

January 19, 1988

Docket Nos.: 50-413
and 50-414

Mr. H. B. Tucker, Vice President
Nuclear Production Department
Duke Power Company
422 South Church Street
Charlotte, North Carolina 28242

Dear Mr. Tucker:

Subject: Issuance of Amendment No. 38 to Facility Operating License NPF-35
and Amendment No. 30 to Facility Operating License NPF-52 - Catawba
Nuclear Station, Units 1 and 2 (TACS 66307/66308)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 38 to Facility Operating License NPF-35 and Amendment No. 30 to Facility Operating License NPF-52 for the Catawba Nuclear Station, Units 1 and 2. These amendments consist of changes to the Technical Specifications in response to your application dated September 8, 1987.

The amendments modify Technical Specification 5.3.1 "Fuel Assemblies" by increasing the maximum allowable fuel enrichment to 4.0 weight percent (w/o) U-235 from the previous value of 3.5 w/o U-235. The amendments are effective as of their date of issuance.

A copy of the related safety evaluation supporting Amendment No. 38 to Facility Operating License NPF-35 and Amendment No. 30 to Facility Operating License NPF-52 is enclosed.

Notice of issuance of amendments will be included in the Commission's next bi-weekly Federal Register notice.

Sincerely,

Kahtan N. Jabbour, Project Manager
Project Directorate II-3
Division of Reactor Projects I/II

Enclosures:

1. Amendment No. 38 to NPF-35
2. Amendment No. 30 to NPF-52
3. Safety Evaluation

cc w/enclosures: See next page

PDII-3/DRPI/II
MRood/mac
12/15/87

PDII-3/DRPI/II
SKT/sks
12/16/87

PDII-3/DRPI/II
KJabbour
12/17/87

PDII-3/DRPI/II
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12/19/87

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PDR ADOCK 05000413
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Mr. H. B. Tucker
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Catawba Nuclear Station

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

DUKE POWER COMPANY

NORTH CAROLINA ELECTRIC MEMBERSHIP CORPORATION

SALUDA RIVER ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-413

CATAWBA NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.38
License No. NPF-35

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Catawba Nuclear Station, Unit 1 (the facility) Facility Operating License No. NPF-35 filed by the Duke Power Company acting for itself, North Carolina Electric Membership Corporation and Saluda River Electric Cooperative, Inc., (licensees) dated September 8, 1987, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, as amended, 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 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 attachments to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-35 is hereby amended to read as follows:

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(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 38, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into the license. Duke Power Company 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

Kahtan N. Jabbour, Acting Director
Project Directorate II-3
Division of Reactor Projects I/II

Attachment:
Technical Specification Changes

Date of Issuance: January 19, 1988

*Not in use
until
approval
of Duke
power*

PDII-3/DRPI/II
MRood/mac
12/15/87

PDII-3/DRPI/II
SK151K
12/16/87

KNJ
PDII-3/DRPI/II
KJabbour
12/17/87

mmh
NRR/RSXB
WHodges
12/18/87

OGC-Bethesda
CWoodward
12/29/87

NY
PDII-3/DRPI/II
KJabbour, Acting PD
12/ /87
L. Crocker 1/7/88

AD/DRPII
GLamas
12/7/88



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

DUKE POWER COMPANY

NORTH CAROLINA MUNICIPAL POWER AGENCY NO. 1

PIEDMONT MUNICIPAL POWER AGENCY

DOCKET NO. 50-414

CATAWBA NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 30
License No. NPF-52

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Catawba Nuclear Station, Unit 2 (the facility) Facility Operating License No. NPF-52 filed by the Duke Power Company acting for itself, North Carolina Municipal Power Agency No. 1 and Piedmont Municipal Power Agency, (licensees) dated September 8, 1987, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, as amended, 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 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 attachments to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-52 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 30, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into the license. Duke Power Company 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

Kahtan N. Jabbour, Acting Director
Project Directorate II-3
Division of Reactor Projects I/II

Attachment:
Technical Specification Changes

Date of Issuance: January 19, 1988

PDII-3/DRPI/II
MRood/mac
12/15/87

PDII-3/DRPI/II
SK...
12/16/87

PDII-3/DRPI/II
KJabbour
12/17/87

NRR/RSXB
WHodges
12/18/87

OGC-Bethesda
C...
12/29/87

PDII-3/DRPI/II
KJabbour, Acting PD
12/17/87
L.P. Crocker 1/7/88

AD/DRPII
GLainas
12/17/88

ATTACHMENT TO LICENSE AMENDMENT NO. 38

FACILITY OPERATING LICENSE NO. NPF-35

DOCKET NO. 50-413

AND

TO LICENSE AMENDMENT NO. 30

FACILITY OPERATING LICENSE NO. NPF-52

DOCKET NO. 50-414

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

Amended
Page

5-6

DESIGN FEATURES

DESIGN PRESSURE AND TEMPERATURE

5.2.2 The reactor containment vessel is designed and shall be maintained for a maximum internal pressure of 15 psig and a temperature of 328°F.

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. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment of 3.5 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum nominal enrichment of 4.0 weight percent U-235 with a maximum enrichment tolerance of ± 0.05 weight percent U-235.

CONTROL ROD ASSEMBLIES

5.3.2 The core shall contain 53 full-length control rod assemblies. The full-length control rod assemblies shall contain a nominal 142 inches of absorber material of which 102 inches shall be 100% boron carbide and remaining 40-inch tip shall be 80% silver, 15% indium, and 5% 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:
- 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,
 - For a pressure a 2485 psig, and
 - 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 12,040 \pm 100 cubic feet at a nominal T_{avg} of 525°F.

5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown in Figure 5.1-1.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 38 TO FACILITY OPERATING LICENSE NPF-35
AND AMENDMENT NO. 30 TO FACILITY OPERATING LICENSE NPF-52

DUKE POWER COMPANY, ET AL.

DOCKET NOS. 50-413 AND 50-414

CATAWBA NUCLEAR STATION, UNITS 1 AND 2

INTRODUCTION

By letter dated September 8, 1987, Duke Power Company, et al., (the licensee) proposed amendments to revise Technical Specification 5.3.1 "Fuel Assemblies" by increasing the maximum allowable fuel enrichment to 4.0 weight percent (w/o) U-235 from the present value of 3.5 w/o U-235.

EVALUATION

The principal safety considerations associated with the proposed amendments are the potential effect of using the more highly enriched fuel in the reactor core and the criticality aspects of storing 4.0 w/o U-235 fuel assemblies as new fuel and as spent fuel.

Before any of the fuel enriched above 3.5 w/o U-235 is loaded into the reactor core, its higher enrichment will be included in the cycle-specific reload safety evaluation (RSE), which considers in detail the effect of fuel enrichment on core operating parameters. The RSE will use the standard reload design methods described in the Topical Reports WCAP-9272 and 9273, "Westinghouse Reload Safety Evaluation Methodology." The proposed amendments are, therefore, acceptable with regard to core reload because the use of fuel enriched up to 4.0 w/o U-235 will be expressly taken into account in the final safety evaluation of each cycle-specific core reload. Criticality accidents during refueling operations are precluded by stringent administrative procedures.

The criticality analyses for new and spent fuel storage described in Sections 9.1.1 and 9.2.2 of the Final Safety Analysis Report are based on a fuel enrichment of 3.5 w/o U-235. A summary of the criticality analyses for the same storage facilities but for the increased fuel enrichment is provided by the licensee in Attachment 2A of its September 8, 1987, submittal. For the new fuel storage vault and for the spent fuel pool these analyses present the criticality design criteria, a description of the facility, the methods used for the analysis, data on the benchmarking of the analysis methods, and the criticality analysis results.

The design basis for preventing criticality in both fuel storage facilities is taken from ANSI N18.2-1973, Section 5.7.4.1, which states:

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"The design of spent fuel storage racks and transfer equipment shall be such that the effective multiplication factor will not exceed 0.95 with new fuel of the highest anticipated enrichment in place assuming flooding with pure water. The design of normally dry new fuel storage racks shall be such that the effective multiplication factor will not exceed 0.98 with fuel of the highest anticipated enrichment in place assuming optimum moderation."

For the spent fuel pool the accidents considered include: 1) loss of spent fuel pool cooling, 2) the sliding of free standing rack modules such that peripheral cells of two rack modules have center-to-center spacings below those assumed in normal design basis analyses, and 3) the dropping of fuel assemblies on top of a rack module or lowering of a fuel assembly by the side of a rack module in a non-storage location.

The criticality analysis method used for both storage facilities makes use of computer codes CSAS2 and 123 GROUPTH for the determination of cross-sections and for the calculation of the effective multiplication factor, k_{eff} . Calculations using this code set were benchmarked against a set of 40 critical experiments representing a diverse group of water moderated oxide fuel arrays separated by materials such as stainless steel, Boral, water, etc. The comparisons indicated that there is a 95 percent probability at the 95 percent confidence level that the uncertainty in reactivity, due to the methods, is not greater than 0.012 Δ k.

For the new storage vault, a number of criticality analyses considering a full loading of either Westinghouse 17x17 Standard (STD) or Optimized (OFA) fuel assemblies were performed using aqueous moderator densities ranging from 0.05 to 1.0 gm/cc.

The following assumptions were used in the criticality evaluation:

- 1) Nominal values for the fuel assembly parameters.
- 2) Credit is taken for the inherent neutron absorption in full length structural materials as allowed by ANSI N18.2-1973.
- 3) No burnable poisons, control rods, or supplemental neutron poisons are assumed to be present.
- 4) Effects of reflectors other than water are included if their neglect would have been nonconservative. This includes the storage vault's concrete walls, ceiling, and floor.
- 5) All assemblies are assumed to be 4.1 w/o U-235 enriched and unirradiated. This worst-case enrichment assumption allows for a specified maximum nominal enrichment of 4.0 w/o U-235 with an enrichment tolerance of ± 0.1 w/o U-235.
- 6) The new fuel storage vault is conservatively modeled as an infinite series of 2 infinite rows of 12 foot high fuel assemblies in minimal thickness SS304 cell enclosures.
- 7) Each fuel assembly is treated as a heterogeneous system with the fuel pins, control rod guide tubes, and instrumentation thimble guide tube modeled explicitly.

- 8) Mechanical uncertainties and biases due to construction tolerances are considered by using worst-case conditions. Uncertainties considered include cell I.D., center-to-center spacing, and cell enclosure thickness.

The results of the analysis, with due allowance for calculational uncertainty and bias show an effective multiplication factor less than 0.95 for either the pure water or the optimum aqueous foam condition. Based on our review, we agree with the results of the licensee's criticality analysis and therefore find that storage of fuel with the maximum enrichment of 4.0 w/o U-235 permitted by Technical Specification 5.3.1 in the new fuel storage vault is acceptable.

Similar criticality analyses were performed for storing either spent fuel or new fuel (Westinghouse 17x17 Standard or Optimized (OFA)) enriched to 4.0 w/o U-235 in the spent fuel pool.

The following assumptions were used in the criticality evaluation:

- 1) Nominal values for the fuel assembly parameters.
- 2) Credit is taken for the inherent neutron absorption in full length structural materials as allowed by ANSI N18.2-1973.
- 3) No burnable poisons, control rods, or supplemental neutron poisons are assumed to be present.
- 4) All assemblies are assumed to be unirradiated 4.05 w/o U-235 enriched Westinghouse STD or OFA type. This worst case assumption allows for a specified maximum nominal enrichment of 4.0 w/o U-235 with an enrichment tolerance of ± 0.05 w/o U-235.
- 5) The spent fuel storage array is conservatively modeled as infinite in lateral and axial extent.
- 6) Geometrical and material uncertainties due to mechanical tolerances are treated by either using worst-case configuration or by performing sensitivity calculations and obtaining appropriate uncertainty values. The uncertainties considered include:
 - Fuel enrichment
 - Water density
 - Stainless steel cell wall thickness
 - Center-to-center spacing
 - Cell ID
 - Cell bowing
 - Assembly positioning
- 7) Each fuel assembly is treated as a heterogeneous system with the fuel pins, control rod guide tubes, and instrument guide tube modeled explicitly.
- 8) The moderator is pure, unborated full density water.

The calculated "worst-case" value of the effective multiplication factor for the Westinghouse 17x17 STD fuel is 0.9377; for the Westinghouse 17x17 OFA fuel, k_{eff} is 0.9455. For both types of fuel the maximum k_{eff} is less than 0.95. Based on our review, we agree with the results of the licensee's analysis and, therefore, find that the storage of fuel with the maximum enrichment of 4.0 w/o U-235 permitted by Technical Specification 5.3.1 in the spent fuel pool is acceptable.

ENVIRONMENTAL CONSIDERATION

These amendments involve changes to the use of facility components located within the restricted area as defined in 10 CFR Part 20. The 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 exposures. The NRC staff has made a determination that the amendments involve no significant hazards consideration, and there has been no public comment on such finding. 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 these amendments.

CONCLUSION

The Commission made a proposed determination that the amendments involve no significant hazards consideration which was published in the Federal Register (52 FR 47783) on December 16, 1987. The Commission consulted with the state of South Carolina. No public comments were received, and the state of South Carolina did not have any comments.

We have 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, and (2) 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.

Principal Contributors: S. Stanley Kirslis, PDII-3/DRPI/II
K. Jabbour, PDII-3/DRPI/II

Dated: January 19, 1988

DATED: January 19, 1988

AMENDMENT NO. 38 TO FACILITY OPERATING LICENSE NPF-35 - Catawba Nuclear Station, Unit 1
AMENDMENT NO. 30 TO FACILITY OPERATING LICENSE NPF-52 - Catawba Nuclear Station, Unit 2

DISTRIBUTION:

Docket File 50-413/414

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