

FEB 25 1981

Docket Nos. 50-280
and 50-281

Mr. J. H. Ferguson
Executive Vice President - Power
Virginia Electric and Power Company
Post Office Box 26666
Richmond, Virginia 23261

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Dear Mr. Ferguson:

The Commission has issued the enclosed Amendment Nos. 66 and 65 to Facility Operating License Nos. DPR-32 and DPR-37 for the Surry Power Station, Unit Nos. 1 and 2. The amendments consist of changes to the Technical Specifications in response to your application transmitted by letter dated May 15, 1980, as supplemented September 15, 1980 and December 4, 1980.

The amendments revise the Technical Specifications to allow an increase in enrichment for new and spent fuel from 3.6 weight percent of U-235 to 3.7 percent of U-235.

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

Sincerely,

Original signed by:
S. A. Varga

Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing

Enclosures:

1. Amendment No. 66 to DPR-32
2. Amendment No. 65 to DPR-37
3. Safety Evaluation
4. Notice of Issuance

cc: w/enclosures
See next page

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Docket



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

February 25, 1981

Docket Nos. 50-280
and 50-281

Mr. J. H. Ferguson
Executive Vice President - Power
Virginia Electric and Power Company
Post Office Box 26666
Richmond, Virginia 23261

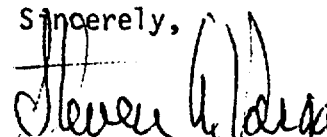
Dear Mr. Ferguson:

The Commission has issued the enclosed Amendment Nos. 66 and 65 to Facility Operating License Nos. DPR-32 and DPR-37 for the Surry Power Station, Unit Nos. 1 and 2. The amendments consist of changes to the Technical Specifications in response to your application transmitted by letter dated May 15, 1980, as supplemented September 15, 1980 and December 4, 1980.

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Steven A. Varga, Chief
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See next page

February 25, 1981

Mr. J. H. Ferguson
Virginia Electric and Power Company

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Mr. Sherlock Holmes, Chairman
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Surry County Courthouse, Virginia 23683

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Attorney General
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Director, Criteria and Standards Division
Office of Radiation Programs (ANR-460)
U. S. Environmental Protection Agency
Washington, D. C. 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. 66
License No. DPR-32

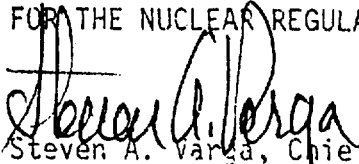
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated May 15, 1980, as supplemented September 15, 1980 and December 4, 1980, complies with the standards and requirements of the Atomic Energy 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;
 - 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 deleting paragraph 3.F of the license and 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 amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 66, 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



Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing

Attachment:
Changes to the
Technical Specifications

Date of Issuance: February 25, 1981



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.65
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 May 15, 1980, as supplemented September 15, 1980 and December 4, 1980, 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;
 - 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 deleting paragraph 3.F of the license and 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 amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 65, 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


Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing

Attachment:
Changes to the
Technical Specifications

Date of Issuance: February 25, 1981

ATTACHMENT TO LICENSE AMENDMENT NOS. 66 AND 65
FACILITY OPERATING LICENSE NOS. DPR-32 AND DPR-37
DOCKET NOS. 50-280 AND 50-281

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

Remove Pages
5.3-2
5.4-1
5.4-2

Insert Pages
5.3-2
5.4-1
5.4-2

3. Reload fuel will be similar in design to the initial core. The enrichment of reload fuel will not exceed 3.7 weight percent of U-235.
4. Burnable poison rods are incorporated in the initial core. There are 816 poison rods in the form of 12 rod clusters, which are located in vacant control rod assembly guide thimbles. The burnable poison rods consist of pyrex clad with stainless steel.
5. There are 48 full-length control rod assemblies in the reactor core. The full-length control rod assemblies contain a 144-inch length of silver-indium-cadmium alloy clad with stainless steel.
6. Surry Unit 1, Cycle 4, Surry Unit 2, Cycle 3, and subsequent cores will meet the following criteria at all times during the operation lifetime.
 - a. Hot channel factor limits as specified in Section 3.12 shall be met.

5.4 FUEL STORAGE

Applicability

Applies to the design of the new and spent fuel storage areas.

Objective

To define those aspects of fuel storage relating to prevention of criticality in fuel storage areas; to prevention of dilution of the borated water in the reactor; and to prevention of inadvertent draining of water from the spent fuel storage area.

Specification

- A. The reinforced concrete structure and steel superstructure of the Fuel Building and spent fuel storage racks are designed to withstand Design Basis Earthquake loadings as Class 1 structures. The spent fuel pit has a stainless steel liner to ensure against loss of water.
- B. The new and spent fuel storage racks are designed so that it is impossible to insert assemblies in other than the prescribed locations. New fuel is stored vertically in an array with a distance of 21 inches between assemblies to assure $k_{\text{eff}} \leq 0.98$ with fuel of the highest anticipated enrichment in place assuming optimum moderation.* Spent fuel is stored vertically in an array with a distance of 14 inches between

*E.G., an aqueous foam envelopment as the result of fire fighting.

assemblies to assure $k_{\text{eff}} \leq 0.95$, even if unborated water were used to fill the spent fuel storage pit. The enrichment of the fuel stored in the spent fuel racks shall not exceed 3.7% weight percent of U-235.

- C. Whenever there is spent fuel in the spent fuel pit, the pit shall be filled with borated water at a boron concentration not less than 2,000 ppm to match that used in the reactor cavity and refueling canal during refueling operations.
- D. The only drain which can be connected to the spent fuel storage area is that in the reactor cavity. The strict step-by-step procedures used during refueling ensure that the gate valve on the fuel transfer tube which connects the spent fuel storage area with the reactor cavity is closed before draining of the cavity commences. In addition, the procedures require placing the bolted blank flange on the fuel transfer tube as soon as the reactor cavity is drained.

References

FSAR Section 9.5 Fuel Pit Cooling System

FSAR Section 9.12 Fuel Handling System



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 66 AND 65 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 May 15, 1980, Virginia Electric and Power Company (the licensee) requested amendments to the Surry Power Station, Unit Nos. 1 and 2 licenses which would change the Technical Specification limits for enrichment of new and spent fuel. The licensee proposed an enrichment of 4.1 weight percent U-235 in the new and spent fuel storage locations. The storage of increased enrichment fuel is necessary to permit the licensee's participation in a Department of Energy demonstration and evaluation program concerned with high burnup technology. This higher enrichment can permit a higher average discharge burnup of the fuel from the reactor.

We have not completed our review of the safety aspects of operating the reactor at an enrichment of 4.1 weight percent U-235 and extended burnup to 45,000 MWD/MTU. We have reviewed the safety aspects of storing 4.1% fuel in the new and spent fuel storage racks. We have also reviewed the operation of the reactor with fuel enriched to 3.7% which is an insignificant increase over the current Technical Specification value. Since we are limiting the operating value to 3.7%, the limit on storage will also be 3.7% even though the analysis was done for 4.1%. The reason for granting an increase to 3.7% from 3.6% is that the licensee is procuring fuel at 3.6% enrichment and fuel procured has a tolerance on enrichment which could slightly exceed 3.6%.

We are continuing our review of the licensee's request to operate the reactor with an increase in enrichment to 4.1% and burnups to 45,000 MWD/MTU.

Discussion

The new fuel storage racks consist of rows of storage boxes, each of which consist of a square stainless steel cylinder 1/8 inch thick with a 9-inch interior dimension. Boxes are placed on 21-inch centers in the row and the rows are either 21 or 30 inches apart. The spent fuel storage racks consist of square cylinders of stainless steel having exterior dimensions of 9.12 inches and a wall thickness of 0.090 inches. These boxes are placed in an array having 14 inch center-to-center spacing.

Calculations of the effective multiplication factor were made for both storage racks for the nominal (design) configuration and for normal (expected) and abnormal variations from the design. Normal variations included off-center placement of fuel in the boxes, variations in box-to-box spacing, moderator density (temperature) and box wall thickness. Abnormal configurations included the effect of dropping a bundle on top of the racks so that it entered a box and impacted on the stored fuel and dropping an assembly across the racks. Dropping an assembly between storage locations or immediately alongside the racks is precluded by the design of the racks.

Base case calculations were performed with the KENO-IV Monte-Carlo code. Sensitivity studies were done with the EXTERMINATOR diffusion theory code. The KENO-IV code has been benchmarked against experiment and shown to be acceptably accurate.

Calculations were performed at the maximum fuel enrichment (4.1 weight percent U-235) in order to ensure maximum multiplication factors. This evaluation applies to the storage of the fuel and any effects of the enrichment on operations will be evaluated in an accident analysis.

Evaluation

Calculations of the effective multiplication factor for the fresh fuel storage racks with fresh 4.1 weight percent U-235 fuel show that the value is 0.47 for an infinite array on a 21.0 inch pitch and no moderation. Calculations of the infinite lattice multiplication factor as a function of moderator density yields a value of 0.973 at a density of about 0.1 gm/cm³. This meets our acceptance criterion of 0.98 (Standard Review Plan 9.1.1) but in view of the small margin a series of calculations which more properly accounted for the actual geometry were performed. In these calculations the geometry in the north-south direction was accurately modeled and infinite dimensions were assumed in the east-west direction. Under these conditions the maximum multiplication factor occurred at about 0.07 gms/cm³ and was 0.90.

In view of the use of standard calculational techniques which have been benchmarked and of the large margin to acceptance criteria in the properly modeled calculation we conclude that an acceptable assessment has been made of the criticality effect of storing fuel of 4.1 weight percent U-235 in the new fuel storage racks.

The calculation of multiplication factor for the storage of 4.1 weight percent U-235 fuel in the spent fuel storage racks results in a value of 0.924 for the nominal configuration and 0.931 for the worst case normal variation including calculational uncertainty. The value including the worst case abnormal configuration is 0.938 (for a pool temperature of 250°F (no credit taken for boron in the water)). Based on the fact that standard calculational techniques which have been benchmarked are used, that calculational and physical uncertainties have been included, and that the results meet our acceptance criterion of 0.95 (standard Review Plan 9.1.2) we conclude that an acceptable assessment of the criticality of the spent fuel storage pool has been made.

Based on our review we conclude that any number of fuel assemblies of the standard Westinghouse 15x15 or 17x17 having enrichments no greater than 4.1 weight percent U-235 (51.7 grams of U-235 per cm.) may be stored in the spent fuel racks at the Surry Power Station. Further, the new fuel storage racks at Surry may be completely filled with similar assemblies with enrichment of 4.1 weight percent U-235 or less.

We have reviewed the safety aspects including accident analyses for operating the reactor at an enrichment of 3.7% U-235. This is an increase from the Technical Specification value of 3.6%. This change is less than 3% and any consequences of this change on accidents are insignificant. Since this enrichment change is insignificant and we have not approved operation of the reactor to burnups above those now allowed, we conclude that this change is acceptable.

ENVIRONMENTAL CONSIDERATIONS

We have determined that this action does 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 action 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 this action.

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: February 25, 1981

UNITED STATES NUCLEAR REGULATORY COMMISSIONDOCKET NOS. 50-280 AND 50-281VIRGINIA ELECTRIC AND POWER COMPANYNOTICE OF ISSUANCE OF AMENDMENT TO FACILITYOPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 66 and 65 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 facility) located in Surry County, Virginia. The amendments are effective as of the date of issuance.

The amendments revise the Technical Specifications to allow an increase in enrichment for new and spent fuel from 3.6 weight percent of U-235 to 3.7 weight percent of U-235.

The application for the amendments comply 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 these license amendments. Prior public notice of these amendments were not required since the amendments do not involve a significant hazards consideration.

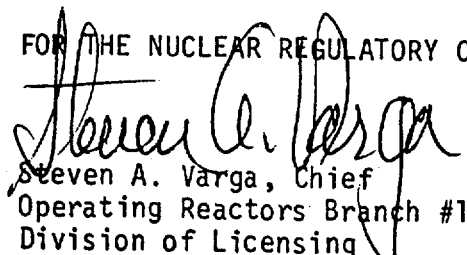
The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement, or negative

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 May 15, 1980, as supplemented September 15, 1980, and December 4, 1980, (2) Amendment Nos. 66 and 65 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 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 25th day of February, 1981.

FOR THE NUCLEAR REGULATORY COMMISSION


Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing