

Mr. J.P. O'Hanlon  
 Senior Vice President - Nuclear  
 Virginia Electric and Power Company  
 5000 Dominion Blvd.  
 Glen Allen, Virginia 23060

June 7, 1996

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SUBJECT: SURRY UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: QUADRANT  
 POWER TILT RATIO (TAC NOS. M95194 AND M95195)

Dear Mr. O'Hanlon:

The Commission has issued the enclosed Amendment No. 210 to Facility Operating License No. DPR-32 and Amendment No. 210 to Facility Operating License No. DPR-37 for the Surry Power Station, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TS) in response to your application transmitted by letter dated April 15, 1996.

These amendments would revise the Technical Specifications to indicate that the quadrant power tilt ratio requirements are applicable only at power levels greater than 50% of rated core power.

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

This completes our effort on this issue and we are, therefore, closing out TAC Nos. M95194 and M95195.

Sincerely,

Original signed by:

Gordon E. Edison, Sr. Project Manager  
 Project Directorate II-1  
 Division of Reactor Projects - I/II  
 Office of Nuclear Reactor Regulation

1/1  
 DFC

Docket Nos. 50-280 and 50-281

Enclosures:

1. Amendment No. 210 to DPR-32
2. Amendment No. 210 to DPR-37
3. Safety Evaluation

cc w/enclosures:  
 See next page

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Mr. J. P. O'Hanlon  
Virginia Electric and Power Company

Surry Power Station

cc:

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DATED: June 7, 1996

AMENDMENT NO. 210 TO FACILITY OPERATING LICENSE NO. DPR-32 - SURRY UNIT 1  
AMENDMENT NO. 210 TO FACILITY OPERATING LICENSE NO. DPR-37 - SURRY UNIT 2

Docket File

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PDII-2 Reading

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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-280

SURRY POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 210  
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 April 15, 1996, 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 3.B of 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. 210, 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 and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Eugene V. Imbro, Director  
Project Directorate II-1  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: June 7, 1996



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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-281

SURRY POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 210  
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 April 15, 1996, 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.

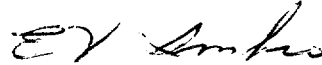
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-37 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 210, 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 and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Eugene V. Imbro, Director  
Project Directorate II-1  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: June 7, 1996

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 210 TO FACILITY OPERATING LICENSE NO. DPR-32

AMENDMENT NO. 210 TO FACILITY OPERATING LICENSE NO. DPR-37

DOCKET NOS. 50-280 AND 50-281

Revise Appendix A as follows:

Remove Pages

Insert Pages

TS 3.12-7

TS 3.12-7

TS 3.12-20

TS 3.12-20



5. The allowable QUADRANT POWER TILT is 2.0% and is only applicable while operating at THERMAL POWER > 50%.
6. If, except for operation at THERMAL POWER  $\leq$  50% or for physics and control rod assembly surveillance testing, the QUADRANT POWER TILT exceeds 2%, then:
  - a. Within 2 hours, either the hot channel factors shall be determined and the power level adjusted to meet the requirement of Specification 3.12.B.1, or
  - b. The power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours.
  - c. If the QUADRANT POWER TILT exceeds  $\pm$  10%, the power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT within the next 30 minutes. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours.
7. If, except for operation at THERMAL POWER  $\leq$  50% or for physics and control rod assembly surveillance testing, after a further period of 24 hours, the QUADRANT POWER TILT in Specification 3.12.B.5 above is not corrected to less than 2%:
  - a. If the design hot channel factors for RATED POWER are not exceeded, an evaluation as to the cause of the discrepancy shall be made and a special report issued to the Nuclear Regulatory Commission.
  - b. If the design hot channel factors for RATED POWER are exceeded and the power is greater than 10%, then the high neutron flux, Overpower  $\Delta$ T and Overtemperature  $\Delta$ T trip setpoints shall be reduced 1% for each percent the hot channel factor exceeds the RATED POWER design values within the next 4 hours, and the Nuclear Regulatory Commission shall be notified.

A 2% QUADRANT POWER TILT allows that a 5% tilt might actually be present in the core because of insensitivity of the excore detectors for disturbances near the core center such as misaligned inner control rod assembly and an error allowance. No increase in  $F_Q$  occurs with tilts up to 5% because misaligned control rod assemblies producing such tilts do not extend to the unrodded plane, where the maximum  $F_Q$  occurs.

The QPTR limit must be maintained during power operation with THERMAL POWER > 50% of RATED POWER to prevent core power distributions from exceeding the design limits.

Applicability during power operation  $\leq$  50% RATED POWER or when shut down is not required because there is either insufficient stored energy in the fuel or insufficient energy being transferred to the reactor coolant to require the implementation of a QPTR limit on the distribution of core power. The QPTR limit in these conditions is, therefore, not important. Note that the  $F_{\Delta H}^N$  and  $F_Q(Z)$  LCOs still apply, but allow progressively higher peaking factors at 50% RATED POWER or lower.

The limits of the DNB-related parameters assure that each of the parameters are maintained within the normal steady-state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the UFSAR assumptions and have been analytically demonstrated to be adequate to maintain a minimum DNBR which is greater than the design limit throughout each analyzed transient. Measurement uncertainties are accounted for in the DNB design margin. Therefore, measurement values are compared directly to the surveillance limits without applying instrument uncertainty.

The 12 hour periodic surveillance of temperature and pressure through instrument readout is sufficient to ensure that these parameters are restored to within their limits following load changes and other expected transient operation. The measurement of the Reactor Coolant System Total Flow Rate once per refueling cycle is adequate to detect flow degradation.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 210 TO FACILITY OPERATING LICENSE NO. DPR-32  
AND AMENDMENT NO. 210 TO 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 April 15, 1996, the Virginia Electric and Power Company (the licensee) proposed changes to the Technical Specifications (TS) for the Surry Power Station, (SPS) Units 1 and 2. The changes would revise Sections 3.12.B.5, 3.12.B.6, and 3.12.B.7 of the SPS TS to indicate that the quadrant power tilt ratio (QPTR) requirements are applicable only at power levels greater than 50% of rated core power. The Section 3.12 Basis would also be revised to describe the basis for the changes to TS Sections 3.12.B.5, 3.12.B.6, and 3.12.B.7.

2.0 PROPOSED TECHNICAL SPECIFICATION CHANGES

TS 3.12.B.5 which currently reads "The allowable QUADRANT POWER TILT is 2%" is being revised to read "The allowable QUADRANT POWER TILT is 2.0% and is only applicable while operating at THERMAL POWER > 50%."

TS 3.12.B.6 which currently reads "If, except for physics and control rod assembly surveillance testing, the QUADRANT POWER TILT exceeds 2%, then:" is being revised to read "If, except for operation at THERMAL POWER ≤ 50% or for physics and control rod assembly surveillance testing, the QUADRANT POWER TILT exceeds 2%, then:"

TS 3.12.B.7 which currently reads "If, except for physics and control rod assembly surveillance testing, after a further period of 24 hours, the QUADRANT POWER TILT in Specification 3.12.B.5 above is not corrected to less than 2%:" is being revised to read "If, except for operation at THERMAL POWER ≤ 50% or for physics and control rod assembly surveillance testing, after a further period of 24 hours, the QUADRANT POWER TILT in Specification 3.12.B.5 above is not corrected to less than 2%:"

3.0 EVALUATION

Currently, TS 3.12.B.5 establishes the allowable quadrant power tilt at 2.0% which is consistent with the Westinghouse Standard TS. However, the current

specification does not specifically define the power levels at which the requirement is applicable.

The QPTR limit of 1.02 (i.e., a 2% quadrant power tilt) ensures that the gross radial power distribution remains consistent with the design values used in the safety analyses. Precise radial power distribution measurements are made during startup testing, after refueling, and periodically during power operation.

The power density at any point in the core must be limited so that the fuel design criteria are maintained. Together, the axial flux difference and control rod insertion limits provide limits on process variables that characterize and control the three dimensional power distribution of the reactor core. Control of these variables ensures that the core operates within the fuel design criteria and that the power distribution remains within the bounds used in the safety analyses, i.e.:

- a. During a large break loss of coolant accident, the peak cladding temperature must not exceed a limit of 2200°F (10 CFR 50.46);
- b. During a loss of forced reactor coolant flow accident, there must be at least 95% probability at the 95% confidence level (the 95/95 departure from nucleate boiling (DNB) criterion) that the hot fuel rod in the core does not experience a DNB condition;
- c. During an ejected rod accident, the energy deposition to the fuel must not exceed 280 cal/gm (Regulatory Guide 1.77); and
- d. The control rods must be capable of shutting down the reactor with a minimum required shutdown margin with the highest worth control rod stuck fully withdrawn (GDC 26).

These criteria can be met by ensuring that the core peaking factor design basis is met. QPTR is a means of ensuring that the peaking factors do not exceed the limits between surveillances. In other words, the QPTR limits ensure that hot-channel factors,  $F^N \Delta_h$  and  $F_q(Z)$  remain below their limiting values by preventing an undetected change in the gross radial power distribution. During power operation, the  $F^N \Delta_h$  and  $F_q(Z)$  limits must be maintained to preclude core power distributions from exceeding design limits assumed in the safety analyses.

Applicability  $\leq$  50% power is not required because there is either insufficient stored energy in the fuel or insufficient energy being transferred to the reactor coolant to require the implementation of a QPTR limit on the distribution of core power. At or below 50% power the additional surveillance on QPTR is not necessary.

The Section 3.12 Basis has been revised to reflect the basis for the changes to TS Sections 3.12.B.5, 3.12.B.6, and 3.12.B.7.

#### 4.0 SUMMARY

The staff has reviewed the licensee's proposed changes to TS Sections 3.12.B.5, 3.12.B.6, 3.12.B.7, and the attendant Basis and find them acceptable.

#### 5.0 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 comment.

#### 6.0 ENVIRONMENTAL CONSIDERATION

These 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 Commission has previously issued a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding (61 FR 20860 ). Accordingly, these amendments meet 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 these amendments.

#### 7.0 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 these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Bart Buckley

Date: June 7, 1996