

March 24, 1987

Docket Nos.: 50-369
and 50-370

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. 68 to Facility Operating License NPF-9 and
Amendment No. 49 to Facility Operating License NPF-17 - McGuire
Nuclear Station, Units 1 and 2

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 68 to Facility Operating License NPF-9 and Amendment No. 49 to Facility Operating License NPF-17 for the McGuire Nuclear Station, Units 1 and 2. These amendments consist of changes to the Technical Specifications in response to your application dated October 13, 1986 and supplemental letter dated January 21, 1987.

The amendments change Technical Specification 5.3.1 "Fuel Assemblies" to authorize a maximum fuel enrichment of 4.0 weight percent (w/o) uranium-235, rather than the present 3.5 w/o. The amendments are effective as of their date of issuance.

A copy of the related safety evaluation supporting Amendment No. 68 to Facility Operating License NPF-9 and Amendment No. 49 to Facility Operating License NPF-17 is enclosed.

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

Sincerely,

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Darl Hood, Project Manager
PWR Project Directorate #4
Division of PWR Licensing-A

Enclosures:

1. Amendment No. 68 to NPF-9
2. Amendment No. 49 to NPF-17
3. Safety Evaluation

cc w/enclosures: See next page

PWR#4/DPWR-A
MDuncan/mac
03/6/87

DSH
PWR#4/DPWR-A
DHood
03/6/87

PWR#4/DPWR-A
BJYoungblood
03/6/87

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Mr. H. B. Tucker
Duke Power Company

McGuire Nuclear Station

cc:

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DATED: March 24, 1987

AMENDMENT NO. 68 TO FACILITY OPERATING LICENSE NPF-9 - McGuire Nuclear Station, Unit 1
AMENDMENT NO. 49 TO FACILITY OPERATING LICENSE NPF-17 - McGuire Nuclear Station, Unit 2

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Docket File 50-369/370

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

DUKE POWER COMPANY

DOCKET NO. 50-369

McGUIRE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 68
License No. NPF-9

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the McGuire Nuclear Station, Unit 1 (the facility) Facility Operating License No. NPF-9 filed by the Duke Power Company (the licensee) dated October 13, 1986, and a supplement filed January 21, 1987, comply 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.

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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-9 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.68, are hereby incorporated into the license. The licensee 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

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Darl Hood, Project Manager
PWR Project Directorate #4
Division of PWR Licensing-A

Attachment:
Technical Specification
Changes

Date of Issuance: March 24, 1987

PWR#4/DPWR-A
MDuncan:mac
03/6/87

DSH
PWR#4/DPWR-A
DHood
03/6/87

*My notes/minutes to
SE. Check STATE &
SEC before issuance*
OGC/BETH
MYoung
03/11/87

PWR#4/DPWR-A
BJYoungblood
03/9/87



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

DUKE POWER COMPANY

DOCKET NO. 50-370

McGUIRE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 49
License No. NPF-17

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the McGuire Nuclear Station, Unit 2 (the facility) Facility Operating License No. NPF-17 filed by the Duke Power Company (the licensee) dated October 13, 1986, and a supplement filed January 21, 1987, comply 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-17 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.49, are hereby incorporated into the license. The licensee 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

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Darl Hood, Project Manager
PWR Project Directorate #4
Division of PWR Licensing-A

Attachment:
Technical Specification
Changes

Date of Issuance: March 24, 1987

PWR#4/DPWR-A
MDuncan:mac
02/16/87
3

D SH
PWR#4/DPWR-A
DHood
02/16/87
3

*unnoted revision
to SE. check STATE &
SECY before issuance*
OGC/BETH
M Young
02/11/87
3

PWR#4/DPWR-A
BJYoungblood
02/11/87
3

ATTACHMENT TO LICENSE AMENDMENT NO. 68

FACILITY OPERATING LICENSE NO. NPF-9

DOCKET NO. 50-369

AND

TO LICENSE AMENDMENT NO. 49

FACILITY OPERATING LICENSE NO. NPF-17

DOCKET NO. 50-370

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.

Amended
Page

5-6

DESIGN FEATURES

5.2.1.2 REACTOR BUILDING

- a. Nominal annular space = 5 feet.
- b. Annulus nominal volume = 427,000 cubic feet.
- c. Nominal outside height (measured from top of foundation base to the top of the dome) = 177 feet.
- d. Nominal inside diameter = 125 feet.
- e. Cylinder wall minimum thickness = 3 feet.
- f. Dome minimum thickness = 2.25 feet.
- g. Dome inside radius = 87 feet.

DESIGN PRESSURE AND TEMPERATURE

5.2.2 The reactor containment is designed and shall be maintained for a maximum internal pressure of 15.0 psig and a temperature of 250°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, except that limited substitutions of fuel rods by filler rods consisting of Zircaloy-4 or stainless steel, or by vacancies, may be made in peripheral fuel assemblies if justified by cycle-specific reload analyses. Each fuel rod shall have a nominal active fuel length of 144 inches and contain a maximum total weight of 1766 grams uranium. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 4.0 weight percent U-235.

CONTROL ROD ASSEMBLIES

5.3.2 The core shall contain 53 full-length and no part-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 for Unit 1 control rods shall be 80% silver, 15% indium, and 5% cadmium. The nominal values of absorber material for Unit 2 control rods shall be 100% boron carbide (B_4C) for 102 inches and 80% silver, 15% indium, and 5% cadmium for the 40-inch tip. All control rods shall be clad with stainless steel tubing.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 68 TO FACILITY OPERATING LICENSE NPF-9
AND AMENDMENT NO. 49 TO FACILITY OPERATING LICENSE NPF-17

DUKE POWER COMPANY

DOCKET NOS. 50-369 AND 50-370

McGUIRE NUCLEAR STATION, UNITS 1 AND 2

INTRODUCTION

By letter dated October 13, 1986, Duke Power Company (the licensee) proposed license amendments for McGuire Nuclear Station, Units 1 and 2 to increase the maximum fuel enrichment in Technical Specification 5.3.1 "Fuel Assemblies" from 3.5 weight-percent (w/o) uranium-235 (U-235) to 4.0 w/o U-235. Supplemental information in support of the proposed change was submitted by the licensee January 21, 1987. This submittal does not alter the scope of the licensee's requested amendment nor does it affect the staff's proposed no significant hazards determination in the November 19, 1986 Federal Register notice.

EVALUATION

Technical Specification 5.3.1 stated that "Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 3.5 weight percent U-235." The change by these amendments is that the "3.5" is increased to "4.0." Thus, this change allows the fuel enrichment for any reload to be any value up to 4 w/o. The actual value used for any reload is included in the cycle-specific reload safety evaluation (RSE) which is performed prior to fuel loading. The RSE uses the standard reload design methods described in the approved Topical Reports WCAP-9272 and -9273, "Westinghouse Reload Safety Evaluation Methodology," to demonstrate that the core reload will not adversely affect the safety of the plant. The proposed change is, therefore, acceptable because the final safety evaluation of the cycle specific enrichment will be made as part of the RSE.

In addition to the reactor core, the new (i.e., unirradiated) and spent fuel storage facilities must be capable of accommodating the maximum enrichment allowed by the Technical Specifications. The criticality aspects of the McGuire spent fuel racks with fuel enriched up to 4.0 w/o have been previously evaluated and found acceptable by the Commission as set forth in McGuire License Amendments 35 (Unit 1) and 16 (Unit 2). The storage capabilities of the new fuel storage vault are governed by Technical Specification Section 5.6 (which does not specify the fuel enrichment) and FSAR Section 9.1.1. The criticality evaluation in FSAR Section 9.1.1 assumed a 3.5 w/o enrichment. In support of the proposed Technical Specification change and in a letter dated January 21, 1987, the licensee accordingly provided a

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criticality analysis for the new fuel vault with increased fuel enrichment. This analysis was performed in accordance with ANSI N16.9-1975 and included the criticality design criteria for the new fuel vault, 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 the new fuel racks is that the effective multiplication factor would not exceed 0.95 if flooded with pure water and would not exceed 0.98 if enveloped with aqueous foam at the density which maximizes the reactivity of the array. The analysis methods used by the licensee were compared to benchmarking data and were shown to have an uncertainty of no more than 0.012 with a 95 percent probability at a 95 percent confidence level.

The licensee's criticality analysis considered a fuel loading in the new fuel racks of either Westinghouse 17x17 Standard or Optimized fuel assemblies. The modeling and input assumptions used in the analysis included the following:

1. Nominal values were used for the fuel assembly designs.
2. No credit was taken for the inherent neutron-absorbing effect of the new fuel storage rack materials.
3. No burnable poisons, control rods, or supplemental neutron poisons were assumed to be present.
4. Effects of reflectors, other than water, were included if their neglect would have been nonconservative. This included the storage vault's concrete walls, ceiling, and floor.
5. All fuel assemblies were assumed to be at least 4.0 w/o U-235 enriched and unirradiated.
6. The new fuel storage vault was modeled as 2 rooms separated by a 2-foot thick concrete wall with each room containing 3 infinite rows of 12-foot high fuel assemblies.
7. Each fuel assembly was 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 were considered by using worst-case conditions. Uncertainties considered included cell inner diameter and center-to-center spacing.

The results of the licensee's criticality analysis, with due allowance for calculational uncertainty and bias, show an effective multiplication factor less than 0.95 for either the pure water or optimum aqueous foam conditions. We have reviewed the licensee's analysis and find that it is properly performed. On this basis we have therefore concluded that storage of fuel with the maximum enrichment of 4.0 w/o permitted by revised Technical Specification 5.3.1 in the new fuel storage vault will not result in criticality conditions exceeding the design basis of the new fuel storage vault.

Accidents resulting in an increase in effective multiplication factor because of geometrical changes of the racks or fuel handling accidents are not affected

by the change because such accidents continue to be adequately precluded by the following existing design bases:

- a. The facility is designed in accordance with General Design Criteria 2 and 4.
- b. The racks are designed to seismic Category 1 requirements.
- c. The only Category 1 structure that could disrupt the array should it fail during a seismic event is the crane trolley. Administrative procedure prohibits the trolley from being parked over the new fuel storage vault.
- d. The runway conductors for the trolley are divided and power to each section is provided through separate circuit breakers. Power to the conductors in the area of the new fuel storage vault is provided only during handling operations. The conductors are divided at a point which will prohibit the trolley being positioned over the vault when power to that end is interrupted.
- e. The racks and anchorages can withstand the maximum uplift force available without a significant change in geometry.
- f. The design of the Fuel Handling System and administrative procedures insure subcritical spacing of fuel assemblies.

Accordingly, the Commission concludes that the proposed change to the Technical Specifications to allow a maximum fuel enrichment of 4.0 w/o U-235 is acceptable because the cycle-specific RSE will demonstrate safety of each core reload by approved methods, and the criticality analysis for the new fuel storage vault shows conformance with criticality criteria. The spent fuel racks have been shown to be capable of storage of fuel with the maximum enrichment in a previous action.

ENVIRONMENTAL CONSIDERATION

These amendments involve changes to the installation or use of facilities' 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 exposure. 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 (51 FR 41853) on November 19, 1986 and consulted with the state of North Carolina. No public comments were received, and the state of North 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: Darl S. Hood, PWR Project Directorate #4, PWR-A
Marvin Dunenfeld, PARS, PWR-A

Dated: March 24, 1987