



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

April 7, 2014

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 1 - ISSUANCE OF AMENDMENT TO
TECHNICAL SPECIFICATION 4.3.1 CRITICALITY (TAC NO. MF2515)

Dear Mr. Shea:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 95 to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant (WBN), Unit 1. This amendment consists of changes to the license and the Technical Specifications (TSs) in response to your application dated July 30, 2013.

The proposed amendment will modify TS 4.3.1.1, "Criticality," to clarify the requirements for storage of new and spent fuel assemblies in the spent fuel racks currently provided in TS 4.3.1.1.d and TS 4.3.1.1.e.2. This change updates the current WBN Unit 1 TS 4.3.1.1 to ensure consistency with the proposed TS 4.3.1.1 for WBN Unit 2. In addition, editorial changes are being made to TS 4.3.1.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink, appearing to read "Andrew Hon", is written over a horizontal line.

Andrew Hon, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosures:

1. Amendment No. 95 to NPF-90
2. Safety Evaluation

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-390

WATTS BAR NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 95
License No. NPF-90

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Tennessee Valley Authority (the licensee) dated July 30, 2013, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

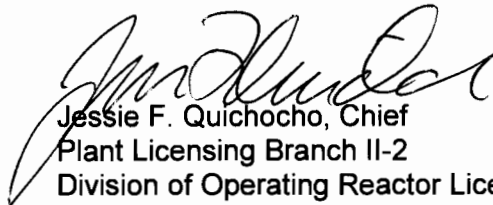
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-90 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 95 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance, and shall be implemented no later than 60 days from the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Jessie F. Quichocho, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Operating License
and the Technical Specifications

Date of Issuance: April 7, 2014

ATTACHMENT TO LICENSE AMENDMENT NO. 95

FACILITY OPERATING LICENSE NO. NPF-90

DOCKET NO. 50-390

Replace Page 3 of Operating License NPF-90 with the attached Page 3.

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain a marginal line indicating the area of change.

REMOVE

4.0-2
4.0-9
4.0-10

INSERT

4.0-2
4.0-9
4.0-10

- (4) TVA, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required, any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis, instrument calibration, or other activity associated with radioactive apparatus or components; and
 - (5) TVA, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.
- C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified or incorporated below.
- (1) Maximum Power Level

TVA is authorized to operate the facility at reactor core power levels not in excess of 3459 megawatts thermal.
 - (2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 95 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.
 - (3) Safety Parameter Display System (SPDS) (Section 18.2 of SER Supplements 5 and 15)

Prior to startup following the first refueling outage, TVA shall accomplish the necessary activities, provide acceptable responses, and implement all proposed corrective actions related to having the Watts Bar Unit 1 SPDS operational.
 - (4) Vehicle Bomb Control Program (Section 13.6.9 of SSER 20)

During the period of the exemption granted in paragraph 2.D.(3) of this license, in implementing the power ascension phase of the approved initial test program, TVA shall not exceed 50% power until the requirements of 10 CFR 73.55(c)(7) and (8) are fully implemented. TVA shall submit a letter under oath or affirmation when the requirements of 73.55(c)(7) and (8) have been fully implemented.

4.0 DESIGN FEATURES (continued)

4.3 Fuel Storage

4.3.1 Criticality

4.3.1.1 The spent fuel storage racks (shown in Figure 4.3-1) are designed and shall be maintained with:

- a. Fuel assemblies having a maximum U-235 enrichment of 5.0 weight percent (wt%);
- b. $k_{\text{eff}} \leq 0.95$ if fully flooded with unborated water, which, includes an allowance for uncertainties as described in Sections 4.3.2.7 and 9.1 of the FSAR;
- c. Distances between fuel assemblies are a nominal 10.375 inch center-to-center spacing in the twenty-four flux trap rack modules.
- d. Fuel assemblies with initial enrichments less than a maximum of 5 wt% U-235 enrichment (nominally 4.95 ± 0.05 wt% U-235) may be stored in the spent fuel racks in any one of four arrangements with specific limits as identified below:
 1. Fuel assemblies may be stored in the racks in an all cell arrangement provided the burnup of each assembly is in the acceptable domain identified in Figure 4.3-3, depending upon the specified initial enrichment.
 2. New and spent fuel assemblies may be stored in a checkerboard arrangement of 2 new and 2 spent assemblies, provided that each spent fuel assembly has accumulated a minimum burnup in the acceptable domain identified in Figure 4.3-4.
 3. New fuel assemblies may be stored in 4-cell arrays with 1 of the 4 cells remaining empty of fuel (i.e. containing only water or water with up to 75 percent by volume of non-fuel bearing material).

(continued)

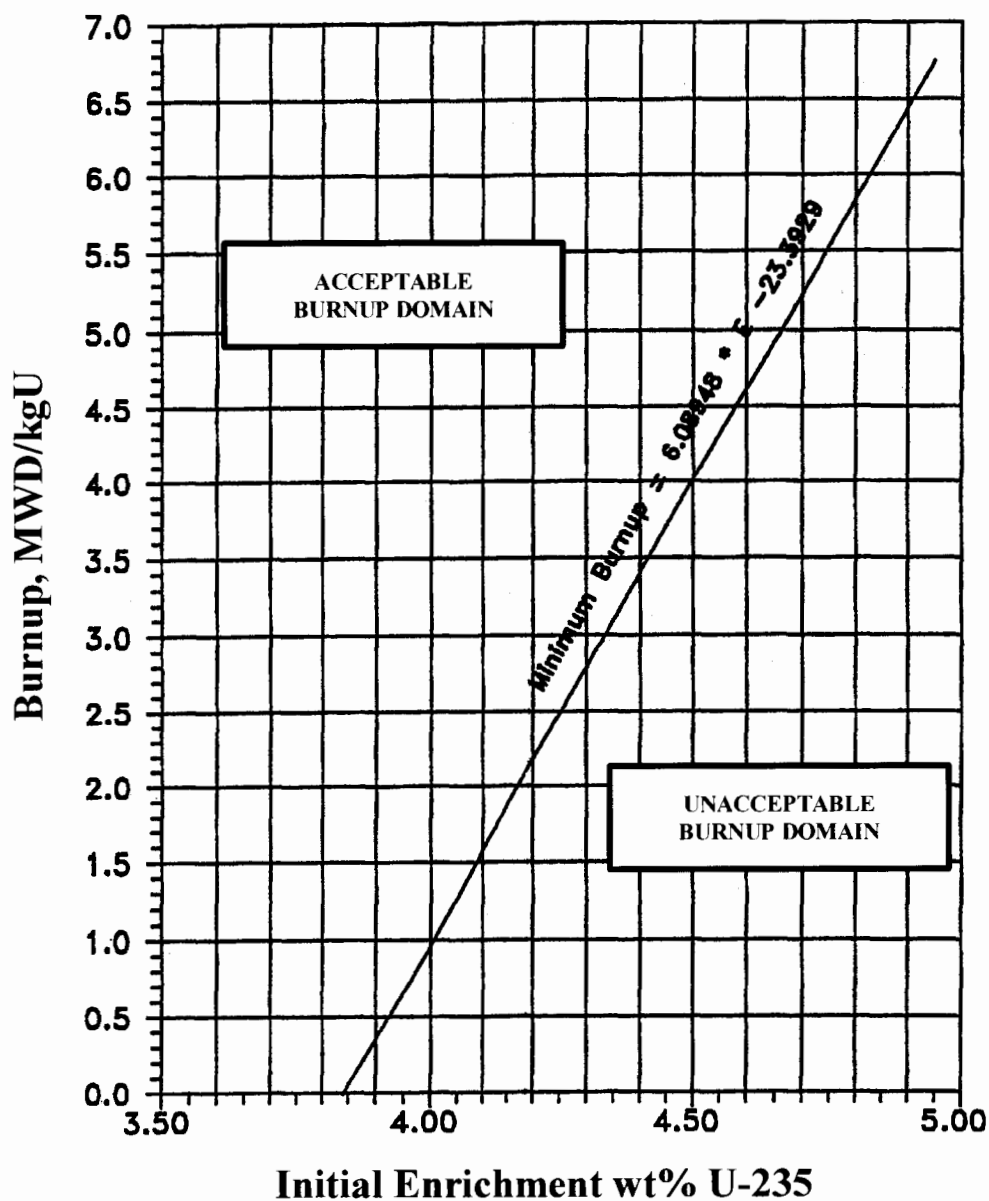


FIGURE 4.3-3
MINIMUM REQUIRED BURNUP FOR UNRESTRICTED STORAGE
OF FUEL OF VARIOUS INITIAL ENRICHMENTS

(continued)

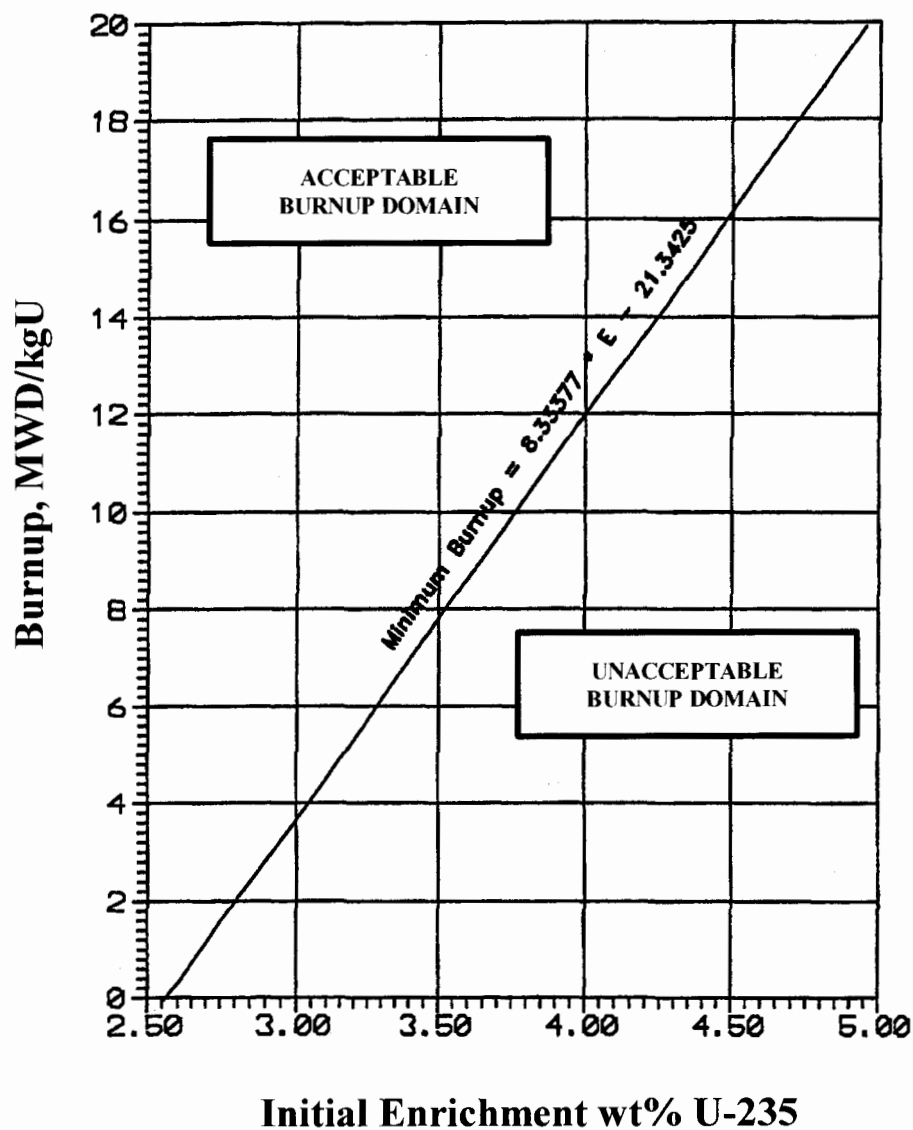


FIGURE 4.3-4
MINIMUM REQUIRED BURNUP FOR A CHECKERBOARD ARRANGEMENT OF 2 SPENT AND 2
NEW FUEL ASSEMBLIES OF 5wt% U-235 ENRICHMENT (MAXIMUM)



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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 95 TO FACILITY OPERATING LICENSE NO. NPF-90

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-390

1.0 INTRODUCTION

By application dated July 30, 2013 (Agencywide Documents Access and Management System Accession No. ML13213A018), Tennessee Valley Authority (TVA, the licensee) requested a license amendment for the Watts Bar Nuclear Plant (WBN) Unit 1, Facility Operating License No. NPF-90. The requested changes would modify Technical Specification (TS) 4.3.1.1, "Criticality," to clarify the requirements for storage of new and spent fuel assemblies in the spent fuel racks currently provided in TS 4.3.1.1.d and TS 4.3.1.1.e.2, to resolve inconsistent requirements between the two TS sections. TS 4.3.1.1.d currently allows unrestricted storage of new and spent fuel assemblies in the spent fuel racks when initial enrichments are less than or equal to 3.80 weight percent Uranium-235 (U-235). Whereas TS 4.3.1.1.e.2 specifies burnup restrictions on spent fuel assemblies from an initial enrichment of approximately 2.56 weight percent U-235 as specified in TS Figure 4.3-4 when those spent fuel assemblies are used in a checkerboard arrangement of two new and two spent fuel assemblies in the spent fuel racks. The proposed amendment request would resolve that inconsistency, as well as make several editorial changes to define an acronym in TS 4.3.1.1.a, as well as correct a typographical error in TS 4.3.1.1.e.3.

2.0 REGULATORY EVALUATION

The NRC staff considered the following applicable regulatory requirements and guidance documents for the review of this amendment request:

Title 10, *Code of Federal Regulations* (10 CFR), Part 50, Section 50.36, "Technical specifications." The TS requirements in 10 CFR 50.36 include the following categories: (1) Safety limits, limiting safety systems settings and control settings, (2) Limiting conditions for operation, (3) Surveillance requirements, (4) Design features, and (5) Administrative controls.

Appendix A of 10 CFR Part 50, General Design Criterion (GDC) 62, "Prevention of criticality in fuel storage and handling," requires the prevention of criticality by physical systems or processes, preferably by use of geometrically safe configurations.

Enclosure

Guidance for meeting the requirements of GDC 62 are included in American National Standards Institute (ANSI)/American Nuclear Society (ANS) 57.1, ANSI/ANS 57.2, and ANSI/ANS 57.3, which relate to the prevention of criticality accidents in fuel storage and handling.

Section 50.68 of 10 CFR, "Criticality accident requirements," specifies requirements for the prevention of criticality accidents and mitigating the radiological consequences of a criticality accident.

3.0 TECHNICAL EVALUATION

TVA proposes to revise WBN Unit 1 TS to remove the allowance of fuel assemblies with enrichments less than or equal to 3.80 weight percent U-235 be stored without restriction. Currently, all acceptable and unacceptable storage regions in terms of burnup versus initial U-235 enrichment conditions are defined by burnup curve figures in the TS Figure 4.3-3 for non-checkerboard configurations and Figure 4.3-4 for checkerboard configurations. Figure 4.3-3 includes a zero burnup storage limit at approximately 3.84 weight percent U-235. In the proposed revised TS, the existing TS 4.3.1.1.d would be deleted, and TS 4.3.1.1.e would be renumbered and revised to clarify that meeting "any" one of the four described storage arrangements satisfies the TS requirement for new and spent fuel. The NRC staff determined that the removal of previous TS 4.3.1.1.d as proposed would resolve the inconsistency between the allowance for unrestricted storage provided in TS 4.3.1.1.d and the restrictive arrangement described in TS 4.3.1.1.e.2, which includes TS Figure 4.3-4 for storage of new and spent fuel assemblies in the spent fuel racks. The proposed change would also modify current TS 4.3.1.1.e.1 and the title of TS Figure 4.3-3 to clarify that both are applicable to all fuel assemblies and not only spent fuel assemblies. These changes are consistent with the existing criticality safety analysis and the burnup curve in Figure 4.3-3, which has a zero burnup value applicable to new fuel.

The title of Figure 4.3-4 is also revised to indicate it applies to assemblies stored in a checkerboard arrangement of two spent and two new fuel assemblies to be consistent with the language in current TS 4.3.1.1.e.2. Also, the weight percent abbreviation (wt%) and U-235 are added in the title for clarification purposes.

Other proposed editorial changes to this TS section are the abbreviation (wt%) added to TS 4.3.1.1.a, and a closing parenthesis to existing TS 4.3.1.1.e.3.

The proposed changes do not affect the design or use of the existing fuel racks, and therefore no criticality analysis was necessary in association with the TS changes. The changes resolve the wording inconsistency in two different sections of the TSs. They also provide consistency with the TS language for Unit 2, which shares the same fuel pool. In addition to the proposed TS changes, TVA also informed the NRC that the corresponding section 4.3.2.7 of the Updated Final Safety Analysis Report would be similarly revised to clarify acceptable storage conditions consistent with the revised TS.

Based on the above evaluation, the NRC staff has concluded that the proposed TS changes to remove the inconsistencies and clarify existing requirements in TS 4.3.1.1 and Figures 4.3-3 and 4.3-4, are editorial in nature, thus, the proposed changes are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (78 FR 74185). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

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

Contributors: D. Cunanan
K. Hemphill

Date: April 7, 2014

April 7, 2014

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
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Sincerely,

/RA/

Andrew Hon, Project Manager
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