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AUTH.NAME AUTHOR AFFILIATION
TUCKMAN,M.S. Duke Power Co.
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SUBJECT: Provides addl info re 970204 ltr requesting exemption to requirements of 10CFR70.24 re criticality accident requirements.

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Duke Power Company
P.O. Box 1006
Charlotte, NC 28201-1006

M. S. TUCKMAN
Senior Vice President
Nuclear Generation
(704)382-2200 Office
(704)382-4360 Fax

DUKE POWER

March 19, 1997

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Subject: Oconee Nuclear Station
Docket Numbers 50-269, -270, and -287
McGuire Nuclear Station
Docket Numbers 50-369 and -370
Catawba Nuclear Station
Docket Numbers 50-413 and -414
Request for Exemption From the Requirements of 10 CFR 70.24; Response to Request for additional Information (TACs 97861, 97862, 97863, 97864, 97865, 97866 and 97867)

By letter dated February 4, 1997, Duke Power Company requested an exemption to the requirements of 10 CFR 70.24, regarding criticality accident requirements. The NRC staff requested, by letter dated February 13, 1997, additional information. Attached please find responses to the Staff's questions.

If there are any additional questions, please call Scott Gewehr at (704) 382-7581.

Very truly yours,

M. S. Tuckman

M. S. Tuckman

A001
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cc: Mr. V. Nerses, Project Manager
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop 14H25, OWFN
Washington, D. C. 20555

Mr. D. E. LaBarge, Project Manager
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-14 H25
Washington, D. C. 20555

Mr. P. S. Tam, Project Manager
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-14 H25
Washington, D. C. 20555

Mr. L. A. Reyes, Regional Administrator
U.S. Nuclear Regulatory Commission - Region II
101 Marietta Street, NW - Suite 2900
Atlanta, Georgia 30323

Mr. S. M. Sheaffer
Senior Resident Inspector
McGuire Nuclear Station

Mr. R. J. Freudenburger
Senior Resident Inspector
Catawba Nuclear Station

Mr. M. A. Scott
Senior Resident Inspector
Oconee Nuclear Station

Request for Exemption to the Requirements of 10 CFR 70.24
Response for Additional Information

Question 1

Describe the administrative controls and procedures that are imposed upon fuel handling operations for precluding inadvertent criticality of fresh fuel during fuel handling operations prior to storage in the fresh fuel racks.

Response 1

New fuel is received in the fuel receiving area. The fuel assemblies are removed from the shipping container one at a time (two assemblies are shipped in each shipping container) by the fuel handling crane. 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 (except at Oconee) 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.

Question 2

What are the possible sources of water during new fuel handling operations? How are these sources controlled during the handling of new fuel?

Response 2

The introduction and retention of moderators into the New Fuel Vault facilities at McGuire and Catawba is prevented by the following:

The new fuel storage area is prevented by design from flooding as a result of either the Probable Maximum Flood or Probable Maximum Precipitation.

There is no piping which could rupture and introduce moderator into the area.

There is a drainage system sized to handle all probable means of flooding.

Administrative policy has been established to preclude the use of hydrogenous fire fighting material in the fuel storage building. All fire extinguishers are of the dry chemical or CO2 type.

Note that Oconee has no new fuel storage vault; new fuel is stored in the spent fuel pool. The new fuel receiving bay, where fuel is stored temporarily, at Oconee has 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.

Question 3

What quantities of other forms of special nuclear material, in addition to nuclear fuel, are stored on site?

Response 3

Overall, the amount of special nuclear material (SNM) other than fuel which is stored on-site is negligible compared to the fuel; it consists of neutron detectors and neutron sources.

At McGuire and Catawba, SNM is contained in several incore fission chambers (movable incore neutron detectors). The total quantity of U-235 in each detector is less than five (5) milligrams. There are a total of six (6) operational detectors for each unit; and as many as 6 spare detectors. Old detectors, once irradiated, are also stored onsite.

Other SNM on-site includes a nominal 5-curie plutonium 238-Beryllium neutron source, which contains approximately .33 grams of plutonium. There is also a Pu-239 source set; the total activity of this is about .5 microcuries.

Catawba, in addition, has 2 fission chambers on each unit in the Boron Dilution Mitigation System. These fission chambers contain 7 grams of U-235 each; there is one spare onsite. Also, there is a neutron flux monitor containing about 14 grams of U-235; total activity of the flux monitor is 15.3 μCi.

At Oconee, there are 16 fission chambers totaling 210.6 μCi of activity. Two plutonium-beryllium calibration sources total 9.05 Ci (this includes 1 plutonium-239, beryllium-13

source = 5 Ci and 1 plutonium-238- beryllium source = 4.05 Ci). Finally, a plutonium-beryllium source boronmeter containing Pu-239 and Pu-241 combined with the beryllium contains 1 Ci.

Question 4

Verify that, with the requested exemption, radiation monitoring remains available to meet the requirements of 10 CFR Part 50, Appendix A, General Design Criterion 63, for fuel storage areas. Also, include a discussion of the training provided to personnel in responding to area radiation monitoring alarms.

Response 4

A description of the radiation monitoring which is available is provided in UFSAR Chapter 12 for each station. For monitor locations, see Table 12-29 for Catawba, Table 12-3 for Oconee, and Table 12-11 for McGuire.

Radiation alarm training, at a minimum, is provided in the general employee plant access training each employee receives prior to being badged for unescorted access at Duke's nuclear plants. This training identifies the types of alarms that are used, the types of alarm signals emitted, and the expected employee response (e.g., report to control room). In addition, employees are trained to consult the applicable radiation work permit for additional instruction prior to starting work.

Question 5

What is the maximum enrichment (or k-infinity) of fresh fuel analyzed for storage in the fresh fuel racks, and what are the effects of complete flooding and low-density, optimum moderation accident conditions.

Response 5

For McGuire, the maximum enrichment analyzed is 4.75 w%, with an enrichment tolerance of .05 w%. Analysis of a fully flooded accident condition results in a k-eff of .94760. Under optimum moderation conditions, k-eff is .94995.

For Catawba, the maximum enrichment analyzed is 5.1 w%. (Note that the enrichment tolerance was included in the analyzed enrichment value of 5.1 w%; CNS Technical

Specifications limit enrichment to 5.0 w%.) Analysis of a fully flooded accident condition results in a k-eff of .93022. Under optimum moderation conditions, k-eff is .95861.

As noted above, Oconee has no dry new fuel storage area.

Question 6

Discuss why the exemption would remain valid for possible future fuel enrichment increases.

Response 6

Any proposed fuel enrichment increase would be accompanied by an analysis similar to the ones whose results are presented in answer to Question 5. The results would necessarily meet applicable limits.