



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

RENEWAL OF FACILITY LICENSE

DOCKET NO. 50-148

THE UNIVERSITY OF KANSAS

Amendment No. 16
License No. R-78

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for renewal of Facility License No. R-78 filed by The University of Kansas, dated December 12, 1989, as supplemented on July 12, 1990 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations as set forth in 10 CFR Chapter I;
 - B. Construction of the facility was completed in substantial conformity with Construction Permit No. CPRR-52 dated April 7, 1960 the provisions of the Act, and the regulations of the Commission;
 - C. The facility will be maintained in conformity with the application, the provisions of the Act, and the regulations of the Commission;
 - D. There is reasonable assurance: (i) that the activities authorized by this license 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;
 - E. The licensee is technically and financially qualified to engage in the activities authorized by this license in accordance with the regulations of the Commission;
 - F. The licensee is a nonprofit educational institution and has satisfied the applicable provisions of 10 CFR Part 140, "Financial Protection Requirements and Indemnity Agreements," of the Commission's regulations;
 - G. The issuance of this license will not be inimical to the common defense and security or to the health and safety of the public;
 - H. The issuance of this license is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied; and

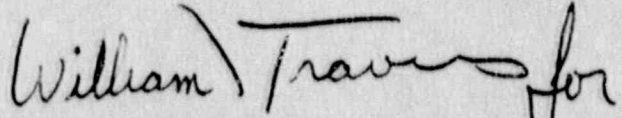
1. The possession and use of the byproduct materials as authorized by this license will be in accordance with the Commission's regulations in 10 CFR Part 30, including Section 30.33.
2. Accordingly, Facility License No. R-78 is hereby amended in its entirety to read as follows:
 - A. This amended license applies to the light water-moderated and water-cooled pool-type nuclear reactor (herein the facility or the reactor) which is owned by the University of Kansas and located on the University's campus in Lawrence, Kansas, and described in the University's application for license dated March 4, 1980, as supplemented.
 - B. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses The University of Kansas:
 - (1) Pursuant to Section 104c of the Act and 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," to possess, but not to operate, the facility at the designated location in Lawrence, Kansas, in accordance with the procedures and limitations set forth in this license.
 - (2) Pursuant to the Act and 10 CFR Part 30 - Rules of General Applicability to Domestic Licensing of Byproduct Material," to possess, but not to separate, such byproduct materials as may have been produced by operation of the reactor.
 - C. This license shall be deemed to contain and is subject to the conditions specified in Parts 20, 30, 50, 51, and 73 of 10 CFR Chapter 1, to all applicable provisions of the Act, and to the rules, regulations and orders of the Commission now or hereafter in effect and to the additional conditions specified below:
 - (1) Operation

The licensee shall not operate the reactor nor install fuel or experiments within the reactor core or core area.
 - (2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 16, are hereby incorporated in the license. The licensee shall possess and maintain the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall expire at midnight, January 1, 1995.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in cursive script that reads "William Travensolo". The signature is written in dark ink and is positioned above the typed name of the director.

Dennis M. Crutchfield, Director
Division of Reactor Projects III, IV
V and Special Projects
Office of Nuclear Reactor Regulation

Enclosure:
Appendix A Technical
Specifications

Date of Issuance: October 5, 1990

APPENDIX A

Technical Specifications
for the
Nuclear Reactor
Facility License R-78

The University of Kansas
Department of Chemical and Petroleum Engineering
Lawrence, Kansas

January 1987

TECHNICAL SPECIFICATIONS

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1.0 DEFINITIONS

Channel. A channel is the combination of sensor, line, amplifier, and output devices which are connected for the purpose of measuring the value of a parameter.

Channel calibration. A channel calibration is an adjustment of the channel such that its output corresponds with acceptable accuracy to known values of the parameter which the channel measures. Calibration shall encompass the entire channel, including equipment actuation, alarm, or trip and shall be deemed to include a channel test.

Channel check. A channel check is a qualitative verification of acceptable performance by observation of channel behavior. This verification, where possible, shall include comparison of the channel with other independent channels or systems measuring the same variable.

Channel test. A channel test is the introduction of a signal into the channel for verification that it is operable.

Measured value. The measured value is the value of a parameter as it appears on the output of a channel.

Operable. Operable means a component or system is capable of performing its intended function.

Operating. Operating means a component or system is performing its intended function.

Reactor secured. The reactor is secured when it contains insufficient fissile material or moderator present in the reactor, adjacent experiments or control rods, to attain criticality under optimum available conditions of moderation and reflection. It is the present status of the reactor.

Shall, should, and may. The word "shall" is used to denote a requirement; the word "should" to denote a recommendation; and the word "may" to denote permission, neither a requirement nor a recommendation.

Surveillance intervals. Allowable surveillance intervals shall not exceed the following:

- a. Five-year (interval not to exceed six years)
- b. Two-year (interval not to exceed two and one-half years)
- c. Annual (interval not to exceed 15 months)
- d. Semiannual (interval not to exceed seven and one-half months)
- e. Quarterly (interval not to exceed four months)

True value. The true value is the actual value of a parameter.

2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

Not applicable. The reactor shall remain secured.

3.0 LIMITING CONDITIONS FOR OPERATION

Not applicable. The reactor shall remain secured.

4.0 SURVEILLANCE REQUIREMENTS

Actions specified in this section are required to be performed during the specified surveillance period.

4.1 Safety System

- a. Applicability. This specification applies to the surveillance requirements of the reactor safety system.
- b. Objective. The objective is to assure that the reactor safety system is operable.
- c. Specification.
 1. A channel check of the portable radiation survey instruments shall be performed semiannually.
 2. The portable radiation survey instruments shall be calibrated annually.
- d. Bases. The periodic surveillance and calibration of the radiation survey instrumentation will assure that the radiation survey equipment is operable.

4.2 Reactor Area

- a. Applicability. This specification applies to surveillance requirements for the reactor area.
- b. Objective. To assure the radiation safety of the reactor area.
- c. Specifications
 1. The operational condition of the fire alarm shall be tested on an annual basis.
 2. The physical barriers (locks on doors, thermal column, beam ports, and tank cover) shall be inspected quarterly.
 3. A radiation survey of the reactor area including the top of the reactor tank shall be made semiannually.

- d. Bases. Monitoring is performed to insure that ALARA will be achieved such that any member of the public or staff would receive below the radiation exposure limits specified in 10 CFR 20.

5.0 DESIGN FEATURES

5.1 Reactor

The reactor is described in the Safety Evaluation Report dated May, 1984 (NUREG-1051).

The reactor has been modified by removing the fuel so as to render the reactor incapable of achieving criticality. The control rods, the bottom grid plate assembly, and the neutron detection chambers have been removed from the tank. The tank has been drained and a cover locked to the tank top to prevent unauthorized access. All ion exchange resin has been disposed of. The control console has been disconnected from the reactor. The graphite thermal column and four beam ports are locked to prevent unauthorized access.

6.0 ADMINISTRATIVE CONTROLS

6.1 Organization

6.1.1 Structure

The organization for the management and maintenance of the reactor facility shall be as a minimum the structure shown in Figure 1. Job titles shown are for illustration only and may vary. Two levels of authority are provided, as follows:

Level 1: Individual responsible for site administration, including licensing.

Level 2: Individual responsible for the reactor facility maintenance.

6.1.2 Responsibility

Responsibility for the safe maintenance of the reactor facility shall be within the chain of command shown in Figure 1. Management levels in addition to having responsibility for the policies and maintenance of the reactor facility shall be responsible for safeguarding the public and facility personnel from undue radiation exposures and for adhering to all requirements of the possession-only license and Technical Specifications. In all instances responsibility of one level may be assumed by designating alternates or by higher levels, conditional upon appropriate qualifications for positions, such as those described in Sections 6.1.3 and 6.1.4.1.

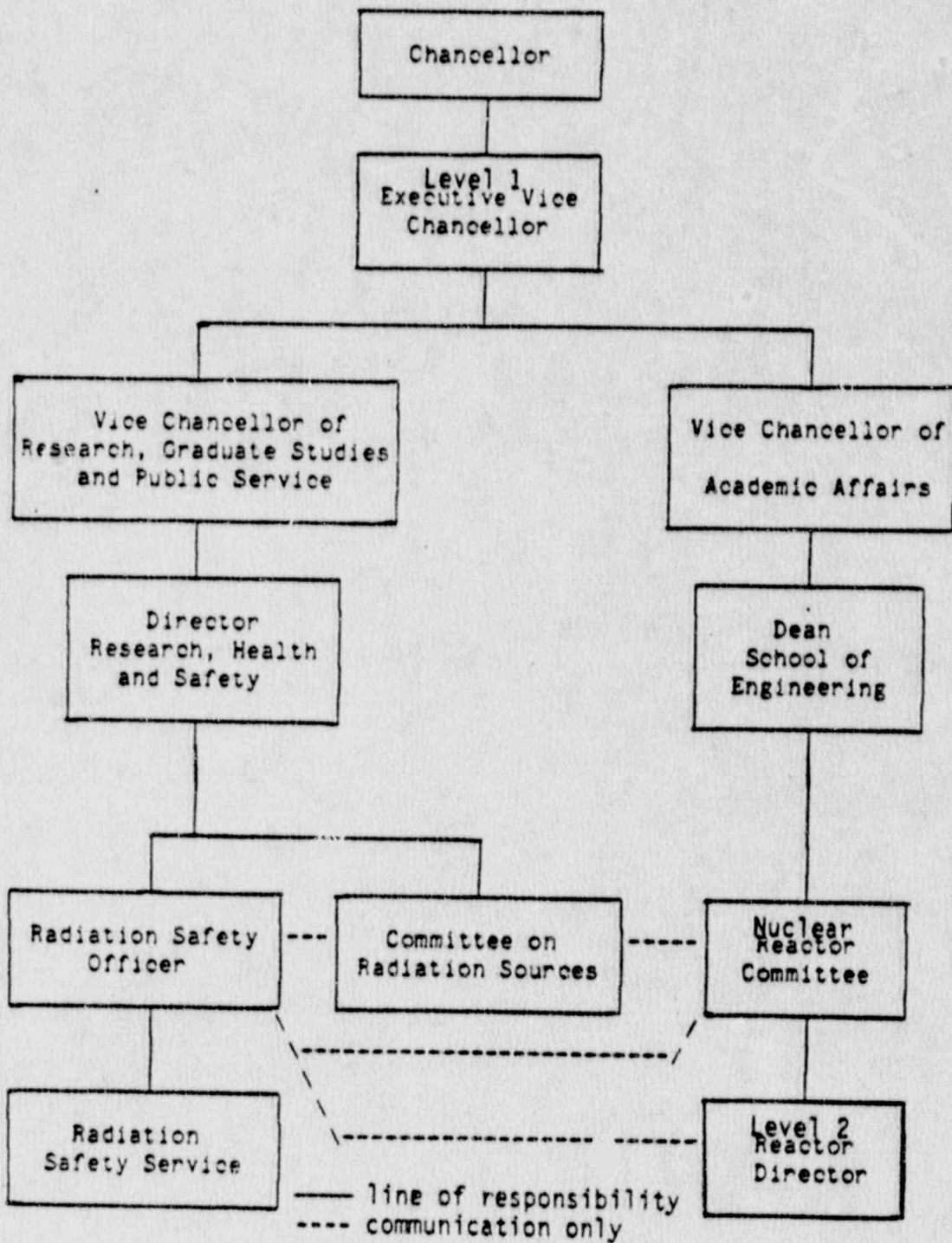


Figure 1. Organization Structure

6.1.3 Training for Radiation Safety Officer

The Radiation Safety Officer heads the University-wide Radiation Safety Service and supervises a professional staff. This person is a qualified health physicist who maintains proficiency in radiation safety through constant on-the-job activity. The Radiation Safety Officer shall advise the Reactor Director about all matters regarding radiation monitoring and radiation safety, and shall provide any special training as necessary.

6.1.4 Nuclear Reactor Committee

6.1.4.1 Composition and Qualifications

The Nuclear Reactor Committee shall be composed of a minimum of 5 members. The members shall collectively provide a broad spectrum of expertise in science and engineering. Members and alternates shall be appointed by and report to the Level 1 authority. They may include the Reactor Director and Radiation Safety Officer. Qualified and approved alternates may serve in the absence of regular members.

6.1.4.2 Charter and Rules

The committee shall function under the following operating rules:

- a. Meetings shall be held as circumstances warrant consistent with effective monitoring of facility activities but not less than annually.
- b. A quorum shall consist of not less than three.
- c. Sub-groups may be appointed to review specific items.
- d. Minutes shall be kept, and shall be disseminated to members and to Level 1 authority within one month after the meeting.

6.1.5 Review and Audit

The independent review and audit of facility operations shall be performed by a qualified person designated by the Nuclear Reactor Committee.

6.1.5.1 Review Function

The following items shall be reviewed by the Nuclear Reactor Committee or a subgroup thereof:

- a. Determinations that proposed changes in equipment, systems, tests, or procedures do not involve an unreviewed safety question.

- b. All new procedures and major revisions thereto having safety significance, proposed changes in reactor facility equipment, or systems having safety significance.
- c. Proposed changes in technical specifications, license, or charter.
- d. Violations of technical specifications, license, or charter.
- e. Operating abnormalities having safety significance.
- f. Reportable occurrences listed in section 6.4.3.
- g. Audit reports.

6.1.5.2 Audit Function

The audit function shall include selective but comprehensive examination of records, logs, and other documents. Where necessary, discussions with responsible personnel shall take place. In no case shall the individual or individuals conducting the audit be immediately responsible for the area being audited. The following items shall be audited:

- a. The conformance of facility operations to the technical specifications and applicable license or charter conditions, at least annually.
- b. The results of actions taken to correct deficiencies occurring in facility equipment, systems, structures, or methods of operations that affect safety, at least annually.

Deficiencies uncovered that affect safety shall immediately be reported to Level 2 authority. A written report of the findings of the audit shall be submitted to the Level 2 authority and the Nuclear Reactor Committee members within 90 days after the audit has been completed.

6.2 Procedures

There shall be written procedures for, and prior to, initiating any of the activities listed in this section. The procedures shall be reviewed by the Nuclear Reactor Committee and approved by Level 2 or designated alternates, and such reviews and approvals shall be documented. Several of the following activities may be included in a single manual or set of procedures or divided among various manuals or procedures.

- a. Surveillance tests and calibrations required by the technical specifications.
- b. Personnel radiation protection, consistent with applicable regulations.

- c. Routine maintenance of major components of systems that could have an effect on reactor safety.

Substantive changes to the above procedures shall be made only after documented review by the Nuclear Reactor Committee and approval by Level 2 or designated alternates. Minor modifications to the original procedures which do not change their original intent may be made by the Level 2 authority. Temporary changes to the procedures that do not affect reactor safety may be made by the Reactor Director and are valid for a period of one month. Such temporary changes shall be documented and reported to the Nuclear Reactor Committee.

6.3 Required Actions

6.3.1 Action to be taken in the event of an occurrence as defined in Section 6.4.3

- a. Corrective action shall be taken to return conditions to normal.
- b. All such occurrences shall be promptly reported to the Level 2 authority or designated alternates.
- c. All such occurrences including action taken to prevent or reduce the probability of a recurrence shall be reviewed by the Nuclear Reactor Committee.

6.4 Reports

All written reports shall be sent within the prescribed interval to the NRC, Washington, D.C. 20555, Attention: Document Control Desk, with a copy to the Regional Administrator, Region IV.

6.4.1 Operating Reports

Routine annual reports covering the activities of the reactor facility during the previous calendar year shall be submitted to the appropriate NRC office within three months following the end of each prescribed year. Each annual operating report shall include the following information:

- a. Tabulation of major preventive and corrective maintenance operations having safety significance.
- b. Tabulation of major changes in the reactor facility procedures, and new tests and/or experiments significantly different from those performed previously and which are not described in the Hazards Summary Report, including conclusions that no unreviewed safety questions were involved.
- c. The results of any environmental surveys performed outside the facility.

- d. A summary of radiation exposures received by facility personnel and visitors in any one year including the dates and times of significant exposures (above 500 mRem).
- e. Reportable occurrences.

6.4.2 Special Reports

Special reports which may be required by the NRC shall be submitted within the time period specified for each report.

6.4.3 Reportable Occurrences

Reportable occurrences such as increases in radiation levels or physical degradation of the facility, including causes, probable consequences, corrective actions, and measures to prevent recurrence, shall be reported to the NRC.

a. Prompt Notification with Written Followup

The types of events listed below shall be reported as expeditiously as possible by telephone and confirmed by telegraph, mailgram, or facsimile transmission to the Director of NRC Region IV or his designated representative no later than the first work day following the event, with a written followup report within two weeks. Information provided shall contain narrative material to provide complete explanation of the circumstances surrounding the event.

- (1) Unanticipated releases of radioactivity to the environment.
- (2) Unanticipated exposure of personnel.
- (3) An observed inadequacy in the implementation of administrative or procedural controls such that the inadequacy causes or could cause an unsafe condition with regard to facility maintenance.

b. Reports Within 30 Days

The types of events listed below shall be reported to the Director of NRC Region IV or his designated representative within 30 days of their occurrence.

- (1) Permanent changes in the facility organization structure.
- (2) An observed inadequacy in the implementation of administrative or procedural controls such that the inadequacy causes or could have caused an unsafe condition with regards to reactor maintenance.

6.5 Records

Records of the following activities shall be maintained and retained for the periods specified below. The records may be in the form of logs, data sheets, or other suitable forms. The required information may be contained in single, or multiple records, or a combination thereof.

6.5.1 Records to be Retained for a Period of at least Five Years

- a. Normal reactor facility operations (including scheduled and unscheduled shutdowns).
- b. Principal maintenance operations.
- c. Reportable occurrences.
- d. Surveillance activities required by the Technical Specifications.
- e. Reactor facility radiation and contamination surveys where required by applicable regulations.
- f. Experiments performed with the reactor.
- g. Special Nuclear Materials (SNM) inventories, receipts, and shipments.
- h. Approved changes in operating procedures.
- i. Records of meeting and audit reports of the Nuclear Reactor Committee.
- j. Sealed source leak test results.

6.5.2 Records to be Retained for Five Years or for the Lifetime of the Reactor Facility whichever is Greater

(Note: Annual reports may be used where applicable as records in this section.)

- a. Gaseous and liquid radioactive effluents released to the environs.
- b. Off-site environmental monitoring surveys required by the Technical Specifications.
- c. Radiation exposure for all personnel monitored.
- d. Updated drawings of the reactor facility.

7.0 REFERENCES

1. Hazards Summary Report (July, 1959)
2. Safety Evaluation Report (NUREG-1051) related to the renewal of the operating license for the research reactor at the University of Kansas, Docket No. 50-148, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation (May, 1984)