



RADIATION PROTECTION COMMITTEE

CAMBRIDGE, MASSACHUSETTS 02139

MINUTES OF THE 112TH MEETING OF THE RADIATION
PROTECTION COMMITTEE ON MAY 24, 1994

MEMBERS PRESENT: Hemond, Haldeman, Pratt, King, Lipman, Fiore,
Massé, Powell.

MEMBERS ABSENT: Davison, Lodish, Galanek, Housman, Dedon,
Billings, Yanch, Young.

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

The meeting was called to order at 1:34 PM.

I. The minutes of the 111th meeting were reviewed. It was noticed that three members (Fiore, Lipman, Housman) were listed in the note on page one, with four members (those plus Dedon) on Page two. A motion passed to accept minutes as presented with the correct number of members listed (i.e. remove Dedon).

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

II. 1. 1-F-9	Amendment	II. 2. 7-BK-2	Amendment
II. 3. 12-N-1	Amendment	II. 4. CCR-B-8	Amendment
II. 5. PFC-I-1	New Auth.	II. 6. 7-BO-1	New Auth.
II. 7. WGC-A-1	Amendment	II. 8. 8-AS-1	New Auth.
II. 9. 22-AF-E	New Auth.	II. 10. W-B-3	Amendment
II. 11. CCR-Y-1	New Auth.	II. 12. 7-BK-2	Amendment
II. 13. 6-N-6	Amendment	II. 14. HST-M-1	New Auth.

II. 9 Item #6, change to "No unusual", not "No usual".
Change Physical/Chemical form to " HO_2O_3 " from " HO_2O_3 ".

II. 14 Item #2, indicate this is not done on human skin.

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

III. 1. 5-AN-1	III. 2. PFC-B-5
III. 3. PFC-H-2	III. 4. W-H-4
III. 5. 5-AH-3	III. 6. CCR-F-6
III. 7. NML-A-15	III. 8. 1-H-2
III. 9. W-I-5	III. 10. CCR-C-6
III. 11. 7-AJ-8	III. 12. 10-L-2
III. 13. LNS-L-7	III. 14. CCR-U-2
III. 15. 10-K-3	III. 16. LNS-V-3
III. 17. NRL-B-3	III. 18. NRL-E-2
III. 19. 7-AK-9	

III. 2 Agenda should reflect "PCB-B-5".

III. 3 Change possession limit requested from "5E3 mCi" to "5000 mCi" or "5 Ci".

Item #6, delete necessity of wipe test by RPO.
Reword with #2.

Item #9, Reword reference to Neutron Dosimeters
"see(ing) areas".

Item #11 Remove training reference.

III. 4 Agenda should reflect "W-H-4".

III. 7 Physical/Chemical form, replace "Gama" with
"Gamma", replace "²⁴¹H" with "²⁴¹Am".

Item #7, remove training reference.

Item #8, replace "usual" with "unusual".

III. 16 Correct title section for Richard Lanza (not a
Professor). The Physical/Chemical form for Tc-99m
is a "liquid", not a "liquid sealed source".

Item #5, protocols were requested for sources
entering and leaving MIT. Note: a motion was
approved to extend this authorization for a period
of 3 months, upon which time it will be re-written
and submitted for review.

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
IV. 3. 7-AO-8

IV. 2. CCR-Y-1

The faculty appointment status of the PI, M. Gefter. The committee conditionally approved the authorization subject to verification of active status or a faculty member is appointed as PI instead.

V. SNM-986 License Activities

1. Don Haes reported to the RPC on SNM activities on Campus and at Bate Linac and the Reactor (see attached). Verification of annual training was indicated by Bates Linac and the Reactor.
2. Frank Massé reported the renewal of the SNM license with the following changes: Aggressively pursue ways dispose of surplus SNM, and to renew the R37 license to include all large sources. Small portable SNM sources will be included under the 986 license.

VI. Analytical X-ray Program: Tom Fuller

The committee voted to approve all applications as presented.

VII. Laser Safety Program

1. Bill Irwin discussed a potential exposure incident involving a He-Cd laser.
2. Don Haes discussed the use of a laser in an airplane at Lincoln Laboratory to study algal growth in the Massachussets Bay. The laser system was filed with Commonwealth of Mass Department of Labor & Industries Division of Occupational Hygiene.
3. Bill Irwin discussed the possibility of improving the way RPO is notified of new laser systems. Frank Massé asked Don Haes to investigate making EMS brochures available to all new MIT students and faculty. He also suggested RPO place another article on the back page of the Tech Talk.

recorded by RPO directly on the current authorizations. Copies of these changes will be sent to the project supervisor after verification of completeness and accuracy.

10. There was no lapse in RPO laboratory surveillance. Weekly and monthly routine surveys in Building 68 have commenced within days of a laboratory's move.
11. Vacated Building 16 laboratories will be "decommissioned" by RPO first because several Building 56 laboratories will move into Building 16 while Building 56 is being renovated.
12. One incident occurred in the Rosenberg laboratory. A spill of ^{35}S took place when a researcher was attempting to clear items from his work bench prior to RPO surveys and chemical packing and moving. While no skin contamination was detected, two pairs of shoes were found to be contaminated (both belonging to the researcher). The researcher was supervised in decontamination efforts by RPO. Afterward all laboratory surfaces were found to be at or very near background radiation levels with no loose surface contamination detected.

VIII. New Business

1. Low Level Waste Update by Frank Massé.
2. Bill Irwin discussed progress of the biology department move to building 68. (See attached.)
3. Don Haes discussed the progress of the Tonegawa lab in handling radioactive waste. The lab has made improvements in some, but not all areas. The motion was passed to extend the authorization another 3 months pending further review.
4. Corporate Agreement: Frank Massé presented the Corporate Agreement to the committee (see 2 attachments).
5. Paul Powell discussed DOE contracts with studies with radioactive materials involving humans. He suggested going through records back 40 years to research any human studies involving humans.



RADIATION PROTECTION OFFICE

To: Francis X. Massé, Radiation Protection Officer
From: Donald Haes, Assistant Radiation Protection Officer
Subject: SNM Under Campus Control
Date: May 24, 1994

A handwritten signature in dark ink, appearing to be "D. Haes", written over the "From:" line of the letterhead.

• 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}Pu alpha sources ranging from 9.90×10^2 - 3.78×10^6 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}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}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}U enriched to $\leq 93\%$. The fission chambers in possession are as follows: 4 mg (≈ 9 nCi) each in 2 detectors from TGM; 1.68 gm (≈ 3.6 μCi) each in 2 detectors from Imaging and Sensing Technology Corp.; 95 mg (≈ 0.20 μCi) and 104 mg (≈ 0.22 μCi) contained in 2 detectors from LND; 1.28 gm (≈ 2.62 μCi) each in 2 detectors and 1.74 gm (≈ 3.57 μCi) 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 112th meeting of the MIT RPC.

cc. M. Galanek

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Environmental Medical Service
Reactor Radiation Protection Office

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

From: Frederick F. McWilliams
Reactor Radiation Protection Officer

Date: April 20, 1994

Subject: Inspection/Audit of Radiation Protection Activities during the Period of the First Quarter of 1994

A. Previous Audits

1. Summary

No findings

2. Status

N/A

B. N.R.C. Inspections

Inspection 50-20/94-02 and 70-938/93-02 were conducted during the reporting period. These inspections included the Special Nuclear Material License and the Radiation Protection Program for the reactor. No findings and all previous open items and Inspector Followup items were 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 part II format.

- b. SNM-002. BTF Bundle (6 CH 1). System contains 30 rods of 1.99 w/o

UO₂. The 6CH1 facility is used periodically during the reporting period as a standard fast flux irradiation facility. The experiment previously installed and operational for Sandia National Laboratories has been removed due to Lack of funding. This facility is secured and withdrawn from the neutron flux region of the BTF.

- c. SNM-003. 5 1Ci ²³⁹PuBe neutron sources. All sources are in storage and secured at the time of this report. These sources were used for criticality loading of a spent fuel cask for shipment during a recent shipment.
- 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.

The experiment previously reported in 4th Quarter report was repeated again. The following is excerpted from the 4th quarter report.

"An experiment was conducted during the reporting period using 9 fission chambers containing nominally 1 µg 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). The new experiment being developed for Sandia National Laboratories has been cancelled due to lack of funding.
- i. SNM-009. Graphite sub-critical piles. Used for teaching purposes. The course 22.59 used this facility during the reporting period. No material was affected during these instruction periods.

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY
MEDICAL DEPARTMENT
Bates Radiation Protection Office



Bates Linear Accelerator Center
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617-253-9217

FAX 617-253-9599

TO: Frank Massé
FROM: Gerry Fallon
DATE: March 18, 1994
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.

³H Target

Two solid ³H 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
March 18, 1994
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The targets are designed for use in the electron scattering program, however, ^3H 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}U Targets

Two ^{238}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}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}Pu Brass Disc Check Source (4.12×10^4 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.



RADIATION PROTECTION OFFICE

TO: Radiation Protection Committee
FROM: William Irwin, Assistant Radiation Protection Officer
RE: Biology Department Move to Building 68
DATE: May 21, 1994

With regards to radiation protection and administration of the Biology Department authorizations, the move into Building 68 has proceeded well. The following items are noted:

1. Beginning 1 May 1994, laboratories representing 28 authorizations were scheduled to move from Buildings 16, 56, 18, and E25.
2. As of 24 May 1994, 24 laboratories have been relocated.
3. Of those 24, nineteen have been reestablished in their new facilities and are ready to work with radioactive materials again.
4. The last four laboratories are scheduled to be relocated by 27 May 1994.
5. All 28 authorizations will be reestablished by 6 June 1994.
6. Professor Baltimore's facilities will be occupied starting around 8 June 1994. His authorization for possession and use of radioactive materials is being prepared at this date, and should be ready for administrative approval shortly thereafter.
7. Assistant Professor Burden's laboratory is leaving the Institute sometime around 26 May 1994.
8. Authorizations that were due to expire between February and May 1994 were not renewed. These authorizations will be renewed now that the laboratories have relocated. Seven authorizations fall into this category.
9. All other authorizations will be renewed according to their original expiration dates. Room changes and other repercussions of the move have been

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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April 2, 1993

Department of Energy
Chicago Operations Office
Argonne IL 60439

Attention: Paul Neeson

Dear Paul:

Enclosed is the annual summary for radiation exposures for calendar year 1992, contract numbers DE-AC02-76ER03069 and DE-AC02-78ET51013. The floppy disk format contains records for the MIT Bates Linear Accelerator Program and the MIT Plasma Fusion Laboratory.

Monitored workers at the Bates facility totaled 151 people, of which 110 had no exposure during the calendar year. The total man rem of monitored workers was 0.613 man rem.

Visitor information for the Bates facility is provided for all long term visitors whether the exposure is positive or minimal. Long term visitors monitored required 59 additional records in the computer database of which 57 people received no exposure. Total man-rem for this group was 0.011 man-rem. Short term visitors (including short-term contractors) monitored during calendar year 1992 totaled 1071 individuals. No short term visitors received recordable exposures.

Non-employee contractors monitored for the Bates facility on the regular database dosimetry system for calendar year 1992 amounted to 45 individuals of which 36 received no positive exposure. Long term contractor exposure for 9 individuals totaled 0.0574 rem. Short term contractors were included in the above mentioned 1071 total. No short term contractors received recordable exposure.

Monitored workers at the Fusion facility totaled 107 people of which 93 received no exposure. The remaining 14 individuals totaled 0.174 rem.

Total records contained on the floppy disk format should equal 362 records for a total of 0.855 man-rem between the two DOE facility contracts.

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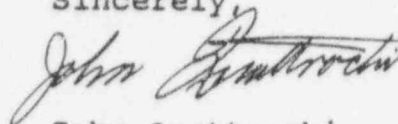
Bates UNAC RPO
P.O. Box 95 21 Manning Road
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(617) 245-6600 Fax: (617) 245-0901

Department of Energy - Chicago
April 2, 1993
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DOE visitors monitored at the Bates facility for 1992 are included in the attached separate listing. None of these individuals recorded detectable exposures above background.

If there are any questions regarding this information, feel free to call me at (508) 774-2370.

Sincerely,

A handwritten signature in cursive script, appearing to read "John Quattrochi".

John Quattrochi

JM/nlj
enclosures