

July 31, 1997

Mr. M. S. Tuckman
Senior Vice President
Nuclear Generation
Duke Power Company
P. O. Box 1006
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SUBJECT: MCGUIRE NUCLEAR STATION - ISSUANCE OF EXEMPTION TO 10 CFR 70.24,
CRITICALITY ACCIDENT REQUIREMENTS (TACS M97863 AND M97864)

Dear Mr. Tuckman:

The Commission has issued the enclosed exemption from certain requirements of 10 CFR 70.24 regarding criticality accident requirements. This exemption is related to your application dated February 4, 1997, as supplemented by letter of March 19, 1997. This exemption relieves McGuire from the requirements of 10 CFR 70.24(a)(1) and (2) regarding the detection, sensitivity, and coverage capabilities of the criticality monitors, and from (a)(3) regarding emergency procedures for each area in which licensed special nuclear material is handled, used, or stored. The Safety Evaluation supporting the exemption provides details of the technical basis.

A copy of the Exemption and the supporting Safety Evaluation by the staff are enclosed. The Exemption is being forwarded to the Office of the Federal Register for publication.

Sincerely,

ORIGINAL SIGNED BY:

Victor Nerves, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosures: 1. Exemption
2. Safety Evaluation

cc w/encls: See next page

*See previous concurrence

OFFICE	PDII-2/PM	PDII-2/LR	PDII-2/D	OGC*	DRPE/D
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COPY	YES NO	YES NO	YES NO	YES NO	YES NO
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DATE	7/24/97	7/24/97	7/24/97		
COPY	YES NO	YES NO			

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

July 31, 1997

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Senior Vice President
Nuclear Generation
Duke Power Company
P. O. Box 1006
Charlotte, NC 28201

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Sincerely,

A handwritten signature in cursive script that reads "Victor Nerses".

Victor Nerses, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosures: 1. Exemption
2. Safety Evaluation

cc w/encls: See next page

McGuire Nuclear Station
Units 1 and 2

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UNITED STATES OF AMERICA
 NUCLEAR REGULATORY COMMISSION

In the Matter of
 DUKE POWER COMPANY
 (McGuire Nuclear Station,
 Units 1 and 2)

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Docket Nos. 50-369 and 50-370

EXEMPTION

I.

The Duke Power Company (the licensee) is the holder of Facility Operating License Nos. NPF-9 and NPF-17, for the McGuire Nuclear Station, Units 1 and 2. The licenses provide, among other things, that the licensee is subject to all rules, regulations, and orders of the Commission now or hereafter in effect.

These facilities consist of two pressurized water reactors located at the licensee's site in Mecklenburg County, North Carolina.

II.

Title 10 of the Code of Federal Regulations (10 CFR) at subsection (a) of 10 CFR 70.24, "Criticality Accident Requirements," requires that each licensee authorized to possess special nuclear material shall maintain in each area where such material is handled, used, or stored, a criticality accident monitoring system "using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs." Subsection (a)(1) and (a)(2) of 10 CFR 70.24 specify the detection, sensitivity, and coverage capabilities of the monitors required by 10 CFR 70.24(a). Subsection (a)(3) of 10 CFR 70.24 requires that the licensee shall

maintain emergency procedures for each area in which this licensed special nuclear material is handled, used, or stored and provides (1) that the procedures ensure that all personnel withdraw to an area of safety upon the sounding of a criticality monitor alarm, (2) that the procedures must include drills to familiarize personnel with the evacuation plan, and (3) that the procedures designate responsible individuals for determining the cause of the alarm and placement of radiation survey instruments in accessible locations for use in such an emergency. Subsection (b)(1) requires licensees to have a means to quickly identify personnel who have received a dose of 10 rads or more. Subsection (b)(2) requires licensees to maintain personnel decontamination facilities, to maintain arrangements for a physician and other medical personnel qualified to handle radiation emergencies, and to maintain arrangements for the transportation of contaminated individuals to treatment facilities outside the site boundary. Subsection (c) exempts Part 50 licensees (such as McGuire) from the requirements of paragraph (b). Subsection (d) states that any licensee who believes that there is good cause why he should be granted an exemption from all or part of 10 CFR 70.24 may apply to the Commission for such an exemption and shall specify the reasons for the relief requested.

By letter dated February 4, 1997, as supplemented March 19, 1997, Duke Power Company requested an exemption for all its nuclear plants from the requirements of 10 CFR 70.24. The staff has reviewed the licensee's submittal, and documented its detailed review in a Safety Evaluation. The staff found that existing procedures and design features make an inadvertent criticality in special nuclear materials handling or storage at McGuire

unlikely. The licensee has thus met the intent of 10 CFR 70.24(d) by the low probability of an inadvertent criticality in areas where fresh fuel could be present, by the licensee's adherence to General Design Criterion 63 regarding radiation monitoring, and by provisions for personnel training and evacuation.

III.

Section 70.14 of 10 CFR, "Specific exemptions," states that

The Commission may, upon application by any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

Section 70.24(d) of 10 CFR states that

Any licensee who believes that good cause exists why he should be granted an exemption in whole or in part from the requirements of this section may apply to the Commission for such exemption.

Accordingly, the Commission has determined that good cause is present as defined in 10 CFR 70.24(d). The Commission has further determined that, pursuant to 10 CFR 70.14, the exemption is authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest. Therefore, the Commission hereby grants Duke Power Company an exemption from the requirement of 10 CFR 70.24(a)(1), (2), and (3) for McGuire, Units 1 and 2, on the bases as stated in Section II above.

Pursuant to 10 CFR 51.32, the Commission has determined that granting of this exemption will have no significant effect on the quality of the human environment (62 FR 41101).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

ORIGINAL SIGNED BY:

Samuel J. Collins, Director
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,
this 31st day of July 1997.

OFFICE	PDII-2/PM	PDII-2/LA	PDII-2/D	OGC	DRPE/D
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COPY	YES NO	YES NO	YES NO	YES NO	YES NO
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NAME	R. ZIMMERMAN	S. COLLINS	M. Chatterton		
DATE	7/24/97	7/28/97	7/24/97		
COPY	YES NO	YES NO			

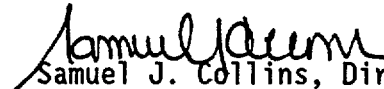
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Pursuant to 10 CFR 51.32, the Commission has determined that granting of this exemption will have no significant effect on the quality of the human environment (62 FR 41101).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


Samuel J. Collins, Director
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,
this 31st day of July 1997.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATING TO REQUEST FOR EXEMPTION FROM 10 CFR 70.24 REQUIREMENTS

DUKE POWER COMPANY

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

DOCKET NO. 50-369 AND 50-370

1.0 INTRODUCTION

Title 10 of the Code of Federal Regulations (10 CFR) at subsection (a) of 10 CFR 70.24, "Criticality Accident Requirements," requires that each licensee authorized to possess special nuclear material shall maintain in each area where such material is handled, used, or stored, a criticality accident monitoring system "using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs." Subsection (a)(1) and (a)(2) of 10 CFR 70.24 specify the detection, sensitivity, and coverage capabilities of the monitors required by 10 CFR 70.24(a). Subsection (a)(3) of 10 CFR 70.24 requires that the licensee shall maintain emergency procedures for each area in which this licensed special nuclear material is handled, used, or stored and provides (1) that the procedures ensure that all personnel withdraw to an area of safety upon the sounding of a criticality monitor alarm, (2) that the procedures must include drills to familiarize personnel with the evacuation plan, and (3) that the procedures designate responsible individuals for determining the cause of the alarm and placement of radiation survey instruments in accessible locations for use in such an emergency. Subsection (b)(1) requires licensees to have a means to quickly identify personnel who have received a dose of 10 rads or more. Subsection (b)(2) requires licensees to maintain personnel decontamination facilities, to maintain arrangements for a physician and other medical personnel qualified to handle radiation emergencies, and to maintain arrangements for the transportation of contaminated individuals to treatment facilities outside the site boundary. Subsection (c) exempts Part 50 licensees (such as Catawba) from the requirements of paragraph (b). Subsection (d) states that any licensee who believes that there is good cause why he should be granted an exemption from all or part of 10 CFR 70.24 may apply to the Commission for such an exemption and shall specify the reasons for the relief requested.

By letter dated February 4, 1997, as supplemented March 19, 1997, Duke Power Company (the licensee) requested an exemption for all its nuclear plants from the requirements of 10 CFR 70.24. The staff has reviewed the licensee's submittal and has determined that procedures and design features make an inadvertent criticality in special nuclear materials handling or storage at McGuire unlikely, in accordance with General Design Criterion 62.

2.0 EVALUATION

Special nuclear material, as nuclear fuel, is stored in the spent fuel pool and the new fuel storage vault. The spent fuel pool is used to store irradiated fuel under water after its discharge from the reactor, and new fuel prior to loading into the reactor. New fuel is stored dry (in air) in the new fuel storage vault.

Special nuclear material is also present in the form of fissile material incorporated into nuclear instrumentation. The small quantity of special nuclear material present in these items precludes an inadvertent criticality.

2.1 Requirements of 10 CFR 70.24(a)(1) and (2)

Each McGuire unit has its own spent fuel pool. The spent fuel pool is designed to store the fuel in a geometric array that precludes criticality. Section 5.6 of the unit's Technical Specifications requires that the spent fuel racks are designed and shall be maintained such that the effective neutron multiplication factor, k_{eff} , will remain less than or equal to 0.95 under all normal and accident conditions for fuel of maximum nominal enrichment of 4.75 weight percent (wt%) U-235. The staff has previously found this design acceptable.

Each McGuire unit has its own new fuel storage vault. The new fuel storage vault is used to receive and store new fuel in a dry condition upon arrival on site and prior to loading in the reactor or spent fuel pool. Although the new fuel storage area is prevented by design from flooding (there is no piping which could rupture and flood the area, there is a drainage system, and there is no hydrogenous fire fighting equipment in the area), the spacing between new fuel assemblies in the vault is sufficient to maintain the array in a subcritical condition even under accident conditions assuming the presence of neutron moderator. The maximum nominal enrichment of 4.75 wt% U-235 for the new fuel assemblies results in a maximum k_{eff} of less than 0.95 under conditions of accidental flooding by unborated water, and k_{eff} less than 0.98 under conditions of low-density optimum moderation. The staff has found the design of the licensee's new fuel storage vault to be adequate to store fuel enriched to 4.75 wt% U-235.

Nuclear fuel is moved between the shipping container (two assemblies in each container), the new fuel storage vault, the reactor vessel, and the spent fuel pool to accommodate refueling operations. In all cases, fuel movements are procedurally controlled and designed to preclude conditions involving criticality concerns. Only one new fuel assembly is handled at any one time in any area of the fuel building. Upon removal from the shipping container, the assembly is inspected and transferred by the crane to the new fuel storage vault or the spent fuel pool for storage. All valves that could allow water into the area of the spent fuel operating deck are administratively controlled, and remain shut during fuel handling operations.

The licensee's current procedures and controls prevent an inadvertent criticality during fuel handling; nevertheless, radiation monitoring, as required by General Design Criterion 63, is provided for handling new fuel prior to being placed into the spent fuel pool. In addition, handling of fuel in the spent fuel pool is monitored by required radiation monitors on the fuel

handling bridges (Section 3/4.3.3 of each unit's Technical Specifications). These required radiation monitors have associated alarm response procedures which provide instructions to the operators upon receipt of alarms.

On the basis of the above, the licensee has met the intent of 10 CFR 70.24(d) by the existing facility design, extremely low probability of criticality, and operating procedures. Literal compliance with the requirements of 10 CFR 70.24(a)(1) and (2) would not increase the margin of safety.

2.2 Requirements of 10 CFR 70.24(a)(3)

The purpose of 10 CFR 70.24 is to ensure that if a criticality were to occur during the handling of special nuclear material, personnel would be alerted to that fact and would take appropriate action. The staff has discussed above that reasonable and satisfactory precautions exist to preclude a nuclear criticality accident, thereby meeting the requirements of General Design Criterion 62. In addition, the licensee has installed radiation monitors, as required by General Design Criterion 63, in fuel storage and handling areas. These monitors will alert personnel to excessive radiation levels and allow them to initiate appropriate safety actions.

The licensee provides radiation alarm training in the general employee plant access training that each employee receives before being badged for unescorted access at the plant. This training identifies the types of alarms that are used, the types of alarm signals emitted, and the expected employee response. An exemption to 10 CFR 70.24(a)(3) would not decrease personnel's ability to identify and respond to radiation alarms in areas involving fresh fuel as long as the licensee's general procedures described in its submittals are in effect.

2.3 Requirements of 10 CFR 70.24(b) and (c)

The requirements of 10 CFR 70.24(c) exempt holders of Part 50 operating licenses (e.g., McGuire) from the requirements of 10 CFR 70.24(b)(1) and (2) regarding decontamination facilities, arrangements for physician and other medical personnel qualified to handle radiation emergencies, and arrangements for the transportation of contaminated individuals to treatment facilities outside the site boundary. Thus there is no need for the staff to take any action on 10 CFR 70.24(b) and (c) for Catawba.

3.0 CONCLUSION

In accordance with 10 CFR 70.24(d), the licensee has demonstrated that good cause exists for an exemption: the existing facility design and operating procedures ensure extremely low probability of criticality, and the existing emergency procedure provides for notification and evacuation of personnel. Literal compliance with the requirements of 10 CFR 70.24(a)(1), (2), and (3) would not increase the margin of safety, and therefore an exemption can be granted.

Principal Contributor: Laurence Kopp

Date: July 31, 1997