



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

PURDUE UNIVERSITY

DOCKET NO. 50-182

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 6
License No. R-87

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Purdue University (the licensee), dated May 24, 1982, as supplemented on August 16, 1982, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
 - 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 (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 License No. R-87-is, hereby, amended to read as follows:

- (2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 6 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

Cecil O. Thomas

Cecil O. Thomas, Acting Chief
Standardization & Special
Projects Branch
Division of Licensing

Attachment:
Changes to the
Technical Specifications

Date of Issuance: September 13, 1982

ATTACHMENT TO LICENSE AMENDMENT NO. 6

FACILITY LICENSE NO. R-87

DOCKET NO. 50-182

Revise Appendix A Technical Specifications as follows:

Remove Page

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Changes on the revised pages are identified by marginal lines.

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consequences than the maximum credible accident analyzed in the Hazards Summary Report.

Specification 3.1.g along with 3.1.a assures that the reactor is capable of being shut down in the event of a positive reactivity insertion caused by the flooding of an experiment.

3.2 Reactor Safety System

Applicability

This specification applies to the reactor safety system and other safety-related instrumentation.

Objective

The objective is to specify the lowest acceptable level of performance or the minimum number of acceptable components for the reactor safety system and other safety related instrumentation.

Specification

The reactor shall not be made critical unless the following conditions are met:

- a. The reactor safety channels and safety-related instrumentation are operable in accordance with Tables I and II including the minimum number of channels and the indicated maximum or minimum set points.
- b. Both shim-safety rods and the regulating rod shall be operable.
- c. The time from the initiation of a scram condition in the scram circuit until the shim-safety rod reaches the rod lower limit switch shall not exceed one second.

TABLE I. SAFETY CHANNELS REQUIRED FOR OPERATION

<u>Channel</u>	<u>Minimum Number Required</u>	<u>Setpoint</u>	<u>Function</u>
Log count rate and period	1 ^(a)	2 cps	2 cps rod withdrawal interlock
		12 sec. period	Setback
Log N and period	1 ^(b)	7 sec. period	Slow scram
		12 sec. period	Setback
		7 sec. period	Slow scram
		7 sec. period	Fast scram
Linear	1	120% power	Slow scram
		110% range	Setback
Safety	1 ^(b)	120% range	Slow scram
		110% power	Setback
		120% power	Fast scram
Manual Scram (console)	1		Slow scram
(hallway)	1		Slow scram

(a) Not required after Log N-Period channel comes on scale.

(b) Required to be operable but not on scale at startup.

TABLE II. SAFETY-RELATED CHANNELS (AREA RADIATION MONITORS)

<u>Channel</u>	<u>Minimum Number Required (a)</u>	<u>Setpoint</u>	<u>Function</u>
Pool top monitor	1	50 mR/hr or 2x full power background	Slow scram
Water process	1	7½ mR/hr	Slow scram
Console monitor	1	7½ mR/hr	Slow scram
Continuous air sampler	1		Air sampling

(a) For periods of time, not to exceed 12 hours of operation, a radiation monitor may be replaced by a gamma sensitive instrument which has its own alarm or is observable by the reactor operator.

5.0 DESIGN FEATURES

5.1 Site Description

- 5.1.1 The reactor is located on the ground floor of the Duncan Annex of the Electrical Engineering Building, Purdue University, West Lafayette, Indiana.
- 5.1.2 The School of Nuclear Engineering controls approximately 5000 square feet.
- 5.1.3 Access to this area is restricted except when classes are held here.
- 5.1.4 The reactor room remains locked at all times except for the entry or exit of authorized personnel.
- 5.1.5 The PUR-1 is housed in a closed room designed to restrict leakage.
- 5.1.6 The minimum free volume of the reactor room shall be 15,000 cubic feet.
- 5.1.7 The ventilation system is designed to exhaust air or other gases from the reactor room through an exhaust vent at a minimum of 50 feet above the ground.
- 5.1.8 Openings into the reactor room consist of the following:
- a. Three personnel doors
 - b. Two locked transformer vault doors
 - c. Air intake
 - d. Air exhaust
 - e. Sewer vent

5.2 Fuel Assemblies

- 5.2.1 The fuel assemblies shall be MTR type consisting of aluminum clad plates enriched to approximately 93% in the U-235 isotope.
- 5.2.2 A standard fuel assembly shall consist of 10 fuel plates containing a maximum of 165 grams of U-235.
- 5.2.3 A control fuel assembly shall consist of 6 fuel plates containing a maximum of 99 grams of U-235.

6.2 Review and Audit

- 6.2.1 A Committee on Reactor Operations (CORO) shall report to the Radiological Control Committee on matters of Radiation Safety and the Head, School of Nuclear Engineering on matters of administration, and safety. CORO will advise the Reactor Supervisor on those areas of responsibility specified in Sections 6.2.5 and 6.2.6. The minimum qualifications for persons on the CORO shall be five years of professional work experience in the discipline or specific field he represents. A baccalaureate degree may fulfill four years of experience.
- 6.2.2 The CORO shall have at least 7 (seven) members of whom no more than a minority shall be directly concerned with the administration or direct use of the reactor. These members shall include the following:
- a. The Chairman, a responsible, senior technical person, knowledgeable in the field of reactor technology, who does not have line responsibility for day-to-day operation of the reactor.
 - b. A senior radiological control officer.
 - c. The Purdue University Superintendent of Safety and Security.
 - d. The Reactor Supervisor.
 - e. Three senior scientific staff members.
- 6.2.3 The CORO or a subcommittee thereof shall meet quarterly at intervals not to exceed 4 months. The CORO shall meet semiannually at intervals not to exceed 7 1/2 months.
- 6.2.4 A quorum shall consist of not less than a majority of the full Committee and shall include the chairman or his designated alternate.
- 6.2.5 The CORO shall review:
- a. Safety evaluations for 1) changes to procedures, equipment or systems and 2) tests or experiments, conducted without NRC approval under the provision of Section 50.59, 10 CFR, to

verify that such actions did not constitute an unreviewed safety question.

- b. Proposed changes to procedures, equipment or systems that change the original intent or use, and are non-conservative, or those that involve an unreviewed safety question as defined in Section 50.59, 10 CFR.
- c. Proposed tests or experiments which are significantly different from previous approved tests or experiments, or those that involve an unreviewed safety question as defined in Section 50.59, 10 CFR.
- d. Proposed changes in Technical Specifications or licenses.
- e. Violations of applicable statutes, codes, regulations, orders, Technical Specifications, license requirements, or of internal procedures or instructions having nuclear safety significance.
- f. Significant operating abnormalities or deviations from normal and expected performance of facility equipment that affect nuclear safety.
- g. Events which have been reported within 24 hours to the NRC in writing.
- h. Audit reports.

6.2.6 AUDITS

Audits of facility activities shall be performed under the cognizance of the CORO but in no case by the personnel responsible for the item audited. Individual audits may be performed by one individual who need not be an identified CORO member. These audits shall examine the operating records and encompass:

- a. The conformance of facility operation to the Technical Specifications and applicable license conditions, to be done annually at intervals not to exceed 15 months.

- b. The performance training and qualifications of the licensed facility staff, to be done annually at intervals not to exceed 15 months.
- c. The results of all actions taken to correct deficiencies occurring in facility equipment, structures, systems or method of operation that affect nuclear safety, to be done annually at intervals not to exceed 15 months.
- d. The Facility Emergency Plan and implementing procedures, to be done biennially at intervals to not exceed 2 1/2 years.
- e. The Facility Security Plan and implementing procedures, to be done biennially at intervals not to exceed 2 1/2 years.
- f. Any other area of facility operation considered appropriate by the CORO or the Reactor Supervisor.

6.2.7 RECORDS

Records of CORO activities shall be prepared and distributed as indicated below.

- a. Minutes of each CORO meeting shall be prepared and forwarded to the Reactor Supervisor within 30 days following each meeting.
- b. Reports of reviews encompassed by sections 6.2.5 e, f, and g above, shall be prepared and forwarded to the Reactor Supervisor within 30 days following completion of the review.
- c. Audit reports encompassed by Section 6.2.6 above, shall be forwarded to the CORO Chairman and to the management responsible for the areas audited within 30 days after completion of the audit.

- 6.4.4 Emergency conditions involving potential or actual release of radioactivity, including provisions for evacuation, re-entry, recovery, and medical support.
- 6.4.5 Maintenance procedures which could have an effect on reactor safety.
- 6.4.6 Experiment installation, operation, and removal.
- 6.4.7 Implementation of the Security Plan and Emergency Plan.

Non-routine operations which require the sequential performance of a series of sub-tasks shall be carried out with the written procedure at the console. To assure adherence to the documentation of the procedure, each step will be entered in the log book as it is completed.

Substantive changes to the above procedures shall be made only with the approval of the CORO. The Reactor Supervisor may make changes to procedures which do not change the intent of the original procedure. All such changes to the procedures shall be documented and subsequently reviewed by the CORO.

6.5 Operating Records

- 6.5.1 The following records and logs shall be prepared and retained for at least five years:
 - a. Normal facility operation and maintenance.
 - b. Reportable occurrences
 - c. Tests, checks, and measurements documenting compliance with surveillance requirements.
 - d. Records of experiments performed.
 - e. Records of radioactive shipments.
 - f. Changes to operating procedures.
 - g. Facility radiation and contamination surveys.

6.6.2 Non-Routine Reports

a. Reportable Occurrence Reports

In the event of a reportable occurrence (defined in 1.0) notification shall be made within 24 hours by telephone and telegraph* to the appropriate regional USNRC Office of Inspection and Enforcement, followed by a written report within 10 days to the Director of the Regional Regulatory Operations Office. The written report on these reportable occurrences, and to the extent possible, the preliminary telephone and telegraph notification shall: (a) describe, analyze, and evaluate safety implications, (b) outline the measures taken to assure that the cause of the condition is determined, (c) indicate the corrective action (including any changes made to the procedures and to the quality assurance program) taken to prevent repetition of the occurrence and of similar occurrences involving similar components or systems, and (d) evaluate the safety implications of the incident in light of the cumulative experience obtained from the record of previous failures and malfunctions of similar systems and components.

*Telegraph notification may be sent on the next working day in the event of a reportable occurrence during a weekend or holiday period.
