

SAFETY EVALUATION REPORT

DUKE POWER COMPANY

Application Dated May 18, 1981,
Revision Dated July 10, 1981, and
Supplement Thereto Dated August 31, 1981
For a Storage License for Fuel and Accessories
For the McGuire Nuclear Station, Unit No. 2
Docket No. 70-2944

The subject application, revision, and supplement requests a license to receive approximately 2360 kilograms contained ^{235}U in uranium enriched to no greater than 3.1% ^{235}U in the form of reactor fuel assemblies and 60 milligrams contained ^{235}U at any enrichment in the form of fission chambers.

The uranium fuel assemblies which Duke wishes to receive contain uranium at three nominal enrichments, 2.1%, 2.6%, and 3.1%. The fuel is contained in up to 196 reactor fuel assemblies. Because of measurement and enrichment variations usually encountered, we propose to license a maximum enrichment of 3.15% ^{235}U . The 60 milligrams of ^{235}U at any enrichment will be sealed in fission chambers (neutron detectors) and will be used for reactor instrumentation.

The uranium containing fuel assemblies will be supplied by the Westinghouse Electric Corporation. The weight of the uranium contained in an individual fuel assembly is approximately 462 kilograms. A maximum of 14.3 kilograms contained ^{235}U is in a single fuel assembly.

The fuel assemblies will be stored in their shipping containers in the fuel receiving area, in the dry state in the New Fuel Storage Vault (6 x 16 fuel assembly array), and in either the wet or dry state in the Spent Fuel Storage Facility (500 fuel assembly array). No more than 12 shipping containers are expected to be onsite at any one time. Since Certificate of Compliance No. 5450 authorizes the shipment of 60 containers in a single Class III shipment, the temporary storage of the assemblies in the shipping containers is safe. The new fuel storage racks provide for a minimum center-to-center distance of 21 inches between assemblies. The spent fuel storage racks provide for a minimum center-to-center distance of 15.5 inches between assemblies. The safety of the 21 inches center-to-center between assemblies of a finite reflected array has been previously shown to be sufficient to prevent criticality under all credible degrees of water moderation (see NR-FM-003, dated November 10, 1975). In the case of dry storage in the Spent Fuel Storage Pool, assemblies will be stored in a "checkerboard" array such that, for a given assembly, the four diagonally adjacent locations contain an assembly and the four immediately adjacent storage locations are vacant. In the "checkerboard" pattern array the center-to-center spacing between assemblies is greater than 21 inches. Inadvertent insertion of assemblies in open spaces of the "checkerboard" pattern are precluded by the developed loading patterns and verification checks made to assure that each assembly is properly positioned.

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Previous calculations (NR-FM-003) have demonstrated that two or more fuel assemblies are necessary in order to attain criticality at optimum spacing between assemblies and optimum moderation and reflection. Only one fuel assembly will be handled at one time within each fuel area of the facility (e.g., shipping, receiving, new fuel storage vault area, spent fuel pool area, transfer canal area and reactor containment area). Only one assembly is allowed in the reactor vessel at any one time for purposes of indexing the core. The assembly used for indexing is inspected for damage prior to use in the core to preclude use of damaged fuel assemblies in the core loading.

A situation that would increase the reactivity of the storage arrays would occur if the fuel assemblies were internally water moderated but the spaces between assemblies were occupied only with air. This might occur if a storage area were flooded, the area then drained, but with the water retained in the plastic bags which may be used to protect fuel assemblies from dust, etc. In that case the fuel assemblies would be moderated with water, but with no water shielding between the assemblies. To prevent such a situation, the Staff has added a license condition requiring that the fuel assemblies be stored in such a manner that would allow water to drain freely from within the assemblies in the event of flooding and subsequent draining of a storage area. It is the Staff's opinion that with this added condition, the applicant has established reasonable and satisfactory precautions to avoid accidental criticality.

The applicant's Physical Security Plan has been reviewed. The plan is to be implemented by the date of fuel receipt and will remain in effect until the security plan submitted pursuant to 10 CFR 50.34(c) is approved and implemented. It is the Staff's opinion that the plan described is adequate and meets the requirements of 10 CFR 73.67.

The applicant has included the technical qualifications, experience, and responsibilities of the personnel associated with the Station Health Physics Program. The Staff has concluded that the applicant's program and personnel are adequate to allow them to reasonably carry out the activities for which a license is requested.

The applicant has requested, pursuant to 10 CFR 70.24(d), an exemption from the provisions of 10 CFR 70.24. Based on the applicant's demonstration of sub-criticality under normal and accident conditions, good cause exists for exemption from the requirements of 10 CFR 70.24. Because of the inherent features associated with the storage and inspection of unirradiated fuel containing uranium enriched to less than 5% in the ^{235}U isotope when no fuel processing activities are to be performed, the staff hereby determines that granting such an exemption will not endanger life or property or the common defense and security, and is in the public interest. This exemption is authorized pursuant to 10 CFR 70.14.

The NRR Project Manager, Mr. R. A. Birkel, and the IE Resident Inspector, Ms. M. J. Graham, have stated they have no objection to issuance of the license.

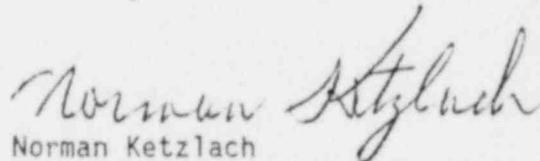
Conclusion:

Based on the above statements, the staff believes that the proposed activities can be performed without undue risk to the health and safety of the public. It has been determined by the staff that the application fulfills the requirements of 10 CFR 70.23(a). Further, the issuance of this license is not a major federal action significantly affecting the quality of the human environment and thus, pursuant to 10 CFR 51.5(d)(4), no environmental impact statement, negative declaration, or environmental appraisal needs to be prepared.

RECOMMENDATION

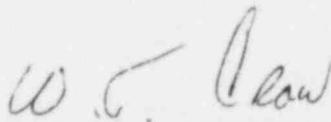
The Staff recommends approval of the revised application and its supplement with the addition of the following condition:

1. Fuel assemblies shall be stored in such a manner that water would drain freely from the assemblies in the event of flooding and subsequent draining of the fuel storage area.



Norman Ketzlach
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety

Approved:



W. T. Crow, Section Leader
Uranium Process Licensing Section



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

Docket Nos. 50-369
50-370

AMENDMENT TO INDEMNITY AGREEMENT NO. B-83

AMENDMENT NO. 5

Effective **OCT 19 1981**, Indemnity Agreement No. B-83, between Duke Power Company, and the Nuclear Regulatory Commission, dated February 28, 1978, as amended, is hereby further amended as follows:

Item 3 of the Attachment to the indemnity agreement is deleted in its entirety and the following substituted therefor:

Item 3 - License number or numbers

SNM-1773 (From 12:01 a.m., February 28, 1978, to
12 midnight, January 22, 1981 inclusive)

SNM-1885 (From 12:01 a.m., **OCT 19 1981**)

NPF-9 (From 12:01 a.m., January 23, 1981)

FOR THE UNITED STATES NUCLEAR REGULATORY COMMISSION

A handwritten signature in cursive script, appearing to read "Jerome Saltzman".

Jerome Saltzman, Assistant Director
State and Licensee Relations
Office of State Programs

Accepted _____, 1981

By _____

DUKE POWER COMPANY