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1. DEFINITIONS

- 1.1 Channel Calibration - A channel calibration is an adjustment of the channel such that its output responds, within acceptable range and accuracy, to known values of the parameter which the channel measures. Calibration shall encompass the entire channel, including equipment, actuation, alarm, or trip.
- 1.2 Channel Check - A channel check is a qualitative verification of acceptable performance by observation of channel behavior. This verification may include comparison of the channel with other independent channels or standards measuring the same variable.
- 1.3 Channel Test - A channel test is the introduction of a signal into the channel to verify that it is operable.
- 1.4 Measuring Channel - A measuring channel is the combination of sensor, lines, amplifiers, and output devices which are connected for the purpose of measuring or responding to the value of a process variable.
- 1.5 Operable - Operable means a component or system is capable of performing its intended function in its normal manner.
- 1.6 Operating - Operating means a component or system is performing its intended function in its normal manner.
- 1.7 Reactor Component - A reactor component is any apparatus, device, or material that is a normal part of the reactor assembly.
- 1.8 Reactor Safety System - The reactor safety system is that combination of safety channels and associated circuitry which forms the automatic protective system for the reactor or provides information which requires manual protective action be initiated.
- 1.9 Reactor Secured - Reactor with the control rods removed and incapable of achieving criticality. It is the present status of the reactor.
- 1.10 Safety Channel - A safety channel is a measuring channel in the reactor safety system.
- 1.11 Surveillance Interval - Quarterly (± 1 month), semi-annually (± 2 months) or yearly (± 4 months).

2. SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

Not applicable. The reactor shall remain secured.

3. LIMITING CONDITIONS FOR OPERATION

Not applicable. The reactor shall remain secured.

4. SURVEILLANCE REQUIREMENTS

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

4.1 Control and Safety System

Applicability

This specification applies to the surveillance requirements of the reactor safety systems.

Objective

To assure that the reactor safety systems are operable.

Specification

- a. A channel check of the following safety channel shall be performed quarterly by the Radiation Safety Officer:

Portable area radiation monitor

- b. The portable radiation monitor shall be calibrated and set points verified annually.

Bases

The periodic surveillance and calibration of the radiation monitoring instrumentation will assure that the radiation monitoring equipment is operable.

4.2 Reactor Structure

Applicability

This specification applies to surveillance requirements for reactor components other than control and safety rods.

Objective

To assure integrity of the reactor structures.

Specification

- a. The shield tank shall be visually inspected every two years. If apparent excessive corrosion or other damage is observed, corrective measures shall be taken.
- b. Visual inspection for water leakage from the shield tank shall be performed every year. Any leakage shall be corrected.

Bases

Based on experience with reactors of this type, the frequency of inspection and leak test requirements of the shield tank will assure capability for radiation protection.

4.3 Reactor Area

Applicability

This specification applies to surveillance requirements for the reactor area other than the reactor structure.

Objective

To assure the physical and radiation safety of the reactor area to protect the reactor fuel.

Specification

- a. The operational condition of the fire alarm shall be tested on a yearly basis.
- b. The physical barriers (door locks and safe locks) shall be inspected quarterly.
- c. The inventory and physical appearance of the fuel in the safe shall be visually checked quarterly.

- d. The shield tank water level shall be visually inspected annually.
- e. The Radiation Safety Officer shall make a radiation survey of the area quarterly.

Bases

Based on experience with reactors of this type, the frequency of inspection and monitoring will assure security for the physical safety of the reactor fuel.

5. DESIGN FEATURES

5.1 Reactor

The reactor is described in the FSAR of March 12, 1979.

The reactor has been modified by removing the control rods so as to render the reactor incapable of criticality and the reactor console has been disconnected from the power supply and the reactor.

5.2 Fuel Storage

Fueled control rods and fuel devices, not in the reactor shall be stored in a locked safe in the reactor room. The storage array shall be such that K_{eff} is no greater than 0.8 for all conditions of moderation and reflection.

5.3 Reactor Facility

- a. The reactor facility includes the reactor room which houses the reactor assembly and accessories required for its maintenance.
- b. The reactor room is a separate room in the Pangborn Engineering Building, constructed with adequate shielding and other radiation protective features to limit doses in restricted and unrestricted areas to levels no greater than permitted by 10 CFR 20.
- c. The Reactor Facility doors are self-closing and locking.

6. ADMINISTRATIVE CONTROLS

- 6.1 Organization - The administrative organization for control of the reactor facility shall be as set forth in Figure 1 attached hereto. The authorities and responsibilities set forth below are

designed to comply with the intent and requirements for administrative controls of the reactor facility as set forth by the Nuclear Regulatory Commission.

- 6.1.1 President - The President is the Chief Administrative Officer responsible for the University and in whose name the application for licensing is made.
- 6.1.2 Executive Vice President - The Executive Vice President reports to the President and is responsible for the internal administration of the University both academic and non-academic. In this capacity he represents the President in all matters pertaining to the reactor except in those cases of health and safety for which the Radiation Safety Committee has authority.
- 6.1.3 Reactor Administrator - The Reactor Administrator is responsible to the Executive Vice President for the administration of the reactor facility. In this capacity, he shall, within the policies set forth by the facility license, prepare all regulations for the facility, review and approve all procedures, seek approval of all procedures and proposals for changes from the Radiation Safety Committee, and be responsible for the health and safety of all personnel in the reactor facility. He shall be responsible for the official files of the facility, including storage of such prescribed logs and records of the facility. He shall prepare, for the signature of the Executive Vice President, all required reports to the NRC. Prior to periods of scheduled absence, the Executive Vice President shall designate an alternate. The Reactor Administrator can be the Radiation Safety Officer.
- 6.1.4 Radiation Safety Committee - The Chairman of the Radiation Safety Committee is appointed by the Executive Vice President (EVP). Additional members of the Committee are appointed by the EVP with the advice of the Chairman. The Committee advises the EVP in all matters concerning radiological aspects of the health and safety of personnel who might be exposed to radiation produced by University owned and/or operated sources or equipment. The Committee reviews, approves, and promulgates a Radiation Safety Manual for the University. The Committee shall be informed of all occurrences related to radiation health and safety and reactor safety which are reportable to any authorities outside the University and advise the EVP of such occurrences and make recommendations to the EVP with regard to such matters.
- The Committee shall be responsible for independent reviews and audits of the facility to assure that the reactor is maintained in a safe and competent manner and advise the Reactor Administrator in all matters related to reactor safety and personnel safety.
- 6.1.5 Radiation Safety Officer - The Radiation Safety Officer (RSO) is appointed by the Executive Vice President with the advice of the Chairman of the Radiation Safety Committee. He is responsible to the EVP for the day-to-day administration of the radiation safety

program and serves as the Secretary of the Radiation Safety Committee. He prepares the University's Radiation Safety Manual and has the authority to enforce the regulations, rules and procedures set forth in the Radiation Safety Manual, suspend the operation and use of radiation producing devices when their use is in violation of these rules, and secure such sources of radiation until corrective action is taken. He also has the authority to disapprove the acquisition of radiation producing sources until satisfactory evidence is presented to ensure the safe storage and use of these facilities. The Radiation Safety Officer is also responsible for preparing, for the signature of the Chairman of the Radiation Safety Committee, reports of all reportable occurrences to the appropriate regulatory agency and for ensuring that appropriate follow-up action is taken.

6.1.6 Director of Public Safety - The Director of Public Safety is responsible for the physical safety of the reactor facility.

6.2 Staff Qualifications - The Reactor Administrator and any Technicians performing work on the reactor shall meet the minimum qualifications set forth in ANS 15.4, "Standards for Selection and Training of Personnel for Research Reactors".

The Radiation Safety Committee consists of two classes of members: Ex-Officio and Technical. The ex-officio members are the Chairman, the Director of Public Safety, the Assistant Vice President for Facilities Planning and Construction, the Radiological Safety Officer and a representative from Health Services or the Nursing Faculty.

The qualifications of the Radiation Safety Officer shall be five (5) years of professional experience in the radiation safety field represented by the member or a baccalaureate degree plus at least two years experience.

The qualifications of the technical members shall be five (5) years of professional experience in the field represented by the member or a baccalaureate degree plus at least two years experience. Generally, these committee members will be made up of University faculty; but outside experience may be sought in areas where additional experience is considered necessary. In this case, a baccalaureate degree plus five (5) years experience will be required.

6.3 Radiation Safety Committee Reviews, Audits, and Authority

6.3.1 Meetings and Quorum - The Radiation Safety Committee meets as necessary but at least once each calendar quarter. A quorum for review shall consist of a majority of the 9 members.

6.3.2 Alternates - Alternate members may be appointed by the EVP to serve on a temporary basis; each appointment shall be in writing.

6.3.3 Reviews - The Radiation Safety Committee shall review:

- a. Proposed changes in Technical Specifications or licenses.
- b. Violations of applicable statutes, codes, regulations, orders, Technical Specifications, license requirements, or of internal procedures or instructions having nuclear safety significance.
- c. Significant abnormalities or deviations from normal and expected performance of facility equipment that affect nuclear safety.
- d. Audit reports.
- e. Reportable Occurrences such as an increase in radiation levels or a degradation in physical security.
- f. Review of revision to procedures affecting facility and fuel storage that have a radiological significance.

6.3.4 Audits - Audits of facility activities shall be performed under the cognizance of the Radiation Safety Committee 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 Radiation Safety Committee member. These audits shall examine the records and encompass:

- a. Conformance to Technical Specifications and applicable license conditions, at least once per 12 months.
- b. The results of all actions taken to correct deficiencies occurring in facility equipment, structures or systems that affect nuclear safety, at least once per calendar year.
- c. The Facility Emergency Plan and implementing procedures, at least once per 24 months.
- d. The Facility Security Plan and implementing procedures, at least once per 24 months.

6.3.5 Authority - The Radiation Safety Committee reports to the EVP and shall advise the Reactor Administrator on those areas of responsibility specified in Sections 6.3.3 and 6.3.4.

6.3.6 Records and Reports of the Radiation Safety Committee - The Chairman of the Radiation Safety Committee shall prepare, maintain, and distribute records of its activities as indicated below:

- a. Minutes of each Radiation Safety Committee meeting shall be prepared, and forwarded to the Executive Vice President and the Committee members within 30 days following each meeting.
- b. Reports of all reviews and audits shall be prepared and

forwarded to the EVP within 30 days following completion of the review or immediately upon completion if corrective action is required.

- c. Reviews of approvals requested by the Reactor Administrator for proposed changes shall be forwarded to the EVP.

6.4 Approvals - The procedure for obtaining approval for any change, modification, or other item which requires approval of the Radiation Safety Committee shall be as follows:

- a. The Reactor Administrator shall prepare a proposal and submit it for approval to the Radiation Safety Committee. The Radiation Safety Committee shall be responsible for review and audit in Section 6.3. A copy of the findings of this Committee shall be submitted to the Radiation Safety Officer for action.
- b. The Reactor Administrator shall submit copies of proposals reviewed by the Radiation Safety Committee to the EVP.
- c. The Reactor Administrator shall upon receipt of the required approvals from the Radiation Safety Committee proceed with the proposed change or modification.

6.5 Procedures - There shall be written operating procedures that cover the following activities. They shall be approved by the Reactor Administrator.

- a. Fuel movement and changes to the core that can effect the reactivity.
- b. Surveillance, testing and calibration of instruments, components and systems involving nuclear safety.
- c. Review and approval of changes to procedures.
- d. Personnel radiation protection consistent with 10 CFR Part 20.
- e. Implementation of the Security Plan and Emergency Plan.
- f. Surveillance and testing of equipment and systems required for the protective storage of the reactor and fuel.
- g. Notification of proper authorities in the event of:
 - (1) Unauthorized entries.
 - (2) Significant changes in radiation or contamination levels in the facility.

Substantive changes to the above procedures shall be made only with approval by the Reactor Administrator and the Radiation Safety Committee.

6.6. Reporting Requirements - All written reports shall be sent within the prescribed interval to the NRC, Washington, D.C. 20540, Attention: Document Control Desk, with a copy to the Regional Administrator, Region I.

6.6.1 Routine Reports - An annual report shall be submitted to the NRC by 31 January, covering the preceding calendar year, which includes a description of the facility status, environmental radiation surveys, evaluation of security and surveillance personnel exposures and abnormal occurrences.

6.6.2 Reportable Occurrences - Reportable occurrences such as increases in radiation levels or degradation in physical security, 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 I or a designated representative no later than the first work week 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) Abnormal degradation discovered in a fission product barrier, i.e., cracked fuel disc, primary gas-tight seals.

(2) Performance of structures, systems, or components which requires remedial action or corrective measures.

6.6.3 Special Reports - Special reports which may be required by the NRC shall be submitted to the Director of the appropriate NRC Regional Office within the time period specified for each report.

6.7 Record Retention

6.7.1 Records to be retained for a period of at least five years:

a. Operating logs or data which shall identify:

(1) Completion of pre-start-up checkout, startup, shutdown, changes, and shutdown of the reactor.

(2) Installation or removal of fuel elements, control rod experiments that could affect core reactivity.

(3) Installation or removal of jumpers, special test notices, or other temporary changes to reactor circuitry.

(4) Rod worth measurements and other reactivity measurements.

- b. Principal maintenance operations.
- c. Reportable occurrences.
- d. Surveillance activities required by technical specifications.
- e. Facility radiation and contamination surveys.
- f. Experiments performed with the reactor.

This requirement may be satisfied by the normal operations log book plus,

- (1) Records of radioactive material transferred from the facility as required by license.
- (2) Records required by the Reactor Safety Committee for the performance of new or special experiments.

- g. Changes to operating procedures.

6.7.2 Records to be retained for the life of the facility:

- a. Gaseous and liquid radioactive effluents released to the environs.
- b. Appropriate off-site environmental monitoring surveys.
- c. Fuel inventories and fuel transfers.
- d. Radiation exposures for all personnel.
- e. Updated as-built drawings of the facility.
- f. Records of transient or operational cycles for those components designed for a limited number of transients or cycles.
- g. Records of training and qualification for members of the facility staff.
- h. Records of reviews performed for changes made to procedures or equipment or reviews of tests and experiments pursuant to 10 CFR 50.59.
- i. Records of meetings of the Reactor Safety Committee.
- j. Facility radiation surveys (added as of 1/1/86).
- k. Inspection of Physical Barrier (added as of 1/1/86).
- l. Abnormal occurrences (added as of 1/1/86).

Tech Specs

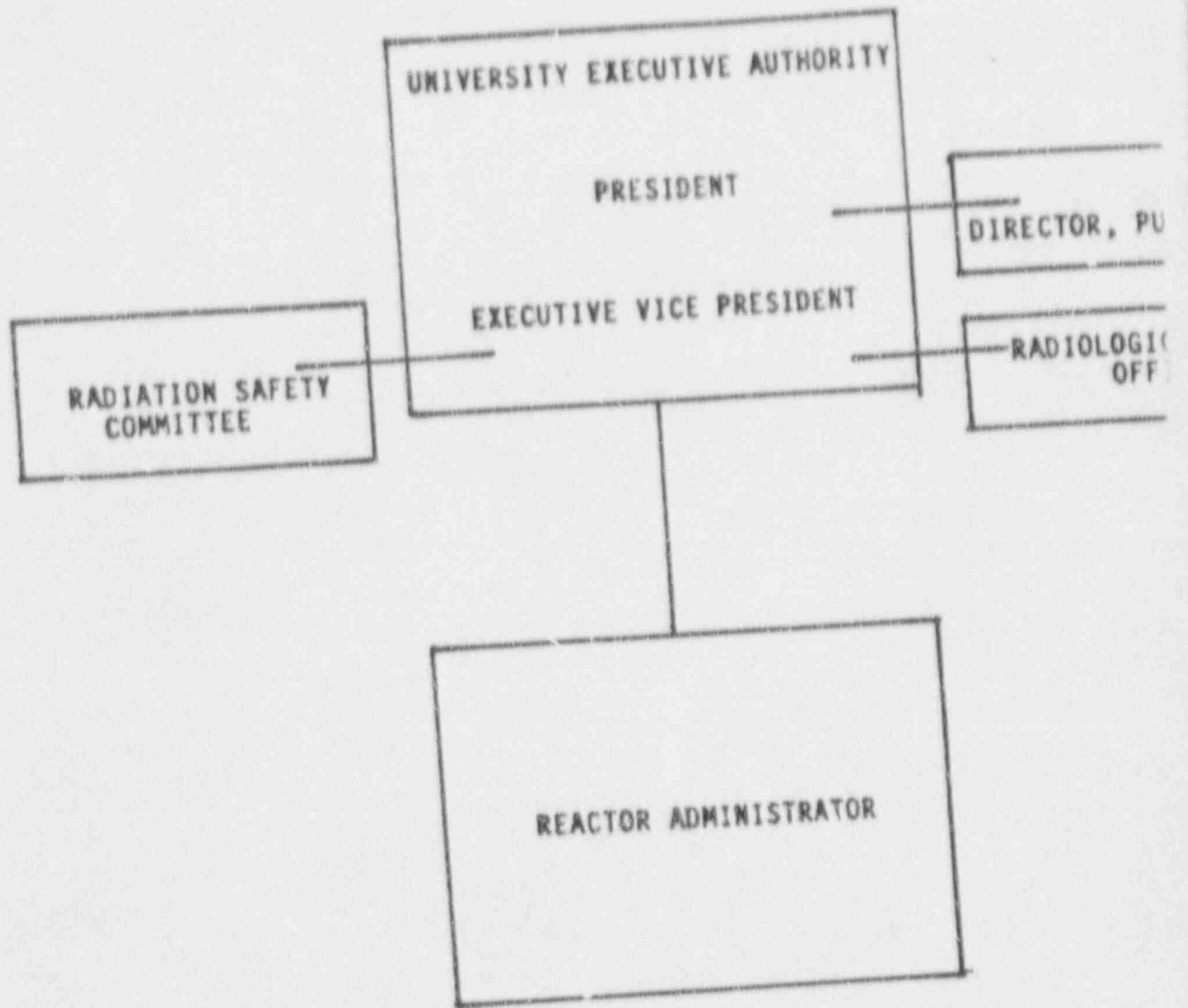


FIG. 1 ADMINISTRATIVE ORGANIZATION FOR REACTOR CONTROL AND S