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

THE UNIVERSITY OF MICHIGAN

DOCKET NO. 50-2

FORD NUCLEAR REACTOR

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 25
License No. R-28

1. The Nuclear Regulatory Commission (the Commission) has found that:

A. The applications for amendment by The University of Michigan (the licensee) dated June 27, 1977 and August 25, 1978, as supplemented June 12 and September 13, 1978, comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

B. The facility will operate in conformity with the applications, 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;

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;

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; and

F. Publication of notice of this amendment is not required since it does not involve a significant hazards consideration nor amendment of a license of the type described in 10 CFR Section 2.106(a)(2).

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. R-28 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 25, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 12, 1978

ATTACHMENT TO LICENSE AMENDMENT NO. 25

FACILITY LICENSE NO. R-28

DOCKET NO. 50-2

Replace existing pages 18, 27, 35 and 37 of the Technical Specifications contained in Appendix A with the attached revised pages 18, 27, 35 and 37. The changed areas on the revised pages are shown by marginal lines.

TABLE 3.2

REQUIRED SAFETY RELATED INSTRUMENTATION

Instrumentation	Setpoint	Minimum Number Required	Function
Linear Level Channel	As Required	1	Linear power level measurement and input for the automatic control mode
Power Level Deviation Interlock	95% of control point setting	1	Return reactor to manual control mode if setpoint is reached
Reactor Coolant Inlet Temperature	Not Applicable	1(a)	Provide information for the heat balance determination
Facility Radiation Monitor System (b)			
1. Building Air Exhaust	1 (1) mr/hr	1	Alarm, scram, initiate confinement evacuation
2. Reactor Bridge	30 (50) mr/hr	1	Alarm
3. NW Column	10 (50) mr/hr	1(c)	Alarm
4. N Wall	5 (50) mr/hr	1(c)	Alarm
5. NE Column	2 (50) mr/hr	1(c)	Alarm
6. Hot DI	20 (50) mr/hr	1(c)	Alarm

(a) Not required for natural convection operation.

(b) The Facility Radiation Monitoring System consists of 7 radiation detectors which alarm and read-out locally, and are recorded in the control room. The normal setpoints for this system are shown. The value in parentheses is the maximum setpoint which will be used depending on local conditions. Use of higher than normal setpoints will require approval of the Reactor Manager or the Assistant Reactor Manager. Any reactor staff member may adjust a setpoint lower than the normal value.

(c) Of the detectors labelled 3-7, any one unit may be out of service for a period not to exceed 7 days without requiring reactor shutdown or replacement by a locally alarming monitor with similar range. Should a second of these units require repair, such repair must be completed within 24 hours or reactor shutdown or replacement of the second unit with a locally alarming monitor of similar range is required.

In the radiography of explosives, the explosive devices will be contained, during exposure, inside a blast-proof box which will be located above the pool at the end of the beam tube. The box will not be coupled to the beam tube and will be constructed to fully contain any blast effects or missiles which might be generated by an accidental detonation.

Specifications 3.8.e and 3.8.f conform to the Regulatory Position put forth in Regulatory Guide 2.2 issued November 1973.

3.9 FISSION DENSITY LIMIT

APPLICABILITY

This specification applies to fission density limits in FNR fuel.

OBJECTIVE

To prevent fuel plate swelling which could result in clad rupture and release of radioactive fission products.

SPECIFICATION

a. The FNR fission density limit shall be 1.5×10^{21} fissions/cc.

BASES

The fission density limit is below operational fission densities reached in other operating reactors using the same kind of fuel without failures attributed to the fuel.

An experimental data base which supports the safe use of UAl_x and U_3O_8 fuel in the FNR up to the fission density was derived from irradiation tests performed in the Materials Test Reactor (MTR), the Engineering Test Reactor (ETR), and the Advance Test Reactor (ATR) at the Idaho National Engineering Laboratory, the High Flux Isotope Reactor (HFIR) at the Oak Ridge National Laboratory, and the German Karlsruhe FR2 reactor.

b. The contents of every tank released shall be sampled and evaluated prior to its release.

BASES

Experience with the counting equipment used in measuring the radioactivity in the waste tanks suggests that the above period is a suitable calibration frequency.

4.8 FISSION DENSITY LIMITS

APPLICABILITY

This specification applies to the surveillance requirements for fission density limits.

OBJECTIVE

To assure that the fission density limits of Specification 3.9 are not exceeded.

SPECIFICATION

a. The fission density of all fuel elements which have Uranium-235 burnup shall be calculated at least quarterly.

BASES

Determination of fission densities on a quarterly basis will ensure that the fission density limits of Specification 3.9 are not exceeded. Fuel element swelling will be kept well below levels which could result in clad rupture and release of radioactive fission products.

5.2 REACTOR FUEL

a. The fuel elements shall be of the MTR type, consisting of plates containing uranium-aluminium alloy, uranium aluminide (UAl_x), or uranium oxide (U_3O_8) fuel (uranium enriched in the isotope U_{235}), clad with aluminium. There shall be eighteen fuel plates containing 140 (± 2%) grams of uranium-235 in the standard fuel elements, and nine fuel plates containing 70 (±2%) grams of uranium-235 in the control room fuel elements. Partially loaded fuel elements in which some of the plates do not contain uranium may be used.

b. Standard, aluminum clad elements with 10 fuel plates containing up to 169 (± 2%) grams of uranium-235 in the form of uranium-aluminum allow may be utilized up to a maximum reactor power of 1 megawatt. Ten-plate elements may be intermixed with 18-plate elements in the core. Reactor scram setpoints will be set at 1.2 megawatts when the 10-plate elements are in use.

5.3 REACTOR BUILDING

The reactor building is a windowless, four story, reinforced concrete building with 12 inch walls structurally integral with the footings and foundation mats. The building is approximately 69 feet wide x 68 feet long x 70 feet high with approximately 44 feet exposed above grade. The building has the following general features:

a. The reactor is housed in a closed room designed to restrict leakage.

b. The reactor room is equipped with a ventilation system designed to exhaust air or other gases present in the building atmosphere into the inlet air region for the building cooling tower which exhausts a minimum of 45 feet above ground level.

c. The ventilation system provides ventilation for certain storage and experimental facilities and exhaust these a minimum of 54 feet above ground level.

d. The openings into the reactor building are the equipment access door, the personnel doors, the equipment access hatch, the air intake and exhaust ducts, the room 3103 fume hood exhaust duct, the beam port ventilation duct, the north wall door, the door between the hot cave operating face and the beam hole floor, and the pneumatic system for sample transfer between the FNR and several laboratories in the Phoenix Memorial Laboratory.

5.4 FUEL STORAGE

a. Irradiated fuel elements and fueled devices shall be stored in an array which will permit sufficient natural convection cooling