December 19, 2007

Mr. David A. Christian
President and Chief Nuclear Officer
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: SURRY POWER STATION, UNIT NOS. 1 AND 2, ISSUANCE OF AMENDMENTS REGARDING INCREASE IN THE LEAD ROD AVERAGE BURNUP LIMIT (TAC NOS. MD4716 AND MD4717)

Dear Mr. Christian:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 257 to Renewed Facility Operating License No. DPR-32 and Amendment No. 256 to Renewed Facility Operating License No. DPR-37 for the Surry Power Station, Unit Nos. 1 and 2 (Surry 1 and 2), respectively. The amendments authorize changes to the Updated Final Safety Analysis Report (UFSAR) in response to your application dated March 6, 2007.

These amendments revise the Surry 1 and 2 licensing basis, as described in the UFSAR, to permit irradiation of the fuel assemblies beginning with Surry 1 and 2, improved fuel assemblies with ZIRLO (Westinghouse trademark) cladding to a lead rod average burnup of 62,000 MWd/MTU.

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

Sincerely,

/RA/

Siva P. Lingam, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-280 and 50-281

Enclosures:
1. Amendment No. 257 to DPR-32
2. Amendment No. 256 to DPR-37
3. Safety Evaluation

cc w/encls: See next page

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*transmitted by memo dated.

OFFICE	NRR/LPL2-1/PM	NRR/LPL2-1/LA	NRR/SNPB/BC	NRR/RERB/BC	OGC	NRR/LPL2-1/BC
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VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-280

SURRY POWER STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 257
Renewed License No. DPR-32

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Virginia Electric and Power Company (the licensee) dated March 6, 2007, 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 as indicated in the attachment to this license amendment, and paragraph 3.B of Renewed Facility Operating License No. DPR-32 is hereby amended to read as follows:

   (B) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 257, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. Further, the license is amended to authorize revision to the Updated Final Safety Analysis Report (UFSAR), as set forth in the application dated March 6, 2007. The licensee shall update the UFSAR to permit irradiation of the Surry Power Station, Unit No. 1 (Surry 1), fuel assemblies beginning with Surry 1 improved fuel assemblies with ZIRLO cladding to a lead rod average burnup of 62,000 MWd/MTU, as described in the licensee's application dated March 6, 2007, and the NRC staff's safety evaluation attached to this amendment, and shall submit the revised description authorized by this amendment with the next update of the UFSAR.

4. This license amendment is effective as of its date of issuance and shall be implemented within 30 days. The UFSAR changes shall be implemented in the next periodic update to the UFSAR in accordance with 10 CFR 50.71(e).

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Evangelos C. Marinos, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Change to License No. DPR-32

Date of Issuance: December 19, 2007

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-281

SURRY POWER STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 256
Renewed License No. DPR-37

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Virginia Electric and Power Company (the licensee) dated March 6, 2007, 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 as indicated in the attachment to this license amendment, and paragraph 3.B of Renewed Facility Operating License No. DPR-37 is hereby amended to read as follows:

   (B) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 256, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. Further, the license is amended to authorize revision to the Updated Final Safety Analysis Report (UFSAR), as set forth in the application dated March 6, 2007. The licensee shall update the UFSAR to permit irradiation of the Surry Power Station, Unit No. 2 (Surry 2), fuel assemblies beginning with Surry 2 improved fuel assemblies with ZIRLO cladding to a lead rod average burnup of 62,000 MWd/MTU, as described in the licensee's application dated March 6, 2007, and the NRC staff's safety evaluation attached to this amendment, and shall submit the revised description authorized by this amendment with the next update of the UFSAR.

4. This license amendment is effective as of its date of issuance and shall be implemented within 30 days. The UFSAR changes shall be implemented in the next periodic update to the UFSAR in accordance with 10 CFR 50.71(e).

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Evangelos C. Marinos, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Change to License No. DPR-37

Date of Issuance: December 19, 2007

ATTACHMENT

TO LICENSE AMENDMENT NO. 257

RENEWED FACILITY OPERATING LICENSE NO. DPR-32

DOCKET NO. 50-280

AND

TO LICENSE AMENDMENT NO. 256

RENEWED FACILITY OPERATING LICENSE NO. DPR-37

DOCKET NO. 50-281

Replace the following pages of the Licenses and the Appendix A Technical Specifications (TSs) with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages	Insert Pages
License	License
License No. DPR-32, page 3	License No. DPR-32, page 3
License No. DPR-37, page 3	License No. DPR-37, page 3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 257 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-32

AND

AMENDMENT NO. 256 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-280 AND 50-281

1.0 INTRODUCTION

By letter dated March 6, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML070720620), Virginia Electric and Power Company (the licensee) submitted a request for changes to the Surry Power Station, Unit Nos. 1 and 2 (Surry 1 and 2).

The requested changes would increase the burnup limit for Surry 1 and 2. The Surry 1 and 2 Improved Fuel (SIF) is a Westinghouse VANTAGE+ fuel design with a 15x15 array. The VANTAGE+ fuel design features including the ZIRLO cladding are documented in an NRC-approved Topical Report WCAP-12610-P-A, entitled "VANTAGE+ Fuel Assembly Reference Core Report." The NRC staff originally approved the VANTAGE+ fuel design including the SIF to a peak rod average burnup limit of 60,000 megawatt days (MWd)/metric ton of uranium (MTU). Subsequently, in letter dated May 25, 2006 (ADAMS Accession No. ML061420458), the Nuclear Regulatory Commission (NRC) staff approved the Westinghouse request that the VANTAGE+ fuel burnup limit can be increased to 62,000 MWd/MTU provided that the evaluation of the fuel performance is performed with the PAD 4.0 code. The PAD 4.0 code is a Westinghouse fuel performance code, as described in Topical Report WCAP-15063-P-A, entitled "Westinghouse Improved Performance Analysis and Design Model (PAD 4.0)," and was approved for use in fuel thermal-mechanical performance analysis to a peak rod average burnup limit of 62,000 MWd/MTU.

Based on the NRC staff's letter dated May 25, 2006, the licensee requested a license amendment to increase the peak rod average burnup limit to 62,000 MWd/MTU for fuel assemblies with ZIRLO cladding beginning with the SIF. The licensee will continue to apply the current burnup limit of 60,000 MWd/MTU for old fuel assemblies, if used, in the spent fuel pool with Zircaloy-4 cladding. In addition, the licensee will maintain the peak rod average burnup limits in the Surry 1 and 2 Updated Final Safety Analysis Report (UFSAR).

2.0 REGULATORY EVALUATION

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Scetion 50.90, "Application for Amendment of License or Construction Permit," allow a licensee to apply to the

commission to amend or change the original license applications. Section 10 CFR 50.92, "Issuance of Amendment," specifies that the NRC staff will be guided by the considerations which govern the issuance of initial licenses to the extent applicable and appropriate in determining whether an amendment will be issued to the applicant. The licensee requests a license amendment to increase the peak rod average burnup limit for fuel assemblies with ZIRLO cladding beginning with the SIF.

3.0 TECHNICAL EVALUATION

3.1 NRC Staff's Position

In the past, the NRC staff has approved various burnup limits for Westinghouse fuel designs and fuel performance codes. Noticeably, the VANTAGE fuel series, including VANTAGE+, was approved to the burnup limit of 60,000 MWd/MTU, and the more recent Westinghouse fuel performance code, PAD 4.0, was approved to the burnup limit of 62,000 MWd/MTU.

Recently, the NRC staff conducted an audit of the Westinghouse documents describing the fuel data, analytical models, and the fuel change procedures. The NRC staff reviewed documents including several plant reload analyses. The reload analyses provided results for all the specified acceptable fuel design limits (SAFDLs) as described in 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 10. The analyses were typically performed at bounding conditions such that plant thermal-mechanical safety evaluations were not required for each reload cycle. The SAFDLs include, but not limited to, rod internal pressure, clad stress and strain, corrosion, clad fatigue, fuel melting temperature, rod growth, and creep collapse. The results showed that all SAFDLs were met for the bounding conditions. The NRC staff also recognized that the SAFDLs were analyzed using the PAD 4.0 code which was approved to a peak rod average burnup of 62,000 MWd/MTU. Based on the audit results, the NRC staff concluded that the burnup limit for WCAP-12610-P-A can be increased to 62,000 MWd/MTU provided that the evaluation of the fuel design performance is performed with PAD 4.0.

By letter dated May 25, 2006, the NRC staff approved the burnup increase for the VANTAGE fuel series. Therefore, the burnup limit of the VANTAGE+ fuel design including the SIF can be increased to 62,000 MWd/MTU peak rod average with an approved license amendment.

3.2 Mechanical Design

The SIF is a VANTAGE+ fuel design, and the design bases and methodology conform to the approved WCAP-12610-P-A. The licensee performed mechanical design analyses for the SIF using the approved PAD 4.0 code. The design analyses showed that all SAFDLs were met for the bounding conditions. The licensee indicated that other mechanical design criteria regarding interface with the rod cluster control assemblies (RCCAs), core components, and handling equipment were not affected by the burnup increase. Since the licensee complies with the NRC staff's position, the NRC staff agrees with the assessment.

Based on the approved PAD 4.0 code and acceptable analyses, the NRC staff concludes that the SIF mechanical design is acceptable to a peak rod average of 62,000 MWd/MTU for Surry 1 and 2.

3.3 Core Design

The licensee continues to use its approved standard reload methodology to evaluate the core design to 62,000 MWd/MTU. The reload methodology includes nuclear design models and thermal-hydraulic models. The licensee has used the nuclear design models for lead test assemblies (LTAs) up to 68,000 MWd/MTU as part of the benchmark data set. The neutronic physics response is not expected to be affected by the slightly higher burnup. The thermal-hydraulic response is within the range of the approved models. These reload models will continue to accurately predict reload fuel to 62,000 MWd/MTU. The licensee determines that the SIF continues to meet the core design requirements including nuclear and thermal-hydraulic analyses.

Based on the approved reload methodology, the NRC staff concludes that the SIF core design is acceptable to a peak rod average of 62,000 MWd/MTU for Surry 1 and 2.

3.4 Loss-of-Coolant Accident (LOCA) Analysis

For LOCA analyses, the NRC staff requires that initial conditions be derived from approved fuel performance codes. The initial conditions consist of fuel average temperature and rod internal pressure for input into the analyses. The licensee performed LOCA analyses using the approved PAD 4.0 code for initial conditions at beginning-of-life (BOL) conditions. Fuel average temperatures are highest at BOL conditions and then decrease with burnups. The core stored energy is maximized at BOL which is conservative for LOCA analyses. Thus, the burnup increase to 62,000 MWd/MTU will not impact these LOCA input parameters. The results show that the licensee continues to meet the 10 CFR 50.46 acceptance criteria.

Based on the approved PAD 4.0 code and acceptable analyses, the NRC staff concludes that the SIF LOCA analysis is acceptable to a peak rod average of 62,000 MWd/MTU for Surry 1 and 2.

3.5 Non-LOCA Transients

The current non-LOCA transient safety analyses are included in Chapter 15 of the UFSAR. In support of the license amendment request, the licensee re-evaluated these analyses for the burnup increase. The results showed that the existing Surry 1 and 2 transient safety analyses remained bounding for all the fuel assemblies in the core. The licensee also determined that the slightly higher burnup would not significantly change the dose analysis, and thus, the radiological consequences of postulated design basis transients remained unchanged.

Based on the acceptable bounding analyses and radiological consequences, the NRC staff concludes that the existing SIF non-LOCA transient analyses are acceptable to a peak rod average of 62,000 MWd/MTU for Surry 1 and 2.

3.6 UFSAR Changes

Because the burnup limit was not explicitly stated in the Surry 1 and 2 License Conditions or Technical Specifications, the licensee chose to incorporate the burnup limit into Section 3.5.2.6.1 of the Surry 1 and 2 UFSAR to ensure that reload design evaluations did not exceed the specified burnup limits. The licensee proposes to update UFSAR Section 3.5.2.6.1 to increase the burnup limit to 62,000 MWd/MTU for fuel assemblies with ZIRLO cladding beginning with the SIF after the

approval of the license amendment. The licensee will continue to apply the current burnup limit of 60,000 MWd/MTU for old fuel assemblies, if used, in the spent fuel pool with zircaloy-4 cladding. Since this is consistent with the NRC staff's position, the NRC staff approves the UFSAR changes.

The NRC staff has reviewed the licensee's proposed license amendment to increase the burnup limit. Based on the NRC staff's evaluation, as set forth above, the NRC staff concludes that the proposed license amendment is acceptable to increase the burnup limit to a peak rod average of 62,000 MWd/MTU for Surry 1 and 2.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact was published in the Federal Register on December 14, 2007 (72 FR 71165). Accordingly, based upon the environmental assessment, the Commission has determined that issuance of this amendment will not have a significant effect on the quality of the human environment.

6.0 CONCLUSION

The Commission 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Wu

Date: December 19, 2007

Surry Power Station, Units 1 & 2

cc:

Mr. David A. Christian
President and Chief Nuclear Officer
Virginia Electrical and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

Ms. Lillian M. Cuoco, Esq.
Senior Counsel
Dominion Resources Services, Inc.
Building 475, 5th Floor
Rope Ferry Road
Waterford, Connecticut 06385

Mr. Donald E. Jernigan
Site Vice President
Surry Power Station
Virginia Electric and Power Company
5570 Hog Island Road
Surry, Virginia 23883-0315

Senior Resident Inspector
Surry Power Station
U. S. Nuclear Regulatory Commission
5850 Hog Island Road
Surry, Virginia 23883

Chairman
Board of Supervisors of Surry County
Surry County Courthouse
Surry, Virginia 23683

Dr. W. T. Lough
Virginia State Corporation Commission
Division of Energy Regulation
Post Office Box 1197
Richmond, Virginia 23218

Dr. Robert B. Stroube, MD, MPH
State Health Commissioner
Office of the Commissioner
Virginia Department of Health
Post Office Box 2448
Richmond, Virginia 23218

Office of the Attorney General
Commonwealth of Virginia
900 East Main Street
Richmond, Virginia 23219

Mr. Chris L. Funderburk, Director
Nuclear Licensing & Operations Support
Dominion Resources Services, Inc.
Innsbrook Technical Center
5000 Dominion Blvd.
Glen Allen, Virginia 23060-6711