Rensselaer

Department of Nuclear Engineering & Engineering Physics

RPI QUALITY ASSURANCE PROGRAM

Submitted in Accordance with
10 CFR 71.12(B)

NRC LICENSE No. CX-22
Docket No. 50-225

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Critical Experiments Facility

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CONTENTS

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INTRODUCTION

In order to perform fissile assay experiments in the RPI Linear Accelerator (LINAC), as part of a research contract with the U.S. Department of Energy (DOE), RPI is now arranging to have some of the low enriched uranium (LEU) fuel used at the Reactor Critical Facility (License CX-22) transferred to the LINAC (License SNM-910).

The Quality Assurance (QA) Program submitted here is to assist in handling the shipment of SPERT (F-1) LEU fuel rods using DOT-6M 110 gallon drum containers provided by the DOE. The program under which these containers will be used is based on the following considerations:

(1) RPI possesses 592 LEU irradiated fuel rods with loadings of 35.2 gm of Uranium-235 per rod.

(2) RPI wishes to transfer sixty four (64) of these fuel rods to the LINAC.

(3) Each rod produces a radiation field of 3.0 to 4.5 millirem per hour at a distance of 1 cm., without intervening shielding.

(4) This program is limited to the objective (2), the quantity indicated in (2), with the characteristics indicated in (3).

(5) RPI does not design, fabricate, assemble, or test containers, and does not intend to procure any container for ownership or lease to others. This QA Program is limited to the use of containers provided by the DOE, to accomplish (2). RPI does not intend to rework, repair, maintain or modify the DOE containers.

(6) Transportation will be handled by an RPI vehicle (transport truck with escorts).

The QA Program is submitted pursuant to 10CFR Part 71, paragraphs 71.12 and subpart H. The Program outline follows Regulatory Guide 7.10 (June 1986) in those parts of Annex 2 that are applicable to use of type B( )F containers.

1. ORGANIZATION

The final responsibility for the Quality Assurance (QA) Program for 10CFR Part 71 requirements rests with Rensselaer Polytechnic Institute. Responsibility for the safe operation of the RPI Reactor Facility is vested within the chain of command shown in Figure 1. The QA Program will be performed within the operating organization.

The Facility Director is responsible for the overall administration of the program, training and certification, document control and auditing.

The Facility Supervisor is responsible for handling, storing, shipping, inspection, operating status and record keeping.

The Office of Radiation and Nuclear Safety (ORNS) will have primary responsibility for monitoring all packaging, and shipping activities with regard to radiation protection.

The Nuclear Safety Review Board (NSRB) is responsible for the audit control of the QA Program.

2. QUALITY ASSURANCE PROGRAM

The scope of the program includes handling, loading, and delivering to an RPI truck for transport; DOE owns the container to transfer the irradiated LEU fuel rods to the LINAC. The containers are DOT-6M 110 gallon drums, NRC approved B( )F containers. The quantity of material to be shipped is fixed (sixty four rods), and the active period of the program will span no more than a few months.

Quality control will be exercised primarily through the use of written procedures constructed from: (a) Federal regulatory requirements; (b) Instructions, procedures, and drawings; and (c) Applicable portions of the RPI Critical Facility Radiation Protection Procedures. Quality assurance will be effected by formatting these procedures as check-lists to be used by the individuals or their designates who are responsible for quality assurance.

3. DESIGN CONTROL

Design activities related to the shipping package are not to be performed by RPI. The proper design control has been performed by the DOE, owner of the shipping package.

4. PROCUREMENT CONTROL

Procurement activities related to the shipping package are not to be performed by RPI. The proper procurement document control is the responsibility of the DOE, owner of the shipping package.

5. INSTRUCTIONS, PROCEDURES, AND DRAWINGS

5.1 Preparation of packaging for use. The routine determinations of 10CFR 71.87, where applicable, will be subject to check-list assurance.

5.2 Repairs, rework, and maintenance. The activities repair, rework, or maintenance are not to be performed. Servicing, such as gasket replacement, shall be in accordance with package specifications.

5.3 Loading. Loading shall be conducted under a plan of sufficient specificity to identify and account for fuel rods and quantities conforming to shipping papers and inventory change reports. Surveys of radiation fields and surface contamination of the package shall be made and recorded.

5.4 Transport of package. Upon delivery of package to an RPI vehicle (transport truck with escorts) for transport, the condition of the package as evidenced by visual inspection will be noted, the seals and labels will be recorded with the package identification by model and license registration number. A check-list procedure will be used.

6. DOCUMENT CONTROL

Control shall be exercised over the following documents:

(1) Document check-list
(2) Operating procedures
(3) Inspection procedures
(4) Loading plans
(5) Documents relating to package certification, QC, and QA
(6) Radiation survey results
(7) Shipping papers

Procedures and check-lists, and changes thereto are to be approved by either the Reactor Supervisor or the Chairman of the NSRB, or their respective designates.

7. CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

No special purpose materials or equipment are to be purchased for this activity. Services such as container off-loading, on-loading, and carrier transport will be procured via normal RPI procedures.

8. IDENTIFICATION AND CONTROL OF MATERIALS, PARTS AND COMPONENTS

No materials, parts or components are to be identified or controlled for this activity, except those mentioned in Section 5.2.

9. SPECIAL PROCESSES

No special processes are to be undertaken under this program.

10. INSPECTION CONTROL

10.1 Receipt Inspection. Inadequately identified packaging, or packaging which deviates significantly from certifications, drawings, or specifications, will not be used unless or until corrected.

10.2 Maintenance. Maintenance other than prescribed servicing will not be performed by RPI.

10.3 Final Inspection. Check-lists will be established to ensure that:

(1) Packages are properly assembled.
(2) Moderators and/or neutron absorbers are present if required.
(3) Shipping papers are properly completed.
(4) Packages and transport vehicle are conspicuously and durably marked as required by DOT.
(5) Pre-loading and post-loading surveys have been completed.

Inspection is to be certified by the Reactor Supervisor or the Radiation Safety Officer or their designated alternate.

11. TEST CONTROL

11.1 Use of packages. Tests permitted, recommended, or specified by package licensee will be used to establish a QA check-list.

11.2 Radiation survey. Radiation survey results are to be compiled and records maintained by the RPI Radiation Safety Office.

12. CONTROL OF MEASURING AND TEST EQUIPMENT

As a user, RPI does not expect to use gauges, fixtures, reference standards, or other devices used to measure product (container) characteristics. Radiation survey equipment shall be maintained and calibrated in accordance with normal procedures of the RPI Radiation Safety Office.

13. HANDLING, STORAGE, AND SHIPPING

13.1 Handling and storage. Special handling and lifting equipment will be used in accordance with equipment specified or provided by the package licensee, and according to conditions identified in a certificate of compliance as well as instructions provided by the package licensee. See Sections 4, 5, and 6. Containers will be used promptly and returned to package licensee; they will not be placed in storage.

13.2 Preparation for release and shipment. Measures will be instituted to ensure that:

(1) Cavities are dry.
(2) Specified operations, inspections, and tests are to be verified by check-list.
(3) The Reactor Supervisor is responsible for the observation of NRC and DOT requirements, and for the preparation of the shipping papers.
(4) Quality assurance will be performed with check-lists.

14. INSPECTION, TEST, AND OPERATING STATUS

Status is to be tracked by a master check-list that acknowledges check-off of individual check-list completion.

15. CONTROL OF NONCONFORMING MATERIALS, PARTS OR COMPONENTS

No applicable. Rework, repair, maintenance, or modification are not to be undertaken by RPI.

16. CORRECTIVE ACTIONS

16.1 Reporting. It is the responsibility of the RPI QC/QA to report conditions detrimental to quality to the package licensee.

16.2 Closeout. RPI as a user will deem closeout completed upon (a) correction or the condition by the package licensee, or (b) package licensee's withdrawal of the container from service.

17. QUALITY ASSURANCE RECORDS

Records, showing evidence of delivery of package to an RPI vehicle (transport truck with escorts) under NRC and DOT requirements shall be retained for a minimum of one year, except for SNM transfer and inventory records retained for the duration of the NRC licensing authority over the RPI Critical Experiments Facility. Records are to be retained by the RPI Radiation Safety Office,

which is also responsible for maintaining all RPI records related to personnel exposures, radioactive material releases and shipment, and radiation protection matters related to the RPI Critical Facility.

18. AUDITS

The activity covered by this QA Program is a short-term effort. The Nuclear Safety Review Board (NSRB) will perform an audit at the end of the fuel transfer effort, to determine the adequacy of the records generated under this program.

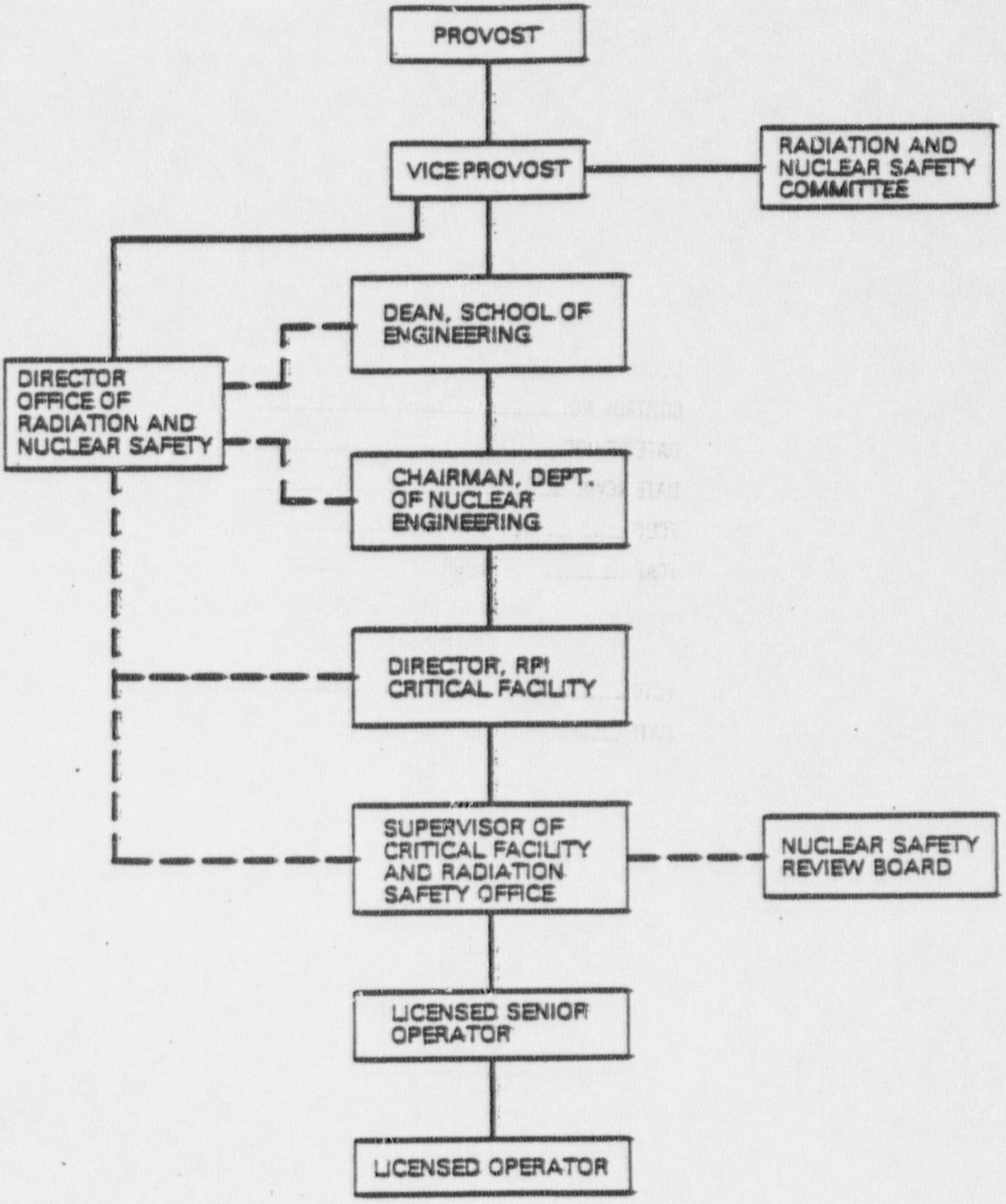

Figure 1 Rensselaer Polytechnic Institute critical facility organization

DOCKET NO. 71-0396
CONTROL NO. 25572
DATE OF DOC. May 23, 1989
DATE RCVD. May 31, 1989
FCUF _____ PDR ✓
FCAF _____ LPDR _____
I&E REF. ✓
SAFEGUARDS _____
FCTC ✓ OTHER _____
DATE 5/31/89 INITIAL JHC