RADIATION PROTECTION COMMITTEE

CAMBRIDGE, MASSACHUSETTS 02139

MINUTES OF THE 114TH MEETING OF THE RADIATION PROTECTION COMMITTEE ON JANUARY 10, 1995

MEMBERS PRESENT: Hemond, Davison, Dedon, Fiore, Galanek, Haldeman, Housman, Styles (for Lodish), Massé, McCunney, Powell, Pratt, Wenzel.

MEMBERS ABSENT: King, Yanch, Hughes (student) .

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

The meeting was called to order at 1:35 PM.

I. The minutes of the 113th meeting were reviewed and accepted as presented with the correction on page two of "registration members" to "registration numbers".

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

II. 1.	T-A-3	Amendment	II. 2.	6-N-6	Amendment
II. 3.	W-I-5	Amendment	II. 4.	10-A-4	Amendment
II. 5.	CCR-Z-1	New Auth.	II. 6.	10-P-1	New Auth.
II. 7.	7-AX-7	Amendment	II. 8.	CSR-A-7	Amendment
II. 9.	7-BN-1	Amendment			

II. 8. CSR-A-7 Amendment - Amendment ratified with the additional condition of approval of urinalysis bioassay as required by NRC license.

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

III. 1.	10-A-4	III. 2.	EMS-B-10
III. 3.	T-C-3	III. 4.	7-P-9
III. 5.	9-F-4	III. 6.	7-AE-8
III. 7.	W-P-3	III. 8.	W-Y-2

III. 9. 7-F-14
III. 10. 5-AJ-3
III. 11. CCR-V-2
III. 12. W-J-4
III. 13. RLE-E-3
III. 14. W-B-4
III. 15. W-M-5
III. 16. 10-M-2
III. 17. CCR-S-3
III. 18. W-V-3

III. 11. CCR-V-2. Supervisor: Hidde Ploegh

The renewal application was ratified with the exception of a six month approval for ^{125}I authorization. The project has presented problems with respect to timely in vivo thyroid burden measurements. See attached correspondence between RPO, RPC, and Professor Ploegh.

IV. Review of application that exceed administrative-approval guidelines:

IV.1. 10-A-4 Amendment #2. Unanimous Approval.

V. SNM-986 License Activities

V.1 Don Haes - quarterly report to the RPC.

V.2 Dr. Catherine Fiore will be submitting a request to house the $^{239}PuBe$ source overnight at the Plasma Fusion Center during instrument calibration procedures.

V.3 Frank Massé is negotiating with the NRC to change our current SNM-986 license into three separate licenses as it was in the past. Ninety nine percent of the special nuclear material at MIT is in the reactor facility. It makes sense to have the material carried by the reactor R-37 license and have 2 small licenses for the special nuclear material and source material used on campus.

VI. Analytical X-ray Program: Tom Fuller

1. Lanza group has installed a DL-1 Neutron generator in room NW13-0386 with a target in the accelerator vault NW13-020. The committee has not reviewed the safety analysis for the project. The project operated the accelerator at 10% power under the supervision of Tom Fuller. The committee requests the project be stopped until a safety report is submitted to RPO for review and approval. The report must include a description of the controls, interlocks, search procedures, anticipated dose level, and shielding requirements.

   Motion by Haldeman: a letter be submitted to Dr. Lanza from RPO expressing the RPC concern about the lack of formality in presenting information to the committee and

that a full safety review be submitted to RPO and approved prior to energizing the machine in the future. Motion seconded by K. Fiore. Unanimous approval. Frank Massé instructed Tom Fuller to shut down the project and communicate the RPC's concerns to Dr. Langer. See attached letter sent to Dr. Langer.

VII. Laser Safety Program

VII.1 D. Haes reported on the mobile LIDAR radar system to be tested by Lincoln Lab. System employs a CO_2 laser to study aircraft wake. System restricted from tracking open cockpit aircraft. Registration application submitted to the Commonwealth and accepted.

VIII. New Business

1. Broadscope Application Renewals:

The MIT and WI broadscope license applications were filed with the NRC during the past quarter. Both licenses are deemed timely renewed.

2. Annual Report to NRC:

Mitch Galanek presented the annual reports to the committee. Attached are copies of the reports.

Meeting adjourned at 4:00 PM.

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY
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CAMBRIDGE, MASSACHUSETTS 02139-4307

To: Professor Hidde Ploegh

From: Mitchell Galanek, Associate RPO

Subject: Reauthorization of ^{125}I Use

Date: January 12, 1994

At the 114th meeting of the MIT Radiation Protection Committee (RPC), the subject of your project's continued ^{125}I use was discussed during review of your authorization renewal application. The committee reviewed the problems of the past year and the proposed solutions outlined in your letter dated January 6, 1994. The RPC voted to renew your radioactive materials authorization (CCR-V-2) including ^{125}I for a period of six months with a compliance progress report to be given by RPO at the next two quarterly RPC meetings.

Personally, I appreciate your letter of January 6, 1995, and your sincerity in getting this matter resolved. If I can be of any assistance, please do not hesitate to call me.

Sincerely,

Mitchell S. Galanek
Associate Radiation Protection Officer

xc: Professor Harry Hemond

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Hidde Ploegh
Professor of Biology

To: Mitchell Galanek
From: Hidde Ploegh
Subject: removal of 125I as an authorized isotope; your meme Jan 3, 1995.
Date: Jan. 6

I was informed of Dr. M. Yilla's non compliance with the regulations covering thyroid scans after she had already left for an extended visit to her home country, Sierra Leone. When I spoke to Don Haes before the holidays, I informed him of this fact. I also put a notice on her desk so that immediately upon her return she would attend to this matter. As it stands now, I can only wait until she returns (expected on or shortly after Jan. 10) and order her to have her thyroid scan immediately.

I appreciate that this is not the first time an incident of this type has happened. In particular Ms. Heemels (who has now left the laboratory) has been negligent on a number of occasions, as outlined in an earlier written notification. Matters of radiation protection are discussed as they arise in our weekly lab meetings. I have spoken to all isotope users individually to make them aware of the fact that a) these regulations exist for their own protection as well as for the protection of their colleagues, both inside and outside of the laboratory, and b) that non-compliance with regulations jeopardizes not only their own experiments, but also those of their colleagues in the laboratory. Dr. Yilla has been an occasional user of 125I, whereas the regular users, in particular Drs. Hill and Tussey, have been quite meticulous in keeping up with their thyroid scans. I find it distressing that Dr. Yilla, who is one of the most responsible workers in my laboratory, should have lapsed in this manner, and that it will not be possible to get in touch with her for some time.

The following steps have now been taken. I have distributed copies of your memo to all members of the laboratory, whether they use isotopes or not, to impress on all the necessity of following the rules. No iodination experiments will be performed until expressly permitted by your office, as per your memo. I propose to put in place the following new rules to ensure compliance with the thyroid burden measurement program. I shall appoint Dr. Hill, who also has a medical degree, as the laboratory representative who will oversee the thyroid burden measurements. She is a regular user of 125I in her own experiments, is aware of the occupational safety reasons why the thyroid burden measurements are important, and has proven herself a responsible and dependable laboratory associate. Furthermore, her continuous presence in the laboratory puts her in an advantageous position to monitor colleagues. While I certainly carry out this type of supervision myself, my travel schedule results in my being absent from the lab on occasion. The cause woulkd be better served, I think, by having someone in the laboratory also monitoring compliance.

I would appreciate the possibility of postponing the decision to desist from using 125I until the return of Dr. Yilla. I look forward to your response in this matter. Let me finish by expressing my appreciation for the efforts of the RPO who have continued to show their concern for the safety of the workers in my laboratory, and for safeguarding the necessary regulatory licenses for MIT. The present episode is a personal embarassment that I wish to avoid for the future.

Sincerely,

Hidde Ploegh
Professor of Biology

cc Professor Harry Hemond.

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77 MASSACHUSETTS AVENUE, 208-238
CAMBRIDGE, MASSACHUSETTS 02139-4307

To: Professor Hidde Ploegh
From: Mitchell Galanek, Associate RPO
Subject: Removal of ^{125}I as an Authorized Radioisotope
Date: January 3, 1995

Currently, a member of your research group, M. Yilla, is 30 days over-due for a thyroid burden measurement and has placed the MIT NRC license in jeopardy. Repeatedly over the past year members of your research group have failed to comply with the MIT thyroid burden measurement program. RPO has repeatedly had to deny purchase orders for ^{125}I or hold ^{125}I shipments that arrive at the Institute until users report for a required thyroid burden measurement. I have written to you about this matter in the past (refer to the previous letter of warning dated August 1, 1994) and you have assured me that improvement was forthcoming.

This memo is a written notice that this continued noncompliance by members of your research group has resulted in the immediate removal of ^{125}I as an authorized radionuclide. The matter will be forwarded to the MIT Radiation Protection Committee for resolution at their next scheduled meeting (January 10, 1995). Failure on the part of any research group to comply with the MIT required procedures for radiation protection jeopardizes the Institute's Nuclear Regulatory Commission license.

The Radiation Protection Committee 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. All work with ^{125}I must cease immediately. Please respond in writing to the Radiation Protection Committee outlining your procedures for your research group's compliance with the thyroid burden measurement program. The Radiation Protection Committee will review these plans and vote to reinstate ^{125}I as an authorized radioisotope.

Please contact me at the Radiation Protection Office if you have any questions about the specifics of the MIT programs for internal dose assessment.

Thank you in advance for your cooperation in this matter.

xc: Professor Harry Hemond, RPC Chairman
RPC files

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To: Professor Hidde Ploegh

From: Mitchell Galanek, Associate RPO

Subject: Continued Use of ^{125}I under Authorization CCR-V-1

Date: August 1, 1994

The MIT Nuclear Regulatory Commission (NRC) license requires that all persons working with unbound radioiodine have thyroid burden measurements to assess the potential uptake of radioiodine by the worker's thyroid gland. These measurements are to be performed within one week after iodination procedures

Your research group has been granted permission by the MIT Radiation Protection Committee (RPC) to use unbound radioiodine under MIT authorization CCR-V-1. As project supervisor, your responsibilities are to ensure that the conditions of approval set forth by the RPC are met. Specifically, condition 4 of your authorization states, " All persons handling $\geq$ 100 μCi of unsealed radioiodine including persons involved in the iodination procedure are required to report to the Radiation Protection Office for a thyroid burden measurement within one week after using the material. Projects not in compliance will be restricted from future use of ^{125}I ".

Repeatedly over the past six months, Ms. Heemels, a graduate student in your research group, has failed to comply with the above authorization condition. RPO has repeatedly had to deny purchase orders for ^{125}I or hold ^{125}I shipments that arrive at the Institute until Ms. Heemels reports for a required thyroid burden measurement. We have spoken about this matter in the past and you have assured me that improvement was forthcoming. However, in reality, no improvement has occurred.

This memo is a written warning that continued noncompliance by Ms. Heemels will result in the removal of ^{125}I as an authorized radionuclide and the matter forwarded to the RPC for resolution at their next scheduled meeting. 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.

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[illegible]

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 Office outlining the steps taken to ensure future compliance with the thyroid burden measurement program.

Please contact me at the Radiation Protection Office if you have any questions about the specifics of the MIT programs for internal dose assessment.

Thank you in advance for your cooperation in this matter.

xc: Professor Harry Hemond, RPC Chairman
RPC files

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RADIATION PROTECTION OFFICE

To: Francis X. Massé, Radiation Protection Officer
From: Donald Haes, Assistant Radiation Protection Officer
Subject: SNM Under Campus Control
Date: January 10, 1995

- 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 $9.90X10^{2}$-$3.78X10^{6}$ 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 ($\approx$ 9 nCi) each in 2 detectors from TGM; 1.68 gm ($\approx$ 3.6 μCi) each in 2 detectors from Imaging and Sensing Technology Corp.; 95 mg ($\approx$ 0.20 μCi) and 104 mg ($\approx$ 0.22 μCi) contained in 2 detectors from LND; 1.28 gm ($\approx$ 2.62 μCi) each in 2 detectors and 1.74 gm ($\approx$ 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 114th metting of the MIT RPC.

cc. M. Galanek

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TO: Frank Massé

FROM: Gerry Fallon

DATE: January 9, 1995

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 second quarter of 1994.

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 the Riordan tunnel. 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, 1994, indicates no removable activity from either source.

^{3}H Target

Two solid ^{3}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.

The targets are designed for use in the electron scattering program, however, ^{3}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}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, 1994.

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TO: Frank Massé

FROM: Gerry Fallon

DATE: September, 1994

SUBJECT: Audit of SNM Activities at Bates

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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 June, 1994, indicates no removable activity from either source.

^{3}H Target

Two solid ^{3}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.

The targets are designed for use in the electron scattering program, however, ^{3}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.

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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.

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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 June, 1994.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Environmental Medical Service
Reactor Radiation Protection Office

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

From: Frederick F. McWilliams
Reactor Radiation Protection Officer

Date: January 3, 1995

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

A. Previous Audits

1. Summary

No findings

2. Status

N/A

B. Inspections

1. NRC Inspections

No Inspections by the NRC were conducted during the reporting period.

2. ANI Inspections

An American Nuclear Insurers inspection was conducted during the reporting period. Although theses inspections are generally all encompassing, this inspection focused almost exclusively on the BNCT project. No findings and a couple of recommendations were made.

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 in support of the Boron Neutron Capture Therapy Program during the reporting period. All use is governed under part II format.

b. SNM-002. BTF Bundle (6 CH 1). System contains 30 rods of 1.99 w/o UO_2. The 6CH1 facility has not been used during the reporting period. This facility is secured and withdrawn from the neutron flux region of the BTF.

c. SNM-003. 5 1Ci ^{239}PuBe neutron sources. All sources are in storage and secured at the time of this report. The course 22.59 is now offered during both the fall and spring semesters now and as a result one source was used for neutron activation of silver foil. This source is located in a moderating shielded box arrangement with access granted through ports.

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.

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). No activity reported for this period. The facility is presently not in use.

i. SNM-009. Graphite/Uranium sub-critical piles. Used for teaching purposes. Although the course 22.59 is now offered during both the fall and spring semesters now, this facility was not used during this last semester and indications are that it may not be used again.

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. Receipt and Disposition of SNM material

1. None.

G. Status of SNM-985 License renewal.

The SNM License number 986 is presently undergoing renewal and was accepted for timely renewal. We are presently operating under the old license. Present issues regarding the renewal effort is in regards to disposition of excess material which was identified during the previous license renewal effort. At present, their exists a considerable amount of excess material on site that is in storage and not intended for further use (refer to authorization SNM-005). Attempts to return this material to the DOE has been meet with minimal success. The NRC has requested status of material disposition and to date the DOE has been re-contacted again with minimal success for returning this material. Assuming that this material can not be returned to the DOE, then it is intended that this material be transferred to the R-37 license in part because this material was used and is stored at the reactor.

FFMcW/ka

File: RRPO-M-SNM9404

MASSSACHUSETTS INSTITUTE OF TECHNOLOGY

ANNUAL RADIATION SAFETY AUDIT

(1) Licensee: Whitehead Institute for Biomedical Research

(2) Address: Nine Cambridge Center, Cambridge, MA

(3) License No.: 20-20706-02

Date of Expiration: 11/31/94 (under timely renewal)

(4) Date of Audit: 1/5/95

(5) Inspection Findings:

The inspection was an examination of the activities conducted under the above MIT license as they relate to radiation safety and to compliance with the Nuclear Regulatory Commission's rules and regulations and the conditions of the above license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the Radiation Protection Officer. The inspection was performed to assure exposures remain as low as reasonably achievable (ALARA). The findings as a result of this inspection are as follows:

I. Personnel Monitoring

A. A thorough review of our program for maintaining radiation exposures ALARA was conducted by M. Gukwek. No one received >500 mRem in that period.

Following are the results of personnel monitoring for the calendar year 1994: The maximum exposure to any one individual was

210 mRem exposure to the whole body, (90)
210 mRem exposure to the skin, and
850 mRem exposure to the extremities.

B. Did personnel monitoring involve a declared pregnancy?
Yes ✓ No _____ N/A _____ (2)

Was training provided?
Yes ✓ No _____ N/A _____

II. Posting of Notices and Signs

A. Rooms or areas were properly posted to indicate the presence of a RADIATION AREA.
Yes _____ No _____ N/A ✓

B. Rooms or areas were properly posted to indicate the presence of RADIOACTIVE MATERIAL.

Yes ✓ No _____ N/A _____

C. Containers were properly labeled to indicate the presence of RADIOACTIVE MATERIAL.

Yes ✓ No _____ N/A _____

D. Posting of documents specified in 10 CFR 19.11(a) (1,2,3) was not practicable; therefore the licensee posted notice which describes the documents and states where they may be examined.

Yes ✓ No _____ N/A _____

E. Form NRC-3, "Notice to Employees", was posted in a sufficient number of places for use by the individuals who work in or frequent any portion of restricted areas.

Yes ✓ No _____ N/A _____

F. A copy of any notice of violation involving radiological working conditions, or order issued pursuant to Subpart B of 10 CFR Part 2 was posted within 2 working days after the receipt of notice.

Yes _____ No _____ N/A ✓

G. A copy of the licensee's response to a notice of violation was posted within 2 working days after the dispatch of response by the licensee.

Yes _____ No _____ N/A ✓

H. The documents posted in compliance, under F. and G. above, remained posted for a minimum of 5 working days or until action correcting the violation was completed, whichever was longer.

Yes _____ No _____ N/A ✓

III. Records and Reports

A. Records of current occupational radiation exposures of individuals were properly maintained.

Yes ✓ No _____ N/A _____

B. Records of individual accumulated occupation dose were maintained for each radiation worker.

Yes ✓ No _____ N/A _____

C. Records of radiation surveys of all the working areas where the licensed material is used were maintained.

Yes ✓ No _____ N/A _____

Frequency of Survey: weekly / monthly

Date of Last Survey: 12/30/94

D. Records of disposal of licensed radioactive material were properly maintained.

Yes ✓ No _____ N/A _____

Frequency of Disposal: daily

Date of Last Shipment: _____

E. Records of receipt, transfer, disposal, export of licensed material were properly maintained.

Yes ✓ No _____ N/A _____

F. Records of wipes performed on the surface of packages received were properly maintained.

Yes ✓ No _____ N/A _____

G. Records of calibration of radiation survey instruments were properly maintained.

Yes ✓ No _____ N/A _____

Frequency of Calibration: Annual (Semi annual "in-house")

Date of Last NIST Traceable Calibration: 10/94

H. Records of bioassay tests were maintained on all individuals per requirements of license.

Yes ✓ No _____ N/A _____

Frequency of Bioassay Test: weekly after iodination [no fraction required]

Number of Bioassay Tests: 41 thyroid, 110 positive measurements

I. Did any bioassay test exceed 10% of permissible?

Yes _____ No ✓ N/A _____

If yes, have the internal and external doses been combined?

Yes _____ No _____ N/A ✓

J. Records of the contamination wipe-test data and results of determination of concentrations of radioactive material present in the working areas were properly maintained.

Yes ✓ No _____ N/A _____

Frequency of Wipe-Test: weekly / monthly

Date of Last Wipe-Test: 12/20/94

K. Records of any spills were properly maintained.

Yes ✓ No _____ N/A _____

Total number of spills for the year: 1

L. Was there any personnel contamination.

Yes _____ No ✓ N/A _____

Total number of personnel contaminated: N/A

IV. Operating Procedures and Manuals

A. The radiation safety instruction program for all radiation workers and employees is operational and effective.

Frequency of Radiation Safety Instruction: weekly

Date of Last Instruction: N/A

B. Radiation safety procedures are written and copies are made available for the use of all the radiation workers, personnel involved in patient care and others who may handle radioactive material.

Yes ✓ No _____ N/A _____

C. Procedures for picking up, receiving and opening of the package containing radioactive material are available and are in routine use.

Yes ✓ No _____ N/A _____

D. Unattended radioactive materials are secured by:

secured cabinet ✓

room with keypad _____

room with restricted lock ✓

E. The Radiation Safety Committee meetings are held at quarterly intervals to review the radiation safety program at the institution.

Yes ✓ No _____ N/A _____

Date of Radiation Safety Committee Meetings held in 1994:

1/26/94, 5/24/94, 10/5/94, 1/12/95 (December meeting attempted but no quorum could be reached)

F. The local fire officials are informed of the location and nature of radioactive materials in the institution.

Date of Last Visit/Notification: _____

V. Administrative Actions

A. No items of noncompliance or unsafe conditions were found.

Radiation Protection Officer Harvey F. Lodish

Signature and Date [signature] March 95

Reviewed by

[signature]
Administrator

Date 3/6/95

MASSSACHUSETTS INSTITUTE OF TECHNOLOGY

ANNUAL RADIATION SAFETY AUDIT

(1) Licensee: MIT

(2) Address: 77 Massachusetts Ave

(3) License No.: 20-01537-02

Date of Expiration: 1/31/95 (under timely renewal)

(4) Date of Audit: 1/5/95

(5) Inspection Findings:

The inspection was an examination of the activities conducted under the above MIT license as they relate to radiation safety and to compliance with the Nuclear Regulatory Commission's rules and regulations and the conditions of the above license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the Radiation Protection Officer. The inspection was performed to assure exposures remain as low as reasonably achievable (ALARA). The findings as a result of this inspection are as follows:

I. Personnel Monitoring

A. A thorough review of our program for maintaining radiation exposures ALARA was conducted by M. Goldwasser. No one received >500 mRem in that period.

Following are the results of personnel monitoring for the calendar year 1994: The maximum exposure to any one individual was

140 mRem exposure to the whole body,
150 mRem exposure to the skin, and
390 mRem exposure to the extremities.

B. Did personnel monitoring involve a declared pregnancy?
Yes ✓ No _____ N/A _____ (2)

Was training provided?
Yes ✓ No _____ N/A _____

II. Posting of Notices and Signs

A. Rooms or areas were properly posted to indicate the presence of a RADIATION AREA.
Yes ✓ No _____ N/A _____

B. Rooms or areas were properly posted to indicate the presence of RADIOACTIVE MATERIAL.

Yes ✓ No _____ N/A _____

C. Containers were properly labeled to indicate the presence of RADIOACTIVE MATERIAL.

Yes ✓ No _____ N/A _____

D. Posting of documents specified in 10 CFR 19.11(a) (1,2,3) was not practicable; therefore the licensee posted notice which describes the documents and states where they may be examined.

Yes ✓ No _____ N/A _____

E. Form NRC-3, "Notice to Employees", was posted in a sufficient number of places for use by the individuals who work in or frequent any portion of restricted areas.

Yes ✓ No _____ N/A _____

F. A copy of any notice of violation involving radiological working conditions, or order issued pursuant to Subpart B of 10 CFR Part 2 was posted within 2 working days after the receipt of notice.

Yes _____ No _____ N/A ✓

G. A copy of the licensee's response to a notice of violation was posted within 2 working days after the dispatch of response by the licensee.

Yes _____ No _____ N/A ✓

H. The documents posted in compliance, under F. and G. above, remained posted for a minimum of 5 working days or until action correcting the violation was completed, whichever was longer.

Yes _____ No _____ N/A ✓

III. Records and Reports

A. Records of current occupational radiation exposures of individuals were properly maintained.

Yes ✓ No _____ N/A _____

B. Records of individual accumulated occupation dose were maintained for each radiation worker.

Yes ✓ No _____ N/A _____

C. Records of radiation surveys of all the working areas where the licensed material is used were maintained.

Yes ✓ No _____ N/A _____

Frequency of Survey: daily / weekly / monthly

Date of Last Survey: 6/30/97

D. Records of disposal of licensed radioactive material were properly maintained.

Yes ✓ No _____ N/A _____

Frequency of Disposal: _____

Date of Last Shipment: _____

E. Records of receipt, transfer, disposal, export of licensed material were properly maintained.

Yes ✓ No _____ N/A _____

F. Records of wipes performed on the surface of packages received were properly maintained.

Yes ✓ No _____ N/A _____

G. Records of calibration of radiation survey instruments were properly maintained.

Yes ✓ No _____ N/A _____

Frequency of Calibration: annual (some manual "in house")

Date of Last NIST Traceable Calibration: varies by project

H. Records of bioassay tests were maintained on all individuals per requirements of license.

Yes ✓ No _____ N/A _____

Frequency of Bioassay Test: weekly

Number of Bioassay Tests: 220 thyroid / 4 positive (3 nc: highest)

I. Did any bioassay test exceed 10% of permissible?

Yes _____ No ✓ N/A _____

If yes, have the internal and external doses been combined?

Yes _____ No _____ N/A ✓

J. Records of the contamination wipe-test data and results of determination of concentrations of radioactive material present in the working areas were properly maintained.

Yes ✓ No _____ N/A _____

Frequency of Wipe-Test: daily, weekly, monthly

Date of Last Wipe-Test: 12/30/94

K. Records of any spills were properly maintained.

Yes ✓ No _____ N/A _____

Total number of spills for the year: ~~8~~ 6 (2 personal contamination only)

L. Was there any personnel contamination.

Yes ✓ No _____ N/A _____

Total number of personnel contaminated: 2

IV. Operating Procedures and Manuals

A. The radiation safety instruction program for all radiation workers and employees is operational and effective.

Frequency of Radiation Safety Instruction: weekly, as necessary

Date of Last Instruction: N/A

B. Radiation safety procedures are written and copies are made available for the use of all the radiation workers, personnel involved in patient care and others who may handle radioactive material.

Yes ✓ No _____ N/A _____

C. Procedures for picking up, receiving and opening of the package containing radioactive material are available and are in routine use.

Yes ✓ No _____ N/A _____

D. Unattended radioactive materials are secured by:

secured cabinet ✓

room with keypad _____

room with restricted lock ✓

E. The Radiation Safety Committee meetings are held at quarterly intervals to review the radiation safety program at the institution.

Yes ✓ No _____ N/A _____

Date of Radiation Safety Committee Meetings held in 1994:

1/26/94, 5/24/94, 10/5/94, 1/20/95 (A December meeting was attempted but a quorum could not be reached)

F. The local fire officials are informed of the location and nature of radioactive materials in the institution.

Date of Last Visit/Notification: _____

V. Administrative Actions

A. No items of noncompliance or unsafe conditions were found.

Radiation Protection Officer [signature]

Signature and Date _____

Reviewed by

[signature]
Administrator

Date 1/10/95

Environmental
Medical
Service

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
MEDICAL DEPARTMENT
77 MASSACHUSETTS AVENUE, 208-238
CAMBRIDGE, MASSACHUSETTS 02139-4307

RADIATION PROTECTION OFFICE

To : Mitchell Galanek, Associate Radiation Protection Officer
From : Donald Haes, Assistant Radiation Protection Officer
Subject : Non-Occupational Radiation Dose
Date : January 9, 1995

The following personnel, at their request, have asked for non-occupational dose to be removed from their dose records during the calendar year 1994:

- Markert, T; participant # 04622, group E1; 120 mrem during 9/94. Non-occupational dose was due to the participant receiving ^{131}I treatment during that month, and inappropriately wearing the film dosimeter. Non-occupational dose entry was removed from the record 10/94.
- Robinson, K; participant # 02489, group B34; 700 mrem during 9/94. Non-occupational dose was due to the participant accidently dropping the film dosimeter into a drying pan. Non-occupational dose entry was removed from the record 10/94.

Director
208-238
(617) 253-5360
Fax: (617) 253-4879

Biohazard Assessment
20C-214
(617) 253-1740
Fax: (617) 258-6107

Industrial Hygiene
20C-204
(617) 253-2596
Fax: (617) 253-4879

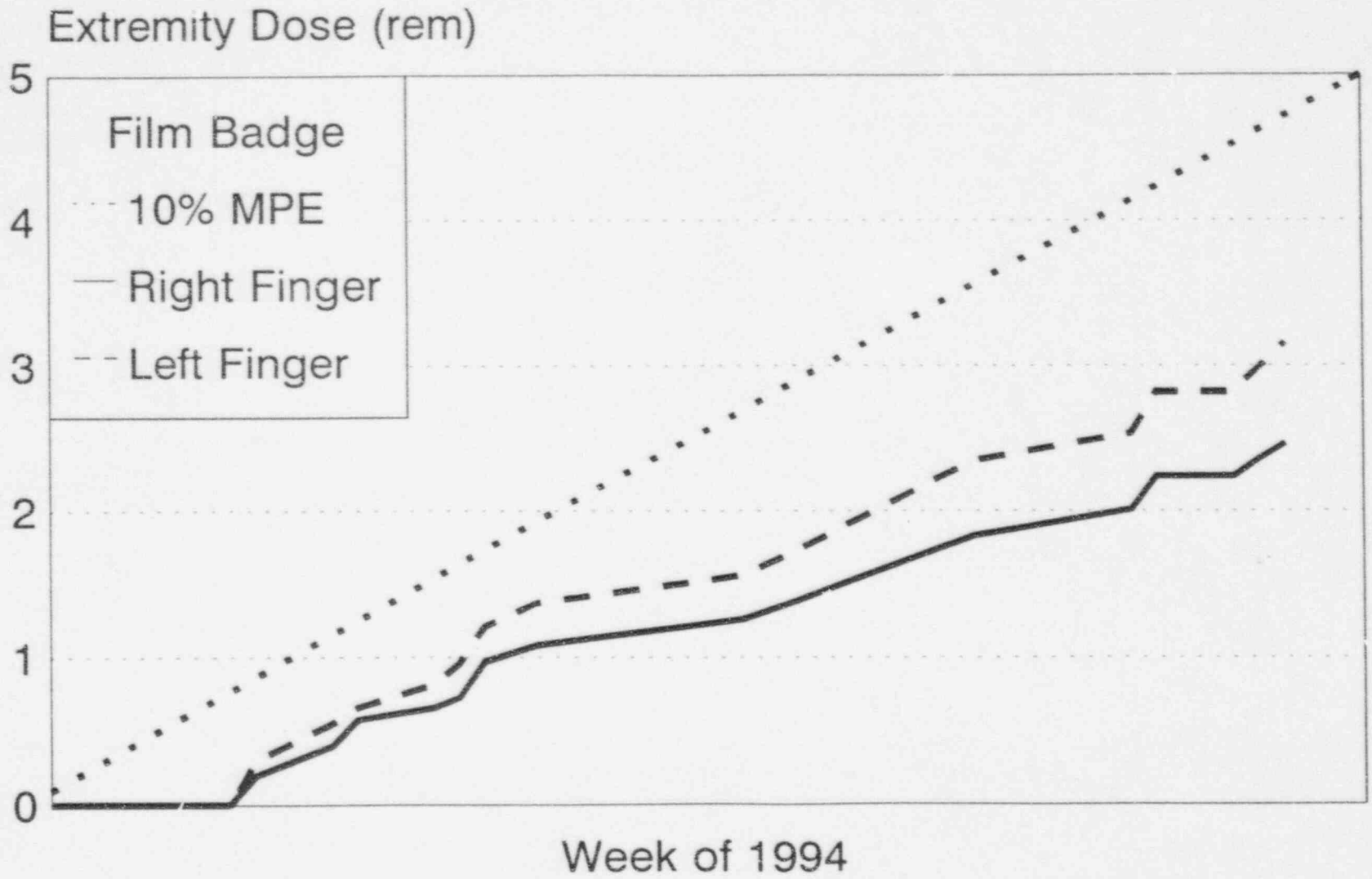
Radiation Protection
Campus RPO 20C-207
(617) 253-2180
Fax: (617) 253-4879

Reactor RPO
NW12-108
(617) 253-4203

Bates LINAC RPO
P.O. Box 95 21 Manning Road
Middleton, MA
(617) 245-6600 Fax: (617) 245-0901

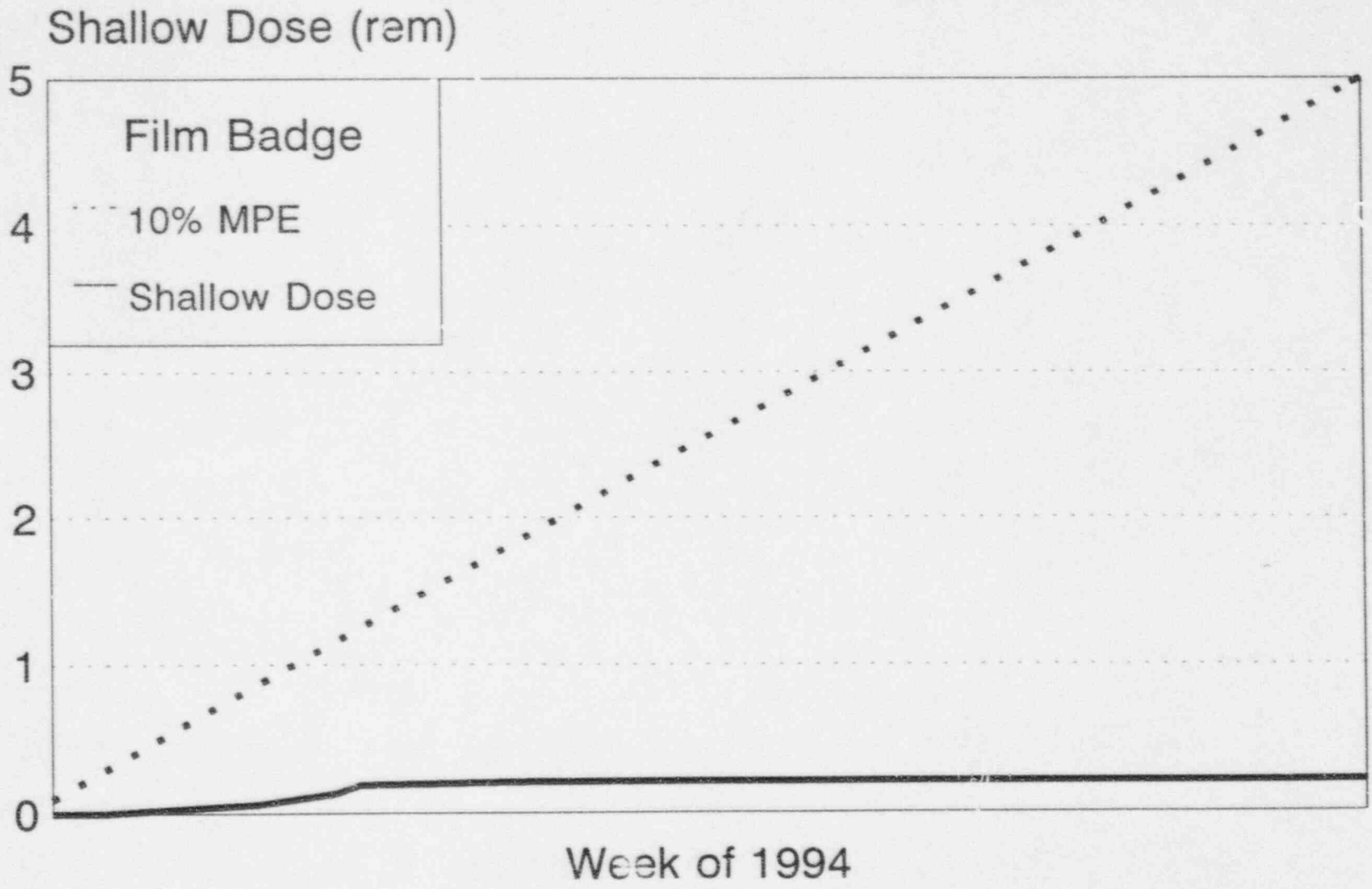
Dy-165 Dose Summary - 1994

Extremity (Right & Left Finger)



Dy-165 Dose Summary - 1994

1 cm^2 of Skin



Dy-165 Dose Summary - 1994

Whole Body