APPENDIX A

TECHNICAL SPECIFICATIONS

REVISION 3
(PROPOSED)

NOVEMBER 1988

LICENSE NO. R-114
DOCKET NO. 50-294

MICHIGAN STATE UNIVERSITY

TRIGA REACTOR

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Included in this document are the Technical Specifications and the "Bases" for the Technical Specifications. These bases, which provide the technical support for the individual technical specifications, are included for information purposes only. They are not part of the Technical Specifications, and they do not constitute limitations or requirements to which the licensee must adhere.

The dimensions, measurements and other numerical values given in these specifications may differ from measured values owing to normal construction and manufacturing tolerances, or normal accuracy of instrumentation.

1.0 DEFINITIONS

1.1 Abnormal Occurrence

An "Abnormal Occurrence" is defined for the purposes of the reporting requirements of Section 208 of the Energy Reorganization Act of 1974 (P.L. 93-438) as an unscheduled incident or event which the Nuclear Regulatory Commission determines is significant from the standpoint of public health or safety.

Reactor Components

The following definitions pertain to the various components that are part of the operational Reactor. Since the Reactor fuel has been removed from the Facility, the function of these components with respect to Reactor Operations/Safety is no longer applicable. These definitions have been retained in order to support information represented in the specifications that follow.

1.2 Shim Rod

A shim rod is a control rod having an electric motor drive and scram capability.

1.3 Safety-Transient Rod

The safety-transient rod is a control rod with scram capability that can be rapidly ejected from the reactor core to produce a pulse.

1.4 Regulating Rod

The regulating rod is a low worth control rod having an electric motor drive and scram capability.

1.5 Fuel Element

A fuel element is a single TRIGA fuel rod of standard type.

1.6 Instrumented Element

An instrumented element is a special fuel element in which a sheathed chromel-alumel or equivalent thermocouple is embedded in the fuel at the vertical center plane of the fuel element. More than one thermocouple may be located in each element.

REACTOR INSTRUMENTATION

1.7 Safety Limit

Safety limits are limits on important process variables which are found to be necessary to reasonably protect the integrity of certain of the physical barriers which guard against the uncontrolled release of radioactivity.

1.8 Limiting Safety System Setting

Limiting safety systems setting is the setting for automatic protective devices related to those variables having significant safety functions.

1.9 Operable

A system, device, or component shall be considered operable when it is capable of performing its intended functions in a normal manner.

1.10 Measured Value

The measured value is the magnitude of that variable as it appears on the output of a measuring channel.

1.11 Measuring Channel

A measuring channel is the combination of sensor, interconnecting cables or lines, amplifiers, and output device which are connected for the purpose of measuring the value of a variable.

1.12 Safety Channel

A safety channel is a measuring channel in the reactor safety system.

1.13 Channel Check

A channel check is a qualitative verification of acceptable performance by observation of channel behavior.

1.14 Channel Test

A channel test is the introduction of a signal into the channel to verify that it is operable.

1.15 Channel Calibration

A channel calibration consists of comparing a measured value from the measuring channel with a corresponding known value of the parameter so that the measuring channel output can be adjusted to respond with acceptable accuracy to known values of the measured variable.

2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

This Section has been deleted in its entirety from the Technical Specifications. It previously contained specifications that pertained only to Reactor Operations (e.g. fuel element temperature limit(s), etc.) Since all Reactor fuel has been permanently removed from the site, these specifications are no longer applicable.

3.0 LIMITING CONDITIONS FOR OPERATION

Applicability

This specification applies to the operational status of the Reactor.

Objective

The objective is to ensure that the Reactor is no longer operated under the "Possession Only" license status.

Specifications

Receipt and/or handling of Reactor fuel is no longer authorized under the conditions of License R-114.

Basis

It has been decided that the Reactor is to be shutdown permanently and the Facility decommissioned. Hence, the fuel has been shipped off-site to a qualified recipient and the license modified to a "Possession Only" status. This current license status no longer allows the receipt, handling or use of fuel in the Reactor Facility.

4.0 SURVEILLANCE REQUIREMENTS

4.1 General

Applicability

This specification applies to the surveillance requirements of the systems related to safety at the Reactor Facility.

Objective

The objective is to verify the proper operation of the systems related to safety at the Reactor Facility.

Specifications

Any additions, modifications, or maintenance to the ventilation system, the core and its associated support structure, the pool or its penetrations, the pool coolant system, the rod drive mechanism, or the reactor safety system shall be made and tested in accordance with the specifications to which the systems were originally designed and fabricated or to specifications approved by the Reactor Safety Committee. A system shall not be considered operable until after it is successfully tested.

Bases

This specification relates to changes in reactor systems which could directly affect safety at the Reactor Facility. As long as changes or replacements to these systems continue to meet the original design specifications, then it can be assumed that they meet the presently accepted operating criteria.

4.2 Limiting Conditions for "Possession Only"

4.2.1 Radiation Monitoring System

Applicability

This specification applies to the surveillance requirements for the area radiation monitoring equipment and the continuous air monitoring system.

Objective

The objective is to assure that the radiation monitoring equipment is operating and to verify the appropriate alarm settings.

Specifications

The area radiation monitoring system and the continuous air monitoring system shall be calibrated annually but at intervals not to exceed 14 months and shall be verified to be operable at monthly intervals.

Bases

The current inventory of radioactive material is made up of only the neutron activated reactor components and bio-shield, fission chamber, and neutron start-up source, (the fuel has been shipped off-site). Therefore, monthly verifica- tion of area radiation and air monitoring system set points in conjunction with annual calibration is adequate to correct for any variation in the system due to a change of operating characteristics over a long time span.

4.2.2 Ventilation System

Applicability

This specification applies to the Reactor Facility ventilation system.

Objective

The objective is to assure the proper operation of the ventilation system in controlling releases of radioactive material to the uncontrolled environment and to provide adequate building climate control to minimize deterioration of electronic monitoring and/or other equipment located within the Facility.

Specification

It shall be verified monthly that the ventilation system is operating properly.

Basis

Experience accumulated over several years of operation indicate that monthly operational tests of this system are sufficient to provide assurance that this system is operating properly in meeting the objective of this specification.

5.0 DESIGN FEATURES

5.1 Radiation Monitoring System

Applicability

This specification describes the functions and essential components of the area radiation monitoring equipment and the system for continuously monitoring airborne radioactivity.

Objective

The objective is to describe the radiation monitoring equipment that is available to monitoring personnel to assure safe storage of the Radioactive components/materials contained in the Reactor Facilty.

Specifications

The radiation monitoring equipment listed in the following table will be available at the Reactor Facility

Radiation Monitoring Channel And Function

Area Radiation Monitor (gamma sensitive instruments)

Function-Monitor radiation fields in key locations, alarm and readout at control console.

Continuous Air Radiation Monitor (Beta, Gamma sensitive detector with air collection capability)

Function - Monitor concentration of radioactive particulate activity in building, alarm and readout at control console.

Bases

The radiation monitoring system is intended to provide information to monitoring personnel of any impending or existing danger from radiation so that there will be sufficient time to take necessary steps to prevent the spread of radioactivity to the surroundings.

5.2 Reactor Building and Ventilation System

Applicability

This specification applies to the building which houses the reactor.

Objective

The objective is to assure that provisions are made to minimize the release of radioactivity into the environment.

Specifications

a. The reactor shall be housed in a facility designed to restrict leakage. The minimum free volume in the facility shall be 2 x 10^7 cubic centimeters.

b. The reactor laboratory shall be equipped with a ventilation system designed to filter and exhaust air or other gases from the reactor laboratory and release them from a stack at a minimum of 13.7 meters from ground level. The filter shall be used during emergency situation specified by the continuous air monitor or by the operator.

c. Emergency filtering controls for the ventilation system shall be located in the control room and the system shall be designed to filter in the event of a substantial release of fission products.

Bases

The facility is designed such that the ventilation system will normally maintain a negative pressure with respect to the atmosphere so that there will be no uncontrolled leakage to the environment. The free air volume within the reactor laboratory is confined when emergency filtering is being performed. Controls for emergency filtering and normal operation of the ventilation system are located in the control room. Proper handling of airborne radioactive materials (in emergency situation) can be conducted from the control room with a minimum of exposure to operating personnel.

5.3 Reactor Pool Water System

Applicability

This specification applies to the pool containing the reactor components.

Objective

The objective is to assure that water shall be available to provide adequate radiation shielding.

Specifications

a. The pool water level shall be maintained at least 5.48 meters above the top grid plate of the core.

b. The pool water shall be sampled for conductivity at least monthly. Conductivity shall not exceed 5 micromhos per centimeter.

Bases

a. In the event of accidental siphoning of pool water through inlet and outlet pipes of the demineralizaer and heat exchanger system, the pool water level will drop no more than 4.5 meters from the top of the pool.

b. In the event of external pipe system failure, the vacuum breaker holes machined into the pipe will cause the cessation of water pumping after the loss of not more than one meter of water.

c. This specification assures that adequate shielding of the activated Reactor components and materials is provided by the pool water.

d. The water conductivity is an indicator of the water purity and can be used to monitor for the leakage of ground water into the tank. Maintaining low conductivity readings should allow early detection of leaks of this type.

6.0 ADMINISTRATIVE CONTROLS

6.1 Organization

The facility shall be under the direct control of the Reactor Supervisor or a qualified individual designated by him to be in direct control. The Supervisor shall be responsible to the Dean of the College of Engineering and the Associate Dean for Graduate Studies and Research for safe operation and maintenance of the reactor and its associated equipment. The Supervisor or his appointee shall enforce rules for the protection of personnel against radiation.

6.2 Review and Audit

a. A Reactor Safety Committee (RSC) of at least three (3) members knowledgeable in fields which relate to Nuclear Safety shall review, evaluate, and approve safety standards associated with use of the facility. The University Radiation Safety Officer and the Reactor Supervisor shall be members of the Reactor Safety Committee. The jurisdiction of the RSC shall include all nuclear operations in the facility and general safety standards.

b. The operations of the Reactor Safety Committee shall be in accordance with a written charter, including provisions for:

(1) Meeting frequency,

(2) Voting rules,

(3) Quorums,

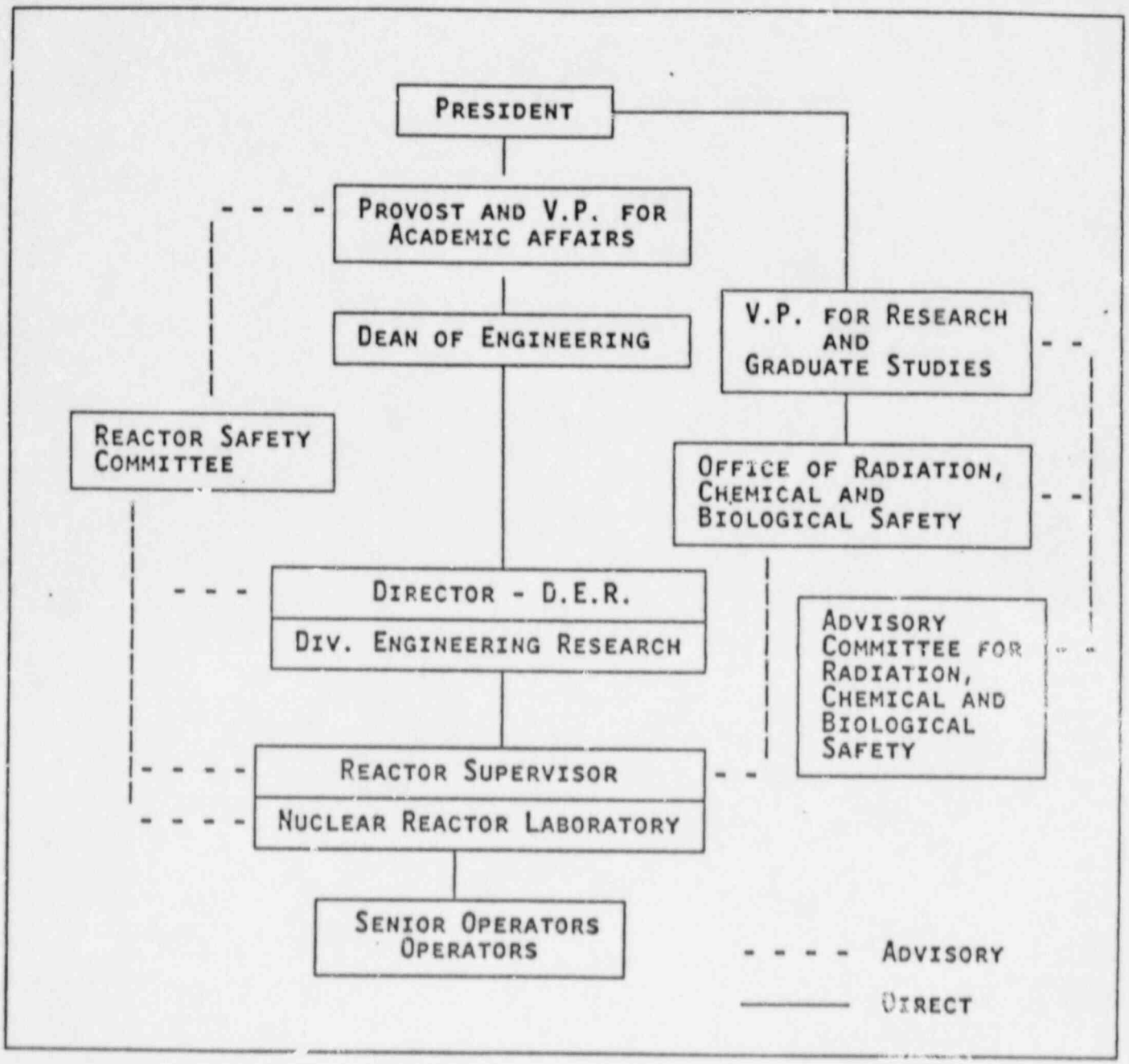
(4) Method of submission and content of presentation to the Committee, and

(5) Use of subcommittees.

c. The RSC or a Subcommittee thereof shall review reactor Facility status at least quarterly, but at intervals not to exceed four months.

REACTOR SAFETY COMMITTEE

ORGANIZATION



d. The responsibilities of the committee or designated Sub-committee thereof include, but are not limited to, the following:

(1) Review and approval of all proposed changes to the facility, procedures, and Technical Specifications;

(2) Review of unusual or abnormal occurrences and incidents which are reportable under 10 CFR Part 20 and 10 CFR Part 50;

(3) Review of abnormal performance of facility equipment.

6.3 Facility Operating Records

In addition to the requirements of applicable regulations, and in no way substituting therefor, records and logs shall be prepared for at least the following items and retained for a prior of at least five years for items a and b and indefinitely for items c through f.

a. Principal maintenance activitie

b. Equipment and component surveillance activities required by the Technical Specifications,

c. Offsite environmental monitoring surveys,

d. Facility radiation and contamination surveys,

e. Radiation exposures for all personnel, and

f. Updated, corrected, and as-built drawings of the facility.

6.4 Reporting Requirements

In addition to the requirements of applicable regulations, and in no way substituting therefor, reports shall be made to the NRC Region III, Office of Inspection and Enforcement as follows:

a. A report within 24 hours by telephone or telegraph.

Any accidental release of radioactivity above permissible limits in unrestricted areas whether or not the the release resulted in property damage, personal injury, or exposure.

b. A report within 10 days in writing of:

Any accidental release of radioactivity above permissible limits in unrestricted areas whether or not the release resulted in property damage, personal injury or exposure. The written report (and, to the extent possible, the preliminary telephone or telegraph report) shall describe, analyze, and evaluate safety implications, and outline the corrective measures taken or planned to prevent reoccurrence of the event;

c. A report within 30 days in writing of:

1. Any changes in facility organization; and

2. Any observed inadequacies in the implementation of administrative or procedural controls.

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

February 25, 1988

Docket No. 50-294

Dr. R. E. Wilkinson
Vice President for
Finance and Operations
412 Administration Building
Michigan State University
East Lansing, Michigan 48824

Dear Dr. Wilkinson:

SUBJECT: ISSUANCE OF AMENDMENT NO. 6 TO FACILITY OPERATING LICENSE NO. R-114 (REQUEST FOR SUSPENSION OF SELECTED TECHNICAL SPECIFICATION ITEMS)

The Commission has issued the enclosed Amendment No. 6 to Facility Operating License No. R-114 for the Michigan State University TRIGA reactor. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated December 22, 1987 and to a subsequent discussion held on February 8, 1988 between Dr. Bruce Wilkinson and myself.

The amendment consists of deletion from your TS for a semi-annual pulse and annual power calibrations because you are no longer planning to operate in a powered mode and because you are planning to remove the fuel and to decommission. Also, the amendment restricts you to a subcritical mode because of your present mode of operation with regards to fulfillment of other TS requirements.

A copy of the related Safety Evaluation supporting Amendment No. 6 is enclosed.

Sincerely,

Theodore S. Michaels

Theodore S. Michaels, Project Manager
Standardization and Non-Power
Reactor Project Directorate
Division of Reactor Projects III, IV,
V and Special Projects
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 6
2. Safety Evaluation

cc w/enclosures:
See next page

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