

December 12, 2003

Dr. Anthony H. Francis, Director
Michigan Memorial Phoenix Project
University of Michigan
Phoenix Memorial Laboratory, Ford Nuclear Reactor
Ann Arbor, MI 48109-2100

SUBJECT: ISSUANCE OF AMENDMENT NO. 46 TO AMENDED FACILITY OPERATING
LICENSE NO. R-28 - UNIVERSITY OF MICHIGAN FORD NUCLEAR
REACTOR (TAC NO. MB7332)

Dear Dr. Francis:

The Commission has issued Amendment No. 46 (enclosure 1) to Facility Operating License No. R-28 for the University of Michigan Ford Nuclear Reactor. The amendment consists of changes to the Technical Specifications (TSs) in response to David K. Wehe's submittal of December 20, 2002.

10 CFR Part 50.36 requires that the licensee have TSs that meet the requirements of that section. Section 50.36(c)(2)(ii) contains the requirement for a Limiting Condition for Operation (LCO) if one or more of the criterion listed are met. The amendment reflects the requested removal of one of the LCOs in Section 3.4, Primary Coolant Conditions, of the TSs. Based on the criteria in the aforementioned Section, the LCO is not required by regulation. Its removal will increase the flexibility for operation and security. As part of this amendment the LCO is removed as requested.

A copy of the related Safety Evaluation supporting Amendment No. 46 is also enclosed (enclosure 2).

Sincerely,

/RA/

Daniel E. Hughes, Project Manager
Research and Test Reactors Section
New, Research and Test Reactors Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-02

cc w/encls.: Please see next page

Enclosures: 1. Amendment No. 46

2. Safety Evaluation

University of Michigan

Docket No. 50-02

cc:

Special Assistant to the Governor
Office of the Governor
Room 1 - State Capitol
Lansing, MI 48909

Mr. C. W. Becker
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Michigan Department of Environmental Quality
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Protection Division
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Lansing, MI 48909-8130

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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UNIVERSITY OF MICHIGAN

PHOENIX MEMORIAL LABORATORY, FORD NUCLEAR REACTOR

DOCKET NO. 50-02

AMENDMENT TO AMENDED FACILITY OPERATING LICENSE

Amendment No. 46
License No. R-28

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for an amendment to Amended Facility Operating License No. R-28 filed by the University of Michigan Ford Nuclear Reactor (the licensee) on December 20, 2002 conforms to the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the regulations of the Commission as stated in Chapter I of Title 10 of the *Code of Federal Regulations* (10 CFR);
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance that (i) the activities authorized by this amendment can be conducted without endangering the health and safety of the public and (ii) such activities will be conducted in compliance with the regulations of the Commission;
 - 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. This amendment is issued in accordance with the regulations of the Commission as stated in 10 CFR Part 51, and all applicable requirements have been satisfied; and
 - F. Prior notice of this amendment was not required by 10 CFR 2.105, and publication of notice for this amendment is not required by 10 CFR 2.106.

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

2.C.(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 46, 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 issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA by Marvin Mendonca Acting for/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
New, Research and Test Reactors Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Enclosure: Appendix A, Technical
Specifications With Changes

Date of Issuance: December 12, 2003

ENCLOSURE TO LICENSE AMENDMENT NO. 46

AMENDED FACILITY OPERATING LICENSE NO. R-28

DOCKET NO. 50-02

Replace the following pages of Appendix A, Technical Specifications, with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove

15
16

Insert

15
16

OPERATING LICENSE AND TECHNICAL SPECIFICATIONS

Ford Nuclear Reactor
Docket 50-2, License R-28
Amendment 46

- f. The door located on the beamport floor which connects to the Phoenix Memorial Laboratory hot cave operating area will be clamped closed.

Bases:

The potential radiation exposure to persons at the operations boundary following an accident releasing fission products within the confinement building has been evaluated. The evaluation used a leakage rate from the confinement building of 10% of the building volume per day, and concluded that the accident doses would be acceptable. Conformance to Specifications 3.3.1 and 3.3.2 will assure that the building leak rate will not exceed the leak rate used in the evaluation.

The 1.0 mrem/hr setpoint for the facility exhaust radiation monitor provides a mechanism for isolating the building ventilation system in the event of a significant release of radioactive material into the reactor building. This setpoint, for the detector location involved, represents a gamma emitting nuclide concentration of 10^{-3} to 10^{-4} microcuries/cc of building air.

By requiring that the access doors and equipment hatch remain closed, except for brief, attended periods to permit personnel or equipment passage, the integrity of the confinement will be maintained at or above the level assumed in the Hazards Summary Report, and the release of radioactive material will be minimized.

3.4 Primary Coolant Conditions

Applicability:

This specification applies to the limiting conditions for available pool water volume, primary coolant pH, conductivity, radioactivity, and flow distribution.

Objective:

To maintain the primary coolant in a condition to minimize the corrosion of the primary coolant system, fuel clad, and other reactor components, and to assure proper conditions of coolant for normal and emergency requirements.

Specification:

1. The primary coolant pH shall be maintained between 4.5 and 7.5.
2. The primary coolant conductivity shall be maintained at a value less than 5 micromho/cm except for periods of time not to exceed 7 days when the conductivity may not be greater than 20 micromho/cm.
3. For operation at power levels in excess of 100 kw in the forced convection mode, all grid positions shall contain fuel elements, reflector elements, sample holders, or experimental facilities.

OPERATING LICENSE AND TECHNICAL SPECIFICATIONS

Ford Nuclear Reactor
Docket 50-2, License R-28
Amendment 46

Bases:

Experience at this and other facilities has shown that the maintenance of primary coolant system water quality in the ranges specified in Specification 3.4.1 and 3.4.2 will control the corrosion of the aluminum components of the primary coolant system and the fuel element cladding.

Specification 3.4.3 that all grid positions be occupied will prevent the degradation of flow rates due to flow bypassing the active fueled region through an unoccupied grid plate position.

3.5 **Airborne Effluents**

Applicability:

This specification applies to the monitoring of airborne effluents from the Ford Nuclear Reactor.

Objective:

To assure that the release of airborne radioactive material from the Ford Nuclear Reactor is maintained below the limits established in 10CFR20.

Specification:

1. The concentration of radioactive materials in the effluent released from the facility exhaust stacks shall not exceed 400 times the concentrations specified in 10CFR20, Appendix B, Table 2, Column 1, Air Effluent Concentration (EAC), averaged over time periods permitted by 10CFR20.
2. During operation of the reactor, the following conditions shall be met:
 - a. The mobile air particulate monitor and the gaseous activity detector for the Stack 2 exhaust shall be operating. If either unit is out of service for more than 24 hours, either the reactor shall be shutdown or the unit shall be replaced by one of comparable monitoring capability;
 - b. The reactor pool floor mobile air particulate monitor and the gaseous activity detector for the reactor building exhaust stack shall be operating. If either unit is out of service for more than 24 hours, either the reactor shall be shutdown or the unit shall be replaced by one of comparable monitoring capability;
 - c. The building exhaust air radiation monitor shall be operating whenever the reactor is in operation as required by Table 3.2 of specification 3.2.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 46 TO

AMENDED FACILITY OPERATING LICENSE NO. R-28

THE UNIVERSITY OF MICHIGAN AT

FORD NUCLEAR REACTOR

DOCKET NO. 50-02

1.0 INTRODUCTION

By letter dated December 20, 2002, the University of Michigan (the licensee) submitted a request for amendment of the Technical Specifications (TSs), Appendix A, to Facility Operating License No. R-28 for the Ford Nuclear Reactor. The request provides for the following changes, which if implemented, will result in Amendment No. 46 of the TSs:

1.1 Section 3.4, Specification 4. A request to remove the specification that requires that the pool gate be in its storage position during operation, and to remove the corresponding basis for this specification.

2.0 EVALUATION

The staff has considered items 1-2 above. Each item is discussed below.

2.1.a Removal of Section 3.4 Specification 4.

This specification was originally intended to ensure that more pool volume was available in the event of a loss of coolant accident (LOCA). The logic was that for a given size rupture the time to uncover the core would be greater if the volume is greater. The licensee has included analyses that demonstrate that even with the gate in place (and the volume of pool water available decreased) the time delay in the case of the LOCA is sufficient to: (1) allow time for the licensee to initiate emergency makeup water (at a rate of three times the assumed leak rate) sufficient to prevent the core from being uncovered, and (2) provide enough cool down time of the fuel so that the peak power density of a fuel element is down to 1.4 kw/in² (as compared to 1.2 kw/in² with the gate removed). The licensee cites previous studies that indicate that fuel cladding temperatures will not exceed the cladding failure temperature even if the power density is 35 W/in² when uncovered (ORNL-2892, *Surface Temperatures of Irradiated ORR Fuel Elements Cooled in Stagnant Air* by J.F. Wett, circa 1959).

Pursuant to 10 CFR Part 50.36 the licensee is required to have TSs that meet the requirements of that section. Section 50.36(c)(2)(ii) requires a Limiting Condition for

Operation (LCO) if one or more of the criterion listed are met. Comparing the LCO in question (Specification 4 in Section 3.4, *Primary Coolant Conditions*, of the Amendment No. 45 TSs) with the criteria in the regulation the staff determined that the LCO was originally established to meet Section 50(c)(2)(ii)(B). With the amendment application the licensee provided a LOCA analysis that shows that removal of the LCO, and the subsequent change in the initial condition, does not significantly increase the challenge to the integrity of a fission product barrier. The licensee states that the analysis shows that the LCO is not required and that its removal will increase the licensee's flexibility for operation and ability to provide security.

The staff verified the licensee's calculations and analysis and concludes that the removal of Specification 4 of Section 3.4 of Amendment No. 45 TSs is not required by regulation and does not significantly diminish the reactor safety in the event of a LOCA as postulated. The staff concludes that this change is acceptable.

2.1.b Removal of Section 3.4.4, Basis.

The removal of the Section 3.4.4 specification obviates the need for the basis. This change is acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that this amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site, and no significant increase in individual or cumulative occupational radiation exposure. Accordingly, this amendment meets 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 with the issuance of this amendment.

4.0 CONCLUSION

The staff has concluded, on the basis of the considerations discussed above, that (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously evaluated, or create the possibility of a new or different kind of accident from any accident previously evaluated, and does not involve a significant reduction in a margin of safety, the amendment does not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed changes; and (3) such changes are in compliance with

the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or the health and safety of the public.

Principal Contributor: Daniel E. Hughes

Date: December 12, 2003