

October 4, 1991

Docket Nos. 50-424
and 50-425

Distribution
See next page

Mr. W. G. Hairston, III
Senior Vice President -
Nuclear Operations
Georgia Power Company
P.O. Box 1295
Birmingham, Alabama 35201

Dear Mr. Hairston:

SUBJECT: ISSUANCE OF AMENDMENTS - VOGTLE ELECTRIC GENERATING PLANT, UNITS 1
AND 2 (TACS 80492/80493)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 47 to Facility Operating License No. NPF-68 and Amendment No. 26 to Facility Operating License No. NPF-81 for the Vogtle Electric Generating Plant, Units 1 and 2. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated June 3, 1991.

The amendments modify the TS to allow the use of two Westinghouse VANTAGE-5™ fuel assemblies in which up to twelve (12) fuel rods may be clad with ZIRLO™.

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

Sincerely,

ORIGINAL SIGNED BY:

Darl S. Hood, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 47 to NPF-68
- 2. Amendment No. 26 to NPF-81
- 3. Safety Evaluation

cc w/enclosures:
See next page

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

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Darl S. Hood, Project Manager
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See next page

Mr. W. G. Hairston, III
Georgia Power Company

Vogtle Electric Generating Plant

cc:

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Birmingham, Alabama 35201

DATED: OCTOBER 4, 1991

AMENDMENT NO.47 TO FACILITY OPERATING LICENSE NPF-68 - Vogtle Electric
Generating Plant, Unit 1

AMENDMENT NO.26 TO FACILITY OPERATING LICENSE NPF-81 - Vogtle Electric
Generating Plant, Unit 2

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

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-424

VOGTLE ELECTRIC GENERATING PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 47
License No. NPF-68

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Vogtle Electric Generating Plant, Unit 1 (the facility) Facility Operating License No. NPF-68 filed by the Georgia Power Company, acting for itself, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the licensees) dated June 3, 1991, 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 set forth in 10 CFR Chapter I;
 - D. The issuance of this license 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.

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2. Accordingly, the license is hereby amended by page 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-68 is hereby amended to read as follows:

Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 47, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. GPC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



David B. Matthews, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification Changes

Date of Issuance: October 4, 1991



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

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-425

VOGTLE ELECTRIC GENERATING PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 26
License No. NPF-81

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Vogtle Electric Generating Plant, Unit 2 (the facility) Facility Operating License No. NPF-81 filed by the Georgia Power Company, acting for itself, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the licensees) dated June 3, 1991, 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 set forth in 10 CFR Chapter I;
 - D. The issuance of this license 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 hereby amended by page 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-81 is hereby amended to read as follows:

Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 26, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. GPC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



David B. Matthews, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification Changes

Date of Issuance: October 4, 1991

ATTACHMENT TO LICENSE AMENDMENT NO.47

FACILITY OPERATING LICENSE NO. NPF-68

AND LICENSE AMENDMENT NO. 26

FACILITY OPERATING LICENSE NO. NPF-81

DOCKET NOS. 50-424 AND 50-425

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

Remove Page

5-4

Insert Page

5-4

DESIGN FEATURES

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The core shall contain 193 fuel assemblies with each fuel assembly containing 264 fuel rods clad with Zircaloy-4 except for two fuel assemblies which may each contain up to twelve (12) fuel rods clad with ZIRLO™. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment not to exceed 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 not to exceed 4.55 weight percent U-235.

CONTROL ROD ASSEMBLIES

5.3.2 The core shall contain 53 full-length control rod assemblies. The control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal absorber composition shall be 95.5% natural hafnium and 4.5% natural zirconium and/or 80% silver, 15% indium, and 5% cadmium. All control rods shall be clad with stainless steel.

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 12,240 ± 100 cubic feet at a nominal T_{avg} of 588.5°F.

5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown on Figure 5.1-1 and 5.1-2.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 47 TO FACILITY OPERATING LICENSE NPF-68
AND AMENDMENT NO. 26 TO FACILITY OPERATING LICENSE NPF-81

GEORGIA POWER COMPANY, ET AL.

VOGTLE ELECTRIC GENERATING PLANT UNITS 1 AND 2

DOCKET NOS. 50-424 AND 50-425

1.0 INTRODUCTION

By letter dated June 3, 1991, Georgia Power Company, et al. (GPC or the licensee), proposed amendments to the operating licenses for the Vogtle Electric Generating Plant (VEGP), Units 1 and 2. The amendments would change the Technical Specifications (TSs) to allow the use of two Westinghouse VANTAGE-5 fuel assemblies, each containing up to twelve fuel rods clad with ZIRLO™, an advanced zirconium alloy cladding material. ZIRLO™ is proposed for limited use in VEGP reload core designs to obtain additional operational experience with the cladding's improved corrosion-resistant performance under VEGP-specific reactor conditions. This TS change is proposed to support the licensee's plan to load two fuel assemblies containing the ZIRLO™ clad fuel rods beginning with the initial introduction of VANTAGE-5 fuel into Unit 1, scheduled for late September 1991.

Previously, on May 13, 1987, the NRC staff approved a similar application for the North Anna Unit 1 reactor to use two demonstration fuel assemblies containing ZIRLO™ clad fuel rods. The North Anna fuel assemblies began irradiation in June 1987.

The NRC staff also previously determined that exemptions to 10 CFR 50.44, 10 CFR 50.46, 10 CFR 51.52, and Appendix K to 10 CFR 50 were required to allow the use of ZIRLO™. Exemptions to these regulations were issued on October 3, 1991.

This Safety Evaluation covers the staff's review of the proposed changes to VEGP TS 5.3.1, "Fuel Assemblies," reflecting changes to the reload core designs beginning with Cycle 4 for Unit 1.

2.0 EVALUATION

2.1 Fuel Mechanical Design

Currently, VEGP Units 1 and 2 utilize the Westinghouse 17x17 low-parasitic (LOPAR) fuel. Beginning with Unit 1 Cycle 4 and Unit 2 Cycle 3, reload fuel will consist of the Westinghouse VANTAGE-5 fuel design, which was approved by the staff in Amendments 43 and 44 (Unit 1) and 23 and 24 (Unit 2). GPC plans to insert up to two Westinghouse VANTAGE-5 fuel assemblies, each containing up to twelve fuel rods clad with the advanced zirconium alloy cladding material (ZIRLO™), into Vogtle reload core designs.

The chemical composition of the ZIRLO™ cladding is similar to Zircaloy-4 except for slight reductions in the content of tin, iron, chromium, and zirconium, and the addition of a nominal one percent niobium. This nominal amount of niobium provides greater corrosion resistance as compared to Zircaloy-4. The physical and mechanical properties are very similar to Zircaloy-4 while in the same metallurgical phase. However, the temperatures at which the metallurgical phases change are different for Zircaloy-4 and ZIRLO™. Further aspects of the ZIRLO™ clad performance, including its performance under loss-of-coolant accident (LOCA) conditions, and the fuel rod design bases and criteria which are particularly affected by the ZIRLO™ clad, are described in WCAP-12610, "Vantage-5 Fuel Assembly Reference Core Report," June 1990. This WCAP was reviewed and approved by the NRC staff on July 1, 1991.

Based on the above, the NRC staff concludes that the mechanical aspects of the proposed fuel design, with its proposed use of some ZIRLO™ clad fuel rods, are acceptable for use in VEGP Units 1 and 2.

2.2 Nuclear Design

WCAP-10444-P-A, "Vantage-5 Fuel Assembly Reference Core Report," September 1985, shows that the design and predicted nuclear characteristics of each fuel rod clad with ZIRLO™ are similar to those of VANTAGE-5 clad with Zircaloy-4. The licensee has performed evaluations using NRC-approved methodology and has shown that the nuclear design bases for fuel clad with ZIRLO™ are satisfied. The licensee has also shown that the change to ZIRLO™ will not affect the use of standard nuclear design analytical models and methods to accurately describe the neutronic behavior of fuel. Furthermore, the use of ZIRLO™ for the two assemblies will not affect the safety limit characteristics of the VANTAGE-5 fuel design.

The staff has previously reviewed the licensee's evaluations in WCAP-12610. By letter dated July 1, 1991, the NRC staff approved the evaluations which had used approved methods. Therefore, the proposed nuclear aspects of the proposed fuel design are acceptable for use in VEGP Units 1 and 2.

2.3 Thermal-Hydraulic Design

WCAP 10444-P-A also shows that the thermal and hydraulic design bases for fuel rods clad with ZIRLO™ are identical to those of the VANTAGE-5 design. The evaluations in the WCAP used approved methodology. Since the use of the ZIRLO™ clad fuel does not affect the parameters which are major contributors in this area (i.e., DNB, core flow, and rod bow), the design bases of the VANTAGE-5 design remain valid as previously approved. Therefore, the staff finds the thermal-hydraulic aspects of the proposed fuel design, with some fuel rods clad with ZIRLO™, to be acceptable for VEGP Units 1 and 2.

2.4 Transient and Accident Analyses

The licensee identified two non-LOCA accidents potentially affected by the use of ZIRLO™ clad material in the Final Safety Analysis Report (FSAR). These are the locked rotor/shaft break accident and the rod cluster control assembly

(RCCA) ejection accident. For the locked rotor/shaft break accident, the licensee has determined that the ZIRLO™ cladding results in a very small increase in peak clad temperature (PCT) of about 2°F, and that the difference in the effect on the metal-to-water reaction rate is negligible when compared to Zircaloy-4. A sufficient margin exists in the Vogtle safety analysis associated with the VANTAGE-5 fuel transition to accommodate the small PCT increase. For the RCCA ejection accident, the ZIRLO™ cladding results in a small reduction in both the fraction of fuel melting at the fuel's hot spot and the fuel's peak stored energy when compared to the results for Zircaloy-4.

LOCA analyses for the VANTAGE-5 fuel in the VEGP units were performed by the licensee using the 1981 Evaluation Model with BASH (large-break LOCA) and the NOTRUMP Evaluation Model (small-break LOCA). Revisions to these evaluation models for use in analyses of fuel with ZIRLO™ cladding were identified and reported in WCAP-12610. The revisions include the cladding specific heat, high-temperature creep (swelling), burst temperature, burst strain, and assembly blockage. Calculations performed with the revised evaluation models showed that the effects of ZIRLO™ cladding on large break and small break LOCA analyses results are relatively minor, such that existing acceptance criteria continue to be met.

The licensee has stated that, prior to insertion of the two fuel assemblies, the fuel rod heatup analyses for the limiting large break and small break cases from the Vogtle VANTAGE-5 fuel analyses would be verified as part of the standard reload design process and would reflect the behavior of the ZIRLO™ clad material during a LOCA as described in WCAP-12610. The licensee's analyses would consider the expected peaking factor margin between the Zircaloy-4 clad rods and the ZIRLO™ clad fuel rods which will be located in the low peaking factor regions.

Since the LOCA analyses are performed with the approved Westinghouse ECCS evaluation model and the results are within acceptable limits, and the fuel rod heat up analyses will be verified prior to insertion of the two fuel assemblies containing the ZIRLO™ clad fuel rods, the NRC staff concludes that the analyses are acceptable.

2.5 Technical Specification Changes

The proposed amendments would modify TS 5.3.1 which requires that the core's fuel assemblies contain 264 fuel rods "clad with Zircaloy-4." This TS will be supplemented by adding, "except for two fuel assemblies which may each contain up to twelve (12) fuel rods clad with ZIRLO™."

Thus, the change reflects the insertion of two Westinghouse VANTAGE-5 fuel assemblies, each containing up to twelve fuel rods clad with the advanced zirconium alloy cladding material (ZIRLO™) into VEGP reload core designs. This change is acceptable because it is consistent with the evaluations described above. The amendments implementing this TS change are in accordance with the Commission's regulations, except as exempted by the NRC's letter dated October 3, 1991, for 10 CFR 50.44, 10 CFR 50.46, 10 CFR 51.52, and Appendix K to 10 CFR 50.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements 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 the amendments involve no significant hazards consideration, and there has been no public comment on such finding (56 FR 29277). Accordingly, the 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.

5.0 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 Contributors: T. Huang, SRXB
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Date: October 4, 1991