

August 9, 1994

Docket Nos. 50-338  
and 50-339

DISTRIBUTION  
See attached sheet

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

Dear Mr. O'Hanlon:

SUBJECT: NORTH ANNA UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE:  
FUEL ASSEMBLY RECONSTITUTION (TAC NOS. M88364 AND M88365)

The Commission has issued the enclosed Amendment Nos. 186 and 167 to Facility Operating License Nos. NPF-4 and NPF-7 for the North Anna Power Station, Units No. 1 and No. 2 (NA-1&2). The amendments revise the Technical Specifications (TS) in response to your letter dated November 19, 1993.

The amendments revise the NA-1&2 TS to allow the substitution of solid stainless steel or zirconium alloy filler rods for a limited number of failed fuel rods in fuel assemblies. This will allow the use of reconstituted fuel assemblies, which were scheduled for reload, without requiring reload core design and selection of a replacement assembly during a refueling outage.

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,

(Original Signed By)

Leon B. Engle, Project Manager  
Project Directorate II-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 186 to NPF-4
2. Amendment No. 167 to NPF-7
3. Safety Evaluation

Document Name - C:\AUTOS\WPDOCS\NA88364.AMD

cc w/enclosures: See next page

OFC	LA:PDII-2	PM:PDII-2	AD:PDII-2	OGC <i>WJH of note remain</i>
NAME	ETAN <i>WJH</i>	LENGLE <i>WJH</i>	VMCCREE <i>WJH</i>	<i>WJH</i>
DATE	7/14/94	7/14/94	8/9/94	8/1/94

110048

9408120132 940809  
PDR ADOCK 05000338  
P PDR

NRC FILE CENTER COPY

*DF01*

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

North Anna Power Station  
Units 1 and 2

cc:

Mr. William C. Porter, Jr.  
County Administrator  
Louisa County  
P.O. Box 160  
Louisa, Virginia 23093

Robert B. Strobe, M.D., M.P.H.  
State Health Commissioner  
Office of the Commissioner  
Virginia Department of Health  
P.O. Box 2448  
Richmond, Virginia 23218

Michael W. Maupin, Esq.  
Hunton and Williams  
Riverfront Plaza, East Tower  
951 E. Byrd Street  
Richmond, Virginia 23219

Regional Administrator, RII  
U.S. Nuclear Regulatory Commission  
101 Marietta Street, N.W., Suite 2900  
Atlanta, Georgia 30323

Dr. W. T. Lough  
Virginia State Corporation Commission  
Division of Energy Regulation  
P.O. Box 1197  
Richmond, Virginia 23209

Mr. J. A. Stall, Manager  
North Anna Power Station  
P.O. Box 402  
Mineral, Virginia 23117

Old Dominion Electric Cooperative  
4201 Dominion Blvd.  
Glen Allen, Virginia 23060

Mr. M. L. Bowling, Manager  
Nuclear Licensing & Programs  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Blvd.  
Glen Allen, Virginia 23060

Office of the Attorney General  
Supreme Court Building  
101 North 8th Street  
Richmond, Virginia 23219

Senior Resident Inspector  
North Anna Power Station  
U.S. Nuclear Regulatory Commission  
Route 2, Box 78  
Mineral, Virginia 23117

DATED: August 9, 1994

AMENDMENT NO. 186 TO FACILITY OPERATING LICENSE NO. NPF-4-NORTH ANNA UNIT 1  
AMENDMENT NO. 167 TO FACILITY OPERATING LICENSE NO. NPF-7-NORTH ANNA UNIT 2

Docket File

NRC & Local PDRs

PDII-2 Reading

S. Varga, 14/E/4

V. McCree

E. Tana

L. Engle

OGC

D. Hagan, TWFN, 4/A/43

G. Hill (4), TWFN 5/C/3

C. Grimes, 11/F/23

ACRS (10)

OPA

OC/~~55~~ LFDCB

E. Kendrick, 8/E/23

D. Verelli, RII



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

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

DOCKET NO. 50-338

NORTH ANNA POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 186  
License No. NPF-4

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Virginia Electric and Power Company et al., (the licensee) dated November 19, 1993, 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.

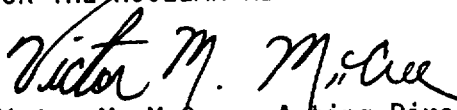
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.D.(2) of Facility Operating License No. NPF-4 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 186, 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

  
Victor M. McCree, Acting Director  
Project Directorate II-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: August 9, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 186

TO FACILITY OPERATING LICENSE NO. NPF-4

DOCKET NO. 50-338

Replace the following page of the Appendix "A" Technical Specifications with the enclosed page as indicated. The revised page is identified by amendment number and contains vertical lines indicating the area of change.

Remove Page

5-4

Insert Page

5-4

## DESIGN FEATURES

---

### DESIGN PRESSURE AND TEMPERATURE

5.2.2 The reactor containment building is designed and shall be maintained for a maximum internal pressure of 45 psig and a temperature of 280°F.

### 5.3 REACTOR CORE

#### FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 157 fuel assemblies with each fuel assembly containing 264 fuel rods clad with Zircaloy-4 or ZIRLO. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment of 3.2 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 4.3 weight percent U-235. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with NRC-approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those designs that have been analyzed with applicable NRC staff-approved codes and methods, and shown by tests or analyses to comply with all fuel safety design bases.

#### CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 48 full length control rod assemblies. The full length control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal values of absorber material shall be 80 percent silver, 15 percent indium and 5 percent cadmium. All control rods shall be clad with stainless steel tubing.

### 5.4 REACTOR COOLANT SYSTEM

#### DESIGN PRESSURE AND TEMPERATURE

5.4.1 The reactor coolant system is designed and shall be maintained:



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

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

DOCKET NO. 50-339

NORTH ANNA POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 167  
License No. NPF-7

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Virginia Electric and Power Company et al., (the licensee) dated November 19, 1993, 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. NPF-7 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 167, 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



Victor M. McCree, Acting Director  
Project Directorate II-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: August 9, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 167

TO FACILITY OPERATING LICENSE NO. NPF-7

DOCKET NO. 50-339

Replace the following page of the Appendix "A" Technical Specifications with the enclosed page as indicated. The revised page is identified by amendment number and contains vertical lines indicating the area of change.

Remove Page

5-4

Insert Page

5-4

## DESIGN FEATURES

### 5.3 REACTOR CORE

#### FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 157 fuel assemblies with each fuel assembly containing 264 fuel rods clad with Zircaloy-4 or ZIRLO. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment of 3.2 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 4.3 weight percent U-235. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with NRC-approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those designs that have been analyzed with applicable NRC staff-approved codes and methods, and shown by tests or analyses to comply with all fuel safety design bases.

#### CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 48 full length control rod assemblies. The full length control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal values of absorber material shall be 80 percent silver, 15 percent indium and 5 percent cadmium. All control rods shall be clad with stainless steel tubing.

### 5.4 REACTOR COOLANT SYSTEM

#### DESIGN PRESSURE AND TEMPERATURE

5.4.1 The reactor coolant system is designed and shall be maintained:

- a. In accordance with the code requirements specified in Section 5.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,
- b. For a pressure of 2485 psig, and
- c. For a temperature of 650°F, except for the pressurizer which is 680°F.

#### VOLUME

5.4.2 The total water and steam volume of the reactor coolant system is approximately 10,000 cubic feet at nominal operating conditions.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NOS. 186 AND 167 TO  
FACILITY OPERATING LICENSE NOS. NPF-4 AND NPF-7  
VIRGINIA ELECTRIC AND POWER COMPANY  
OLD DOMINION ELECTRIC COOPERATIVE  
NORTH ANNA POWER STATION, UNITS NO. 1 AND NO. 2  
DOCKET NOS. 50-338 AND 50-339

1.0 INTRODUCTION

By letter dated November 19, 1993 (Ref. 1), the Virginia Electric and Power Company (the licensee) proposed changes to the Technical Specifications (TS) for the North Anna Power Station, Units No. 1 and No. 2 (NA-1&2). The proposed changes would allow the use of a limited number of solid rods of zirconium alloy or stainless steel as inert filler rods to replace fuel rods which have been identified as failed or damaged. Such reconstitution will permit a damaged fuel assembly to be reused in another operating cycle without requiring the selection of a replacement fuel assembly and a reload core design change during a refueling outage.

2.0 DISCUSSION

The licensee's safety evaluation (SE) for the substitution of inert filler rods for failed or damaged fuel rods addresses the mechanical, neutronic and thermal-hydraulic analyses and approved methodology used to demonstrate that all applicable design criteria and pertinent licensing basis acceptance criteria are satisfied.

The proposed changes to TS 5.3.1 - "Fuel Assemblies" will also delete the individual fuel rod uranium weight limit to allow for Westinghouse fuel pellet design improvements which slightly increase the fuel stack weight. Supplement 1 of Generic Letter (GL) 90-02, "Alternative Requirements for Fuel Assemblies in the Design Features Section of Technical Specifications," dated July 31, 1992 (Ref. 2), recognizes the acceptability of the use of reconstituted fuel assemblies including inert filler rods. GL 90-02, Supplement 1, also provides model TS wording which has been incorporated into the new Standard Technical Specifications (STS) Section 4.2.1. These reconstitutions may be performed under the provisions of 10 CFR 50.59 provided that the required safety analyses are performed with NRC staff-approved methodologies which are applied to assembly configurations that lie within the scope of the reviewed fuel lattice configurations.

### 3.0 EVALUATION

The proposed amendment would modify TS Section 5 - Design Features, 5.3 Reactor Core, 5.3.1, "Fuel Assemblies," to allow "limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations." The licensee intends to use a limited number of inert filler rods to replace failed or damaged fuel rods for reconstituting Westinghouse LOPAR or VANTAGE-5H fuel assemblies. The licensee states that cycle-specific reload safety evaluation (RSE) analyses will be performed in accordance with the approved topical report WCAP-13060-P-A, "Westinghouse Fuel Assembly Reconstitution Evaluation Methodology," (Ref. 3) and other applicable approved Westinghouse and licensee methodologies. WCAP-13060-P-A describes the methodology for using inert filler rods to replace failed or damaged fuel rods during reconstitution of fuel assemblies for core reloads. This methodology is applicable for Westinghouse reconstituted assemblies with mixing vane grid designs.

The RSE analyses are performed according to the approved licensee's methodologies (Ref. 4) described in TS Section 6, and also conform to the Westinghouse fuel reconstitution topical report WCAP-13060-P-A methodology which was recently approved (Ref. 5). The SE approval is contingent upon analytical confirmation that the exact configuration and associated core power distribution of the proposed reconstituted assemblies does not introduce a change in radial gradients in the flow and enthalpy distribution that could invalidate the applicability of the CHF correlation used for DNB predictions. These limitations are consistent with the guidance from Supplement 1 of GL 90-02 and ensure compliance with General Design Criteria (GDC) 10 and are therefore acceptable. The specific TS 5.3.1 wording is also consistent with the model TS from the GL and from the new STS and will ensure that full reconstitution will be supported by an analysis of the nuclear, thermal-hydraulic and mechanical design and the overall effect on the core. Therefore the proposed change is acceptable.

The licensee also furnished a summary of its Surry reconstitution history. Based on the guidance furnished in Supplement 1 to GL 90-02, the licensee's RSE approach is consistent with the staff requirements, and is therefore acceptable for NAPS Units 1 and 2.

Therefore, based on all of the above, the staff finds the revised RSE process to be used by the licensee for fuel reconstitution to be acceptable.

### 4.0 STATE CONSULTATION

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

## 5.0 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 (58 FR 67863). 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 the amendments.

## 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: E. Kendrick

Date: August 9, 1994

REFERENCES

1. Letter from W. L. Stewart (VEPCO) to Document Control Desk (U.S. NRC), "North Anna Power Station Units 1 and 2 Proposed Technical Specifications Changes - Reconstituted Fuel Assemblies," Serial No. 93-706, November 19, 1993.
2. Supplement 1 to Generic Letter 90-02, "Alternative Requirements for Fuel Assemblies in the Design Features Section of Technical Specifications," dated July 31, 1992.
3. WCAP-13060-P-A, "Westinghouse Fuel Assembly Reconstitution Evaluation Methodology," Westinghouse Electric Corporation, Commercial Nuclear Fuel Division, July 1993.
4. VEP-FRD-42, Rev. 1-A, "Reload Nuclear Design Methodology," Virginia Electric and Power Company Topical Report, September 1986.
5. Letter from A. C. Thadani (NRC) to S. R. Tritch (W), "Acceptance for Referencing of Topical Report WCAP-13060-P, 'Westinghouse Fuel Assembly Reconstitution Evaluation Methodology, (TAC No. M82139)," March 30, 1993.