

TUFTS UNIVERSITY SCHOOL OF MEDICINE - NEW ENGLAND MEDICAL CENTER HOSPITAL

F. X. MASSÉ  
RADIATION SAFETY OFFICER

171 HARRISON AVENUE  
BOSTON, MASSACHUSETTS 02111  
AREA 956-6168

September 9, 1985

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P8

U.S. Nuclear Regulatory Commission  
Region 1  
631 Park Avenue  
King of Prussia, PA 19406

Attention: Judy Joustra

Re: License # 20-00045-10  
Docket # 030-06932  
Control # 103795

Gentlemen:

Following is our response to your letter of June 11, 1985, requesting additional information on our amendment application of March 19, 1985.

1. Professor Geronimo Terres, PhD. has been the heaviest user of this particular irradiator in his eight years at TUSM. He was initially trained in the use of the unit by Professor Walter Hughes and myself when he first arrived at TUSM.. Prior to that, Professor Terres was on the faculty at MIT, where he was also the principal investigator on a project using an enclosed-source irradiator. His training at MIT on that irradiator was conducted by the MIT Radiation Protection Office, and his use of that irradiator was subject to frequent MITRPO surveillance and retraining. In total, Professor Terres has undergone more than 25 hours of formal training on irradiator use applicable to his present assignment.
2. a. Training to other users closely follows the item 8 outline in the October 1984 proposed Reg Guide 10.9. Included is the regular session on the principals and fundamentals of radiation safety and good safety practises applicable to the use of radioactive materials which all radioactive materials users are required to attend. This is a normal 2-hour session which often stretches beyond 3 hours with questions and discussion. Second is the regular laboratory session involving the use of radiation detection instruments. Again, this is a normal 2-hour session which often extends well beyond that time. Third is a special session on the design and operation of the irradiator. Again, the normal length of this session is two hours, but the session generally extends well beyond this time with discussion and questions.  
  
b. The 25-question quiz (complete with answers) that is to be given at the end of this training program is enclosed. The passing grade for this quiz is 80%. While persons qualified for irradiator use in the past (those who now have significant experience with this unit) have not been required to take this quiz, all future applicants will be so examined.

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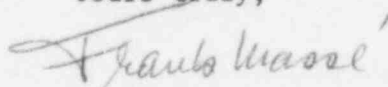
c. In addition to the training outlined in 2a) above, an on-the-job training session is required for all new users in that their first use of the irradiator is under the direct supervision of either Dr. Terres or a staff member of the Radiation Safety Office. Any final questions on all aspects of irradiator use will be covered in this session.

d. The first two portions of the formal training program are given by the Radiation Safety Office staff, under the direction of RSO Frank Masse or Assistant RSO Tom McMahon. The third session and on-the-job training may also be given by Dr. Terres. Tom McMahon has been a member of the RSO staff for more than 4 years, following his graduation from St. Anselm's College with a Bachelor's degree in biology. He has had the equivalent of more than a year's worth of formal training in health physics under my direct tutelage in that time and has, in addition, attended many seminars and training sessions conducted by the N.E. Chapter, HPS, Harvard School of Public Health, etc. He assumed the position of Assistant RSO following the recent resignation of Fred Driscoll to take the RSO position at Jackson Labs in Maine.

e. Formal records on the training of all authorized users and on their use of the irradiators are kept. In addition, this formal record will include the successfully completed quiz for each successful future applicant.

Please don't hesitate to contact me at 617-245-6600 if further information is required.

Yours truly,

A handwritten signature in cursive script that reads "Frank Masse".

Frank Masse, RSO

Enclosure

Tufts University School of Medicine

Irradiator User's Quiz

- Q Can this irradiator make the materials inserted radioactive?  
(A) No, the energy of the Cesium-137 emissions do not approach the photoneutron threshold.
- Q Are there any restrictions on materials to be placed in the irradiator?  
(A) No chemically unstable, explosive or highly exothermic materials may be inserted.
- Q What controls over sample dose are available?  
(A) time, dose factor setting (distance), positioning, rotation.
- Q What is the effect of not operating the rotator?  
(A) dose rate across the chamber may vary by factor of 10.
- Q Can source be removed from biological shield during operation?  
(A) No, it is permanently fixed in shield.
- Q What is the primary shielding material for operator protection?  
(A) Lead encased in steel provides the fixed protection.
- Q What is the maximum permissible whole-body occupational radiation exposure applicable to the operators of this irradiator?  
(A) 5 Rem/year.
- Q Is it likely that an operator can be overexposed by mishandling the unit?  
(A) Since the dose rate external to the unit is less than 1 mrem/hour, it is not possible for anyone to receive the maximum dose, or even approach it on a normal work schedule.
- Q What is the maximum dose rate deviation within the chamber of a properly operating system?  
(A) Depending on position in the rotating chamber, dose rate may vary by as much as 30%.
- Q Does the dose rate vary proportionately to the "Dose Factor" dial setting?  
(A) No, the comparative reading must be taken off the derived graph, the actual dose may be as much as 20% different from what the "dosefactor" implies.
- Q Does sample stay in irradiate position at end of timer cycle?  
(A) No, sample chamber automatically swings out to "load" position at end of timer cycle.

- Q What is the maximum timer cycle?  
(A) 10,000 minutes.
- Q Can longer exposures be arranged?  
(A) Yes, there is a "timer bypass" control position.
- Q What regulatory authority governs the use of this facility?  
(A) The U.S. Nuclear Regulatory Commission.
- Q Where are the applicable regulations published?  
(A) The Federal register, 10 CFR 20.
- Q What is the worst type of incident likely to occur in normal use of this type of device?  
(A) Source leakage in which a significant amount of radioactive material escapes the sealed source.
- Q How is the integrity of the source routinely checked?  
(A) by periodically wiping accessible surfaces of the unit to determine if contamination is occurring.
- Q What damage to the unit is likely to occur from its exposure to a laboratory fire?  
(A) Damage to electrical or mechanical components - probably not shielding.
- Q What initial tests should be performed following such a fire?  
(A) 1. Dose rate measurements around the unit.  
2. leak test for source integrity.  
3. electrical, mechanical tests.
- Q What access control procedures are in effect for this facility?  
(A) Only persons registered for use with the Radiation Safety Office may gain access. Keys to facility are secured and released only to properly registered individuals. Sign-up sheet must be completed by all users.
- Q What procedure should be followed if materials are spilled in chamber?  
(A) Responsible operator is required to initiate cleanup, reporting spill to RSO and requesting assistance if necessary.
- Q What instrument is used to measure radiation levels around the unit?  
(A) a portable G-M survey meter.
- Q What is the upper range of dose rates measurable with this instrument?  
(A) 0-50 mr/hr in close proximity to the unit.
- Q What is the normal expected dose rate around the unit?  
(A) 1-2 mr/hr. in close proximity to the unit.
- Q What is the normal whole-body dose rate to the operator during normal operation?  
(A) Less than 1 mr/hr. while standing close to the unit.