

November 16, 2006

Mr. Karl W. Singer  
Chief Nuclear Officer and  
Executive Vice President  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 — ISSUANCE OF  
AMENDMENTS REGARDING EXTENDED BURNUP OF FRAMATOME FUEL  
(TAC NOS. MD1443 AND MD1444) (TS 05-10)

Dear Mr. Singer:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 314 to Facility Operating License No. DPR-77 and Amendment No. 303 to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant, Units 1 and 2, respectively. These amendments are in response to your application dated May 1, 2006 (TVA-SQN-TS-05-10).

The amendments modify the Technical Specification (TS) Section 6.0, "Administrative Controls," to adopt a Nuclear Regulatory Commission approved topical report that extends the burnup limit of the Mark-BW fuel design with M5 alloy. These amendments also incorporate Technical Specification Task Force (TSTF) Traveler 363, Revision 0, "Revised Topical Report References in Improved Technical Specification 5.6.5, Core Operating Limits Report." TSTF-363 makes administrative changes to the format of referenced topical reports in the TSs.

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

Sincerely,

/RA/

Douglas V. Pickett, Senior Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosures:

1. Amendment No. 314 to License No. DPR-77
2. Amendment No. 303 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures: See next page

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**/RA/**  
Douglas V. Pickett, Senior Project Manager  
Plant Licensing Branch II-2  
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Tennessee Valley Authority

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 314  
License No. DPR-77

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Tennessee Valley Authority (the licensee) dated May 1, 2006, 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 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. DPR-77 is hereby amended to read as follows:

- (2) Technical Specifications

- The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 314 are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented no later than 45 days after issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/ Evangelos C. Marinos for*

Douglas V. Pickett, Acting Chief  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: November 16, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 314

FACILITY OPERATING LICENSE NO. DPR-77

DOCKET NO. 50-327

Replace page 3 of Operating License No. DPR-77 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 marginal lines indicating the area of change.

REMOVE

6-13  
6-13a

INSERT

6-13  
6-13a

- (4) 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 associated with radioactive apparatus or components; and
  - (5) 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 Sequoyah and Watts Bar Unit 1 Nuclear Plants.
- 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

The Tennessee Valley Authority is authorized to operate the facility at reactor core power levels not in excess of 3455 megawatts thermal.
  - (2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 314, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications.
  - (3) Initial Test Program

The Tennessee Valley Authority shall conduct the post-fuel-loading initial test program (set forth in Section 14 of Tennessee Valley Authority's Final Safety Analysis Report, as amended), without making any major modifications of this program unless modifications have been identified and have received prior NRC approval. Major modifications are defined as:

    - a. Elimination of any test identified in Section 14 of TVA's Final Safety Analysis Report as amended as being essential;
    - b. Modification of test objectives, methods or acceptance criteria for any test identified in Section 14 of TVA's Final Safety Analysis Report as amended as being essential;
    - c. Performance of any test at power level different from there described; and

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 303  
License No. DPR-79

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Tennessee Valley Authority (the licensee) dated May 1, 2006, 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 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. DPR-79 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 303, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented no later than 45 days after issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/ Evangelos C. Marinos for*

Douglas V. Pickett, Acting Chief  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: November 16, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 303

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

Replace page 3 of Operating License No. DPR-79 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 marginal lines indicating the area of change.

REMOVE

6-13

6-14

INSERT

6-13

6-14

- (4) 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 or instrument calibration or associated with radioactive apparatus or components; and
- (5) 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 Sequoyah and Watts Bar Unit 1 Nuclear Plants.

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

The Tennessee Valley Authority is authorized to operate the facility at reactor core power levels not in excess of 3455 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 303, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications.

(3) Initial Test Program

The Tennessee Valley Authority shall conduct the post-fuel-loading initial test program (set forth in Section 14 of Tennessee Valley Authority's Final Safety Analysis Report, as amended), without making any major modifications of this program unless modifications have been identified and have received prior NRC approval. Major modifications are defined as:

- a. Elimination of any test identified in Section 14 of TVA's Final Safety Analysis Report as amended as being essential;
- b. Modification of test objectives, methods or acceptance criteria for any test identified in Section 14 of TVA's Final Safety Analysis Report as amended as being essential;
- c. Performance of any test at power level different from there described; and

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 314 TO FACILITY OPERATING LICENSE NO. DPR-77  
AND AMENDMENT NO. 303 TO FACILITY OPERATING LICENSE NO. DPR-79  
TENNESSEE VALLEY AUTHORITY  
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2  
DOCKET NOS. 50-327 AND 50-328

1.0 INTRODUCTION

By letter dated November 19, 2001 (ML013520640 [Agencywide Document Access and Management System Accession Number]), Framatome ANP (FANP) submitted Supplement 1 to Topical Report (TR) BAW-10186P-A, Revision 1, "Extending Burnup Evaluation", for review and approval by the U. S. Nuclear Regulatory Commission (NRC). The supplement provided justification to extend the Mark-BW fuel design with advanced cladding material M5 from a peak rod average burnup limit of 60,000 MWd/MTU to 62,000 Mwd/MTU. By letter dated June 18, 2003 (ML031700090), the staff concluded that the Mark-BW fuel design with the M5 cladding was acceptable for a peak rod average burnup limit of 62,000 Mwd/MTU and, therefore, acceptable for referencing in licensing applications.

By letter dated May 1, 2006 (ML061290286), Tennessee Valley Authority (TVA, the licensee) submitted a proposed license amendment to adopt the above TR for the Sequoyah Nuclear Plant, Units 1 and 2 (SQN). Technical Specification (TS) 6.9.1.14.a references the NRC-approved analytical methods used to determine the Core Operating Limits Report. The licensee's proposed license amendment would modify TS 6.9.1.14.a to reference the TR.

TVA's letter of May 1, 2006, also proposed adoption of Industry/TS Task Force Traveler, TSTF-363, Revision 0, "Revised Topical Report References in Improved Technical Specification (ITS) 5.6.5, Core Operating Limit Report (COLR)." This proposed change makes administrative changes to the format of referenced TRs in TS Section 6.9.1.14.a.

2.0 REGULATORY EVALUATION

Regulatory guidance for the review of fuel system designs and adherence to applicable General Design Criteria is provided in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (SRP), Section 4.2, "Fuel System Design." In accordance with the SRP Section 4.2, the objectives of the fuel system safety review are to provide assurance that:

- a. The fuel system is not damaged as a result of normal operation and anticipated operational occurrences,
- b. Fuel system damage is never so severe as to prevent control rod insertion when it is required,

- c. The number of fuel rod failures is not underestimated for postulated accidents, and
- d. Coolability is always maintained.

In addition to licensed reload methodologies, an approved mechanical design methodology is utilized to demonstrate consistency with SRP 4.2 fuel design criteria. By letter dated June 18, 2003, the NRC approved Supplement 1 to TR BAW-10186P-A, Revision 1, "Extending Burnup Evaluation." The TR extended the Mark-BW fuel assembly design and supporting methodology up to a peak rod average burnup limit 62,000 MWd/MTU.

Title 10 to the *Code of Federal Regulations* (10 CFR) Part 50.36(c)(5) requires that TSs will include "provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner." As such, licensees must reference NRC-approved methodologies that will be used to determine their core operating limits. TVA references these approved methodologies in TS 6.9.1.14.1.a.

### 3.0 TECHNICAL EVALUATION

The license amendment request modifies TS 6.9.1.14.a by 1) including a reference to TR BAW-10186P-A, "Extended Burnup Evaluation," and 2) making administrative changes to the format of referenced TRs as described in TSTF-363, Revision 0.

#### 3.1 BAW-10186P-A

The first proposed change involves a change to TS 6.9.1.14.a that adds the published NRC approved TR BAW-10186P-A justifying the extended burnup as item 8 to the current TS list. On November 19, 2001, FANP submitted Supplement 1 to TR BAW-10186P-A, Revision 1. Supplement 1 provided justification for extending the peak rod average burnup limit for the Mark-BW fuel design with M5 alloy to 62,000 MWd/MTU. No Safety Evaluation limitations or conditions are specified for the application of TR BAW-10186P-A Revision 1, Supplement 1.

A burnup extension has the potential to impact the radiological source term used in the on-site and off-site dose calculations. The source terms applied at SQN are correlated to the effective full power day burnup of the average core or per assembly, dependent upon the accident evaluation. No change is proposed to the established safety analysis fuel assembly inputs. Specifically, fuel assemblies are still limited to a maximum 1500 Effective Full Power Day (EFPD) burnup and the reactor core average maximum burnup will remain at 1000 EFPD burnup. This ensures that the present accident analyses remain bounding.

The SQN Unit 1 and 2 cores will be designed and analyzed to reach but not exceed a peak rod average burnup of 62,000 MWd/MTU. Therefore, TVA expects that some fuel assemblies will approach a peak rod average burnup of 62,000 MWd/MTU during operation. There are no parameters that would limit the peak rod average burnup to a value less than 62,000 MWd/MTU. In addition, the SQN Final Environmental Statement dated February 1974 does not contain any limits regarding fuel burnup.

Based on the NRC staff's prior approval of the Mark BW burnup extension TR and the continued use of a conservative assembly average and core average burnup term in the dose calculations, the staff finds the proposed change to TS 6.9.1.14.a acceptable.

### 3.2 TSTF-363, Revision 0

The second proposed change involves adopting Technical Specification Task Force Traveler (TSTF) 363, Revision 0. By letter dated December 15, 1999, from the NRC to Siemens Power Corporation entitled, "Acceptance for Siemens References to Approved Topical Reports in Technical Specification," the NRC stated that it is acceptable for the references to TRs in ITS Section 5.6.5, "Core Operating Limits Report," to give the TR title and number as long as the complete citation is given in the COLR. This method of referencing TRs would allow licensees to use current topical reports to support limits in the COLR without having to submit a license amendment to the facility operating license each time a revision to the TR is approved by the NRC. The COLR would provide specific information identifying the particular approved TRs used to determine core limits for the particular cycle in the COLR report. This method of referencing TRs was subsequently accepted generically by NRC's approval of TSTF-363, Revision 0, on April 13, 2000.

As recommended in TSTF-363, a sentence was added to TS Section 6.9.1.14.a which states "The COLR [Core Operating Limits Report] will contain the complete identification for each of the TS referenced topical reports used to prepare the COLR (i.e., report number, title, revision, date, and any supplements)." This ensures that full citations are included in the COLR used to determine the core limits for the particular fuel cycle. As discussed above, the staff has previously reviewed TSTF-363 and found it acceptable. Therefore, since the licensee has implemented the recommendations of TSTF-363 without deviation, the staff finds this proposed change acceptable.

### 4.0 STATE CONSULTATION

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

### 5.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 amendments involve 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 NRC has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (71 FR 35459). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

## 6.0 CONCLUSION

The NRC staff reviewed the proposed changes to TS 6.9.1.14.a and determined that these TS changes are in accordance with the guidance of SRP Section 4.2 and 10 CFR 50.36 (c)(5). The staff previously reviewed the extension of the Mark-BW fuel with M5 alloy peak rod average burnup limit from 60,000 MWd/MTU to 62,000 MWd/MTU and finds implementation of the approved TR acceptable at the Sequoyah units.

The NRC staff 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 adverse to the common defense and security or to the health and safety of the public.

Principal Contributor: Paul Clifford  
Lisa Regner

Date: November 16, 2006