Carlson

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V
1990 N. CALIFORNIA BOULEVARD
SUITE 202, WALNUT CREEK PLAZA
WALNUT CREEK, CALIFORNIA 94596

9/26/80

Docket No. 50-288

Reed College
Portland, Oregon 97202

Attention: Dr. Paul Bragdon
President

Gentlemen:

Subject: NRC Inspection of Research Reactor (Triga MK I)

This refers to the inspection conducted by Mssrs. J. Carlson and D. Willett of this office on September 8-10, 1980 of activities authorized by NRC License No. R-112, and to the discussion of our findings held by Mssrs. Carlson and Willett with Dr. M. A. Kay of your staff at the conclusion of the inspection.

Areas examined during this inspection are described in the enclosed inspection report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

No items of noncompliance with NRC requirements were identified within the scope of this inspection.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you believe to be proprietary, it is necessary that you submit a written application to this office, within 20 days of the date of this letter, requesting that such information be withheld from public disclosure. The application must include a full statement of the reasons why it is claimed that the information is proprietary. The application should be prepared so that any proprietary information identified is contained in an enclosure to the application, since the application without the enclosure will also be placed in the Public Document Room. If we do not hear from you in this regard within the specified period, the report will be placed in the Public Document Room.

A/2.

Should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely,

J. T. Crews, Chief
Reactor Operations and
Nuclear Support Branch

Enclosure:
IE Inspection Report
No. 50-188/80-03

cc w/enclosure:
Dr. M. A. Kay, Reed College

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

Report No. 50-288/80-03

Docket No. 50-288 License No. R-112 Safeguards Group

Licensee: Reed College
Portland, Oregon 97202

Facility Name: Research Reactor (TRIGA Mk I)

Inspection at: Portland, Oregon

Inspection conducted: September 8-10, 1980

Inspectors: John C. Carlson 9/24/80
J. D. Carlson, Reactor Inspector Date Signed

D. J. Willett 9-24-80
D. J. Willett, Reactor Inspector Date Signed

Date Signed

Approved By: D. M. Sternberg 9/25/80
D. M. Sternberg, Chief, Reactor Projects Section 1 Date Signed
Reactor Operations and Nuclear Support Branch

Summary:

Inspection on September 8-10, 1980 (Report No. 50-288/80-03)

Areas Inspected: Routine, unannounced inspection of facility operations, procedures; maintenance; surveillance; operator requalification program; review and audit; and experiments. The inspection involved 30 inspector-hours onsite by two NRC inspectors.

Results: No deviations or items of noncompliance were identified.

RV Form 219 (7)

8011000069
4pp.

DETAILS

1. Persons Contacted

Licensee Personnel

*M. A. Kay, Facility Director
L. B. Church, Reactor Supervisor

*The above personnel were present at the exit interview.

2. Organization, Logs and Records

The organizational structure for the operation and administration of the Reed College research reactor had a couple of changes since the previous inspection. Dr. M. A. Kay has replaced Dr. L. B. Church as the Facility Director; however, Dr. Church has remained in the area and is acting as a consultant while Dr. Kay is obtaining his SRO license. Mr. M. Hybertson has left the college as Reactor Supervisor. Dr. Church is presently acting in this capacity until a new supervisor is selected. Through discussions with licensee representatives and an examination of facility records, the qualification levels, authorities, and responsibilities of licensee personnel were found consistent with the technical specification requirements.

Records of maintenance and operation of the Reed College research reactor for the period January thru September 1980, were reviewed by the inspector and found to document that these activities were performed consistent with the conditions of the facility license. The records reviewed include the following:

a. Console Log Book
b. Maintenance Log Book
c. Scram Book
d. Startup and Shutdown Checklists

No deviations or items of noncompliance were identified.

3. Requalification Training

The inspector reviewed the training files for each reactor operator and verified that the licensee had implemented the requalification program for licensed operators. The files contained applicable records of examinations, reactivity manipulations, evaluations and other activities as described in the requalification program.

No deviations or items of noncompliance were identified.

4. Review and Audit

The Reactor Operations Committee and the Radiation Safety Committee were determined to have met semiannually during 1979 and 1980. The minutes and records of each committee's meetings were reviewed and found to document the performance of review responsibilities as required by the technical specifications.

No deviations or items of noncompliance were identified.

5. Surveillance

Periodic instrument calibrations, reactivity measurements, control rod measurements and safety system tests had been performed by the licensee. A review of facility records verified that the required calibrations and tests had been performed consistent with the technical specification requirements.

No deviations or items of noncompliance were identified.

6. Experiments

The experiment program has remained essentially unchanged since the previous inspection. Experiments performed have consisted of activation analyses in support of various research projects and classroom laboratory work. Records of routine and modified routine experiments were examined by the inspectors and found to have been properly reviewed and approved by cognizant personnel. No special experiments had been performed since the previous inspection. Selected records were examined and found to have been consistent with approved experiment procedures as verified by the reactor operator prior to the actual irradiation in the reactor facility.

No deviations or items of noncompliance were identified.

7. Exit Interview

The purpose and scope of the inspection were summarized and inspection findings were reviewed with the licensee. A number of concerns were expressed by the inspectors to the licensee:

a. The Percent Power Meter has developed a sticking problem at the lower end of scale. The licensee committed to fix the meter by October 1, 1980. In the interim, all operators will be made aware of the problem prior to their operation of the reactor.

b. Logb ·k entries concerning problems were incomplete in that sufficient details concerning the nature of the problem, cause, and resolution were not logged. The licensee committed to upgrade log entries by the operators to resolve this concern.

c. This licensee had conducted a test to determine if the ventilation system could be lined-up into the "isolation" mode when the control air pressure was low. Results of the test showed that below a certain air pressure the ventilation system could not be lined-up into the "isolation" mode. The licensee committed to issue a procedure providing instructions to the operators to not operate the reactor below a certain air pressure.

REED COLLEGE Portland, Oregon 97202

REACTOR FACILITY

December 14, 1983

Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Mr. Cecil O. Thomas

Dear Mr. Thomas:

The Reed Reactor Facility recently submitted a Revised Security Plan to your office. We are requesting that upon completion of review, our license (R-112) be amended to incorporate the new plan.

Sincerely,

Michael A. Kay

Michael A. Kay, Sc.D.
Director, Reed Reactor Facility

vn

S005
A020
1/0 A/3

PR4 1.

Region V

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

RECEIVED

JUL 9 1984

Docket No. 50-288

Dr. M. A. Kay, Director
Reactor Facility
Reed College
3203 SE Woodstock Boulevard
Portland, Oregon 97202

Dear Dr. Kay:

By letter dated November 10, 1983, as supplemented by letter dated February 22, 1984, you submitted a revision to the "Physical Security Plan for Reed College Reactor Facility," Facility Operating License No. R-112. We have reviewed the submittal and have concluded that the revision meets the fixed site requirements of 10 CFR 73.67 for the protection of special nuclear material of low strategic significance. Accordingly, we are herewith issuing Amendment No. 4 to Facility Operating License No. R-112, which references your currently approved physical security plan.

Changes which would not decrease the effectiveness of your approved physical security plan may be made without prior approval by the Commission pursuant to the authority of 10 CFR 50.54(p). A report containing a description of each change shall be furnished to the Regional Administrator, U. S. Nuclear Regulatory Commission, Region V, 1450 Maria Lane, Suite 210, Walnut Creek, California 94596 with a copy to the Director, Office of Nuclear Reactor Regulation, Attn: Document Control Desk, Washington, D. C. 20555 within two months after the change is made. Records of changes made without Commission approval shall be maintained for a period of two years from the date of the change. Changes which do require prior NRC approval should be submitted in the manner required by 10 CFR 50.90 to the Director of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555 and identified as a license amendment request.

Based on our review of your updated physical security plan, we have concluded that:

(1) the amendment does not involve a significant increase in the probability or consequence of accidents previously considered, does not involve a significant decrease in a safety margin, and, therefore, does not involve a significant hazards consideration;

8407170196 311

A/4

Reed
RR-4

(2) there is reasonable assurance that the health and safety of the public will not be endangered by this action; and

(3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

This amendment relates solely to physical security and does not involve any significant construction impacts. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(12). Pursuant to 10 CFR 51.22(c), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

This NRC-approved physical security plan supersedes all previously submitted security commitments under your 10 CFR Part 50 license. The documents comprising the currently approved physical security plan for the Reed College reactor and our evaluation findings have been placed in the Commission's files. Pursuant to 10 CFR 2.790(d) this information is being withheld from public disclosure.

You are required to implement this physical security plan within 30 days of the date of issuance of this amendment.

Sincerely,

Cecil O. Thomas

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

Enclosure:
Amendment No. 4

cc w/enclosure:
See next page

cc w/enclosure(s):

Director, Oregon Department
Of Energy
528 Cottage Street, N. E.
Salem, Oregon 97310

Mayor of City of Portland
1220 Southwest 5th Avenue
Portland, Oregon 97204

Administrator
Siting and Regulation
Oregon Department of Energy
Labor and Industries Building
Room 111
Salem, Oregon 97310

Attorney General
Department of Justice
State Office Building
Salem, Oregon 97130

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

JUL 9 1984

REED COLLEGE

DOCKET NO. 50-288

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 4
License No. R-112

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Reed College (the licensee) dated November 10, 1983, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR, Chapter I;

   B. The facility will operate in conformity with the provisions of the Atomic Energy Act of 1954, as amended, 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, Facility Operating License No. R-112 is hereby amended by changing paragraph 3.E., to read now as follows:

E. Physical Security Plan

The licensee shall maintain and fully implement all provisions of the Commission-approved physical security plan, including amendments and changes made pursuant to the authority of 10 CFR 50.54(p). The approved physical security plan entitled "Physical Security Plan for Reed College Reactor Facility" dated June 1983, submitted by letter dated November 10, 1983, as supplemented by letter dated February 22, 1984, consists of documents withheld from public disclosure pursuant to 10 CFR 2.790(d).

3. The license amendment is effective 30 days from date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Cecil O. Thomas

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

Date of Issuance:

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CALIFORNIA 94596

Cillis

Docket No. 50-288

MAY 10 1985

Reed College
Portland, Oregon 97202

Attention: Dr. Paul Bragdon, President

Gentlemen:

Subject: NRC Inspection

This refers to the routine inspection conducted by Mr. M. Cillis of this office on March 27-29, 1985 and the telephone discussions on April 11 and 22, 1985, of activities authorized by NRC License No. R-112, and to the discussion of our findings held by Mr. Cillis with Dr. M. Kay and other members of your staff at the conclusion of the inspection.

Areas examined during this inspection are described in the enclosed inspection report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

Based on the results of this inspection, it appears that certain of your activities were not conducted in full compliance with NRC requirements, as set forth in the Notice of Violation, enclosed herewith as Appendix A.

In view of these violations and other inspection findings we are concerned that you are not providing an adequate level of management attention to oversight of the facility operation. Accordingly, I will contact you in the near future to establish an opportunity to discuss these inspection findings and your plans to improve performance.

Your response to this Notice is to be submitted in accordance with the provisions of 10 CFR 2.201 as stated in Appendix A, Notice of Violation.

In accordance with 10 CFR 2.790(a), a copy of this letter and the enclosure will be placed in the NRC Public Document Room.

The responses directed by this letter and the accompanying Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely,

Ross A. Scarano, Director
Division of Radiation Safety and
Safeguards

A/S

8505290090

1P

2.

Appendix A
Notice of Violation

Reed College

License No. R-112
Docket No. 50-288

As a result of the inspection conducted during the period of March 27 through April 22, 1985 and in accordance with NRC Enforcement Policy 10 CFR, Part 2, Appendix C, the following violations were identified.

A. 10 CFR Part 19.11, "Posting of Notices to Workers" requires:

"(a) Each licensee shall post current copies of the following documents: (1) The regulations in this part and in Part 20 of this chapter; (2) the license, license conditions, or documents incorporated into a license by reference, and amendments thereto; (3) the operating procedures applicable to licensed activities; (4) ...

(b) If posting of a document specified in paragraph (a) (1), (2) or (3) of this section is not practicable, the licensee may post a notice which describes the document and states where it may be examined....

(d) Documents, notices, or forms posted pursuant to this section shall appear in a sufficient number of places to permit individuals engaged in licensed activities to observe them on the way to or from any particular licensed activity location to which the document applies, shall be conspicuous, and shall be replaced if defaced or altered...."

Contrary to the above, on March 27-29, 1985 documents specified in 10 CFR Part 19.11(a) were not posted at the licensee's facility.

This is a Severity Level V Violation (Supplement IV).

B. 10 CFR Part 50.54 "Conditions of Licenses states in part (i-1) that "Holders of operating licenses in effect on September 17, 1973 shall implement an operator requalification program which, as a minimum, meets the requirements of Appendix A of Part 55 of this chapter which was submitted for approval by the Atomic Energy Commission."

The licensee's NRC approved operator requalification program, revised on November 27, 1980, requires: (1) "Each reactor operator (RO) and senior reactor operator (SRO) take a requalification examination once every year, ...(2) each SRO and RO will be responsible for making at least 10 reactivity control manipulations per year, and (3) once every six months, a meeting of all RO's and SRO's will be held to make them aware of recent changes in the Reed College Reactor Facility License, Facility design changes, recent abnormal occurrences, and changes in emergency procedures."

Contrary to the above, during 1983 and 1984 the reactor operator requalification program was not implemented in that:

1). One SRO had not taken the yearly requalification examination since May 1983.

2). During 1983 one SRO made only 3 reactivity control manipulations and another SRO made only 5 such manipulations in 1984.

3). No RO or SRO meetings were held between the period of November 1983 and January 1985.

This is a Severity Level IV Violation (Supplement 1).

C. 10 CFR Part 50.54(i) requires:

"(i) Except as provided in § 55.9 of this chapter, the licensee shall not permit the manipulation of the controls of any facility by anyone who is not a licensed operator or senior operator as provided in Part 55 of this chapter." and

10 CFR Part 55.31(e) states:

"(e) If a licensee has not been actively performing the functions of an operator or senior operator for a period of four months or longer, he shall, prior to resuming activities licensed pursuant to this part, demonstrate to the Commission that the knowledge and understanding of facility operation and administration are satisfactory. The Commission may accept as evidence, a certification by an authorized representative of the facility licensee by which the licensee has been employed."

Contrary to the above, at least four individuals holding NRC operator licenses who had not performed the functions of a reactor operator for periods of four or more months were subsequently permitted to manipulate the controls of the Reed TRIGA facility without being certified by an authorized representative of the facility or receiving the approval of the Commission. The individuals holding the below listed docketed licenses and the respective dates involved are as follows:

1)	Docket No. 55-8696	April 26, 1983 through September 29, 1983
2)	Docket No. 55-9442	January 12, 1984 through June 26, 1984
		June 26, 1984 through January 14, 1985
3)	Docket No. 55-7177	May 16, 1984 through October 12, 1984
4)	Docket No. 55-7180	August 25, 1983 through March 28, 1984
		June 5, 1984 through February 15, 1985

This is a Severity Level IV Violation (Supplement 1).

Pursuant to the provisions of 10 CFR 2.201, Reed College is hereby required to submit to this office within thirty days of the date of this Notice, a written statement or explanation addressing each alleged violation and including: (1) the corrective steps which have been taken and the results achieved; (2) corrective steps which will be taken to avoid further violations; (3) the date when full compliance will be achieved. Consideration may be given to extending your response time for good cause shown.

G P Yuhas

G. P. Yuhas, Chief
Facilities Radiological Protection Section

MAY 10 19[illegible]

Date Signed

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-288/85-01

Docket No. 50-288

License No. R-112

Licensee: Reed College
Portland, Oregon 97202

Facility Name: Reed Reactor Facility

Inspection at: Portland, Oregon - Reed College

Inspection conducted: March 27-29, 1985 and telephone discussions on April 11 and 22, 1985

Inspector: M. Cillis — 5/7/85
M. Cillis, Radiation Specialist — Date Signed

Approved by: G P Yuhas — 5/9/85
G. P. Yuhas, Chief — Date Signed
Facilities Radiological Protection Section

Summary:

Inspection on March 27-29, 1985 and telephone discussions on April 11 and 22, 1985 (Report No. 50-288/85-01):

Areas Inspected: Routine unannounced inspection by a regionally based inspector of facility operations, radiation protection program, environmental monitoring program, emergency preparedness program, review and audits, standard operating procedures, training, surveys, operating logs and records, transportation activities, reactor operator and senior reactor operator requalification program, surveillances, experiments, organization and a tour of the facility. The inspection involved 34 hours of on-site time by one inspector.

Results: Of the fourteen areas inspected, three apparent violations were identified: failure to post notices to workers pursuant to 10 CFR 19.11 (paragraph 9); failure to implement the NRC approved operator requalification program (paragraph 4(a)), and operation of the facility by four individuals who had not been recertified after a four month absence as prescribed in Part 55.31(e), in that they had not performed the functions of a reactor operator for periods of four months or more and were permitted to manipulate the controls of the Reed TRIGA facility without certification or demonstrating to the Commission that their understanding and knowledge of the facility was satisfactory (paragraph 4(b)).

Details

1). Persons Contacted

Dr. Paul Bragdon, President
Dr. M. Cronyn, Vice President Provost
+ J. Frewing, Chairman, Radiation Safety Committee
+,*Dr. M. Kay, Director, Reed Reactor Facility (RRF)
D. M. Richardson, Senior Reactor Operator
*Dr. D. Hoffman, Chairman, Reactor Operations Committee
*Dr. C. R. Keedy, Senior Reactor Operator
+,*Q. Hanley, Reactor Supervisor
+,*J. Shohet, Reactor Operator
+ T. M. Mitts, Senior Reactor Operator

*Denotes those individuals attending the exit interview on March 29, 1985.

+Denotes those individuals that were contacted by telephone.

In addition to the individuals noted above, the inspector met with and interviewed other members of the licensee's staff.

2) Organization and Responsibilities

The organizational structure for operation and administration of the Reed College research reactor was reviewed. Additionally, the responsibilities of the staff as described in the licensee's administrative procedures were examined.

The examination disclosed that the administrative procedures have not changed since 1974.

Among the responsibilities assigned to the Director of RRF is the establishment of administrative controls through reactor regulations that are consistent with the NRC regulatory requirements and other state or local governmental regulations. The Director of RRF is also responsible for the direct enforcement of said regulations. Similarily, the Reactor Supervisor, Health Physicist, operators, and the Reactor Operations (ROC) and Radiation Safety Committee's (RSC) responsibilities are described in the licensee's Administrative Procedure.

The inspection disclosed the following:

- There were fourteen NRC licensed operators and senior operators. Seven are undergraduate students at Reed College while the remaining seven are from outside organizations. The Reactor Supervisor is an undergraduate student.

- The Health Physicist is from an outside organization. The Reactor Supervisor informed the inspector that the Health Physicist has not performed the functions of a health physicist, as defined in the

Administrative Procedure, since he was appointed the position of reactor supervisor (e.g. approximately 2½ years ago). The Supervisor stated that the Health Physicist did attend the RSC and ROC meetings. The Director of RRF confirmed the Reactor Supervisor's observations, stating that he and/or the operators performed most of the health physics functions.

- The Director of RRF has other major responsibilities. They are: Reed College Radiation Safety Officer, Chairman of the Reed College Isotopes Committee, Ex-officio member of the ROC and RSC, Reed College Instructor, and Implementation of the RRF Emergency Plan and reactor operators/senior reactor operators training and requalification programs.

The review disclosed that the Director of RRF, Reactor Health Physicist, Reactor Supervisor and Reactor Operators were not adequately administering their responsibilities in accordance with the Administrative Procedure. This observation was discussed with the President of Reed College and at the exit interview. The inspector cited the findings in this and subsequent paragraphs of this report as examples in which the responsibilities of the staff were not being effectively administered. This item will be examined on a subsequent inspection (85-01-01).

No violations or deviations were identified.

3) Logs and Records

The inspector examined the following facility logs and operational records for the period of 1982 through 1984:

- Console Log
- Environmental Log
- Startup Check List
- Shutdown Checklists
- Procedure Change Notices
- Reactor Operator's Records
- Weekly, Monthly, Bi Monthly, Semi-Annual and Annual Checklists. These check lists are used for verifying that the Technical Specification surveillances have been performed (e.g. yearly calibrations, semi-annual rod drop times, weekly pool water analysis, etc).
- Health Physics Survey Records
- Operator Requalification Program Training Records
- Maintenance Log

The following observations were made:

- Approximately 20% of the check lists contained omissions. In most instances the Reactor Supervisor's and Reactor Director's reviews (certified by their signature) of the checklists were made anywhere from two to seven months after the check list items were completed.

- None of the check lists clearly distinguish Technical Specification requirements.

- The supply of "typed" copies of the bi-monthly check list was depleted in January 1984. The form, which contains 8 line items that must be verified every two months, has been hand written since January 1984. The licensee's staff still includes the need for performing the portable monitor calibrations on this form even though the calibration frequency had been changed to every six months.

- Verification of Technical Specification, Section D.2 (e.g. weekly sampling of pool water) might be found on any one of three different records.

- The Environmental Monitoring Log book for 1985 did not indicate that environmental samples were taken in January of 1985. The reactor supervisor informed the inspector that the January 1985 sampling was conducted but not documented.

- The July 1984 environmental soil sample results had not been documented in either the Health Physics or Environmental Log even though the sample analysis had been completed in the latter part of 1984.

- Dates and times were not included in Reactor Operator's Records.

- Numerous log entries were unsigned.

- Log entries are written in pencil and are illegible in some cases.

- Reactor Operator's Records are not being maintained as required by a policy that was established by the Reactor Director. Specifically some operators are not recording reactivity manipulations.

- The "procedures review" verifications are not being recorded by operators as required by a unwritten policy that was established by the Reactor Director.

- There were several occasions where samples were placed in the core and removed from the core where no log book entries were made as required by SOP-51 "Running Rabbits".

- SOP 10 "Writing in Log Books" requires that any entry of consequence should be signed by the person marking that entry. The inspector noted that most entries (>50%) are initialed rather than signed.

A review of licensee audit reports identified similar observations to that made by the inspector. The inspector's observations were brought to the licensee's attention at the exit interview. The inspector emphasized the importance for maintaining accurate, legible and meaningful logs as is also stressed in SOP-10. This item will be examined during a subsequent inspection (85-01-02).

No violations or deviations were identified.

4) Reactor Operations

a) Operator Requalification Program

The NRC approved Reed Reactor Facility (RRF) Operator Requalification Program was examined. The program was initially approved on March 12, 1974 and was last revised on November 27, 1980. The program is designed to meet the requirements as set forth in 10 CFR Part 50.54(i), "Conditions of License" and 10 CFR Part 55, Appendix A, "Requalification Programs for Licensed Operators of Production and Utilization Faciliti

Reactor operators and senior reactor operators training records, reactor console logs, reactor operator licenses and other documents related to this topic were reviewed.

10 CFR Part 50.54 "Conditions of the License", Subparagraph (i-1) states in part:

"Holders of operating licenses in effect on September 17, 1973 shall implement an operator requalification program which, as a minimum, meets the requirements of Appendix A of Part 55 of this chapter which was submitted for approval by the Atomic Energy Commission."

10 CFR Part 55, Appendix A, Section 7 states in part:

The licensee's approved program pursuant to 10 CFR Part 55, Appendix A, Section 7 states in part:

...1) "Each Reactor Operator (RO) and Senior Reactor Operator (SRO) will be required to take a requalification examination once every year."

..2) "Each SRO and RO will be responsible for making at least 10 reactivity control manipulations per year."

...3) "Once every six months a meeting of all reactor operators and senior reactor operators will be held to make them aware of recent changes in the Reed College Reactor License, Facility design changes, recent abnormal occurrences, and changes in emergency procedures."

Section II, Part 2.2 of the RRF Administrative Procedure (AP) assigns the reactor supervisor the responsibility for directing the activities of reactor operators. Section III of the Administrative

Procedure requires that at least two persons must be present within the Reactor facility whenever the reactor is not shutdown. Additional policies established by the Director are:

- Each RO and SRO are required to maintain their own personal "Reactor Operator's Records" current, describing the dates, times and number of reactivity control manipulations they perform.

- To sign the procedure change log, as an acknowledgement that they have reviewed all procedures that were changed since they last performed reactivity control manipulations of the RRF.

- To acknowledge in the control console log that they have reviewed all entries in the log since they last performed reactivity control manipulations.

The examination, which included a review of records and discussions with the Director of RRF, Reactor Supervisor and Operators, disclosed irregularities with the licensee's reactor operators requalification program. The following observations were noted:

- The inspector noted that at least nine of the currently licensed RO's and SRO's had special conditions stipulated in their respective operators licenses. The conditions required the use of corrective lenses whenever the involved individuals manipulated the controls of the facility. One of the nine also had a license condition requiring that another individual be present when he was assigned to manipulate the facility controls. This requirement was added to the individuals SRO license because of a medical problem.

  Neither the reactor director or reactor supervisor were aware of the licensed conditions that were stipulated in the licenses issued to the RRF staff. The reactor director was confident that the license conditions were being met because of the policies established in the RRF administrative procedures; however, there was no way for verifying this because the name of the second (or backup person) individual in attendance at the reactor facility is not normally documented in the licensee records. Nor is the second individual made aware of any special conditions that may be included in an operator's license.

- The reactor supervisor stated he found it extremely difficult trying to schedule reactor operations in a manner that would assure that the qualifications and/or recertification of the RO's and SRO's were maintained in accordance with 10 CFR Part 55.31. The reactor supervisor stated he was no longer attempting to schedule the activities of RO's and SRO's that are from outside organizations.

- Only a few of the RO's and SRO's maintain the "Reactor Operator's Records" current.

- Only a few of the RO's and SRO's verify they have reviewed all procedure changes that were issued since they last operated the reactor.

- Only a few of the RO's and SRO's verified that they have reviewed the entries in "reactor console log" since they last operated the reactor.

- At least one SRO (Docket No. 55-9442) has not taken a yearly SRO examination since May 1983.

- Two operators did not maintain their reactor operator license (Docket Nos. 55-9444 and 55-7797) current. RO, Docket No. 55-9444, did not perform reactor control manipulations since receiving his license on September 6, 1983 while SRO, Docket No. 55-7797, did not operate the reactor since May 14, 1984. The Reactor Director did not become aware of this problem until January of 1985, at which time he felt they were no longer qualified as operators. One of the individuals decided not to renew his license while the other is in the process of requalifying.

- The inspector found portions of at least two requalification examinations that were not graded. This same observation was made in Inspection Report 50-288/83-01.

- Semi-annual (once every six months) meetings of the RO's and SRO's were not held between the period of November 1984 through January 1985. The reactor supervisor informed the inspector that he has never attended a meeting in which there was 100% attendance by the facilities licensed RO's and SRO's. One SRO informed the inspector that he had never attended any meetings during a two year period that he was a licensed operator.

- At least two reactor operators (Docket Nos. 55-7177 in 1983, 55-9442 in 1984) did not perform at least 10 reactivity control manipulations per year. Docket No. 55-7177 made only mode 3 reactivity control manipulations in 1983 and 55-9442 only made 5 reactivity control manipulations in 1984. Both individuals made the required amount of reactivity changes in the preceeding and subsequent years.

- There was no indication that an overview (audit) of the reactor operator requalification program was performed by either the Reactor Operations Committee or Radiation Safety Committee.

The inspector discussed the above observations with the Reed College President and the Reactor Director and at the exit interview. The inspector informed the licensee that failure to 1). provide the yearly reactor operators requalification examinations, (2) failure of reactor operators to perform at least 10 reactivity control manipulations, and (3) failure to hold RO's and SRO meeting at least once every six months was considered to be a violation of 10 CFR Part 50.54 (i-1) (85-01-03).

b) Conditions of Licenses

10 CFR Part 50.54, "Conditions of the License," Subparagraph (i) states in part:

"(i) Except as provided in § 55.9 of this chapter, the licensee shall not permit the manipulation of the controls of any facility by anyone who is not a licensed operator or senior operator as provided in Part 55 of this chapter."

Additionally, 10 CFR Part 55.31 states in part:

"(e) If a licensee has not been actively performing the functions of an operator or senior operator for a period of four months or longer, he shall, prior to resuming activities licensed pursuant to this part, demonstrate to the Commission that the knowledge and understanding of facility operation and administration are satisfactory. The Commission may accept as evidence, a certification by an authorized representative of the facility licensee by which the licensee has been employed."

An examination of the reactor console logs and reactor operator's records was conducted by the inspector for the purpose of verifying compliance with 10 CFR Part 50.54(i) and 10 CFR Part 55.31(e). The results of the examination were confirmed by the RRF Director and in discussions held with the licensee's operations staff. Additional inspector observations related to this topic are discussed in paragraph 4(a) above.

The examination disclosed the following:

- Four individuals, identified as Docket Nos. 55-8696, 55-9442, 55-7177, and 55-7180 were allowed to perform reactivity control manipulations of the Reed Reactor Facility even though they had not performed the functions of a reactor operator for a period of four months or greater. None of the individuals were recertified by an authorized licensee representative nor did they demonstrate to the Commission that their understanding and knowledge of facility operations were satisfactory. The individuals and respective dates involved are as follows:

Operator	Dates
1). Docket No. 55-8696	April 26, 1983 through September 29, 1983
2). Docket No. 55-9442	January 12, 1984 through June 26, 1984 and June 26, 1984 through January 14, 1985
3). Docket No. 55-7177	May 16, 1984 through October 12, 1984

4) Docket No. 55-7180 August 25, 1983 through March 23, 1984 and June 5, 1984 through February 15, 1985

The reactor director informed the inspector that he had left it up to the individual operators to maintain their qualifications current. The inspector informed the Reactor Director of the 10 CFR Part 50.54(i) requirement which assigns the licensee the responsibility for disallowing the manipulations of the controls of the facility by anyone who is not qualified or considered to be licensed. The inspector also reminded the Reactor Director of the responsibility assigned to him by the licensee's Administrative Procedures. The Administrative Procedure states that the Reactor Director is responsible for enforcing NRC and other governmental agency regulations.

The above observation was discussed with the President of Reed College, the RRF Director and at the exit interview. The inspector informed the licensee that failure to disallow the manipulation of facility controls by individuals who had not performed that function for a period of four months or greater was an apparent violation of 10 CFR Part 50.54(i) (85-01-04).

c) Experiments

The licensee's reactor experiment program has remained essentially unchanged since the previous inspection. No new or special experiments had been performed since the previous inspection. Selected records were examined and were found to be consistent with approved experiment procedures by cognizant licensee personnel.

No violations or deviations were identified.

d) Standard Operating Procedures (SOP's)

Written procedures required for the operation of the RRF pursuant to Technical Specifications, Section I.5, were examined. The inspector found that approved copies of SOP's were available at the reactor control console. All of the procedures, with the exception of those required for emergency and abnormal conditions were last revised on May 14, 1981.

Discussions with the Director of RRF and the Reactor Supervisor disclosed that new emergency procedures were being developed. The Director of RRF did not expect that these procedures would be approved by May 1985 as previously committed to NRC Region V staff on November 11, 1984.

The Reactor Supervisor expressed some concern with the review and approval process of SOP's. The Reactor Supervisor stated that seven procedure revisions made in early 1984 were submitted to the Reactor Operations Committee in July 1984 and still had not been approved at the time of this inspection. The reactor supervisor stated that

such delays were not unusual because of the infrequent meetings of ROC.

The inspector noted there were inconsistencies in some procedures and that the licensee's staff was not following procedures. Examples of these observations are discussed in other sections of this report (e.g. paragraphs 3, 4, 7 and 11).

Some SOP's reviewed failed to provide specific instructions regarding the frequency for performing certain actions and where to record the data. An example is SOP-20, "Environmental Monitoring". The procedure fails to identify the frequency for obtaining soil and water samples and where to record the sample analysis results. Discussions with the Reactor Director and Reactor Supervisor indicated that water samples are normally obtained in January of each year while soil samples are obtained in July of each year. The fact that the samples are taken is recorded in the Environmental Log book; however, the sample analysis results are recorded in the Health Physics Log book.

An SOP for the calibration of portable instruments is not yet available even though the licensee's staff agreed such a procedure was necessary in 1982 and again in 1984. Discussions related to this topic are provided in Region V Inspection Report 50-288/82-02 and the Reactor Operations Committee meeting minutes of November 15, 1984.

The inspectors observations were brought to the attention of the President of Reed College and the licensee's staff attending the exit interview. The inspector emphasized the need for (1) developing emergency plan procedures, (2) procedure compliance (3) developing consistent procedures, and (4) expediting the procedure review and approval process.

This item will be examined during a subsequent inspection (85-01-05).

No violations or deviations were identified.

5) Review and Audit

The inspector reviewed the minutes of the Reactor Operations Committee (ROC) and Radiation Safety Committee (RSC) meetings held since April of 1983. The charters of the two committees, which are described in Part II of the RRF Administrative Procedures, were also reviewed. Additionally, discussions related to this topic were held with the Chairmen of the two committees, the Reactor Director, and the Reactor Supervisor.

The following observations were identified:

- The Chairman of the ROC resigned approximately two weeks prior to this inspection. A new Chairman, from the Reed Faculty staff was appointed during this inspection.

- Both the Reactor Director and Reactor Supervisor are non voting ex-officio members of both committees.

- The only Reed member having voting privileges on either committee is the Chairman of the ROC. Remaining members of both committee's are from outside organizations. The Reactor Supervisor stated that the ROC makeup has resulted in delays in review and approval of facility business.

- Neither committee charter describes what, if any, audit function they are responsible for performing.

- The ROC's charter references 10 CFR Part 20 as the governing regulatory requirement for performing reviews/evaluations of any problems that may be constituted as an unreviewed safety question. 10 CFR 50.59 is the correct regulatory reference.

- Neither committee tracks the status of audit findings.

- Both committees have, over the past two years, been attempting to redefine their responsibilities. As a result, the committee's surveillance and audit activities have become less frequent and affairs requiring immediate attention have suffered, e.g. such as approval of the revised Emergency Plan.

- The inspector noted that several ROC meeting minutes held over the past two years failed to indicate who was present.

The inspector observed that the ROC has not been fully utilized as an effective tool in assuring that the RRF operations are performed in accordance with the appropriate regulatory requirements and facility policies. The inspector observed that the effectiveness of the RSC was also in need of improvement.

The above observations were discussed at the exit interview.

No violations or deviations were identified.

6) IE Information Notices (IN)

Discussions with the Reactor Supervisor disclosed that he had evaluated IN 84-21 "Inadequate Shutdown Martin". The evaluation, which was made for the purpose of determining its applicability to RRF activities, was completed on May 6, 1984.

The Supervisor stated that he had concluded that the concerns described in the IN applied to the RRF. The Supervisor's evaluation and recommendations were provided to the Radition Safety Committee in July 1984 for resolution. The Radiation Safety Committee assigned another member of the Committee and Director of the RRF to resolve the Supervisor's evaluation.

A discussion was held with the Director of the RRF for the purpose of determining the status of the recommendations made by the Reactor

Supervisor with respect to the IN. The Director stated that he was not sure whether he agreed with the Reactor Supervisor's evaluation of this IN; however, neither he or the other committee member had completed their actions for resolving this matter.

The above observation was brought to the attention of the licensee at the exit interview. The inspector emphasized the purpose and importance for evaluating IN's in a timely manner.

No violations or deviations were identfied.

7) Transportation Activities

Radioactive materials produced by the Reed Reactor Facility are possessed under the licensee's by-product materials license issued by the State of Oregon. All transfers and/or shipments of radioactive material other than spent fuel are made under the state license. The licensee has not made any shipments under the NRC license since the previous inspection.

No violations or deviations were identified.

8) Emergency Preparedness

Discussions were held with the licensee's staff for the purpose of determining the status of their emergency plan which was submitted to the NRC November 1, 1983 for approval pursuant to 10 CFR Part 50.54(r). Similar discussions were held with the licensee on November 11, 1984. An NRC letter sent to the licensee on June 22, 1984 advised the licensee to revise the plan to include the required information identified by the NRC's Emergency Plan Review. The June 22, 1984 letter requested the licensee to submit their revisions to the NRC within 60 days of June 22, 1984.

During the November 11, 1984 meeting with Region V representatives the Director of RRF agreed to:

a). Respond to the NRC June 22, 1984 letter by January 7, 1985.

b) Implement emergency plan procedures for approval by May 1985.

As of this inspection, the examination disclosed that the licensee had not responded to the NRC's June 22, 1984 letter. Nor, had any progress been made toward the preparation of emergency procedures as agreed to during the November 11, 1984 meeting.

Discussions with the Director of the RRF revealed that he was unaware that the Reactor Supervisor had prepared a reply to the NRC's June 22, 1984 letter.

Discussions held with the Chairman of the RSC revealed that the on several occasions RSC had assigned the Director of RRF to resolve the information requested by the NRC's June 22, 1984 letter. The RSC chairman added that the Director of RRF response to the RSC pursuant to the assignment has been delinquent for quite some time.

A review was conducted for the purpose of determining if the licensee implemented their existing emergency plan pending the approval of their plan that was submitted on November 1, 1983. Based on this review it appears that the licensee met the minimum requirements of their current plan.

The above observations were brought to the attention of the President of Reed College, Chairman of the ROC and RSC, Director of RRF and at the exit interview. The inspector emphasized the importance of resolving the NRC questions, establishing procedures and training the staff. This matter will be examined during a subsequent inspection (85-01-06).

No violations or deviations were identified.

9) Facility Tour

The inspector toured the facility and conducted independent radiation surveys with an Eberline, Model RO-2 ion chamber radiation detection instrument, S/N 837, calibrated on February 25, 1985.

During the tour the inspector noted that the licensee's posting and labeling practices appeared to be consistent with 10 CFR Part 20.203, "Caution signs, labels, signals and controls" and 10 CFR Part 20.204, "Same: Exceptions".

The inspector noted that copies of Form NRC-3 were posted throughout the facility; however, information related to the locations of the documents specified in 10 CFR Part 19.11(a), "Posting of Notices to Workers" were not posted as required by 10 CFR Part 10.11(b) and/or 10 CFR Part 19.11(d). This observation was brought to the attention of the Director of the Reed Reactor Facility and at the exit interview. The inspector informed the licensee that failure to post pursuant to 10 CFR Part 19.11 was considered to be an apparent violation (85-01-07). The Director of RRF informed the inspector that the locations of the required documents would be immediately posted pursuant to 10 CFR Part 19.11.

10) Radiation Protection Program

a) Surveys

As part of the Daily Shutdown Check List the licensee performs a radiation survey. Procedure SOP-2, "Wipe Tests: How and When", 5/14/81, requires that a contamination (swipe) survey be conducted every two weeks.

The inspector reviewed radiation and contamination surveys taken between the period of January 1984 and March 1985. The following observations were made:

- Contamination surveys were obtained at frequencies ranging from every two weeks to intervals of up to six weeks.
- Only five swipes are normally taken. In a few exceptions as many as seven swipes may be taken and in most instances

(greater than 96%) the swipes are taken in the same locations. No contamination surveys are performed during special evolutions such as fuel inspection or control rod inspections. Nor are contamination surveys taken at the rabbit hood or in the counting room, e.g. during the handling of irradiated samples.

- The swipes are analyzed on a instrument (GM-counter) that is calibrated with a known standard at no set frequency (approximately once per year). The inspector noted that a performance check of the counting system is not performed prior to counting the swipes to confirm that the instrument response has not drifted from its initial calibration parameters. ANSI N323-1978, "Radiation Protection Instrumentation Test and Calibration", paragraph 4.7.3 recommends that source checks be made prior to each use, during intermitted use and at least several times a day during continuous use.

- The inspector noted that the licensee's contamination surveys were recorded in units (e.g. counts per minute) that are not consistent with that prescribed in 10 CFR Part 20.401(b), "Records of Surveys, Radiation Monitoring, and Disposal" or as defined in 10 CFR Part 20.5, "Units of Radioactivity".

- In several instances, the inspector noted that the radiation levels recorded for the Ion Exchange Tank read lower upon reactor shutdown than it did at reactor startup. The Director of RRF and Reactor Supervisor, who are responsible for reviewing the data, stated the readings on the tank should always read higher at shutdown. They had not identified the apparent inconsistency in their review process.

- Procedure SOP-18, "The Health Physics of High Radiation Areas", 5/14/81, requires that only the Director of the RRF or Health Physicist are the individuals authorized to work in a nigh radiation area. The inspector noted that work performed at the rabbit area on November 19, 1984, having radiation levels of 150 millirem/hour, was performed by an unauthorized individual. The Director of the RRF was not aware of the occurrence until it was brought to his attention by the inspector.

The above observations were brought to the licensee's attention at the exit interview. The need for improving their survey techniques and being more observant in review of records was emphasized.

No violations or deviations were identified.

b) Gaseous and Liquid Effluent Releases

The inspector held discussions with the licensee's staff and reviewed RRF records related to gaseous and liquid effluent releases. The examination disclosed that no liquid releases were made since the previous inspection and Argon-41 releases were well below the levels permitted by 10 CFR Part 20, Appendix B.

No violations or deviations were identified.

c) Personnel Radiation Dosimetry

Inspection Reports 50-288/82-02, paragraph 2(b) and 50-288/83-01, paragraph 2(b) described the licensee's personnel radiation dosimetry program. No significant changes were identified during this inspection, with the exception that the licensee was in the process of developing an in house testing and calibration program for pocket ionization chambers.

The inspector reviewed personnel dosimetry records for the period of January 1984 through March 1985. The doses recorded for whole body, extremities, and skin of the whole body were below the regulatory limits specified in 10 CFR Part 20.101(a) and Part 20.104.

No items of noncompliance were identified.

d) General Employee's Training (GET)

The inspector examined the licensee's GET program for the purpose of verifying compliance with 10 CFR Part 19.12, "Instructions to Workers". GET program lesson plans and attendance records were reviewed. The inspector concluded that the GET program, as described in Region V Inspection Report 50-288/82-02, continues to meet the requirements prescribed in 10 CFR Part 19.12.

No violations or deviaions were identified.

e) Environmental Monitoring

The inspection disclosed that the licensee has implemented an environmental monitoring program. The program consists of a soil, sediment and water sampling program. The Director of RRF stated that the environmental monitoring program gave no evidence of changes in the environs due to reactor operations. Records pertaining to the program were examined by the inspector. Additional observations related to this topic are discussed in paragraphs 3, 4(d), and 5 of this report.

No violations or deviations were identified.

11) Instrument Calibration

a) Portable Instruments

10 CFR Part 20.201 "Surveys" requires that the licensee perform evaluations of the radiation hazard that may be present Further, it requires that when appropriate such evaluations include measurements of the levels of radiation. Additionally, although not specifically required, good practices suggest that instruments used for radiation measurements be calibrated. ANSI N323-1978, "Radiation Protection Instruments Test and Calibrations" provides recommendations for a calibration program.

The inspector examined the licensee's Portable Monitor's Log used for documenting the calibration of portable radiation detection survey instruments. Also reviewed were the licensee's bimonthly check-list for the period of January 12, 1981 through January 6, 1985. Discussions were also held with licensee representatives for the purpose of determining if a standard operating procedure (SOP) for performing the calibrations was established as described in Region V Inspection Report 50-288/82-02, paragraph 2(d).

The examination disclosed the following:

- An SOP for calibration of portable survey instruments has not been established. The calibration methods described in the Monitor Log book were not performed in a consistent manner. Nor were the calibrations performed at a level that is commensurate with the recommendations provided in ANSI N323-1978.

- The licensee does not calibrate any instrument for measuring non-penetrating radiation.

The above observations were brought to the licensee's attention at the exit interview.

No violations or deviations were identified.

b) Fixed Instrumentation

Technical Specifications, Section G, "Radiation Monitoring" requires that an area radiation monitor (ARM) and a continuous air monitor (CAM) shall be operable in the reactor room when the reactor is operating. Section G of the Technical Specifications requires that the monitors be calibrated once each year. Section I.5.(a) requires that written instructions be in effect for checkout and calibration of the ARM's and air particulate monitors.

An examination of the applicable calibration procedure and the ARM and CAM log book was conducted. The inspector verified that the yearly calibrations of the monitors were accomplished. A visual inspection of the ARM's and CAM's was also conducted.

The inspector noted that two separate CAM's were available. Each is capable of isolating the ventilation system on a high air particulate channel alarm. One system monitors the stack releases while the other monitors the reactor high bay area. The Director of RRF stated that each CAM served as a backup to the other when one was inoperable. The CAM monitoring the stack is capable of monitoring gaseous and particulate activity whereas the reactor bay CAM only monitors for air particulate activity. It was noted that both CAM's were essentially the same except for the differences noted.

The examination disclosed that the procedures used for performing the calibrations required by the Technical Specifications were

significantly different from one another even though the monitors were essentially the same. The differences, as provided in SOP-30, "Calibration of the CAM" and SOP-32, "Particulate Stack Monitor" were brought to the attention of the Director of the RRF, Reactor Supervisor and were discussed at the exit interview. The licensee's staff stated the inspectors observations would be examined.

No violations or deviations were identified.

12) Exit Interview

The inspector met with the licensee's representatives (denoted in paragraph 1) at the conclusion of the inspection on March 29, 1985. The inspector summarized the scope and findings of the inspection. The licensee was informed of the violations described in paragraphs 4(a), 4(b) and 9.

The Director of RRF informed the Region V staff that all reactor operators who have not met the conditions of their license would be removed from licensed duties until the conditions of their licenses were met.

The inspector informed the licensee that the violations and other findings identified during the inspection indicate an apparent lack of management overview of reactor operations. The need for management support and involvement of the RRF was emphasized.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CALIFORNIA 94596

JUN 19 1985

Docket No. 50-288

Reed College
Portland, Oregon 97202

Attention: Dr. Paul Bragdon
President

Gentlemen:

Thank you for your letter dated May 31, 1985, informing us of the steps you have taken to correct the items which we brought to your attention in our letter dated May 10, 1985. Based on the telephone discussion on June 14, 1985 between you and Mr. Gregory Yuhas of this office, we understand that the "Notice to Employees" attached as an enclosure to your letter will be revised to describe 10 CFR 19 and 20 as required by 10 CFR 19.11(b). Your corrective actions will be verified during a future inspection.

Your cooperation with us is appreciated.

Sincerely,

Ross A. Scarano, Director
Division of Radiation Safety
and Safeguards

cc:
Dr. Michael Kay, Director
Reed Reactor Facility
State of Oregon

REED COLLEGE Portland, Oregon 97202

OFFICE OF
E PRESIDENT

May 31, 1985

Mr. Ross A. Scarano, Director
Division of Radiation Safety and Safeguards
United States Nuclear Regulatory Commission
1450 Maria Lane, Suite 210
Walnut Creek, California 94596

Re: Docket No. 50-288

Dear Mr. Scarano:

We appreciated the opportunity of meeting with you and your associates here earlier in the month, and we are determined to take appropriate steps as quickly as possible to carry out the understanding reached at that time. I would at this time like to respond to your Notice of Violation of May 10, 1985 with respect to Reed College (License No. R112) as follows:

Item A - The notice required by 10 CFR Part 19.11, "Posting of Notices to Workers" was posted in the Reed Reactor Facility (RRF) and at all other required places on March 29, 1985. The notice was posted in proximity to NRC Form 3, "Notice to Employees." A copy of the notice posted is attached to this letter. In the future, a copy of this notice will be attached to all Form 3's prior to posting. The referenced materials are available as described in the notice.

Item B - 1) The SRO who had not taken the yearly requalification examination since May 1983 is no longer a licensed operator for RRF.

Item B - 2) The operators referred to who did not make the sufficient number of reactivity changes are no longer licensed operators at RRF.

Item B - 3) The immediate corrective steps are given in the response to Item B below:

> The corrective steps taken to ensure compliance with the RRF Operator Requalification Program are contained in the May 1985 Revision of the Reed Reactor Facility Administrative Procedures. Under Section 2.3.1 Review, "The following items shall be reviewed by the Technical Subcommittee."

3203 Southeast Woodstock Boulevard Portland, Oregon 97202 Telephone (503) 771-1112

IE01

2.3.1.10) Operator Requalification Program

Under Section 2.3.2 Audits. "The following items shall be audited by the Technical Subcommittee."

2.3.2.2) The retraining and requalification program for the operating staff, at least once every other calendar year.

2.3.2.3) The Main Log, Maintenance Log, Operator Log, and Problem Log at least once per calendar year.

Item C - 1) Docket No. 55-8696: This operator is no longer at RRF.

Item C - 2) Docket No. 55-9442: License and position resigned.

Item C - 3) Docket No. 55-7177: This Senior Operator has taken the 1985 Senior Operator Requalification Examination and will be given a console and oral examination as soon as operations are resumed at RRF. At that time the SRO will apply for reinstatement. Copies of all materials will be submitted with this request.

Item C - 4) Docket No. 55-7180: This Senior Operator wrote the 1985 Senior Operator Requalification Examination. He will be given console and oral examinations as soon as operations are resumed at RRF. At that time the SRO will apply for reinstatement. Copies of the oral and console examination will be submitted with this request.

The corrective action to ensure compliance with 10 CFR Part 50.54(i) and the relevant parts of the Reed Reactor Facility Operator Requalification Program are the same as those given for Item B above.

The entire contents of this response will be an agenda item for the September 1985 RRF Operators Meeting.

The revised Administrative Procedures have already been approved by the current Reactor Safety Committee and have been distributed in final draft form to the Reactor Operations Committee scheduled to meet June 10, 1985. It is anticipated that approval and distribution of the Administrative Procedures will be completed by June 30, 1985.

Thank you again for your advice and counsel at our recent meeting. I hope that you will agree that progress is being made and steps to assure further progress are already scheduled.

Sincerely,

Paul E. Bragdon
President

Enclosure

cc: M. Cronyn
M. Kay
E. McFarlane

/j

Notice to Employees

The Reed Reactor Facility is licensed to operate by the Nuclear Regulatory Commission under Facility License R-112. The license, the conditions, amendments, and documents referred to in this license are available on request. The license and amendments are on file in the Director's and Chemistry Department Secretary's Offices. The Technical Specifications, Administrative Procedures, and Safety Analysis Report are on reserve in the Reed College Main Library, and are also in the Director's Office. The Standard Operating Procedures, Emergency Plan, and Security Plan are available in the Reed Reactor Facility Control Room and also in the Director's Office. Title 10 of the Code of Federal Regulations is available in the Director's Office. Excerpts from Title 10 of the Code of Federal Regualtions are available in the Reed College Chemistry Library.

This notice complies with the requirements of 10 CFR 19.11.
Do not remove.

REED COLLEGE Portland, OR 202

RECEIVED NRC

1985 JUL 18 AM 11:27

REGION V

OFFICE OF THE
VICE PRESIDENT—PROVOST

July 12, 1985

Mr. M. Cillis, Radiation Specialist
Division of Radiation Safety and Safeguards
United States Nuclear Regulatory Commission
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596

Dear Mr. Cillis:

This letter is to confirm our telephone conversation of last week relating to management plans for the Reed Reactor Facility.

Mr. Kay has prepared a revised management plan which has been approved by the Reactor Safety Committee, chaired by John Frewing, but the plan has yet to be approved by the Reactor Operations Committee because of the difficulty of getting a quorum, due to summer vacation schedules. We expect to be able to assemble a quorum of this Committee within the next couple of weeks.

I have attached a copy of a set of instructions to Mr. Kay from me that outline the conditions under which the Reed Reactor is to remain in a state of suspended operations. Mr. Kay has been informed that if the conditions for return of the Reactor to operational status has not been met by July 1, 1986, he will be given a termination of employment notice and the College will then plan for a restructuring of the management of the Reed Reactor Facility.

As soon as the Reactor Operations Committee has approved the revised management plan for the facility, a copy will be forwarded to your office.

Please let me know if there are other aspects of our management plans about which you are concerned.

Sincerely,

Marshall Cronyn

Marshall W. Cronyn
Vice President - Provost

enclosure

cc: Paul E. Bragdon

/w

8507230108

A/7

IE01 2

COPY

OFFICE OF THE
VICE PRESIDENT - PROVOST

June 19, 1985

MEMO TO: Michael Kay

From: Marsh Cronyn
Vice President - Provost

The purpose of this memorandum is to clarify the conditions under which the Reed Reactor could change from its current state of suspended operations and might become operational again:

1. All regulations of the NRC applicable to the Reed Reactor must be met to the satisfaction of the appropriate oversight bodies as indicated by their written notice of approval of management, operations, safety and security procedures.

2. Similarly, the expectations of the relevant regulatory agencies of the State of Oregon must be satisfied as indicated by written notice of approval.

3. In a like manner, the Reactor insurer must be satisfied.

4. A financial report on the Reactor's income and expenses for July 1 - June 30, 1985 should be prepared and a budget proposal submitted for July 1, 1985 - June 30, 1986 showing all sources of income and expenses. Reserves in specific accounts and their purposes should be indicated as of June 30 for each year.

5. Copies of the minutes of both Operations and Safety Committee meetings, including the names of those present, should be supplied to the President and the Provost's Office, together with copies of all correspondence to and from the regulatory agencies.

M. W. Cronyn

cc: P. Bragdon
E. McFarlane
John Frewing, Chairman, Reactor Safety Committee
Dennis Hoffman, Chairman, Reactor Operations Committee

/clw

Callis

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CALIFORNIA 94596

AUG 07 1985

Docket No. 50-288

Reed College
Portland, Oregon 97202

Attention: Dr. Paul Bragdon, President

Gentlemen:

Thank you for your letter dated July 12, 1985, informing us of the steps you have taken to date and those planned for correcting the items we brought to your attention during our meeting of May 21, 1985.

By your response, we understand that the Reed TRIGA reactor facility will be maintained in accordance with the conditions specified in NRC License R-112 during the period of suspended reactor operations.

The progress and adequacy of your corrective actions will be examined during an early re-inspection of the TRIGA facility.

Should you have any questions concerning this letter, we will be glad to discuss them with you.

Your cooperation with us is appreciated.

Sincerely,

Frank A Wenslawski

for Ross A. Scarano
Division of Radiation Safety and
Safeguards

8508230043

A/8

5.

SAFETY RELATED DOCUMENT

Reed Reactor Facility

Emergency Plan

Docket 50 - 288

License R - 112

15 September 1985

Reed Reactor Facility
3203 S.E. Woodstock Boulevard
Portland, Oregon 97202
(503) 771-1112 or (503) 777-8008

The Reed Institute dba
Reed College
3203 S.E. Woodstock Boulevard
Portland, Oregon 97202
(503) 771-1112

NRC Approved February 1986

A/9

3.

RRF EMERGENCY PLAN

TABLE OF CONTENTS

NRC Approved February 1986

RRF EMERGENCY PLAN

1.0 INTRODUCTION

1.1 Application

This emergency plan applies to The Reed Institute dba Reed College Reed Reactor Facility (RRF). The RRF is licensed pursuant to Title 10 Code of Federal Regulations, Chapter 1, Part 50, as a Research and Utilization Reactor, Facility Operating License No. R-112 (Docket No. 50-288). This plan specifies the objectives and implementing procedures to be followed for emergency situations occurring at RRF.

1.2 Objective

The objective of the RRF Emergency Plan is to establish guidelines and designate areas of responsibility for the RRF staff should an emergency occur at RRF that might affect the public health and safety. The RRF Emergency Plan identifies the Offsite Support Organizations that may be activated if required.

1.3 Site Description

The RRF is located on the Reed College Campus in the city of Portland, Multnomah County, Oregon. The 90-acre campus property, owned by The Reed Institute, is in the southeastern section of Portland known as Eastmoreland. The location of the College campus relative to the city of Portland and some of the neighboring communities is shown in Figure 1. Detailed access to RRF is shown in the map of the Reed College Campus - Figure 2. RRF is entirely contained within the reactor building. The reactor bay and control room comprise the restricted area.

1.4 Reed Reactor Facility Description

The RRF reactor is a General Atomics TRIGA Mark I reactor licensed to operate at a maximum power level of 250 kilowatt thermal (250 KW_{th}). The RRF reactor can be operated using either aluminum-clad or stainless-steel-clad standard TRIGA fuel elements enriched to a nominal concentration of 20% Uranium-235. The reactor core support structure is permanently mounted at the bottom of a 25-foot "swimming pool" tank. The pool structure is located below grade in the reactor bay. The RRF consists of the reactor bay, mechanical room, control room, ventilation loft, and exit corridor. The reactor building is attached to the southeast corner of the Chemistry Building. There is access to the radiochemistry laboratory and counting rooms from the exit corridor. Figure 3 is a floor plan of RRF.

1.5 Reactor Utilization and Operating Frequency

The RRF provides services and facilities for nuclear science education and research by the members of the Nuclear Science Consortium of the Willamette Valley. The RRF also provides services to industrial and consulting clients and government agencies. The RRF operates on an intermittent schedule averaging 4 hours per week for an average annual output of 50 MWH (2.2MW Days).

FIGURE 1
Portland, Oregon

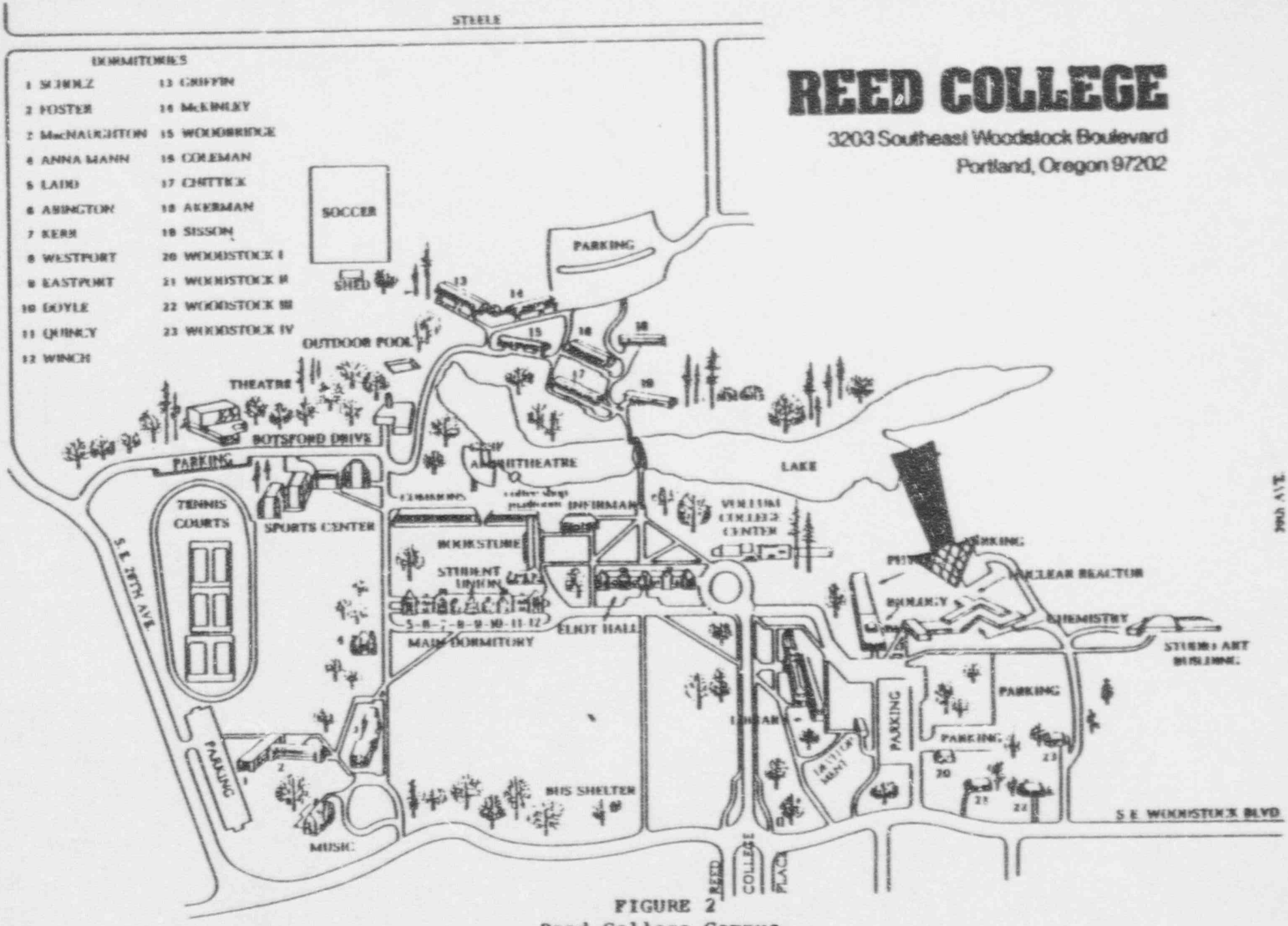


FIGURE 2
Reed College Campus

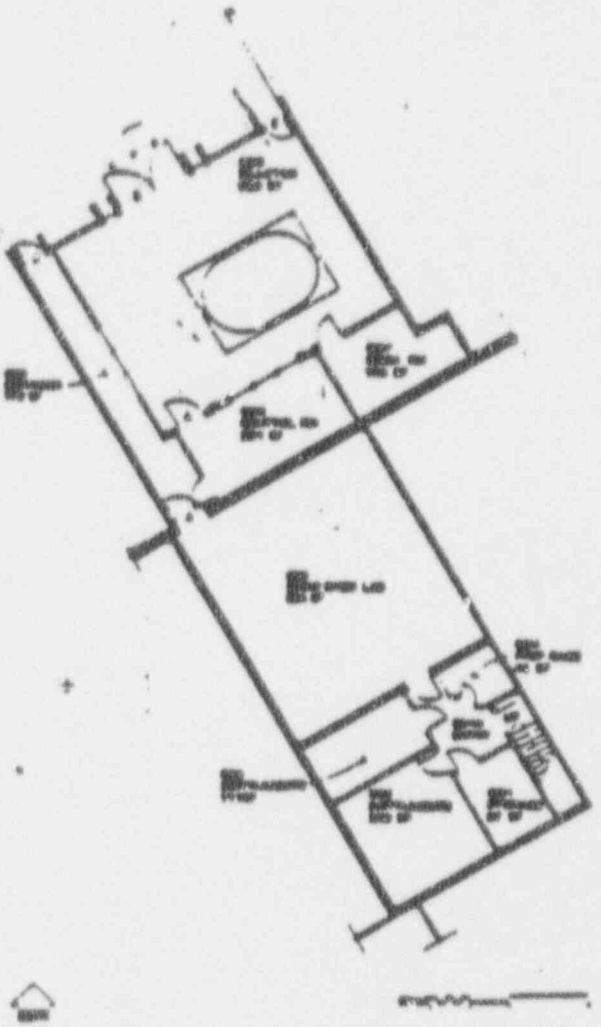


FIGURE 3

	REED COLLEGE 7·1983	REACTOR	(C&R)	DRWG 19··

2.0 Definitions

EMERGENCY. An emergency is a condition which calls for immediate action, beyond the scope of standard operating procedures, to avoid an accident or to mitigate the consequences of one.

EMERGENCY ACTION LEVELS. Specific instrument readings, or observations; radiological dose or dose rates; or specific contamination levels of airborne, waterborne, or surface-deposited radioactive materials that may be used as thresholds for establishing emergency classes and initiating appropriate emergency measures.

EMERGENCY CLASSES. Emergency classes are classes of accidents grouped by severity level for which predetermined emergency actions should be taken or considered.

EMERGENCY PLAN. An emergency plan is a document that provides the basis for actions to cope with an emergency. It outlines the objectives to be met by the emergency procedures and defines the authority and responsibilities to achieve such objectives.

EMERGENCY PLANNING ZONE (EPZ). Area for which offsite emergency planning is performed to assure that prompt and effective actions can be taken to protect the public in the event of an accident. The EPZ size depends on the distance beyond the site boundary at which the Protective Action Guide (PAG) could be exceeded.

EMERGENCY PROCEDURES. Emergency procedures are documented instructions that detail the implementation actions and methods required to achieve the objectives of the emergency plan.

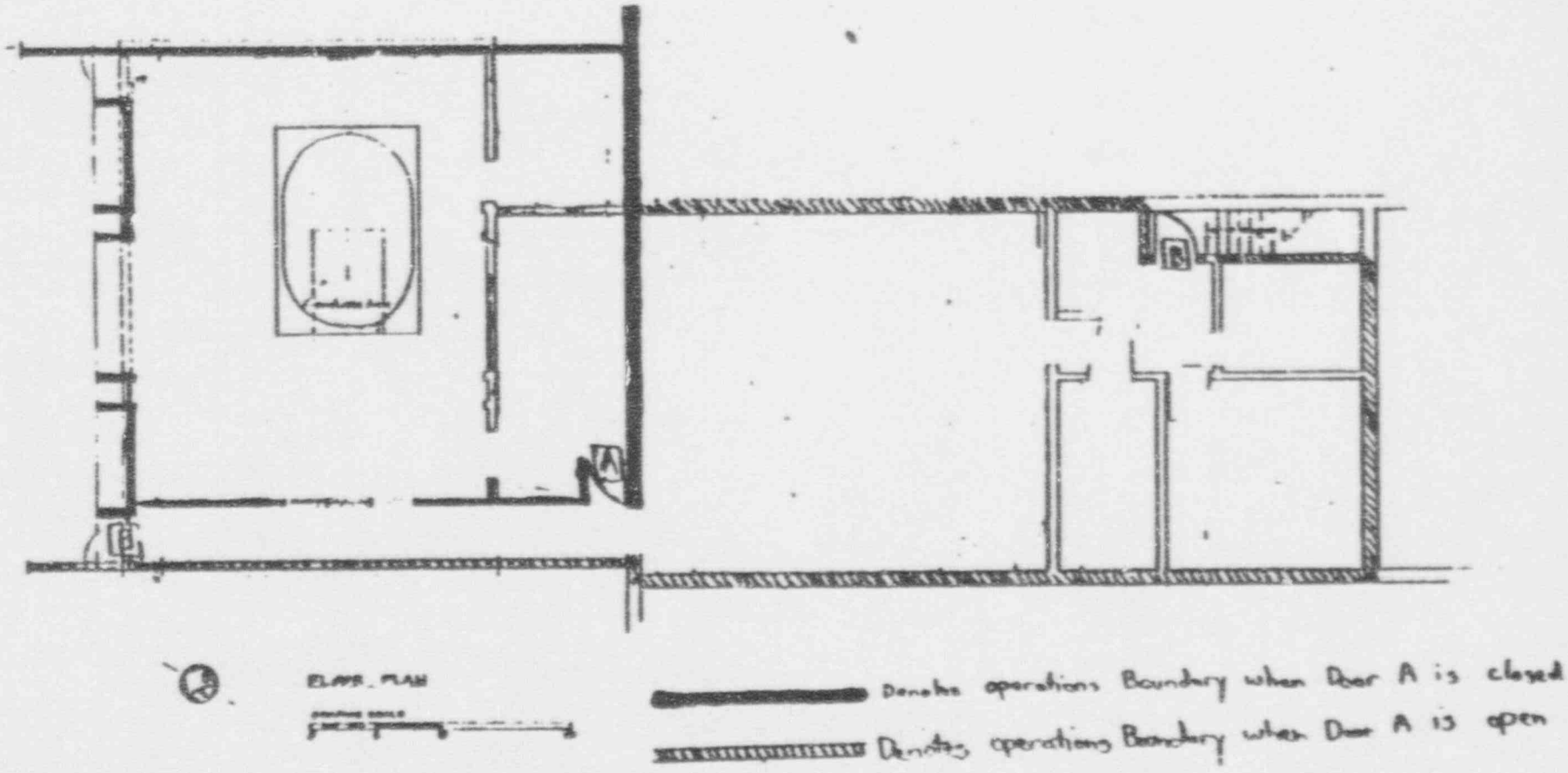
HEALTH PHYSICS PERSONNEL. In the context of the Emergency Plan: the Reactor Health Physicist, RRF personnel performing radiological sssessment under the direction of the Reactor Health Physicist, and any Offsite Support Organization personnel activated to perform radiological assessment. State of Oregon Department of Energy Emergency Response Personnel may act as a qualified alternate to the Reactor Health Physicist if necessary.

OFFSITE. The geographical area that is beyond the site boundary.

ONSITE. The geographical area that is within the site boundary.

OPERATIONS BOUNDARY. The area within the site boundary as shown in the RRF floor plan (Figure 4) is the operations boundary. When door 'A' is closed, it consists of the area outlined in black. When door 'A' is open, it includes the area outlined in hatched lines. Within the operations boundary the Reactor Director has direct authority over all activities. The area within this boundary shall have prearranged evacuation procedures known to personnel frequenting the area.

PROTECTIVE ACTION GUIDES (PAG). Projected radiological dose or dose commitment values to individuals that warrant protective actions would be warranted provided the reduction in individual dose expected to be achieved by carrying out the protection action is not offset by excessive risks to individual safety in taking the protective action. The projected dose does not include the dose that has unavoidably occurred prior to the assessment.



Floor Plan of Reactor Facility

FIGURE 4

RESEARCH REACTOR. A device designed to support a self-sustaining neutron chain reaction for research, developmental, educational, training, or experimental purposes, and which may have provisions for production of nonfissile radioisotopes.

RRF MANAGEMENT. The President, Vice President-Treasurer, and Vice President-Provost of Reed College. The Director of RRF is the highest level of operational management, and the reactor supervisor is a student Senior Reactor Operator.

SITE BOUNDARY. The site boundary is that boundary, not necessarily having restrictive barriers, including the adjoining Chemistry Building and extending 250 feet in every direction from the operations boundary. Within this area the Emergency Coordinator may directly initiate emergency activities. The area within the site boundary may be frequented by persons unacquainted with reactor operations.

SHALL, SHOULD AND MAY. The work "shall" is used to denote a requirement; the word "should" to denote a recommendation; and the work "may" to denote permission, neither a requirement nor a recommendation.

3.0 Organization and Responsibilities

The RRF staff as established by the Director is involved with routine reactor operations, technical support and administration activities, and through training and operating experience is capable of handling any foreseeable emergency at the RRF. The Director's Position is the only salaried position at RRF, all other positions are staffed by student licensed operators, off-campus licensed operators, or professionals in appropriate fields such as Health Physics.

3.1 Emergency Organization

Several offsite organizations are available to augment the RRF emergency organization for emergency event response. The assistance and support services provided by these organizations include fire fighting, ambulance and emergency medical services, hospital facilities, radiological monitoring and assessment, and police protection. Written agreements with these organizations are renewed biannually (in odd-numbered years) and are included in Appendix A to this plan. The RRF staff with augmentation from offsite agencies forms the RRF emergency organization. Figure 5 shows the interface between the elements of the emergency organization.

3.1.1 Emergency Notification Call List (ENCL)

The Director shall establish the Emergency Notification Call List (ENCL) and determine the personnel order. There shall be a minimum of five (5) licensed operators on the ENCL which shall include the following: Director, Reactor Supervisor, and Health Physicist.

3.1.2 Emergency Coordinator

Any Reactor Operator (RO) or Senior Reactor Operator (SRO) may initiate emergency action. The SRO on duty shall be the Emergency Coordinator. At that time the Emergency Coordinator has ultimate authority over on-site activities and personnel. The Emergency Coordinator is responsible for:

(1) placing RRF in a safe shutdown condition,

(2) terminating or minimizing releases of radioactive materials,

(3) protecting RRF personnel and visitors,

(4) assessing severity of the emergency event, and

(5) notifying the first available person on the ENCL.

To fulfill these responsibilities the Emergency Coordinator shall exercise judgment and summon medical, ambulance, fire, and police assistance as necessary. If the SRO on duty cannot respond, the Director's office shall be notified, and the Director shall assume the role of Emergency Coordinator. If the Director is not available, then the first available SRO shall assume the duties of Emergency Coordinator. If an SRO is not able to respond, an RO shall assume the duties of the Emergency Coordinator and immediately ask for assistance from ENCL Personnel, RRF Management, and, if necessary, State of Oregon Department of Energy Emergency Response Personnel.

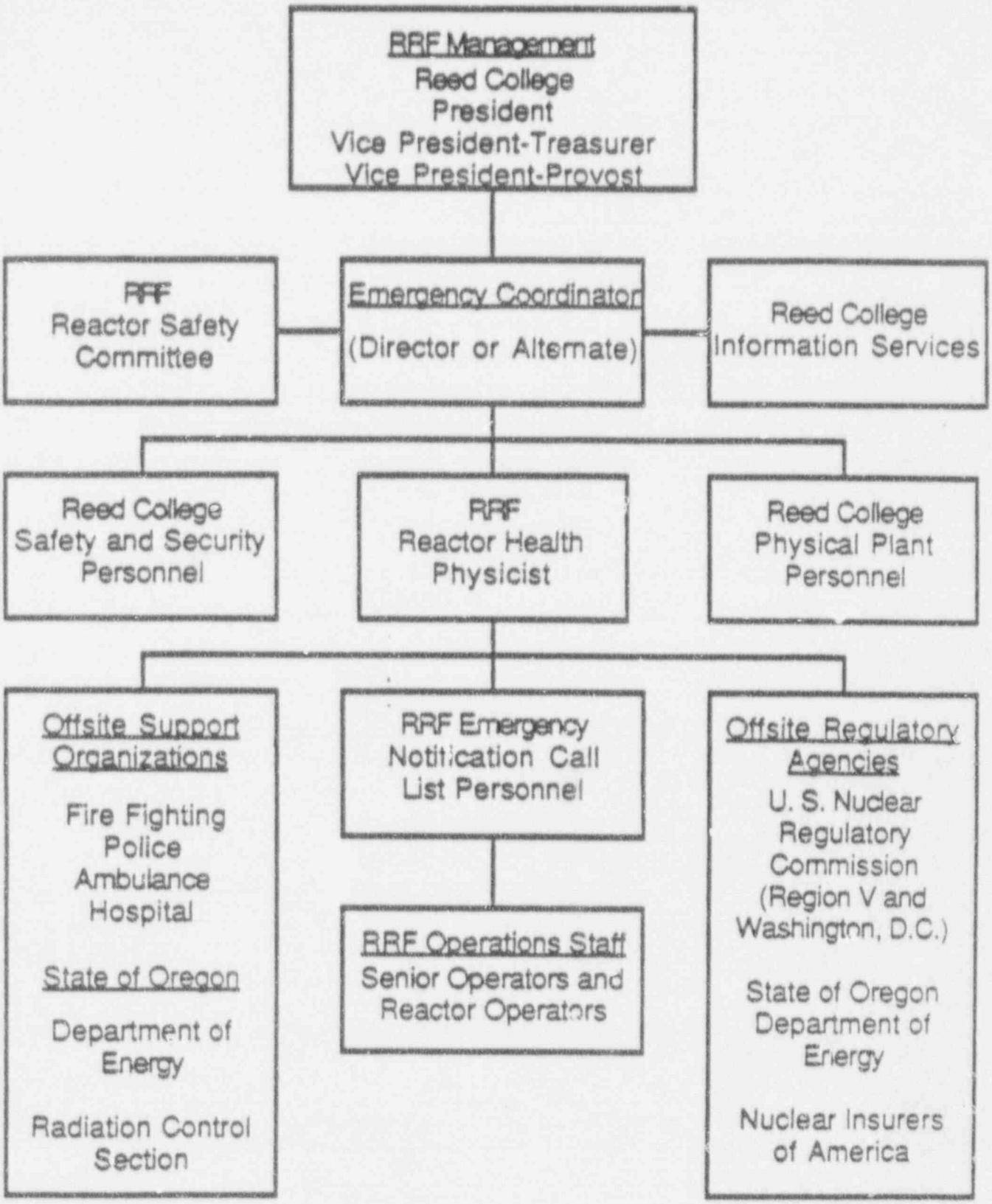


Figure 5 - RRF Emergency Organization

The Emergency Coordinator shall direct all emergency actions until relieved by a member of the ENCL. The ENCL is based upon fast response; it is ordered in usual distance from RRF. The Organizational Hierarchy of RRF personnel shall be:

Director
Health Physicist
Reactor Supervisor
Previous Director
Senior Reactor Operator(s)

An Emergency Coordinator on this list shall surrender the position to a person higher on the Organizational Hierarchy list.

3.1.3 Reactor Supervisor

The Reactor Supervisor shall be responsible for reviewing and updating emergency plans and procedures. The Reactor Supervisor is also responsible for emergency training and for conducting emergency drills and reporting critiques to the Director and Reactor Safety Committee. The Reactor Supervisor shall be a licensed Senior Reactor Operator.

3.1.4 RRF Management

The RRF Management consists of the President, Vice President-Treasurer, and Vice President-Provost of Reed College. The Director is the highest level of operational management, and a student SRO is Reactor Supervisor. The Director (or highest person on the RRF Organizational Hierarchy in the absence of the Director) will assume responsibility, as Emergency Coordinator; for directing emergency control measures for any incident posing a radiological threat to the health and safety of individuals or the public. The Director will provide news releases when warranted to the Reed College Information Services Office which in turn controls all official news releases.

3.1.5 RRF Health Physics

The Director serves as the onsite Health Physicist during non-emergency periods. The Reactor Health Physicist will be available during emergencies as needed. Additional Health Physics expertise and support are available from State of Oregon Department of Energy Emergency Response Personnel as necessary. RRF personnel will provide support as requested by the Reactor Health Physicist.

3.1.6 Facility Support

Individuals on the RRF staff may be assigned duties and responsibilities during the course of an emergency event. All RRF personnel receive basic instruction in radiation safety and emergency procedures on an annual basis.

3.1.7 RRF Reactor Safety Committee

The Reactor Safety Committee is the Review, Audit, and Approval organization for RRF. It is composed of two subcommittees with expertise in Safety and Operations respectively. It provides a source of expertise available to RRF during emergencies. It will review and audit emergency preparedness under this plan.

3.1.8 Communications

Reed College maintains 24-hour telephone communications. RRF has a direct dial-in line through the college switchboard (503-777-7222), and a special phone separate from the college switchboard (503-777-8008). The special phone is operational any time the Pacific Northwest Bell system is operating and the lines are intact. The college electronic switching system is 110 Volt A.C. dependent as well and does not function as reactor emergency communications during a power outage. There is an extension of 503-777-8008 in the Director's Office which serves as the Emergency Support Center (ECS). Reed Safety and Security patrols are in radio contact with this base, and have the capability of handling phone communications on their radio equipment. During periods when RRF is unattended, Reed Safety and Security patrols RRF, and notice of any alarm condition is communicated to the first available person on the ENCL.

3.1.9 Reed College Information Services Office

The Reed College Information Services Office, 212 Eliot Hall, will handle all official news releases concerning emergency events at RRF.

3.1.10 Reed College Safety and Security

Reed College Safety and Security personnel may be called to provide RRF security assistance, emergency radio communications, and traffic control as necessary. Reed Safety and Security personnel shall be trained annually in their role in RRF emergency procedures.

3.1.11 Reed Physical Plant Personnel

Reed Physical Plant Personnel may be called to provide assistance with electrical, plumbing, or structural problems encountered during an emergency.

3.1.12 Portland Fire Bureau

The City of Portland Fire Bureau will serve as the primary firefighting agency. The firemen are trained annually in their role in RRF emergency procedures.

3.1.13 Portland Ambulance Service

The City of Portland operates a coordinated Emergency Dispatching System through the 911-all emergency number, and will provide emergency medical assistance and ambulance service for RRF as required. Because of the presence of a major nuclear generating plant near Portland, the emergency medical technicians have been trained to handle contaminated personnel.

3.1.14 Good Samaritan Hospital

Good Samaritan Hospital will provide medical facilities and care for contaminated injured individuals and for individuals suffering from acute radiation exposure. Good Samaritan Hospital is the primary receiving hospital for contaminated injured personnel from a major nuclear generating station. Full-scale exercises are held at frequent intervals to train and requalify personnel in the radiological emergency unit. Good

Samaritan Hospital has 50% of its emergency facilities completely isolable to handle such emergencies. Good Samaritan Hospital produces videotapes and other materials as training aids for medical personnel involved in response to radiological accidents and injuries.

3.1.15 State of Oregon Department of Energy

The State of Oregon Department of Energy has statutory responsibility for the coordination of all State and Local Emergency Response to an accident at RRF. This responsibility has placed RRF in the category of a Research Reactor included as an appendix to the State's Trojan Nuclear Power Plant Emergency Response Plan. Radiological monitoring and assessment, and Health Physics expertise are deployed as part of the response upon being notified of an event at RRF. Full-scale exercises at Trojan have been used to train the components of the State Emergency Response Organization. State personnel write the State's RRF Response Plan with input from RRF.

3.1.16 Offsite Law Enforcement Agencies

The Portland Police Bureau is the primary offsite agency for facility security assistance, emergency radio communications, traffic control, and riot control as necessary. PPB officers and personnel are trained annually in Emergency Response to RRF alarms. The PPB is notified in all cases involving RRF security, and any other requests for assistance may be made by the ENCL person acting as Emergency Coordinator or by Reed Safety and Security. Additional offsite assistance is available from the Multnomah County Sheriff's Office and the Oregon State Police as requested by the Portland Police Bureau.

3.2 Coordination with and Notification of Government Agencies

The postulated credible accidents associated with the operation of RRF's Triga Mark I Nuclear Reactor will not result in a radiological hazard affecting the public health and safety. These emergency events will not require the direct involvement of local, state, and federal agencies.

3.2.1 U.S. Nuclear Regulatory Commission

Notification of an incident to the U.S. Nuclear Regulatory Commission shall be in accordance with the requirements of 10 CFR 20 and other applicable regulations. Additionally, RRF will transmit to the NRC all information specified in the Technical Specifications to Reactor License R-112. Notification of the NRC shall be an RRF Management responsibility. If the Director is not available, an Emergency Coordinator who is also a member of the ENCL shall assume this responsibility and notify the Vice President-Provost of this action.

3.2.2 State of Oregon Department of Energy (ODOE)

ODOE shall be notified any time an Offsite Support Organization is activated for a radiological incident. Notification of an incident to the ODOE, Salem, Oregon, shall be in accordance with the regulations specified in Oregon Regulations for the Control of Radiation and other applicable State Regulations. Notification of the ODOE shall be an RRF management responsibility. If the Director is not available, an Emergency Coordinator who is also a member of the ENCL shall assume this responsibility and notify the Vice President-Provost of this action.

3.2.3 Local Government Agencies

The City of Portland and Multnomah County shall be notified of any incidents which may have caused or threaten to cause an uncontrolled release of radioactive materials that results in a projected offsite dose of 1 Rem whole body or 5 Rem thyroid. Notification of local government agencies shall be an RRF Management responsibility. If the Director is not available, an Emergency Coordinator who is also a member of the ENCL shall assume this responsibility and notify the Vice President-Provost of this action. This notification may be under the responsibilities of the State of Oregon Emergency Response Personnel in which case RRF personnel will respond to State instructions.

3.2.4 American Nuclear Insurers (ANI)

ANI shall be notified as soon as possible after declaration of a nuclear Alert, Site Area Emergency, or General Emergency as required by their contract. Notification of ANI shall be an RRF Management responsibility. If the Director is not available, an Emergency Coordinator who is also a member of the ENCL shall assume this responsibility and notify the Vice President-Provost of this action.

3.3 Termination of an Emergency

The Emergency Coordinator who is a member of the ENCL shall be responsible for the termination of an emergency. Prior to termination of an emergency the Emergency Coordinator shall conclude that there exist no foreseeable subsequent events that could cause damage to the reactor or render its operation unsafe. He shall verify that all areas to be reopened to personnel or the general public meet the requirements of 10 CFR 20 for occupancy. He shall also confirm that areas restricted to entry or that require controlled access are clearly posted.

3.4 Authorization for Reentry

The Emergency Coordinator who is a member of the ENCL shall authorize any reentry into the reactor building or portions thereof previously evacuated during the course of an emergency. It shall be the responsibility of the Health Physicist to establish reentry requirements, provide personnel monitoring, and insure that protective clothing and proper respiratory protection is utilized when required.

3.5 Authorization of Radiation Exposures in Excess of 10 CFR 20 Limits

An Emergency Coordinator who is also a member of the ENCL with the concurrence of the Health Physicist, or a qualified alternate Health Physicist such as a State of Oregon Emergency Response Team Member, may authorize exposures to emergency team members and radiation workers in excess of normal occupational limits as specified in 10 CFR 20. The exposure limits are 75 Rem whole body for life saving and 25 Rem whole body for corrective action that mitigates the consequences or reduces the severity of the emergency event. In either case, the exposure is authorized on a once-in-a-lifetime basis with preference given to the eldest able-bodied volunteers.

4.0 Emergency Classification System

The emergency classes described for the RRF are based upon credible accidents associated with reactor operations and other emergency situations that are non-reactor-related and have less severe radiological consequences than the least severe claims. An Emergency Classification Guide is presented in Table 1. Implementing Procedures for the emergency classes of credible accidents are listed in Appendix B.

4.1 Non-Reactor Safety Related Events

These events are separate from reactor operations and do not necessarily indicate changing of the reactor status. Advisories to Reed Safety and Security or Portland Police may be warranted, and conditions may require such local services as ambulance and medical. There may be a need to shut down the reactor to reallocate personnel or because of injuries to a key individual.

The following action levels shall be used to initiate emergency measures associated with this emergency class.

1. Civil disturbances or receipt of a bomb threat non-specific to the reactor or adjoining chemistry building.

2. Personnel injury with or without radiological complications.

3. Minor fire or explosion non-specific to the reactor, its control system, or facility power lines in the chemistry building.

4. Facility or individual contamination.

TABLE I: EMERGENCY CLASSIFICATION GUIDE

Emergency Class	Action Level	Purpose
Non-Reactor Safety Related Event	Civil disturbances or receipt of bomb threat non-specific to reactor	Alert staff to a possible escalation
	Personnel injury with or without radiological complications	Initial Assessment and Provide Treatment
	Minor fire or explosion non-specific to the reactor, its control system, or facility power lines in the Chemistry Building	
	Facility or individual contamination	
Notification of Unusual Event	Receipt of bomb threat with possible radiological release implications	Assure that emergency personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring if required.
	Pool level alarm and visual observation indicating abnormal loss of water or abnormal increase in water level.	
	Fire or explosion in basement of Chemistry Building (radiochemistry laboratory, counting rooms, pneumatic tube terminal, or reactor storeroom), reactor bay, or control room.	Provide offsite authorities current status information
	Major fire, explosion, or any event requiring evacuation of any part of the Chemistry Building	
	Radiological effluents at the site boundary exceeding 10 MPC when averaged over 24 hours or 15 mRem whole body accumulated in 24 hours.	

NRC Approved February 1986

TABLE I (continued)

Emergency Classification Guide

Emergency Class	Action Level	Purpose
Notification of Unusual Event (continued)	Failure of an experiment or fuel cladding as indicated by alarms on one or more of the facility monitors: Air Particulate Monitor Continuous Air Monitor Gaseous Stack Monitor Radiation Area Monitor	
Alert	Radiological effluents at the site boundary exceeding 50 MPC when averaged over 24 hours or 75 mRem whole body accumulated in 24 hours	Assure response centers are manned
	Radiation levels at the site boundary of 20 mRem/hr for 1 hour whole body or 100 mRem thyroid dose in 1 hour	Assure that monitoring teams are dispatched Assure onsite evacuation capability
	Severe fuel damage or experiment failure resulting in significant releases of radioactivity as determined by observing the following radiaion levels on the facility air monitors Air Particulate Monitor: 100 x alarm level Gaseous Stack Monitor: 100 x alarm level Continuous Air Monitor: 100 x alarm level Radiation Area Monitor: An alarm lasting 1 hour from an unexplained source	Provide for consultation with offsite authorities Provide information for the public through the Reed College Information Services Office

4.2 Notification of Unusual Events

This class of emergency may be initiated by either manmade events or natural phenomena that can be recognized as creating a significant hazard potential that was previously non-existent. There is usually time available to take precautionary and corrective steps to prevent the escalation of the accident or to mitigate the consequences should it occur. No releases of radioactive material requiring offsite responses are expected. One or more elements of the emergency organization are likely to be activated or notified to increase the state of readiness as warranted by the circumstances. Although the situation may not have caused damages to the reactor, it may warrant an immediate shutdown of the reactor.

The following action levels shall be used to initiate emergency measures associated with this emergency class:

1. Receipt of a bomb threat with possible radiological release implication.

2. Pool level alarm and visual observation indicating abnormal loss of water or abnormal increase in water level.

3. Fire or explosion in the basement of the Chemistry Building (radiochemistry laboratory, counting rooms, pneumatic tube terminal, or reactor storeroom), reactor bay, or control room.

4. Major fire, explosion, or any event requiring evacuation of any part of the Chemistry Building.

5. Radiological effluents at the site boundary exceeding 10 MPC when averaged over 24 hours or 15 mRem whole body accumulated in 24 hours.

6. Failure of an experiment or fuel cladding as indicated by alarms on one or more of the facility monitors:

Air Particulate Monitor (APM)
Continuous Air Monitor (CAM)
Gaseous Stack Monitor (GSM)
Radiation Area Monitor (RAM)

4.3 Alert

Events leading to an alert would be of such radiological significance as to require notification of the emergency organization and response as appropriate for the specific emergency situation. During an alert it is unlikely that offsite response or monitoring would be necessary. However, substantial modification of the reactor operating status is a highly probable corrective action with shutdown (as described in the Technical Specifications to Reactor License R-112) the goal. Protective evacuations, or isolation of certain areas within the operations or site boundary may be necessary. The following action levels shall be used to initiate emergency measures associated with this emergency class.

1. Radiological effluents at the site boundary exceeding 50 MPC when averaged over 24 hours or 75 mRem whole body accumulated in 24 hours.

2. Radiation levels at the site boundary of 20 mRem/hr. for 1 hour whole body or 100 mRem thyroid dose in one hour.

3. Severe fuel damage or failure of an experiment resulting in significant releases of radiactivity as determined by observing the following radiation levels on the facility air monitors:

Air Particulate Monitor - 100 x alarm level
Gaseous Stack Monitor - 100 x alarm level
Continuous Air Monitor - 100 x alarm level

4. A Radiation Area Monitor Alarm lasting one hour from an unexplained source.

4.4 Site Area Emergency

No credible accidents attributable to the reactor or its operation are postulated which can cause emergency conditions beyond the operations boundary; therefore, this emergency class is not addressed in this plan.

4.5 General Emergency

No credible accidents attributable to the reactor or its operation are postulated which can cause emergency conditions beyond the operations boundary; therefore, this emergency class is not addressed in this plan.

5.0 Emergency Action Levels (EAL's)

There are no postulated credible accidents associated with the operation of the RRF Reactor that lead to exposures exceeding the Protection Action Guides (PAG's) of 1 Rem whole body or 5 Rem Thyroid beyond the site boundary. The action levels specified in Table I "Emergency Classification Guide" and described in Sections 4.1, 4.2, and 4.3 are EAL's for activating the Emergency Organization and initiating protective actions appropriate for the emergency event.

6.0 Emergency Planning Zone

The operations boundary for the RRF Reactor (defined as the reactor bay or reactor containment area) is established as the Emergency Planning Zone (EPZ) for the RRF. Areas within and adjacent to the EPZ are large enough to support emergency actions beyond the EPZ if necessary.

7.0 Emergency Response

7.1 Activation of the RRF Emergency Organization

The Emergency Coordinator shall be responsible for initiating the emergency procedures and for notifying and mobilizing the emergency organization. During periods of time when RRF is unattended and an emergency is detected by Reed Safety and Security, appropriate RRF staff will be contacted as per the Emergency Notification Call List (ENCL) by the Reed Operator. There is an operator on duty 24 hours per day insuring that in the event of an emergency RRF personnel on the ENCL will be notified. Additionally, the Offsite Support Organizations are available 24 hours per day. Communication during emergency situations may be by telephone, word of mouth, short wave radio, intercom, or public address system, as appropriate.

7.2 Protective Action Values

Every attempt shall be made to maintain radiation exposures to emergency personnel within the limits of 10CFR20 and/or the Protective Action Guides (PAG's) of 1 Rem whole body or 5 Rem Thyroid. However, an Emergency Coordinator who is also a member of the ENCL with the concurrence of the Reactor Health Physicist, or a qualified alternate Health Physicist such as a State of Oregon Emergency Response Team Member, may authorize exposures in excess of these values to facilitate rescue of injured personnel or take corrective actions which will mitigate the consequences of the emergency event. The exposure limit for life-saving shall be 75 Rem and for corrective actions 25 Rem. In either case, these exposures shall be on a voluntary basis and restricted to a once-in-a-lifetime exposure.

7.3 Health Physics Emergency Response Program

The Reactor Health Physicist shall be responsible for determining radiation dose rates and contamination levels both onsite and offsite. The Reactor Health Physicist may request assistance from RRF personnel, State of Oregon Emergency Response Personnel, and other Offsite Support Organizations as necessary to carry out radiological assessment of the accident. This information will be relayed by face-to-face communication, telephone communication, intercom, or short wave radio to the individual responsible for accident assessment. In addition, these individuals shall provide for isolation and supervise access control to restricted areas to minimize personnel exposures and the spread of radioactive contamination.

7.4 Reporting of Emergencies

Copies of the ENCL are posted in the facility, the Emergency Support Center (ESC), and the Chemistry Secretary's Office. Telephone numbers are listed for RRF personnel. Copies of this plan with notification procedures for all offsite support agencies are located in the control room, emergency grab bag, ESC, and Chemistry Secretary's Office. Initial and follow-up emergency messages to the ODOE and the NRC and, if applicable, to other offsite government agencies should, to the extent known, include the following:

1. Name, title, and telephone number of caller, and the location of the incident.

2. Description of the emergency event and emergency class.

3. Date and time of incident initiation.

4. Type of expected or actual release (airborne, waterborne, surface spill) with estimated duration times.

5. The quantity of radionuclides released or expected to be released.

6. Projected or actual dose rates outside of the operations boundary.

7.5 Emergency Response for Non-Reactor Safety Related Events

7.5.1 Activation of the Emergency Organization for Non-Reactor Safety Related Events

The complete activation of the emergency organization for this Emergency Class would not normally be required. The Emergency Coordinator shall activate that portion of the Emergency Organization necessary to respond to the emergency event. In any case, RRF Management shall be notified and kept informed of the emergency status.

7.5.2 Assessment Actions for Non-Reactor Safety Related Events

Civil disturbances or bomb threats shall be assessed to the Emergency Coordinator for validity and specificity using Portland Police Bureau experience, Reed Safety and Security experience, and the information source.

For personnel injury the Emergency Coordinator shall assess the extent of the injury and with Health Physics assistance shall determine if radioactive contamination is present. Portable and fixed radiation monitoring devices are available for this assessment. In the absence of contamination, the assessment shall consider the nature of the injury, the appropriate first aid, and the need for ambulance transport.

The Emergency Coordinator shall insure the suitable monitoring of potentially contaminated individuals or facilities. The Health Physicist shall be notified in all cases of major personnel contamination (a positive survey after washing shall constitute major personnel contamination), and in the case of any contamination incident rendering any part of the facility a restricted area until decontaminated.

7.5.3 Corrective Actions for Non-Reactor Safety Related Events

In the event of a civil disturbance or receipt of a bomb threat non-specific to RRF, the Portland Police and Reed Safety and Security shall be notified. The Portland Police will initiate the appropriate controls to insure the protection of personnel and property in accordance with their Emergency Plan. In addition the Emergency Coordinator shall notify a member of RRF Management and keep him informed of the emergency status.

For cases of personnel injury with or without radiological complications, the Emergency Coordinator shall be responsible for notifying RRF Management and a member of the ENCL. In addition, the Emergency Coordinator shall provide medical assistance including a request for ambulance transport. If the injured individual is contaminated, decontamination will be attempted only if it is judged that this will not further aggravate the injuries. The contaminated injured individual shall be

transported using contamination control and reverse isolation methods to the extent possible.

7.5.4 Protective Actions for Non-Reactor Safety Related Ev

Protective actions at this level of emergency are generally distinguishable from corrective actions. Some cases may necessitate the evacuation of the containment area (reactor bay) in which case personnel shall assemble in the designated assembly area and be verified by roll call. Evacuation shall be initiated by sounding the evacuation alarm, and notifying all personnel by way of public address system and word of mouth. Should personnel evacuation be necessary, the Emergency Coordinator shall control access to the Facility, and will be responsible with Health Physics support for the segregation of potentially contaminated personnel.

7.6 Emergency Response for Notification of Unusual Events

7.6.1 Activation of the Emergency Organization for Notification of Unusual Events

The Emergency Coordinator shall activate that portion of the emergency organization necessary to respond to the emergency situation. In addition, RRF management shall be notified and kept informed of the emergency status.

7.6.2 Assessment Actions for Notification of Unusual Events

Minor fuel damage, experiment failure, or any event manifested by unusual radiation or radioactivity levels within the containment building or the release of effluents at the site boundary shall be immediately assessed by the Emergency Coordinator with assistance from the Reactor Health Physicist. Additional support is available from the Offsite Support Organizations.

The assessment will consist of an observation and evaluation of facility air and/or radiation monitors in the control room and the use of portable survey instruments. Excessive levels may require evacuation of the RRF and future assessment will be made from the RRF. Hand and foot monitors and pocket dosimeters can also be used for accident assessment. Collected filter paper and swipe samples can be counted in a laboratory removed from the RRF. Levels observed on the stack air monitors are used to assess release levels at the site boundary. Civil disturbances and bomb threats shall be assessed by the Emergency Coordinator for validity and specificity using Portland Police Bureau and Reed Safety and Security experience and the information source.

Pool Level Alarms and visual observation indicating abnormal loss of water or abnormal increase in pool level shall immediately be assessed by the Emergency Coordinator and the source or sink of water identified.

Fire or explosion in the basement of the Chemistry Building or RRF shall immediately be assessed by the Emergency Coodinator and magnitude of the event shall be determined. Appropriate Offsite Support Organizations (Fire, Police, Rescue, Ambulance, Health Physics) shall be summoned. The Emergency Coordinator shall remain in the designated assembly area to brief Offsite Support Units upon arrival. Health Physics personnel will monitor as necessary to determine if radioactivity is present.

Because of the physical location of RRF in relation to the rest of the Chemistry Building, any major fire, explosion, or event requiring evacuation of any part of

the Chemistry Building may present a serious threat to the RRF (eg. vapor, water, fire, chemical, electrical). When RRF is notified of such an event, the senior person on duty shall become the Emergency Coordinator and immediately assess the magnitude of the event and the nature of the threat to RRF. The Emergency Coordinator shall initiate appropriate protective actions (eg. shutdown, evacuation, sandbagging) and shall brief responding units. The Emergency Coordinator shall activate that portion of the RRF Emergency Organization necessary to respond to and minimize potential or actual damage to the facility.

7.6.3 Corrective Actions for Notification of Unusual Events

In the event that a Notification of Unusual Event is dictated by assessment of radiological levels, the reactor facility may be evacuated pending an evaluation of the problem and identification of the probable source. The Emergency Coordinator shall confer with the Reactor Health Physicist and shall control access to the reactor facility until radiation and airborne activity levels have been restored to normal. All personnel will be verified present at the designated assembly area and unnecessary personnel will assemble in the training classroom to be available for assistance.

For bomb threats with possible radiological release implications, RRF Management, the Portland Police Bureau, and Reed Safety and Security shall be notified. The police will initiate appropriate procedures following their Emergency Plan to insure the protection of personnel and property. The reactor shall be shutdown and all personnel evacuated to the ESC.

In case of prolonged fire or explosion within the facility, the Portland Fire Bureau shall be summoned, the first available member of the ENCL and RRF Management shall be notified. The Reactor Health Physicist shall be notified of fire in areas where radioactive materials are located. In addition, the Emergency Coordinator shall shutdown the reactor and evacuate personnel from the RRF and the basement of the Chemistry Building. Teams will be dispatched to check for injured personnel. The Emergency Coordinator will monitor the extent of the fire and brief fire bureau personnel upon their arrival.

In case of Pool Level Alarm and visual indication of abnormal loss or gain of pool water, the Emergency Coordinator shall shutdown the reactor, secure the primary and secondary water systems, and isolate the pool through appropriate value changes. The Emergency Coordinator shall insure that a preliminary radiation survey is performed and appropriate personnel protective measures instituted (eg. evacuation, radiation area warning, protective clothing required, electrical hazard). The Reactor Health Physicist, the first available member of the ENCL, and RRF Management shall be notified.

7.6.4 Protective Actions for Notification of Unusual Events

For this emergency class the reactor facility may be evacuated and shall be done in accordance with facility Emergency Procedures. All personnel shall be verified present by roll call in the designated assembly area, and those individuals who exited the containment building will be surveyed for contamination using portable instruments from the Emergency Grab Bag or the ESC. Those who are contaminated shall be segregated. The Emergency Coordinator is responsible for controlling access to the containment building; such access shall be limited to rescue and emergency response operations.

Facility air and area radiation monitors shall be used to assess the radiological emergency. In addition to these, other sources of information are available from Offsite Support Organizations. The Emergency Coordinator with support from Health Physics personnel is responsible for minimizing personnel exposure and spread of contamination. Emergency exposure levels for personnel shall be in accordance with Section 7.2.

7.7 Emergency Response for an Alert

7.7.1 Activation of the Emergency Organization for an Alert

The Emergency Coordinator shall activate that portion of the emergency organization necessary to respond to the emergency situation. In addition, RRF management and ODOE shall be notified and kept informed of the emergency status.

7.7.2 Assessment Action for an Alert

Any severe fuel damage, experiment failure, or event manifested by excessive radiation or radioactivity levels within the reactor facility or the release of effluents at the site boundary shall require immediate evacuation of personnel from the reactor facility and assessment action will be made from the ESC using portable radiation monitors available there. Assessment will be made by the Reactor Health Physicist with support from RRF personnel. Additional support is available as needed from Offsite Support Organizations. Further assessments can be made using portable survey meters, air samplers, and personnel dosimetry. Filter paper and swipe samples can be counted in a laboratory separate from the ESC. Release levels at the site boundary are levels observed on the stack air monitors.

7.7.3 Corrective Actions for an Alert

For an alert that has been dictated by assessment of radiological levels, the reactor facility shall be evacuated following Emergency Procedures pending an evaluation of the problem and identification of the probable source. The Emergency Coordinator shall control access to the containment building until radiation and airborne activity levels have been restored to normal. In addition, teams will be dispatched to seal doors to the facility which are non-essential to access for emergency control. The Emergency Coordinator shall notify the first available member of the ENCL, the Reactor Health Physicist. Additional assistance may be summoned from Offsite Support Organizations.

7.7.4 Protective Action for an Alert

Protective actions for alert emergencies will be in accordance with Section 7.6.4.

8.0 Emergency Facilities and Equipment

8.1 Emergency Support Center (ESC)

The RRF Director's Office (Room 2B Chemistry Building) shall be the Emergency Support Center for emergency actions. Because of its close proximity to the reactor building the ESC allows for timely evacuation of personnel and emergency action. Telephone and access to radio communications are available in the ESC.

8.2 Assessment Facilities

The RRF has area radiation monitors and facility air monitors with readouts and alarm indications in the reactor control room. In addition, RRF maintains counting laboratories and portable survey instruments in the reactor and laboratory buildings, and if necessary, additional counting equipment and survey instruments are available from the Reed Radiation Safety Officer (RSO) and Offsite Support Organizations. A hand and foot monitor is located at the principal exit from the radiochemistry lab. There is also available in the laboratory building a gamma ray spectrometer for radioisotope identification. In addition, the following alarms and indicators provide non-radiological information in the event of an emergency:

	Monitor	Alarm
1)	High-Low Water Alarm	Red light in evacuation corridor and on roof of Chemistry Building, and buzzer in Console Room
2)	Pool Temperature Alarm	Buzzer on console
3)	Isolation cycle indicator	Red lights in reactor and Console Roms. Both visible from evacuation corridor.
4)	Secondary Water Low Pressure Alarm	High Pitched Howler in Reactor Bay; audible outside RRF
5)	Fire Alarm Pull Station	Alarm bells throughout adjacent Chemistry Building
6)	Evacuation Alarm	Klaxon in Reactor Bay. Red light in radiochemistry lab.
7)	Primary Water Conductivity	None

8.3 First Aid and Medical Facilities

Onsite first aid and medical supplies are located in the emergency grab bag located in the evacuation corridor. Additional first aid supplies are available in the cabinets in the corridors of the Chemistry Building.

Accidents resulting in personal injury without contamination will be handled by administering first aid and summoning an ambulance with paramedics if needed. In the event of injury with contamination, the individual will be transported to Good Samaritan Hospital, Portland. Each ambulance is staffed with two emergency medical technicians and is capable of transporting contaminated victims. Good Samaritan Hospital has emergency procedures for this situation.

Written agreement letters with respect to arrangements made for hospital, medical, and other emergency services shall be filed and attached to this plan as Appendix A.

8.4 Decontamination Facilities

Decontamination of personnel at the RRF can normally be handled using sinks at the facility. The Reactor Health Physicist shall be responsible for decontamination of all individuals involved in any emergency.

8.5 Communications Systems

RRF telephones, and the facility intercom system located throughout the facility, may be utilized during emergency conditions. The intercom system links the reactor control room with the bridge and laboratory building. In addition, word of mouth communications will provide a backup for internal communications to campus, and emergency radiotelephone communications. Also there is a semi-annual update and verification of the emergency notification call list.

9.0 Recovery Operations

Restoring RRF to a safe operating condition after an emergency shall be the responsibility of the Emergency Coordinator. In the event that recovery procedures are necessary, they shall be written by the Emergency Coordinator and reviewed by the Reactor Safety Committee. Any operations necessary to restore RRF to operational status shall be under the direction of the Emergency Coordinator. The Reactor Health Physicist shall survey, direct decontamination operations, and ascertain that contamination and radiation levels within the affected area are within appropriate limits. RRF management with the advice of the Reactor Safety Committee shall assess resultant damages, direct repairs, review the emergency, and authorize continued operation of the reactor.

10.0 Maintaining Emergency Preparedness

10.1 Training

The RRF personnel with emergency response responsibilities shall complete an initial training program and an annual retraining program to include classroom training and practical drills. The training is designed to demonstrate an individual's ability to perform assigned functions such as accident assessment, decision-making, radiological monitoring, contamination control and first aid and rescue of personnel.

In addition, Reed Safety and Security, Portland Police Bureau, Portland Fire Bureau, and Good Samaritan Hospital emergency room personnel are trained on an annual basis in radiation safety and RRF emergency procedures.

10.2 Conduct of Drills and Exercises

Onsite emergency drills shall be conducted annually to test the adequacy of emergency procedures and to ensure that emergency organization personnel are familiar with their duties. These drills shall be executed as realistically as possible and shall include the use of appropriate emergency equipment. At least every two years the communication links and notification procedures with offsite agencies and support organizations shall be tested.

Accident scenarios shall be developed for conducting drills to include:

1. Medical emergency drills involving a simulated contaminated individual.

2. Radiological monitoring including contamination control methods, dose rate measurements, non-essential personnel evacuation, and record keeping.

3. Communication drills designed to ensure reliability of the system(s) and correct transmission and receipt of messages.

10.3 Critiques of Drills and Exercises

At the conclusion of each drill a critique to identify deficiencies shall be held by the participaing RRF staff and all drill observers and may include members of other support and emergency groups. Observer and participants comments concerning areas needing improvement shall be evaluated and consideration may be given to possible changes in the plan and procedures. Results shall be evaluated by the Reactor Safety Committee (RSC).

10.4 Emergency Plan Review and Update

The Emergency Plan shall be revised and updated as required based on drill results or changes in the facility and shall be reviewed annually by the RSC to ensure the plan is adequate and up to date. Applicable portions of the plan, agreements, and implementing procedures shall be distributed to authorized agencies and support organizations, and any revisions to implementing procedures affected by the plan shall be approved by the RSC and sent to authorized recipients within 30 days after the revised plans have been issued.

10.5 Emergency Equipment Maintenance Surveillance

Surveillance of emergency supplies insures availability and proper condition for immediate use. The RRF operations staff is responsible for surveillance of emergency supplies. Emergency supplies at the RRF are verified to be operational and complete on a semi-annual basis, and fire extinguishers located throughout the facility are checked approximately semi-annually by Campus Physical Plant personnel. The pool level alarm system is verified operational on a bimonthly basis and is maintained by the RRF and Reed Physical Plant. Telephone and radio communication maintenance is provided by the utility company or the manufacturer of the equipment.

10.5.1 Inventory of Emergency Supplies and Equipment

The emergency kit is located in the evacuation corridor from the RRF facility. The kit is inventoried on a semi-annual basis or after each use and contains such items as portable survey instruments, protective clothing, flashlights, survey maps, swipes and barrier ropes and signs.

Firefighting facilities at the RRF include CO_2 fire extinguishers distributed throughout the site. The condition of these extinguishers is checked and certified by the Reed Physical Plant or Contracted Service annually. Additional emergency equipment is available from the Reactor Storeroom, ESC, and Offsite Support Organizations.

10.5.2 Radiation Monitoring Equipment Checks and Calibration

Portable health physics instruments, including dosimeters dedicated for emergency use shall be inspected and checked for operability and calibrated semi-annually. The RRF Operations staff conducts routine checks and calibrations of facility air and area radiation monitors.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CALIFORNIA 94596

JUN 30 1986

Docket No. 50-288

Reed College
Portland, Oregon 97202

Attention: Dr. Paul Bragdon, President

Gentlemen:

SUBJECT: EXAMINATION REPORT

On May 20, 21 and 22, 1986, the NRC administered examinations to members of your college who had applied for licenses to operate your TRIGA Test Reactor. At the conclusion of the examination, the examination questions and preliminary findings were discussed with those members of your staff identified in the enclosed report.

In accordance with 10 CFR 2.790 of the Commissions regulations, a copy of this letter and enclosures (1) and (2) will be placed in the NRC Public Document Room.

Should you have any questions concerning this examination, please contact us.

Sincerely,

Robert J. Pate

Robert J. Pate, Chief
Reactor Safety Branch

Enclosures:
1. Examination Report No. 50-288/OL-86-01
2. Examinations and Answer Key (RO)

cc w/enclosures (1) and (2):
Dr. M. Kay, Director, Reed Reactor Facility
RSB/Document Control Desk (RIDS)

cc w/enclosure (1):
P. Morrill, RV
C. Thomas, S&SP Branch, NRR HQ
W. Apley, PNL
L. Miller, OLB HQ
M. Cillis, RV
R. Muscat, RV (2 copies)

8607160044
1P

A/12

6

U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-288/OL-86-01 License No. R-112

Docket No. 50-288

Licensee: Reed College
Portland, Oregon 97202

Facility Name: Reed Reactor Facility

Examination Administered At: Reed College, Portland, Oregon

Examinations Conducted: May 20-22, 1986

Chief Examiner: Walter J. Apley 6/5/86
Date

Approved By: J. O. Elin, Chief
Operations Section 6/26/86
Date

Examination Summary

Examination administered on May 20-22, 1986. Written examinations were administered to six reactor operator candidates on May 20, 1986. Oral examinations were administered to four reactor operator candidates on May 21, 1986, and two reactor operator candidates on May 22, 1986.

Results: One reactor operator candidate failed the written examination and one reactor operator failed the oral examination.

8607160043 9pp

Report Details

1. Examiners

W. J. Apley, PNL (Chief Examiner)
L. J. Defferding, PNL
R. Maines, NRC (to certify LJ Defferding on 5/21/86)

2. Examination Review Meeting

At the conclusion of the written examination, the examiners met with Michael Kay and Alana Boland to review the examination and answer key. No questions were deleted. Some minor word changes were made in the answer key to clarify the expected responses. The facility reviewers were requested to provide comments with references to the NRC Regional Office within five days. Several major changes to the key were made due to out-of-date facility information. The summary of facility comments and their resolution is attached to this report.

3. Exit Meeting

An exit meeting was held on May 22, 1986 following the last oral examination (M. Kay and W. Apley). No generic weaknesses were identified; the only item discussed was the need for Reed College to update training and SAR material prior to the next exam. Also the facility was again told that they had 5 days to get their comments in to the regional office regarding the RO written exam.

Resolution of Facility Comments
Reactor Operator Examination

QUESTION A.04

"Rotation" must mean to a different core grid plate location; not rotation about the vertical axis of the individual fuel element.

Resolution:

The examiner sees No reason to change the key.

QUESTION A.06

0.4% Δk/k (or $0.53). The % is missing in the key and $0.53 is the equivalent worth in those units.

Resolution:

Answer key modified.

QUESTION A.08b

"to correct for the prompt negative temperature coefficient" is an equivalent answer.

Resolution:

Answer key modified.

QUESTION B.02

In the TRIGA MARK I REACTOR MECHANICAL MAINTENANCE AND OPERATING MANUAL (for Reed College, Portland, Oregon) GA-8605, Section 3.6 describes the "Control Rod Guide Tubes" to be installed in the proper locations in the grid plate where the control rods will be located. Another correct response is that the holes in the bottom grid plate are too small for a control rod to fall through the core. The main purpose of the control rod guide tubes is to keep the path vertical at all times.

Resolution:

Answer key modified to give full credit for "guide tubes" and "small holes."

QUESTION B.04

The question is not correctly stated for RRF, and the answer given is not consistent with the question asked. The Reactor Bay is the entire confinement area. The three answers given are correct for the Reactor Bay being the confinement area.

Resolution:

The examiner sees no need to change the key; the question is clear as to what area is specified.

QUESTION B.05b

The question is not dependent on whether or not the reactor is operating. The answer to "How can a leak in the heat exchanger be detected?" is the same at all times for RRF. The pool level will increase eventually tripping the pool level alarm (buzzer in the control room, red light in the exit corridor, and red light on the roof of the Chemistry Building). Our Tech. Specs, Administrative Procedures, and Standard Operating Procedures all require that the pressure at the outlet of the secondary basket filter be greater than the inlet pressure to the primary filter; there is no radiation monitor on the secondary system; the pool is not radioactive to the extent a heat exchanger leak could be detected by any monitor on the secondary side; and the RRF SAR Section 5.2.6 makes no mention of radiation detectors in the water system.

Resolution:

Answer key modified to give full credit for pool level increasing.

QUESTION B.06

In training the phrases "breaks up the thermal column," or "disturbs the thermal column" are used to describe the action of the water directed across the core by the diffuser nozzle.

Resolution:

Answer key modified.

QUESTION B.09

Also, the pool outlet pipe terminates 18 inches below the normal pool level to limit pumping and siphoning even if the hole is clogged and the primary pump continues to operate.

Resolution:

Answer key modified.

QUESTION C.02

There are 4 control rod drive indicator lights on the control console:

White	Magnet or Motor Down
Red	Magnet or Motor Up
Blue	Continuity (magnet in contact with armature or rod)
Yellow	Magnets Energized (magnet power on)

The illuminated switches are labeled:

Down
Up
Cont/On

The details of the system are given in the TRIGA MARK I REACTOR INSTRUMENTATION MAINTENANCE MANUAL for Reed College, Portland, Oregon, GA-8533, Section 1.2.1 Control-Rod Drive Switches and Circuits.

Resolution:

Answer key modified.

QUESTION C.10

Training and the startup procedure (SOP 01) indicate "two squares" of the console chart which is 5 minutes to reach equilibrium. The halflife of the longest group of delayed neutrons is 55 seconds. Equilibrium will be obtained by five minutes.

Resolution:

Answer key modified.

QUESTION D.02

RRF uses different names for the channels in training, daily usage, and in the SOP's. The channels and scrams are:

Linear Power Scram
% Power Scram
Period Scram
Manual Scram
(Loss of) High Voltage Scram
(Loss of) (110 VAC or Site or Facility) Power (Scram)

Resolution:

Answer key modified.

QUESTION D.03

RRF uses CIC's in an undercompensated circuit so that there is always a conservative indication and a reduced probability of being overcompensated.

Resolution:

The examiner sees no reason to change the key.

QUESTION D.04

The reference to SOP 01 is correct, however the paraphrasing is not accurate. The entire primary water purification system is downstream of the outlet of the primary side of the heat exchanger, and the temperature at all points is that indicated by the "pool inlet" (or "demin") position of the temperature switch on the console.

Resolution:

The examiner sees no reason to change the key.

QUESTION D.06

There are only 4 neutron count rate or power indicator channels:

count-rate channel	fission chamber
linear channel	cic
log channel	cic
% power channel	fission chamber

The % power ion chamber failed many years ago and was replaced with a fission chamber.

Resolution:

Answer key modified.

QUESTION E.05

Additional portable monitoring equipment is located in three places at RRF:

1. The West Wall Shelf of the control room is the primary source, if reachable during an emergency.

2. The Emergency Grab Bag contains portable monitoring equipment.

3. The ESC (Director's Office in the Chem Building) contains portable monitoring equipment.

The order given is the hierarchy of where to go for such equipment.

Resolution:

Answer key modified to given 1/2 credit for answers 1 and 2.

QUESTION E.07b

The evacuation alarm in the control room is located on the North wall just to the right of the right-hand panel of the reactor control console.

Resolution:

Answer key modified.

QUESTION F.02

The SOP set point for the period scram is greater than 3 seconds. The current set point is approximately 4.3 seconds as tested prior to each startup.

Resolution:

Answer key modified.

QUESTION F.05

1. "Two persons must be present within the Reactor Facility whenever the reactor is not shutdown...", which is taken to mean the controlled access area.

2. "A Senior Reactor Operator must be present in the Reactor Facility (or the adjoining Chemistry Building) and the operator must know the whereabouts of this individual prior to beginning operation."

Reed Reactor Facility Administrative Procedures Section 3.1.4

Resolution:

Answer key modified.

QUESTION F.07

This question is really a two-part question:

1. Who must give permission before the reactor can be restored (taken to mean restarted and taken to previous level to continue operations) after an inadvertent scram? An SRO (SOP 8.3 only refers to an inadvertent scram).

2. Who must give permission before the reactor can be restored after an unexplained scram? "In case of an 'unexplained' scram, the committee will review the case and determine whether the reactor will be restarted and the procedure for startup." RRF Administrative Procedures "Reactor Operations Committee" (item number 4) page 7, and SOP 8.4. "SRO" is not the correct response for an unexplained scram.

Resolution:

The examiner sees no reason to change the key.

QUESTION G.01a

The facility has two usual storage areas referred to as 1) the storage cave (located in the mechanical room), and 2) the lead cave (or lead cage as on the startup checklist) located in the Reactor Bay. For radioactive experiments there are two more acceptable areas, the storage racks in the pool, and the storage pits in the floor of the reactor bay. The Administrative Procedures also give the catchall "properly shielded area roped off and labeled."

Resolution:

Answer key modified.

QUESTION G.05c

The current setpoint of the GSM is 118 cpm from the latest calibration with Ar-41.

Resolution:

Answer key modified.

QUESTION G.08

During fuel inspection the limit is no higher than the entrance to the fuel inspection tool.

Resolution:

Answer key modified.

QUESTION G.09

An equivalent description is: Into the facility stack prior to the GSM sampling tube.

Resolution:

Answer key modified.