



RADIATION PROTECTION COMMITTEE

CAMBRIDGE, MASSACHUSETTS 02139

MINUTES OF THE 111TH MEETING OF THE RADIATION  
PROTECTION COMMITTEE ON JANUARY 26, 1994

MEMBERS PRESENT: Hemond, Davison, Galanek, Billings, Massé,  
Powell.

MEMBERS ABSENT: Lodish, Haldeman, Housman, Pratt, Dedon, King,  
Lipman, Fiore, Yanch, Young.

EX OFFICIO MEMBERS PRESENT: Haes, Reilly, Fuller, Lavalley,  
Irwin.

Note: Due to weather problems, several committee members were  
not able to attend. Chairman Hemond instructed Galanek  
to have the single agenda item IV be approved by several  
non attending committee members. Approved by Fiore,  
Lipman and Housman.

The meeting was called to order at 1:40 PM.

I. The minutes of the 110<sup>th</sup> meeting were approved as presented.

II. Ratification of Administratively Approved Authorizations:  
The following administratively approved authorizations were  
ratified as presented:

II. 1.	9-F-3	Amendment	II. 2.	8-AQ-1	Amendment
II. 3.	6-N-6	Amendment	II. 4.	7-AE-7	Amendment
II. 5.	13-A-1	New Auth.	II. 6.	8-AR-1	New Auth.
II. 7.	HST-B-4	Amendment	II. 8.	1-B-3	Amendment
II. 9.	8-G-23	Amendment	II. 10.	5-AL-1	Amendment
II. 11.	W-X-2	Amendment	II. 12.	5-AL-1	Amendment
II. 13.	R-F-1	New Auth.	II. 14.	2-C-1	New Auth.
II. 15.	T-I-1	New Auth.	II. 16.	W-AA-1	New Auth.

Note: RPO staff will include the Department or Center where the  
work with radioactive materials is being done on the RP-014  
and RP-018 forms submitted for RPC notification or approval.  
The project supervisor title section will include the  
faculty's departmental affiliation.

Example:

I. Identification of Authorization  
Assigned Authorization #: CCR-  
Department or Center: Center for Cancer Research  
Project Supervisor: Richard Hynes  
Title: Professor of Biology

III. Ratification of administratively-approved renewal of authorizations. The following were ratified as presented:

III. 1. 6-N-5	III. 2. CCR-M-5*
III. 3. 7-T-9	III. 4. 7-B-4
III. 5. T-G-2	III. 6. CCR-F-6
III. 7. HST-D-4	III. 8. 1-H-2
III. 9. LL-T-3	

\*III.2. CCR-M-5

The Committee voted to renew Professor Tonnegawa's authorization for a period of three months. Don Haes will report at next RPC meeting of progress in the Tonnegawa labs with respect to disposal of low level radioactive waste. (See attached letter to Professor Tonnegawa.)

IV. Review of application that exceed administrative-approval guidelines. The following applications that exceeded administrative approval guidelines were approved as presented:

IV. 1. 9-I-1

Approved as presented. Mitch Galanek will poll several absent RPC members to get their vote on this application. Contacted Neil Lipman, Peter Dedon, David Houseman, and Catherine Fiore. All approved.

V. SNM-986 License Activities

1. Don Haes reported to the RPC on SNM activities on campus and at Bate Linac and the Reactor. Reactor report reflects recent SNM inspection by NRC (Inspector Della Ratta: No findings and previous open items closed). See attached reports.
2. Frank Massé requested that Don Haes check into technician annual training at Linac and reactor. Campus retraining performed by Tom Fuller in December 1993.

## VI. Analytical X-ray Program

Tom Fuller reported that a new electron beam accelerator has been registered at the Plasma Fusion Center. This is a portable unit which will be shipped to Hanford Washington after the completion of experiments at the PFC.

## VII. Laser Safety Program

No report.

## VIII. New Business

1. <sup>99</sup>Tc Lab Decommissioning:  
Alan Davison reported that project had been completed. Professor Davison noted the large effort contributed by the Radiation Protection Office to enable the project to be completed successfully. Mitch Galanek reported that the final report from the project is due in a couple of weeks.
2. Low Level Waste Update:  
Frank Massé reported that the Southeast Compact to meet in February to vote on Massachusetts continued access the Barnwell, South Carolina site. The Massachusetts Low Level Waste Management Board will be voting to determine if they will proceed with a site selection process. A \$45 million dollar bond has been approved for this process. Licenses will eventually repay the bond.
3. Radioactive Materials Use in Human Subjects at MIT:  
Frank Massé reviewed for the RPC his involvement in the recent controversy over human use experiments performed during the 1940's and 1950's. Frank has testified before committees chaired by Senator Kennedy held at the Fernald School in Waltham and by Senator John Glen held in Washington, DC. The studies involving MIT researchers delivered small doses to the subjects and would be approved under today's standard for exposure to humans as experimental subjects. Other studies performed during the same time frame but not involving MIT researchers delivered much higher doses to the subjects.

4. Bates Linac Accelerator:  
Paul Powell reviewed for the committee the change in status of the relationship between the MIT Bates Linac and DOE. The lab for Nuclear Science has had a DOE contract since 1958. The next funding mechanism beginning in 1994 will be a cooperative agreement. Under this agreement, DOE will no longer have oversight for radiation protection. The oversight will transfer to the Massachusetts Department of Radiation Control (Robert Hallissey, Director). The Plasma Fusion Center remains under DOE contract, so radiation protection program must comply with DOE orders. Chairman Hemond requested the committee be given an overview document to explain the Bates Linac operations. In addition, a future RPC meeting may be scheduled for the Linac facility. Frank Massé will distribute a copy of the Bates annual report to the RPC members.

5. Items for the next meeting.  
a) RPO annual report to the NRC  
b) Lincoln Laboratory authorization procedures  
c) MIT ALARA program

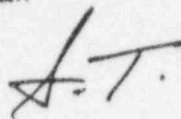
Meeting adjourned at 4:15 P.M.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CENTER FOR CANCER RESEARCH

77 MASSACHUSETTS AVENUE, CAMBRIDGE, MASSACHUSETTS 02139

TO: MIT Radiation Protection Committee  
Professor Harold Hemond, Chair

FROM: Professor Susumu Tonegawa 

SUBJECT: Renewal Authorization CCR-M-4

DATE: March 15, 1994

After receiving notification of the term-restricted renewal, I called a meeting of the entire lab to discuss the issue. I stressed the extreme importance of strict adherence to protocol for all radioactive procedures, especially those for low level waste disposal. Even though I was assured by all personnel that they had been practicing correct disposal procedures ever since their January retraining session, we all saw the need to set up a monitoring system. We have now designated a supervisor in each room of the lab to oversee regulatory compliance in all radioactive procedures. Everyone in my lab wants to employ all possible measures to fulfill our obligation for safe use of radioactive materials.



RADIATION PROTECTION COMMITTEE

To: Professor Susumu Tonnegawa

CAMBRIDGE, MASSACHUSETTS 02139

From: MIT Radiation Protection Committee  
Professor Harold Hemond, Chair

Subject: Renewal Authorization CCR-M-4

Date: March 6, 1994

At the 111<sup>th</sup> meeting of the MIT Committee on Radiation Protection (RPC), your renewal authorization, CCR-M-4, was submitted to the committee for approval. The Radiation Protection Office recommended the renewal be approved for the standard two year period. As is commonly the case, RPC members asked the RPO staff for a review of the project's operational and safety compliance during the previous two years. During the discussion of your authorized uses, the RPO reported a recurring problem with respect to your laboratories compliance with MIT procedures for the safe disposal of low level radioactive waste. These problems were reviewed with your entire group during the annual retraining meeting held on January 13, 1994, at which time your group agreed to do a better job of compliance in the future. Due to the recurring nature of these problems with respect to low level radioactive waste disposal, the committee voted to renew your authorization for a restricted period of three months and instructed the RPO to closely monitor your laboratories' compliance. RPO will report to the committee at the next quarterly meeting (expected schedule is late April).

Failure on the part of any research group to comply with the MIT required procedures for radiation protection could jeopardize the Institute's Nuclear Regulatory Commission licenses or expose the Institute to substantial fines. One of the RPC's responsibilities to the Institute is to ensure the safe use of radioactive material through compliance with applicable regulations and the programs established by the radiation protection office.

The RPC strongly encourages you to discuss this matter with your research group and resolve to work with radioactive materials in full compliance with the established MIT procedures.

We ask that you respond in writing to the MIT Radiation Protection Committee outlining the steps taken to ensure future compliance with the low level radioactive waste program. Please contact Mitchell Galanek at the Radiation Protection Office if you have any questions about the specifics of the MIT low level radioactive waste program.

Thank you in advance for your cooperation in this matter.

xc: RPC files

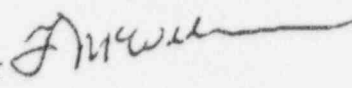


## MASSACHUSETTS INSTITUTE OF TECHNOLOGY

## ENVIRONMENTAL MEDICAL SERVICE

Reactor Radiation Protection Office  
138 Albany Street (NW 12)  
Cambridge, MA 02139  
(617-253-4203)

To: Frank X. Masse  
E.M.S., Radiation Protection Officer

From: Frederick F. McWilliams  
Reactor Radiation Protection Officer 

Date: January 15, 1994

Subject: Inspection/Audit of Radiation Protection Activities during the Period of the Fourth Quarter of 1993

**A. Previous Audits**1. Summary

No findings

2. Status

N/A

**B. N.R.C. Inspections**

Inspection 50-20/93-03 and 70-938/93-01 were conducted during the reporting period. These inspections involved physical security and nuclear material control and accountability. No findings and a previous open item is now closed.

**C. Review of SNM-986 License Activities**1. Authorizations and Status

- a. SNM-001. Neutron diffraction spectrometers containing 122.4 lbs as depleted uranium for shielding. S-2 Spectrometer is the only system containing material in present use. All others have been removed and are in storage.

S-2 spectrometer is located at port 4DH3 and contains 8.6 lbs of depleted Uranium. This spectrometer was modified for use as a prompt gamma facility. This facility had considerable use for prompt gamma analysis

during the reporting period. All use governed under I format.

- b. SNM-002. BTF Bundle (6 CH 1). System contains 30 rods of 1.99 w/o  $\text{UO}_2$ . The 6CH1 facility is used periodically during the reporting period as a standard fast flux irradiation facility. No modifications or changes to the facility transpired.
- c. SNM-003. 5  $1\text{Ci } ^{239}\text{PuBe}$  neutron sources. All sources are in storage and secured.
- d. SNM-004. Neutron detectors. Neutron detectors are either in storage (not in use) or used as part of reactor instrumentation and are inventoried per reactor operations procedures. The remaining detectors are accounted for under the Reactor Operations Accountability Program.

An experiment was conducted during the reporting period using 9 fission chambers containing nominally 1  $\mu\text{g}$  each. This experiment was to measure the radial and axial flux distribution in core as a function of blade height. This experiment was conducted under an approved part II with written protocol and with operations and RRPO present continuously. These fission chambers became very radioactive as a result of the irradiation and were stored in a shield cask for decay. These fission chambers have subsequently been removed to the reactor top area until the experiment can be completed.

- e. SNM-005. BTF vault. This authorization is for storage of SNM material not in use and maintained under control within the BTF vault. Status covered under Reactor Operations Accountability Program.
- f. SNM-006. Depleted uranium shipping containers. Accounted for as being on-site during audit.
- g. SNM-007. Pu alpha calibration standards. Under direct control of RRPO. Used for calibration of alpha particle detecting instruments. Properly stored and accounted. Leak test surveillance acceptable.
- h. SNM-008. Blanket Test Facility (BTF). New experiment is being developed for Sandia National Laboratories and review has been conducted under a separate safety review for the reactor pursuant to 10CFR50.59. This experiment does not affect SNM material as material is placed within BTF for fission conversion and is within the scope of previously defined activities. Located within reactor building under secured access.
- i. SNM-009. Graphite sub-critical piles. Used for teaching purposes. No use of facility was reported during this reporting period.



**D. Criticality Safety**

Audits of criticality safety are conducted quarterly by the criticality officer in accordance with the Reactor Procedure Manual. These audits are presented to the Reactor Safeguards Committee.

**E. Records Review**

1. All routine surveillance was conducted in the time frame established and no discrepancies were identified.
2. Calibrations were conducted accordingly. No discrepancies were identified.
3. Representative shipping records were reviewed and records are in accordance with D.O.T. regulations.
4. Personnel dosimetry records were reviewed and all exposures are within the specified limits of 10 CFR 20.
5. Source inventory and leak tests conducted during reporting period were performed as scheduled and no discrepancies were identified.

**F. Inventory and Disposition of SNM material**

1. None.

FFMcW/ka

File: RRPO-M-940115



## **RADIATION PROTECTION OFFICE**

To: Francis X. Massé, Radiation Protection Officer  
✓ From: Donald Haes, Assistant Radiation Protection Officer  
Subject: SNM Under Campus Control

● All Special Nuclear Material and Accountable Material under control of the Campus Radiation Protection Program is in dead storage in 6-017 with the following exceptions:

- Ten (10) Eberline  $^{239}\text{Pu}$  alpha sources ranging from  $9.90 \times 10^2$  -  $3.78 \times 10^6$  dpm are in occasional use and stored under lock and key in 20C-205 (counting room). These sources are included in the RPO periodic wipe-test and inventory schedule. Records of inventory control and wipe-test results are kept in accordance with current NRC license requirements. Eberline  $^{239}\text{Pu}$  alpha source #830 (42609 dpm) is on loan to the Bates LINAC RPO.
- The Plasma Fusion Center has RPO authorization (PFC-C-1) to use a 1 Curie  $^{239}\text{Pu}$ -Be neutron source under control of the Reactor RPO. Specific conditions of approval of the authorization require the source to be returned to RRPO after each day of use, and when no longer of use to the project.
- The Plasma Fusion Center has now received twelve fission chambers containing  $^{235}\text{U}$  enriched to  $\leq 93\%$ . The fission chambers in possession are as follows: 4 mg ( $\approx 9$  nCi) each in 2 detectors from TGM; 1.68 gm ( $\approx 3.6$   $\mu\text{Ci}$ ) each in 2 detectors from Imaging and Sensing Technology Corp.; 95 mg ( $\approx 0.20$   $\mu\text{Ci}$ ) and 104 mg ( $\approx 0.22$   $\mu\text{Ci}$ ) contained in 2 detectors from LND; 1.28 gm ( $\approx 2.62$   $\mu\text{Ci}$ ) each in 2 detectors and 1.74 gm ( $\approx 3.57$   $\mu\text{Ci}$ ) each in 4 detectors from University of California - LL National Labs. As of this date, all fission chambers are or will soon be located in the Alcator C-Mod cell (NW21-199).
- The above information be will reported at the 111<sup>th</sup> meeting of the MIT RPC.

cc. M. Galanek

Environmental  
Medical  
Service

## MASSACHUSETTS INSTITUTE OF TECHNOLOGY

MEDICAL DEPARTMENT

Bates Radiation Protection Office

Bates Linear Accelerator  
PO Box 95, 21 Manning Road  
Middleton MA 01949



FAX (617) 245-0901

(617) 245-6600

TO: Frank Massé  
FROM: Gerry Fallon  
DATE: December 30, 1993  
SUBJECT: Audit of SNM Activities at Bates

The following is a summary of the audit of activities involving SNM materials at the Bates Linac for the fourth quarter of 1993.

#### PuBe Sources

Two PuBe sources (940 mCi SN M1123, 181 mCi SN M1124) possessed under SNM license number 986 are stored at the Bates Linac under the control of the RPO group.

During the past quarter use of these sources was limited to routine calibration of survey instruments and personnel dosimeters. As required by authorization, all such procedures were conducted by RPO personnel in properly posted and secured areas. At the completion of each procedure, sources were returned to their storage containers and secured by RPO personnel.

When not in use, the 940 mCi PuBe source is secured with a combination padlock in a shielded container located in warehouse #1. The 181 mCi source is shielded and secured in a key-locked storage cabinet located in the Reardon tunnel. The padlock code and cabinet keys are under the control of the RPO group.

Posting of both storage areas was in compliance with 10 CFR 20 requirements at the time of this audit.

Each PuBe source is inventoried and wipe tested at six month intervals. The most recent wipe test conducted on December, 1993, indicates no removable activity from either source.

#### $^3\text{H}$ Target

Two solid  $^3\text{H}$  targets (total activity 51.6 Ci) controlled under SNM license number 986 are stored at the Bates Linac under the control of the RPO group.

Audit of SNM Activities at Bates  
December 30, 1993  
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The targets are designed for use in the electron scattering program, however,  $^3\text{H}$  experiments are not authorized at the present time. As such, these targets remained in storage during the past quarter under the control of the RPO group.

The targets are stored in a properly posted cabinet in the target preparation area secured with locks controlled by the RPO group.

#### $^{238}\text{U}$ Targets

Two  $^{238}\text{U}$  targets (1.08 grams depleted uranium total) controlled under SNM license number 986 are stored at the Bates Linac.

The targets are designed for use in the electron scattering program, however,  $^{238}\text{U}$  experiments are not authorized at the present time. As such these targets remained in storage during this quarter under dual control of radiation protection and target assembly personnel.

To prevent deterioration the targets are maintained under an inert atmosphere within a sealed vessel located in the target assembly area. Target assembly personnel are responsible for maintaining proper storage conditions and notifying RPO if this environment cannot be maintained. RPO personnel must be present whenever the target vessel is opened.

At the time of this audit the targets were properly stored and the vessel was labelled as required by 10 CFR 20.

#### Depleted Uranium (0.800 kg)

Eight hundred grams of depleted uranium controlled under SNM license number 986 are stored at the Bates Linac under the control of the RPO group. This material is contained in a sealed vacuum vessel as part of an experimental gas transfer system in storage since 1980.

The vessel is secured in warehouse #2 in an area accessible only to RPO personnel. At the time of this audit, the vessel and area were posted as required by 10 CFR 20.

#### $^{239}\text{Pu}$ Brass Disc Check Source ( $4.12 \times 10^4$ dpm)

This check source (RPO identification number R #4) is contained in a wooden box and secured in the RPO source cabinet located in the Reardon tunnel.

This source is checked on the six month source inventory. The most recent inventory was completed December, 1993.