JULY 27 1979

Distribution

Docket Files 50-280 and 50-281	B. Scharf(10)
NRC PDR (2)	D. Brinkamn
Local PDR	B. Harless
ORB1 Reading	ACRS (16)
NRR Reading	OPA(Clare Miles)
W. Gammill	R. Diggs
D. Eisenhut	H. Denton
B. Grimes	J. Buchanan
R. Vollmer	L. Shao
T. J. Carter	J. Miller
W. Russell	
P. Kreutzer	
D. Neighbors	
J. Diodato	
Attorney, OELD	
OI&E (5)	
B. Jones (8)	

Docket Nos. 50-280
and 50-281

Mr. W. L. Proffitt
Senior Vice President - Power
Virginia Electric and Power Company
Post Office Box 26666
Richmond, Virginia 23261

Dear Mr. Proffitt:

In response to your request dated February 21, 1978, the Commission has issued the enclosed Amendment Nos. 51 and 50 to Facility Operating License Nos. DPR-32 and DPR-37 for the Surry Power Station, Unit Nos. 1 and 2.

These amendments revise the Technical Specification limits concerning the reduction in $F_{\Delta H}$ due to fuel rod bowing for Surry Units 1 and 2. The Technical Specification changes eliminate the rod bowing penalty.

Copies of the related Safety Evaluation and the Notice of Issuance are also enclosed.

Sincerely,

Original signed by
M. Grotenhuis

for A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 51 to DPR-32
2. Amendment No. 50 to DPR-37
3. Safety Evaluation
4. Notice of Issuance

cc: w/enclosures
See next page

7908300096

Cmdr CCP

REGULATORY DOCKET FILE COPY

No legal objection to form of amendment + notice. SER not reviewed.

TACS 07370 and 08360

#4

OFFICE ▶	DOR:ORB1	DOR:ORB1	DOR:ORB3	DOR:ORB1	OELD
SURNAME ▶	JDiodato/jc	DNeighbors	PKreutzer	for ASchwencer	CUTCHIN
DATE ▶	07/11/79	07/1/79	07/17/79	07/27/79	07/19/79

NRC FORM 318 (9-76) NRCM 0240 ★ U.S. GOVERNMENT PRINTING OFFICE: 1978 - 265 - 769

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

July 27, 1979

Docket Nos. 50-280
and 50-281

Mr. W. L. Proffitt
Senior Vice President - Power
Virginia Electric and Power Company
Post Office Box 26666
Richmond, Virginia 23261

Dear Mr. Proffitt:

In response to your request dated February 21, 1978, the Commission has issued the enclosed Amendment Nos. 51 and 50 to Facility Operating License Nos. DPR-32 and DPR-37 for the Surry Power Station, Unit Nos. 1 and 2.

These amendments revise the Technical Specification limits concerning the reduction in $F_{\Delta H}$ due to fuel rod bowing for Surry Units 1 and 2. The Technical Specification changes eliminate the rod bowing penalty.

Copies of the related Safety Evaluation and the Notice of Issuance are also enclosed.

Sincerely,

Marshall Grotenhuis

for A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 51 to DPR-32
2. Amendment No. 50 to DPR-37
3. Safety Evaluation
4. Notice of Issuance

cc: w/enclosures
See next page

cc: Mr. Michael W. Maupin
Hunton and Williams
Post Office Box 1535
Richmond, Virginia 23213

Swem Library
College of William and Mary
Williamsburg, Virginia 23185

Donald J. Burke
U. S. Nuclear Regulatory Commission
Region II
Office of Inspection and Enforcement
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Mr. Sherlock Holmes, Chairman
Board of Supervisors of Surry County
Surry County Courthouse, Virginia 23683

Commonwealth of Virginia
Council on the Environment
903 Ninth Street Office Building
Richmond, Virginia 23219

Attorney General
1101 East Broad Street
Richmond, Virginia 23219

Mr. James R. Wittine
Commonwealth of Virginia
State Corporation Commission
Post Office Box 1197
Richmond, Virginia 23209

Director, Technical Assessment Division
Office of Radiation Programs (AW-459)
U. S. Environmental Protection Agency
Crystal Mall #2
Arlington, Virginia 20460

U. S. Environmental Protection Agency
Region III Office
ATTN: EIS COORDINATOR
Curtis Building - 6th Floor
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-280

SURRY POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 51
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 February 21, 1978, 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 the 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 Appendices A and B, as revised through Amendment No. 51 , 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Marshall Grotenhuis

for A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the
Technical Specifications

Date of Issuance: July 27, 1979

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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-281

SURRY POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 50
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 February 21, 1978, 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 the 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 Appendices A and B, as revised through Amendment No. 50 , 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

for A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the
Technical Specifications

Date of Issuance: July 27, 1979

ATTACHMENT TO LICENSE AMENDMENT NOS. 51 AND 50

FACILITY OPERATING LICENSE NOS. DPR-32 AND DPR-37

DOCKET NOS. 50-280 AND 50-281

Replace the following pages of the Apendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

Remove	Insert
2.1-4	2.1-4
3.12-4	3.12-4
3.12-15	3.12-15
3.12-16a	3.12-16a
Figure 3.12-9	Figure 3.12-9

than the loci of points of thermal power, coolant system average temperature, and coolant system pressure for which either the DNB ratio is equal to 1.30 or the average enthalpy at the exit of the core is equal to the saturation value. At low pressures or high temperatures the average enthalpy at the exit of the core reaches saturation before the DNB ratio reaches 1.30 and, thus, this arbitrary limit is conservative with respect to maintaining clad integrity. The plant conditions required to violate these limits are precluded by the protection system and the self-actuated safety valves on the steam generator. Upper limits of 70% power for loop stop valves open and 75% with loop stop valves closed are shown to completely bound the area where clad integrity is assured. These latter limits are arbitrary but cannot be reached due to the Permissive 8 protection system setpoint which will trip the reactor on high nuclear flux when only two reactor coolant pumps are in service.

Operation with natural circulation or with only one loop in service is not allowed since the plant is not designed for continuous operation with less than two loops in service.

TS Figures 2.1-1 through 2.1-3 are based on a $F^N_{\Delta H}$ of 1.55, a 1.55 cosine axial flux shape and a DNB analysis as described in Section 4.3 of the report Fuel Densification Surry Power Station, Unit 1 dated December 6, 1972 (including the effects of fuel densification). They are also valid for the following limit of the enthalpy rise hot channel factor: $F^N_{\Delta H} = 1.55\ (1 + 0.2\ (1-P))$ where P is the fraction of rated power.

These hot channel factors are higher than those calculated at full power over the range between that of all control rod assemblies fully withdrawn to

$F_Q(Z) \leq 2.05/P \times K(Z)$ for $P > .5$

$F_Q(Z) \leq 4.10 \times K(Z)$ for $P \leq .5$

$F^N_{\Delta H} \leq 1.55\ (1 + 0.2(1-P))$

$F^N_{\Delta H}\Big|^{\text{LOCA}}_{\text{Assm.}} \leq 1.38/P$

$F^N_{\Delta H}\Big|^{\text{LOCA}}_{\text{Rod}} \leq 1.45/P$

where P is the fraction of rated power at which the core is operating, K(Z) is the function given in TS Figure 3.12-8, and Z is the core height location of F_Q.

2. Prior to exceeding 75% power following each core loading, and during each effective full power month of operation thereafter, power distribution maps using the movable detector system, shall be made to confirm that the hot channel factor limits of this specification are satisfied. For the purpose of this confirmation:

   a. The measurement of total peaking factor, $F_Q^{\text{Meas.}}$, shall be increased by eight percent to account for manufacturing tolerances, measurement error, and the effects of rod bow. The measurement of enthalpy rise hot channel factor, the hot assembly enthalpy rise factor, $F^N_{\Delta H}\Big|^{\text{LOCA}}_{\text{Assm.}}$, and the hot rod enthalpy rise factor, $F^N_{\Delta H}\Big|^{\text{LOCA}}_{\text{Rod}}$, shall be increased by four percent to account for measurement error. If any measured hot channel factor exceeds its limit specified under 3.12.B.1, the reactor power and high neutron flux trip setpoint shall be reduced until the limits under 3.12.B.1 are met. If the hot channel factors cannot be brought to within the limits $F_Q \leq 2.05 \times K(Z)$, $F^N_{\Delta H} \leq 1.55$, $F^N_{\Delta H}\Big|^{\text{LOCA}}_{\text{Rod}} \leq 1.45$, and $F^N_{\Delta H}\Big|^{\text{LOCA}}_{\text{Assm.}} \leq 1.38$ within 24 hours, the Overpower ΔT and Overtemperature ΔT trip setpoints shall be similarly reduced.

Deleted

When an F_Q measurement is taken, measurement error, manufacturing tolerances, and the effects of rod bow must be allowed for. Five percent is the appropriate allowance for measurement error for a full core map ($\geq$40 thimbles monitored) taken with the movable incore detector flux mapping system, three percent is the appropriate allowance for manufacturing tolerances, and five percent is the appropriate allowance for rod bow. These uncertainties are statistically combined and result in a net increase of 1.08 that is applied to the measured value of F_Q.

In the specified limit of $F^N_{\Delta H}$ there is an eight percent allowance for uncertainties which means that normal operation of the core is expected to result in $F^N_{\Delta H} \leq 1.55\ (1+ 0.2\ (1-P))/1.08$. The logic behind the larger uncertainty in this case is that (a) normal perturbations in the radial power shape (e.g., rod misalignment) affect $F^N_{\Delta H}$, in most cases without necessarily affecting F_Q, (b) the operator has a direct influence on F_Q through movement of rods, and can limit it to the desired value, he has no direct control over $F^N_{\Delta H}$, and (c) an error in the predictions for radial power shape, which may be detected during startup physics tests and which may influence F_Q can be compensated for by tighter axial control. Four percent is the appropriate allowance for measurement uncertainty for $F^N_{\Delta H}$ obtained from a full core map ($\geq$40 thimbles monitored) taken with the movable incore detector flux mapping system.

The values specified for the limits of $F^N_{\Delta H}\big|^{\text{LOCA}}_{\text{Rod}}$ and $F^N_{\Delta H}\big|^{\text{LOCA}}_{\text{Assm.}}$ are the values used in the LOCA analysis. It has been determined that four percent is the appropriate allowance to be applied for measurement uncertainty for each of these parameters. Measurement of the hot channel factors are required as part of startup physics tests, during each effective full power month of operation,

A recent evaluation of DNB test data obtained from experiments of fuel rod bowing in thimble cells has identified that the reduction in DNBR due to rod bowing in thimble cells is more than completely accommodated by existing thermal margins in the core design. Therefore, it is not necessary to continue to apply a rod bow penalty to $F^N_{\Delta H}$.

DELETED

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 51 AND 50 TO

FACILITY OPERATING LICENSE NOS. DPR-32 AND DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-280 AND 50-281

Introduction

By letter dated February 21, 1978 the Virginia Electric and Power Company (the licensee) requested a change to the Technical Specifications for Surry Units 1 and 2 to eliminate a reduction in the $F_{\Delta H}$ limit due to fuel rod bowing.

Evaluation

The current reduction in $F_{\Delta H}$ in the Technical Specifications was imposed based on Westinghouse data which assumed fuel rods are bowed to make contact with other rods (fuel rods or thimble tubes) in a subchannel (Reference 1). Westinghouse has submitted more recent data (Reference 2) from experiments in which simulated fuel rods are not bowed to contact, but rather are bowed to a gap closure of 85%. This gap closure corresponds to the upper tolerance limit of gap closure calculated at the maximum region burnup. The reduction in DNBR for this case was significantly less than that for the contact case. In Reference 3 we approved the use of these data as being appropriate; we also approved a change in the calculational model based on these data.

The proposed change in the Technical Specifications for the Surry Units 1 and 2 to eliminate the rod bowing penalty is consistent with this staff approved model.

It should be noted that elimination of this penalty (reduction in $F_{\Delta H}$) depends on certain offsetting generic credits included in the subchannel analysis. These credits in terms of DNBR are given below:

VALUES USED TO OFFSET DNBR REDUCTION DUE TO FUEL ROD BOWING (REFERENCE 4)

Pitch Reduction	3.3%
TDC .019 vs. .038	3.0%
Fuel Densification Power Spike	7.0%
Total	13.3%

Any elimination of the above credits or use for other purposes will require a new determination that sufficient generic credit remains.

Summary

We conclude that the proposed change to the Technical Specifications to remove the the reduction in $F_{\Delta H}$ due to fuel rod bowing is acceptable since it is consistent with approved models and the required margin has been identified as being available.

Environmental Consideration

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: July 27, 1979

References

1. Nagino, et al., "Rod Bowed to Contact Departure from Nucleate Boiling Tests in Cold Wall Thimble Cell Geometry," J. of Nuclear Science and Technology, Vol. 15, No. 8, August 1976.

2. Westinghouse to NRC letter NS-CE-1580, October 24, 1977.

3. Letter from J. F. Stolz, NRC, to T. Anderson, Westinghouse April 5, 1979.

4. Westinghouse to NRC letter NS-CE-1161, August 13, 1976.

7590-01

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-280 AND 50-281

VIRGINIA ELECTRIC AND POWER COMPANY

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY OPERATING LICENSES

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 51 and 50 to Facility Operating License Nos. DPR-32 and DPR-37 issued to Virginia Electric and Power Company, which revised Technical Specifications for operation of the Surry Power Station, Unit Nos. 1 and 2 (the facilities) located in Surry County, Virginia. The amendments are effective as of the date of issuance.

These amendments revise the Technical Specifications limits concerning the reduction in $F_{\Delta}H$ due to fuel rod bowing for Surry Units 1 and 2. The Technical Specification changes eliminate the rod bowing penalty.

The application for the amendments complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments.

The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of these amendments.

For further details with respect to this action, see (1) the application for amendment dated February 21, 1978 (2) Amendment Nos. 51 and 50 to License Nos. DPR-32 and DPR-37, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H. Street, N. W., Washington, D. C. and at the Swem Library, College of William and Mary, Williamsburg, Virginia. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 27thday of July, 1979.

FOR THE NUCLEAR REGULATORY COMMISSION

Marshall Grotenhuis, Acting Chief
Operating Reactors Branch #1
Division of Operating Reactors