pool boron concentration must be performed once per 7 days. Currently no TS SR exists to perform this surveillance.

The HNP fuel storage pool boron concentration has typically been maintained above 2000 ppm. Therefore there will be no change in actual plant practices regarding pool boron concentration. However including this requirement in the TS provides assurance that the required minimum boron concentration will be maintained.

The changes to TS 5.6.1 are less restrictive on the negative reactivity contribution of a rack, but will continue to ensure that a criticality accident is not credible. With the expected condition of pool boron concentration (in excess of 2000 ppm), k_{eff} will remain below 0.95. Should a low probability boron dilution event occur, k_{eff} could exceed 0.95, but even if the boron concentration were reduced to 0 ppm, k_{eff} would still remain less than 1.0 and hence a criticality accident is not credible. Attachment 7 presents a discussion of the types of dilution events considered and an analysis of the potential for criticality. The proposed limits on k_{eff} allow for credit for soluble boron and are consistent with the requirements of 10 CFR 50.68(b)(4). The allowance for credit for soluble boron is also consistent with approved license amendments for other plants including: H.B. Robinson Unit 2, McGuire Units 1 and 2, Oconee Units 1, 2 and 3, Ginna, Palisades, North Anna Units 1 and 2, and South Texas Project Units 1 and 2.

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Technical Analysis (continued)

The technical bases for the conclusions on maintaining an acceptable subcriticality margin are provided in the Framatome ANP, Inc. (FANP) report, "Shearon Harris Criticality Evaluation." A non-proprietary version of this report is contained in Attachment 6 (Report No. 77-5069740-NP-00 dated August 2005), and a proprietary version of this report is contained in Attachment 9 (Report No. 77-5069740-P-00 dated August 2005).

Specific features outside of the scope of the criticality evaluations (Attachments 6 and 9) impact the proposed changes as follows:

1. The attached TS Figure 5.6-2 includes a specific exclusion for the HNP Failed Rod Storage Canister (FRSC). The FRSC can hold up to 54 PWR failed rods with a maximum initial enrichment of 5 weight-percent and no burnup. The calculated k_{eff} of the basket is 0.682. This is much lower than the k_{eff} of a BUC-region qualified fuel assembly, and therefore placement of the FRSC in the 4-of-4 region with low burnup rods is acceptable.
2. Application of the BUC curve requires use of a specific assembly average burnup uncertainty. Progress Energy will apply a value consistent with the methods used to calculate the burnup of the PWR fuel in the HNP PWR Boraflex racks.
3. The criticality evaluation (Attachment 9) was predicated on analysis of BWR Boraflex racks without credit for Boraflex. The BWR Boraflex racks at HNP currently are evaluated as having design margin to $k_{eff} \leq 0.95$ assuming these racks are flooded with unborated water. Therefore, the criteria calculated by FANP for the BWR fuel is not applicable until such time that Progress Energy requests a TS change for the BWR Boraflex rack design criteria to eliminate credit for Boraflex in BWR spent fuel storage racks.

Conclusion

HNP has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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10 CFR 50.92 NO SIGNFICANT HAZARDS EVALUATION.

10 CFR 50.92 NO SIGNIFICANT HAZARDS EVALUATION

A written evaluation of the significant hazards consideration of a proposed license amendment is required by 10 CFR 50.92. Harris Nuclear Plant (HNP) has evaluated the proposed amendment and determined that it involves no significant hazards consideration. According to 10 CFR 50.92, a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated; or

2. Create the possibility of a new or different kind of accident from any accident previously evaluated; or

3. Involve a significant reduction in a margin of safety

The basis for this determination is presented below.

Proposed Change

In accordance with the 10 CFR 50.90, Carolina Power and Light Company (CP&L) doing business as Progress Energy Carolinas, Inc., requests a license amendment to the Technical Specifications (TS) of the Harris Nuclear Plant (HNP). HNP proposes to create TS 3.7.14 and TS Surveillance Requirement (SR) 4.7.14 and to revise TS 5.6.1. The proposed changes are related to requirements for ensuring adequate subcriticality margin in the spent fuel storage pools. TS 5.6.1 is being revised to include the design requirements for dry storage of new fuel.

Basis

This amendment does not involve a significant hazards consideration for the following reasons:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed changes do not modify the facility. The accident previously analyzed for the spent fuel pool is a fuel handling accident. The proposed change applies administrative controls for maintaining the required boron

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Basis (continued)

concentration in the spent fuel storage pools, revises acceptance criteria and storage arrangements for fuel storage in PWR "flux trap" style racks and adds acceptance criteria for dry storage of new fuel to the Technical Specifications. The controls on spent fuel pool boron and dry storage of new fuel have previously been implemented but are being added to the Technical Specifications as requirements. The proposed change applies new acceptance criteria for criticality safety of fuel storage in PWR "flux trap" style racks in Pools "A" and "B." The new acceptance criteria require new administrative controls on the placement of fuel in Pools "A" and "B." Similar administrative controls have previously been placed on fuel stored in Pools C and D. These changes will eliminate the dependence on Boraflex in the PWR "flux trap" style storage racks. These changes do not impact the probability of having a fuel handling accident and do not impact the consequences of a fuel handling accident.

Therefore, this amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   No change is being made to the acceptance criteria of the dry storage of new fuel. These criteria are being added to Technical Specification Section 5.6.1.

   Detailed analyses have been performed to ensure a criticality accident in Pools "A" and "B" is not a credible event. The events that could lead to a criticality accident are not new. These events include a fuel mis-positioning event, a fuel drop event, and a boron dilution event. The proposed changes do not impact the probability of any of these events. The detailed criticality analyses performed demonstrate that criticality would not occur following any of these events. For the more likely event, such as a fuel mis-positioning event, the acceptance criteria for k_{eff} remains less than or equal to 0.95. For the unlikely event that the spent fuel storage pool boron concentration was reduced to zero, k_{eff} remains less than 1.0.

   Therefore, a criticality accident remains "not credible," and this amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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Basis (continued)

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   Incorporation of acceptance criteria for dry storage of new fuel into TS 5.6.1 does not involve a reduction in the margin of safety. The new fuel storage condition continues to meet $k_{eff} \leq 0.95$ during normal conditions and $k_{eff} \leq 0.98$ under optimal moderation conditions.

   The proposed changes for storage of new and irradiated fuel in Pools "A" and "B" continue to provide the controls necessary to ensure a criticality event could not occur in the spent fuel storage spool. The acceptance criteria are consistent with the acceptance criteria specified in 10 CFR 50.68, which provide an acceptable margin of safety with regard to the potential for a criticality event.

   Therefore, this amendment does not involve a significant reduction in a margin of safety.

Based on the above, HNP concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

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PROPOSED TECHNICAL SPECIFICATIONS (TS) CHANGES

PROPOSED TECHNICAL SPECIFICATIONS (TS) CHANGES

Proposed Text of NEW Technical Specification for spent fuel pool boron.

PLANT SYSTEMS

3/4.7.14 FUEL STORAGE POOL BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.7.14 The boron concentration of spent fuel pools shall be ≥ 2000 ppm.

APPLICABILITY: At ALL TIMES for pools that contain nuclear fuel

ACTION:

1. With the spent fuel pool boron concentration not within the limits, immediately suspend movement of fuel assemblies.

2. Immediately initiate action to restore pool boron concentration within the limit.

SURVEILLANCE REQUIRMENTS

4.7.14 At least once every 7 days verify spent fuel pool boron concentration is within the limit by:

1. Sampling the water volume connected to or in applicable pools.

2. In addition to 4.7.14.1, sampling an individual pool containing nuclear fuel if the pool is isolated from other pools.

5.6 FUEL STORAGE

CRITICALITY

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INSERT A next page

5.6.1 The ~~spent~~ fuel storage racks are designed and shall be maintained with (indent) a k_{eff} less than or equal to 0.95 when flooded with unborated water. ~~which includes an allowance for uncertainties as described in Section 4.3.2.6 of the FSAR.~~

b. The reactivity margin is assured for BWR racks in pools "A" and "B" by maintaining:

Moved to INSERT C

~~a. A nominal 10.5 inch center-to-center distance between fuel assemblies placed in the flux trap style PWR storage racks and~~ 6.25 inch center-to-center distance in the BWR storage racks.

INSERT B

b. ~~The maximum core geometry K_{eff} for PWR fuel assemblies less than or equal to 1.470 at 68°F.~~

The reactivity margin is assured for pools "C" and "D" by maintaining a nominal 9.017 inch center-to-center distance between fuel assemblies placed in the non-flux trap style PWR storage racks and 6.25 inch center to center distance in the BWR storage racks. The following restrictions are also imposed through administrative controls:

Revise

a. PWR assemblies must be within the "acceptable range" of the burnup restrictions shown in Figure 5.6-1 prior to storage in Pools "C" or "D".

b. BWR assemblies are acceptable for storage in Pool "C" provided the maximum planar average enrichments are less than 4.6 wt% U235 and K_{inf} is less than or equal to 1.32 for the standard cold core geometry (SCCG).

5. INSERT C

DRAINAGE

5.6.2 The pools "A", "B", "C" and "D" are designed and shall be maintained to prevent inadvertent draining of the pools below elevation 277.

CAPACITY

5.6.3.a Pool "A" contains six (6 x 10 cell) flux trap type PWR racks and three (11 x 11 cell) BWR racks for a total storage capacity of 723 assemblies. Pool "B" contains six (7 x 10 cell), five (6 x 10 cell), and one (6 x 8 cell) flux trap style PWR racks and seventeen (11 x 11 cell) BWR racks and is licensed for one additional (11 x 11 cell) BWR rack that will be installed as needed. The combined pool "A" and "B" licensed storage capacity is 3669 assemblies.

DELETE

Technical Specification 5.6.1 INSERT A:

1. PWR storage racks in pools "A" and "B"

    a. k_{eff} less than or equal to 0.95 if fully flooded with water borated to 2000 ppm.
    b. k_{eff} less than 1.0 if flooded with unborated water.
    c. A nominal 10.5 inch center-to-center distance between fuel assemblies.
    d. Assemblies must be within the "acceptable range" of the burnup restrictions shown in Figure 5.6-2 prior to storage in unrestricted storage.
    e. Assemblies that do not meet the requirements of 5.6.1.1.d shall be stored in a 2-of-4 checkerboard within and across rack module boundaries. Less dense storage pattern (e.g. 1-of-4 or 1-of-5) are acceptable in place of 2-of-4.
    f. The empty spaces (water holes) in the 5.6.1.1.e checkerboard may be occupied by non-fuel items (e.g., containment specimen and trash baskets, mock fuel assemblies etc.) up to a limit of one per every 6 storage spaces.
    g. If fuel that meets the requirement of 5.6.1.1.d and fuel that does not meet 5.6.1.1.d are stored in the same rack module, an interface region must exist between the two regions. The interface region shall either be an empty row/column or a row /column of fuel that meets the requirements of 5.6.1.1.d in a checkerboard pattern with the restricted 2-of-4 (5.6.1.1.e) region.

2. Dry New Fuel PWR Storage Racks

    a. Fuel assemblies having a maximum U-235 enrichment of 5.0 weight percent.
    b. $k_{eff} \leq 0.95$ if fully flooded with unborated water without credit for Boraflex in the rack module.
    c. $k_{eff} \leq 0.98$ in an optimum moderation event,
    d. A nominal 10.5 inch center to center distance between storage cells with alternating rows and columns blocked such that fuel is stored in a 1-of-4 pattern.

3. BWR Storage Racks in Pools "A" and "B"

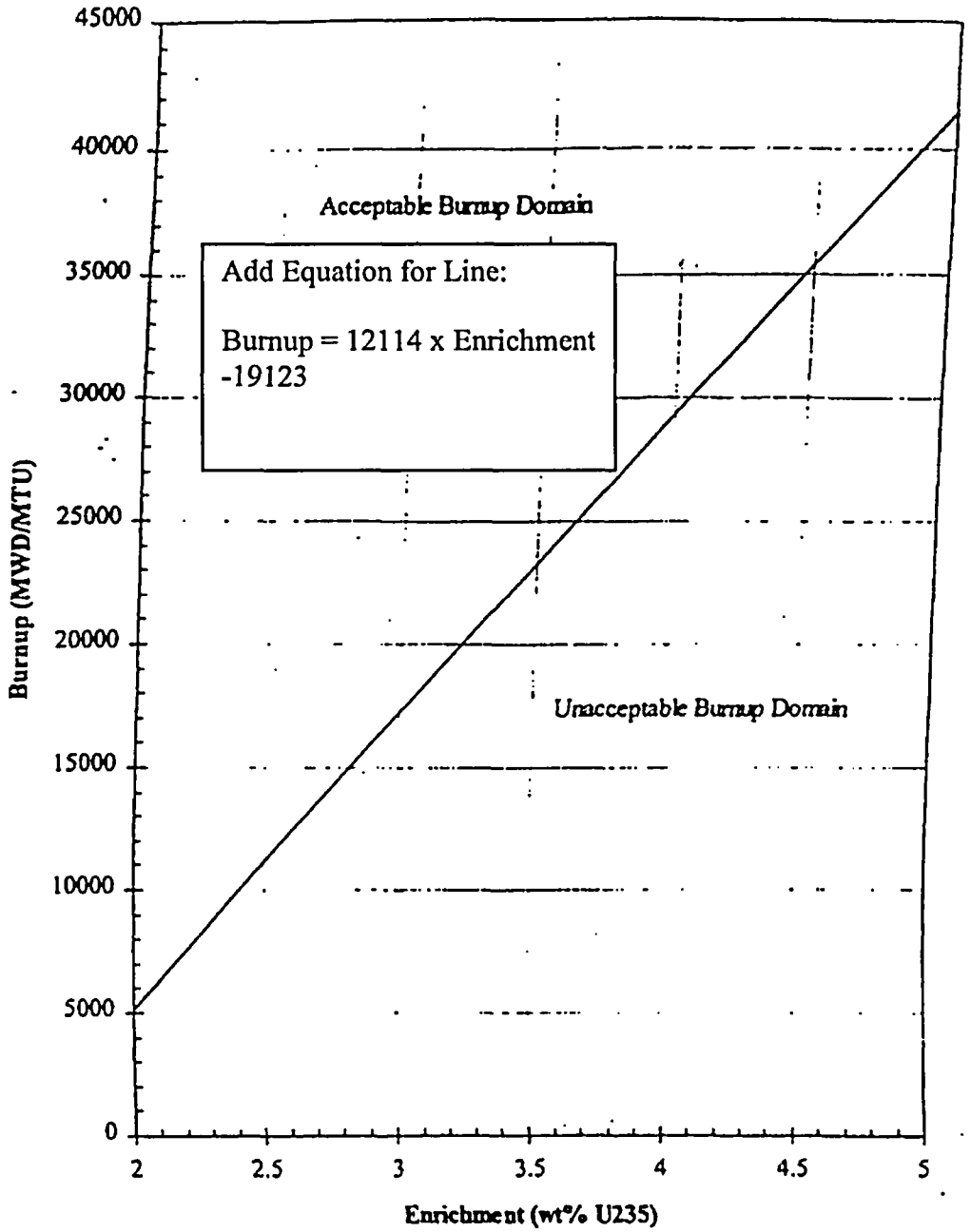
Technical Specification Insert B:

4. PWR and BWR storage racks in Pools "C" and "D"

    a. $k_{eff} \leq 0.95$ with unborated water.

Technical Specification Insert C:

5. In each case, k_{eff} includes allowances for uncertainties as described in Section 4.3.2.6 of the FSAR.



POOLS "C" AND "D"

FIGURE 5.6-1
BURNUP VERSUS ENRICHMENT FOR PWR FUEL

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New Technical Specification Figure

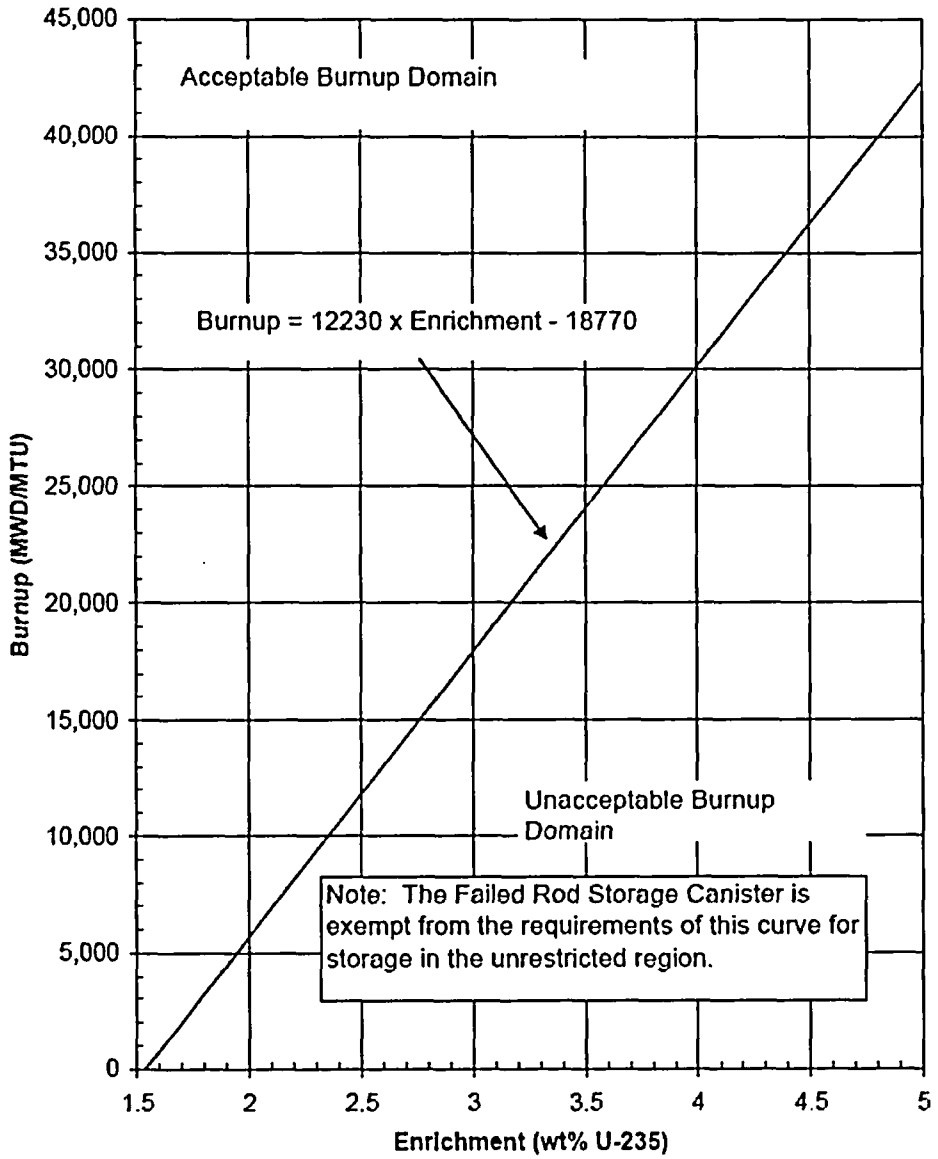

Figure 5.6-2
Pools "A" and "B" BURNUP VERSUS ENRICHMENT FOR PWR FUEL

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REVISED TECHNICAL SPECIFICATIONS (TS) PAGES

REVISED TECHNICAL SPECIFICATIONS (TS) PAGES

3/4.7.14 FUEL STORAGE POOL BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.7.14 The boron concentration of spent fuel pools shall be ≥ 2000 ppm.

APPLICABILITY: At ALL TIMES for pools that contain nuclear fuel.

ACTION:

a. With the spent fuel pool boron concentration not within the limits, immediatley suspend movement of fuel assemblies.
b. Immediately initiate action to restore pool boron concentration within the limit.

SURVEILLANCE REQUIREMENTS

4.7.14 At least once every 7 days verify spent fuel pool boron concentration is within the limit by:

a. Sampling the water volume connected to or in applicable pools.

b. In addition to 4.7.14.1, sampling an individual pool containing nuclear fuel if the pool is isolated from other pools.

5.6 FUEL STORAGE

CRITICALITY

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

1. PWR storage racks in pools "A" and "B"

   a. k_{eff} less than or equal to 0.95 if fully flooded with water borated to 2000ppm.

   b. k_{eff} less than 1.0 if flooded with unborated water.

   c. A nominal 10.5 inch center-to-center distance between fuel assemblies.

   d. Assemblies must be within the "acceptable range" of the burnup restrictions shown in Figure 5.6-2 prior to storage in unrestricted storage.

   e. Assemblies that do not meet the requirements of 5.6.1.1.d shall be stored in a 2-of-4 checkerboard within and across rack module boundaries. Less dense storage patterns (e.g. 1-of-4 or 1-of-5) are acceptable in place of 2-of-4.

   f. The empty spaces (water holes) in the 5.6.1.1.e checkerboard may be occupied by non-fuel items (e.g., containment specimen and trash baskets, mock fuel assemblies etc.) up to a limit of one per every 6 storage spaces.

   g. If fuel that meets the requirement of 5.6.1.1.d and fuel that does not meet 5.6.1.1.d are stored in the same rack module,an interface region must exist between the two regions. The interface region shall either be an empty row/column or a row/column of fuel that meets the requirements of 5.6.1.1.d in a checkerboard pattern with the restricted (5.6.1.1.e) region.

2. Dry New Fuel PWR Storage Racks

   a. Fuel assemblies having a maximum U-235 enrichment of 5.0 weight percent.

   b. $k_{eff} \leq 0.95$ if fully flooded with unborated water without credit for Boraflex in the rack module.

   c. $k_{eff} \leq 0.98$ in an optimum moderation event.

   d. A nominal 10.5 inch center to center distance between storage cells with alternating rows and columns blocked such that fuel is stored in a 1-of-4 pattern.

3. BWR Storage Racks in Pools "A" and "B"

   a. k_{eff} less than or equal to 0.95 when flooded with unborated water.

   b. The reactivity margin is assured for BWR racks in pools "A" and "B" by maintaining a nominal 6.25 inch center-to-center distance in the BWR storage racks.

4. PWR and BWR racks in pools "C" and "D" .

   a. k_{eff} less than or equal to 0.95 when flooded with unborated water.

   b. The reactivity margin is assured for pools "C" and "D" by maintaining a nominal 9.017 inch center-to-center distance between fuel assemblies placed in the non-flux trap style PWR storage racks and 6.25 inch center-to-center distance in the BWR storage racks.

   c. The following restrictions are also imposed through administrative controls:

      1. PWR assemblies must be within the "acceptable range" of the burnup restrictions shown in Figure 5.6-1 prior to storage in pools "C" and "D".

      2. BWR assemblies are acceptable for storage in pool "C" provided the maximum planar average enrichments are less than 4.6 wt.% U235 and K_{inf} is less than or equal to 1.32 for the standard cold core geometry (SCCG).

5. In each case, k_{eff} includes allowances for uncertainties as described in Section 4.3.2.6 of the FSAR.

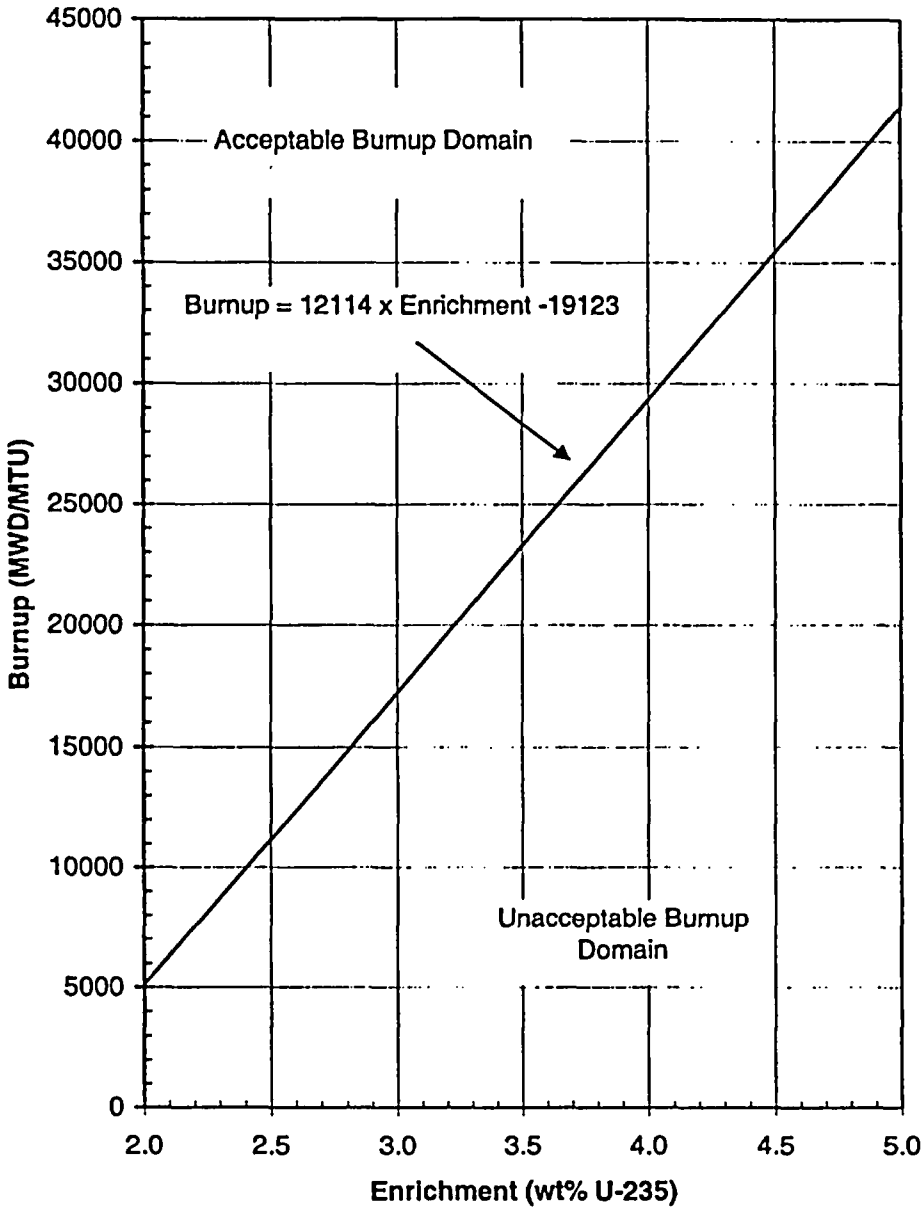

FIGURE 5.6-1
POOLS "C" and "D" BURNUP VERSUS ENRICHMENT FOR PWR FUEL

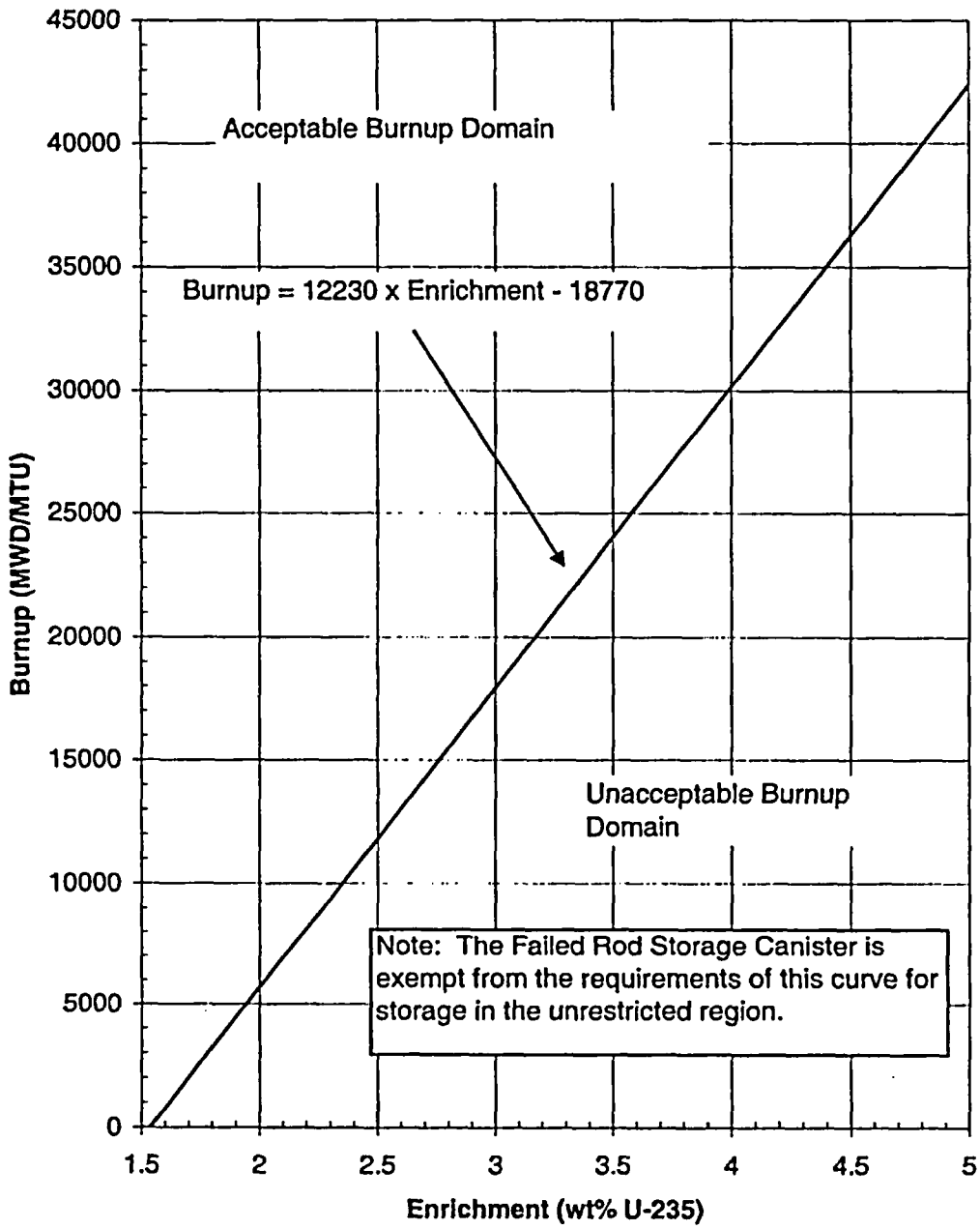

FIGURE 5.6-2
POOLS "A" and "B" BURNUP VERSUS ENRICHMENT FOR PWR FUEL

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
PROPOSED TECHNICAL SPECIFICATIONS (TS) BASES CHANGES
(FOR INFORMATION ONLY)

PROPOSED TECHNICAL SPECIFICATIONS (TS) BASES CHANGES (FOR INFORMATION ONLY)

3/4.7.9 SEALED SOURCE CONTAMINATION

The sources requiring leak tests are specified in 10 CFR 31.5(c)(2)(ii). The limitation on removable contamination is required by 10 CFR 31.5(c)5. This limitation will ensure that leakage from Byproduct, Source, and Special Nuclear Material sources will not exceed allowable intake values.

Sealed sources are classified into three groups according to their use, with Surveillance Requirements commensurate with the probability of damage to a source in that group. Those sources that are frequently handled are required to be tested more often than those that are not. Sealed sources that are continuously enclosed within a shielded mechanism (i.e., sealed sources within radiation monitoring or boron measuring devices) are considered to be stored and need not be tested unless they are removed from the shielded mechanism.

3/4.7.10 DELETED

3/4.7.11 DELETED

3/4.7.12 DELETED

3.4.7.13 ESSENTIAL SERVICES CHILLED WATER SYSTEM

The OPERABILITY of the Emergency Service Chilled Water System ensures that sufficient cooling capacity is available for continued operation of safety related equipment during normal and accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the safety analyses.

Add New Bases Section 3/4.7.14 from next page

DELETE

3/4.7.14 FUEL STORAGE POOL BORON CONCENTRATION

The fuel storage pools contain several rack designs. The PWR and BWR racks in Pools "C" and "D" have a poison that maintains k_{eff} less than or equal to 0.95 during normal operation. The BWR racks in Pools "A" and "B" also credit a poison in the rack design. For the PWR racks in Pools "A" and "B", the installed poison is not credited and soluble boron is relied upon to maintain the storage k_{eff} less than or equal to 0.95 during normal operation. Soluble boron is also relied upon during design basis accidents (e.g. fuel handling accident (FHA) or misloading) to maintain k_{eff} less than or equal to 0.95. The most limiting boron requirement is 1000 ppm of any of the pools. The difference between 2000 ppm and 1000 ppm provides margin for boron measurement uncertainties and the detection and mitigation of an accidental boron dilution event. It is not required to postulate the boron dilution accidents concurrent with another accident such as fuel misloading or FHA.

The water in the pools normally contains a concentration in excess of 2000 ppm. The pools are typically interconnected through canals. Years of operating data show that the boron concentration does not vary significantly from pool to pool. The sampling surveillance permits taking a sample from any location in the connected volume of the pools. This is typically done by rotating between four widely separated locations (e.g. Pool A, Pool B, Pool C and 1&4 Transfer Canal) in the entire pool volume. Sampling of an individual pool is only required when a specific pool is isolated such that diffusion of the boron between pools is restricted.