



Radiation Safety Manual

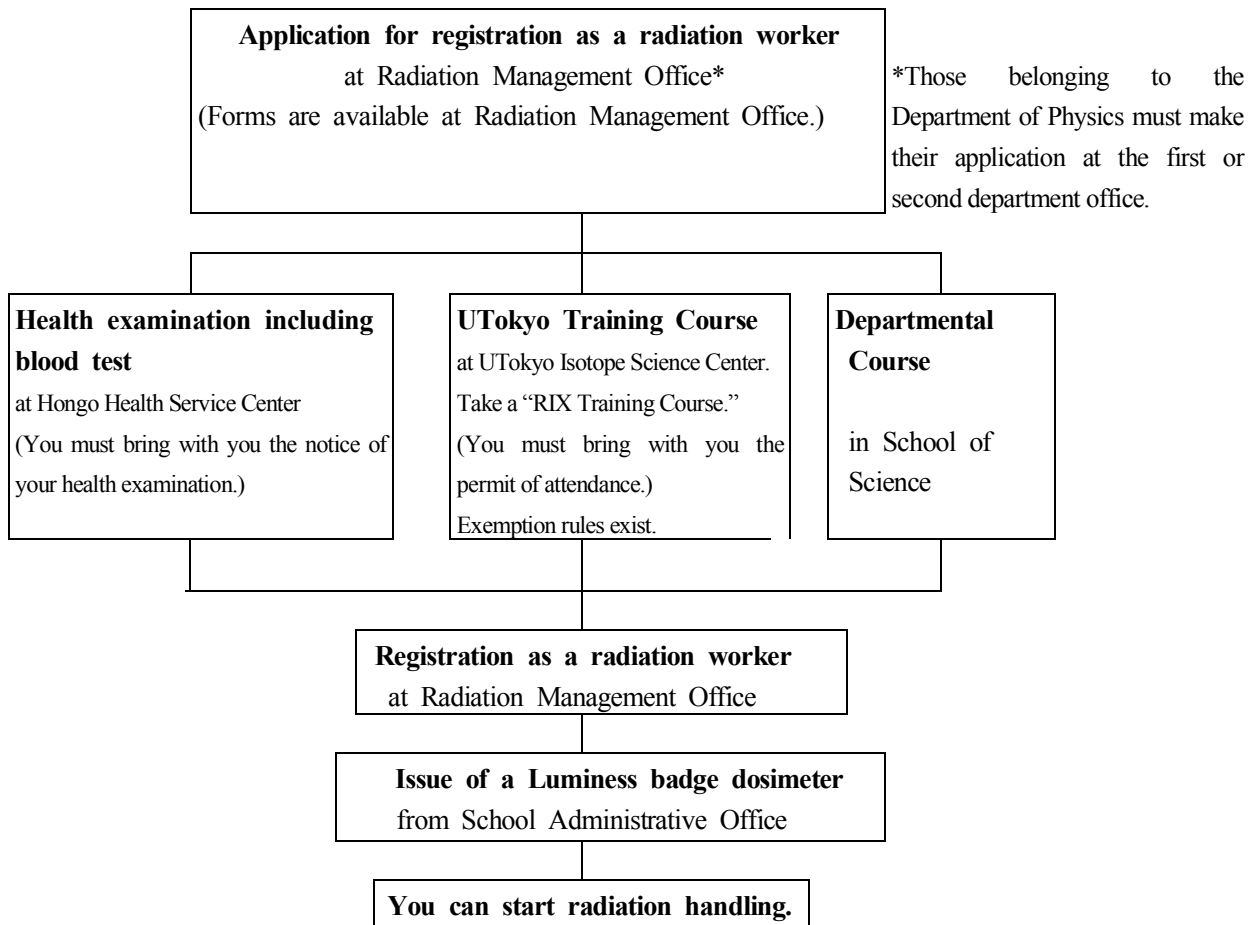
May 2020

School of Science, The University of Tokyo

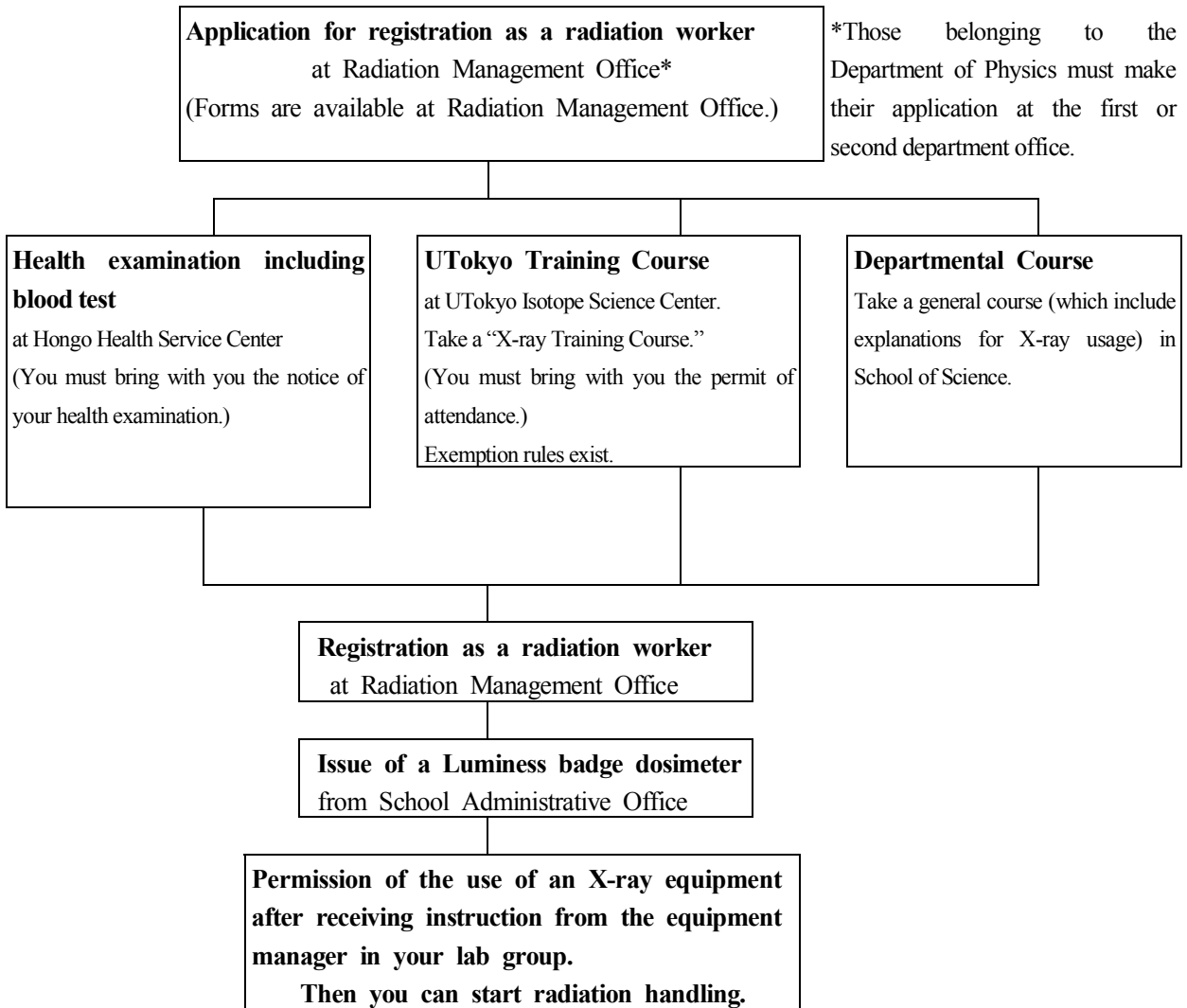


■ Flow Sheet for Radioisotope and Radiation Generating Equipment Users

(Accelerators, SOR = Synchrotron Radiation Facilities, Nuclear Reactors etc.)



■ **Flow Sheet for X-ray Equipment (Categories C, D and E) Users**

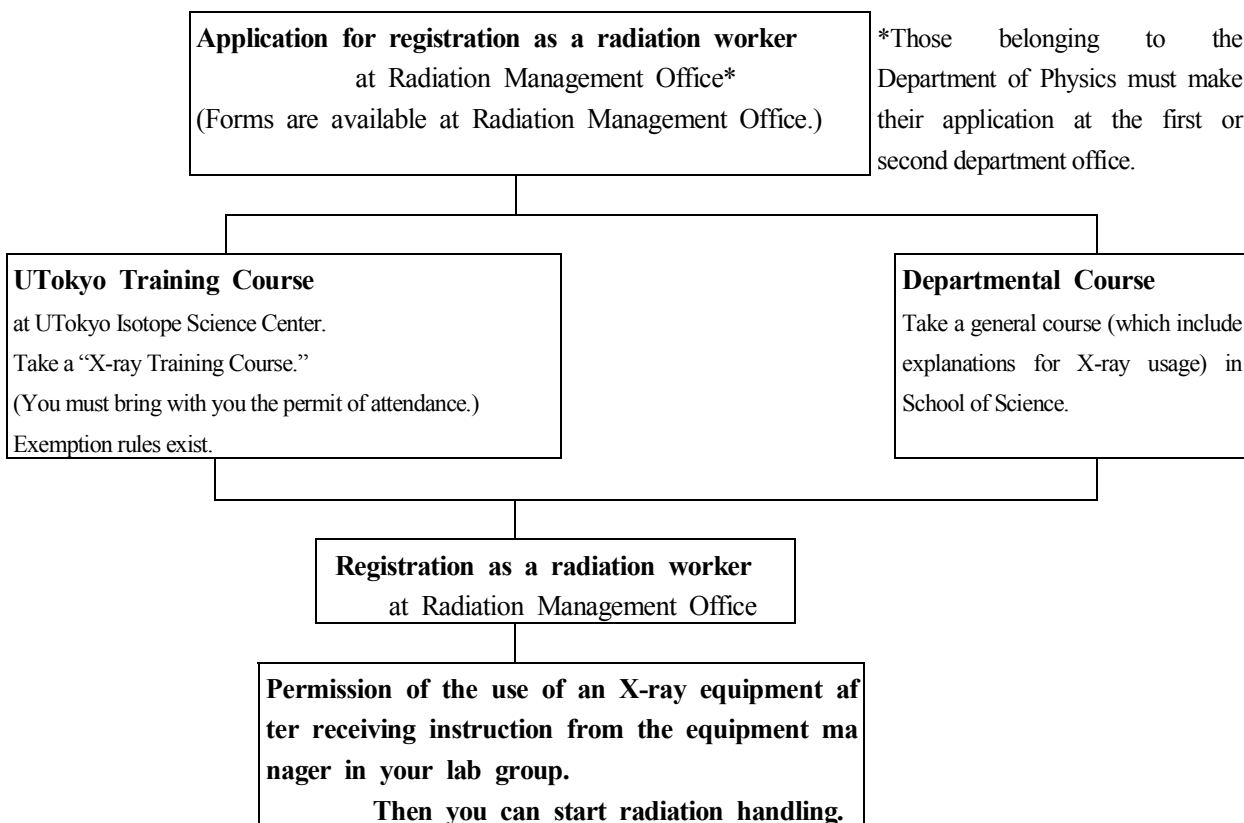


** Once you have finished a "RIX Training Course", you do not need to take an "X-ray Training Course."

Classification of X-ray Equipments

- Category A: X-ray equipments installed in a completely sealed box.
- Category B: X-ray equipments with a safety device used all the time.
- Category C: X-ray equipments with a safety device used appropriately.
- Category D: X-ray equipments installed in a room for their exclusive use.
- Category E: mobile X-ray equipments.

■ **Flow Sheet for X-ray Equipment (Categories A and B) Users**



** Once you have finished a “RIX Training Course”, you do not need to take an “X-ray Training Course.

Procedures for Registration as a Radiation Worker

- 1) You must be registered as a radiation worker before you start radiation handling.
- 2) If you have already worked before as a radiation worker in The University of Tokyo, or in another university or institute, you will be exempt from UTokyo training courses by submitting necessary certificates.
- 3) Registration as a radiation worker is not automatic. After you have finished necessary courses and health examination (exemption for X-ray users of category A & B), you should inform Radiation Management Office and ask for authorization.

Radiation Management Office, School of Science, The University of Tokyo:

E-mail ri-jimu@chem.s.u-tokyo.ac.jp
 TEL ext. 24606 direct line/ mobile phone (03)5841-4606
 FAX ext. 21363 direct line/ mobile phone (03)5841-1363

- 4) Be aware that the whole procedure can take more than a month or even a few months. You should make your plan well in advance before you can start your experiment with radiation handling.

UTokyo Training Courses

UTokyo training courses are offered by UTokyo Isotope Science Center a.k.a. Radioisotope Center. There are two courses: RIX (Radioisotope and X-ray) Training Course and X-ray Training Course. One who wishes to start radiation handling must take either of the courses according to the materials and equipments which he/she will use.

Materials and equipments to use	UTokyo training course
Unsealed radioisotopes, Sealed radioisotopes, Radiation generating equipments: Accelerators, SOR = Synchrotron Radiation Facilities, Nuclear Reactors.	RIX (Radioisotope and X-ray) Training Course*
X-ray equipments	X-ray Training Course

* RIX Training Course includes the content of X-ray Training Course.

Those who have finished a RIX Course do not need to take a X-ray Training Course.

The schedule of UTokyo Training Courses is shown on the web site of UTokyo Isotope Science Center.

Departmental Courses in School of Science

- 1) You must take a departmental course in School of Science before you start radiation handling.
- 2) Following three departmental courses are available in School of Science:
 - a) General Departmental Course,
 - b) Departmental Course at Department of Biological Sciences (Science Bldg. 3),
 - c) Departmental Course at the affiliated facility, Center for Nuclear Study (CNS).Those who belong to Department of Biological Sciences (Science Bldg. 3) (except for users of X-ray equipments) and CNS should take the course given at their department. Others should take a General Departmental Course.
- 3) Radiation workers must take a departmental course periodically (once a year) to maintain their status as a registered radiation worker.

Health Examination for New Registrants

- 1) At the health examination, you are required to hand in the notice of your health examination issued from UTokyo Isotope Science Center.
- 2) The notice of your health examination will be issued after your application of registration as a radiation worker. It will take one or two weeks to receive the notice.
- 3) You will need to have further medical checkup when the medical doctor judges it necessary.

Periodic Health Examination

- 1) Radiation workers must have a health examination periodically.
- 2) The periodic health examinations for radiation workers are made twice a year by using a questionnaire. The questionnaire cards are sent to every research group from Radiation Management Office. Radiation workers should answer the questions.
- 3) A medical doctor of Health Service Center checks your answer. You will need to have further medical checkup when the medical doctor judges it necessary.

Health Examination in Case of Extraordinary Exposure

When the following incidents should occur, contact immediately someone who is concerned with radiation management (see Communication Network for Radiation Emergency)*. The fact of your radiation exposure will be checked, and you may be sent to a medical examination in case of necessity.

- (a) You have taken a radioisotope into your body by mistake.
- (b) The contamination level of your skin with a radioisotope exceeds the limit.
- (c) Your wound is contaminated with a radioisotope.
- (d) Your effective dose exceeds 5 mSv per year or your tissue dose equivalent exceeds 3 tenths of the limit. For example, a part of your body is directly exposed to X-ray beam from an X-ray equipment.

* In case the situation is urgent and you have no choice, contact directly University Hospital.
Emergency Room, University Hospital (at night, on weekend and on holidays)

TEL 34100
 (03)5800-8683

Luminess Badge Dosimeter

We use Luminess badge dosimeters to monitor radiation workers of School of Science, The University of Tokyo.

- 1) Wear a suitable type Luminess badge dosimeter.
SG-type: X-ray, β -ray, and γ -ray
KG-type: X-ray, β -ray, γ -ray, thermal neutron, and fast neutron
- 2) Wear your dosimeter when you enter controlled radiation areas.
- 3) We recover all the distributed dosimeters and send them to the Nagase-Landauer Company for the measurement of dose. Return your used dosimeter to the Laboratory Manager of your laboratory and receive your new dosimeter from him/her at the beginning of every month.
- 4) The report of the result can be checked on the monthly report sent to your lab.

Organization

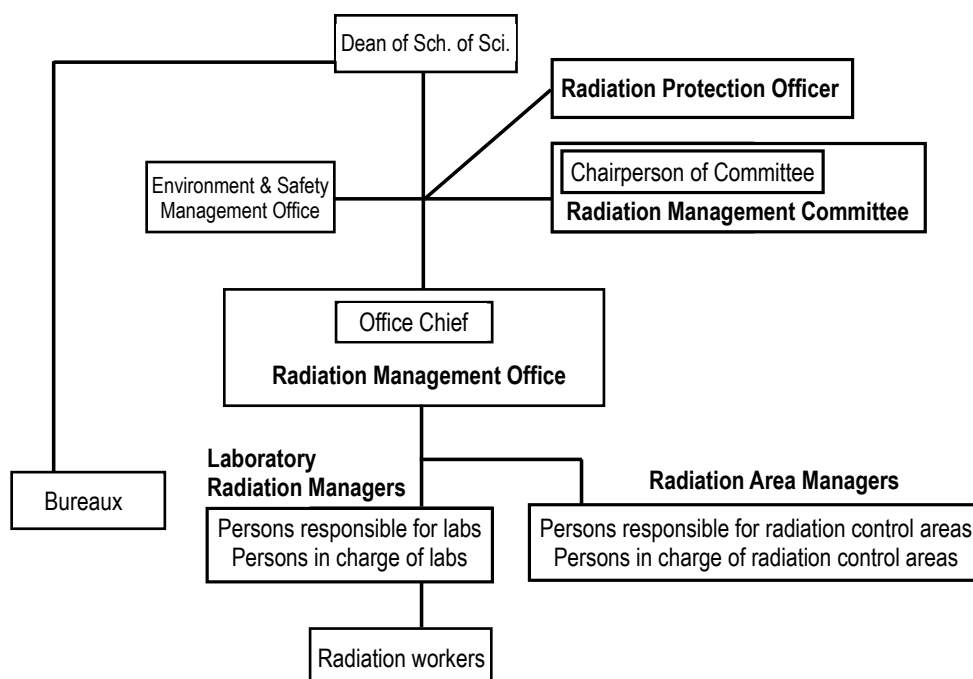


Fig.4 The diagram of the organization for general radiation workers (category RIX) in the School of Science, The University of Tokyo and personnel in radiation management and protection.

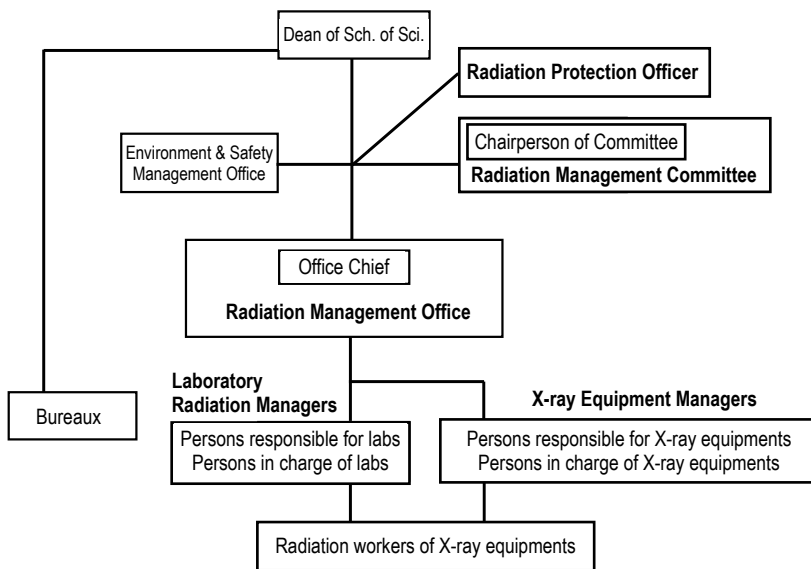
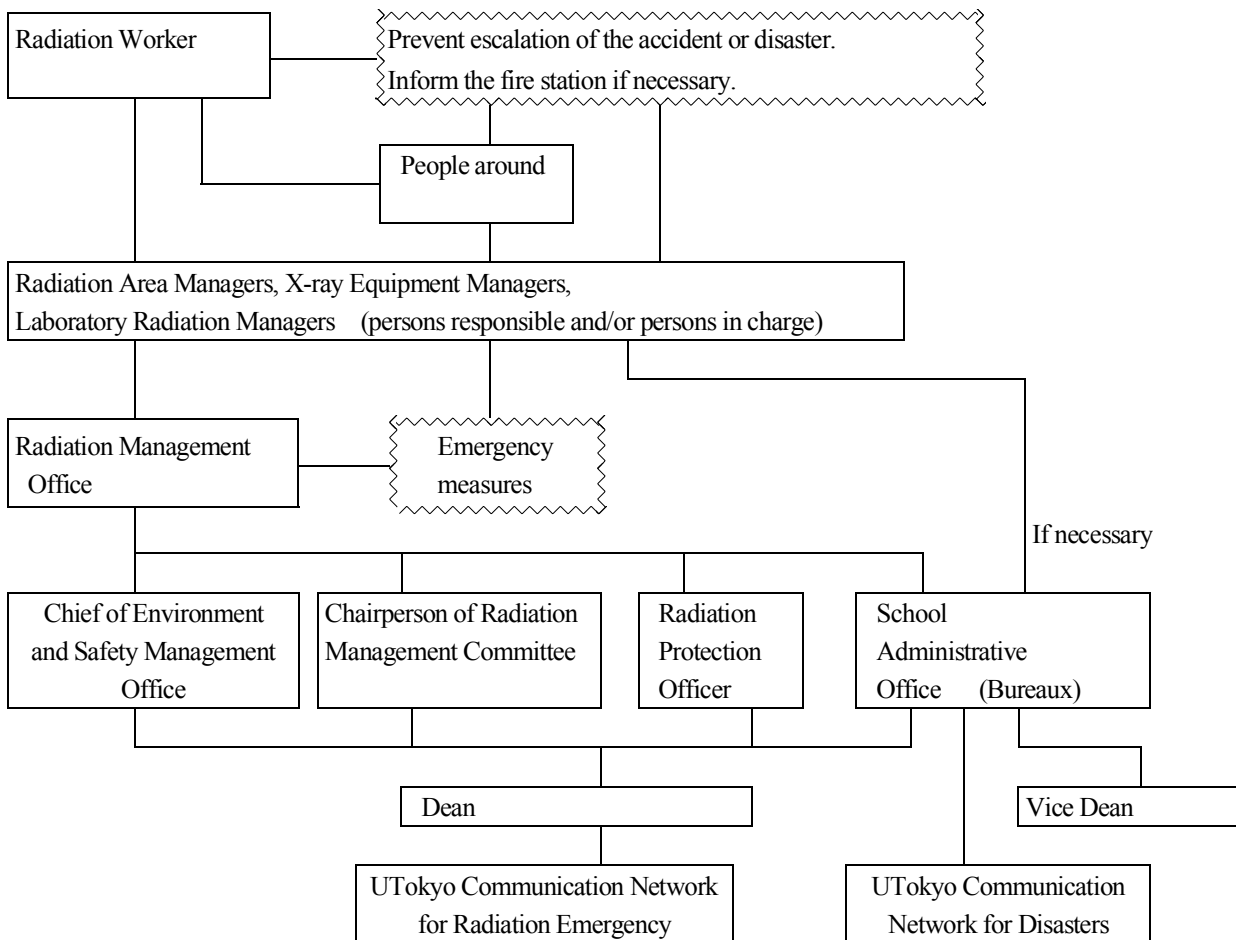


Fig. 5 The diagram of the organization for radiation workers who use X-ray equipments and personnel in radiation management and protection

Communication Network for Radiation Emergency



Contacts (May 2020)

Application for registration of radiation workers Change of registration of radiation workers	Radiation Management Office (Those belonging to the Department of Physics must make their application at the first or second department office.)
Application for UTokyo training courses	Each department office or Environmental Safety Office TEL <input type="text"/> ext. 28868
Distribution and recovery of Luminess badge dosimeters	School Administrative Office TEL <input type="text"/> ext. 24030
Application for authorization as radiation workers, Issue of certificates, Application forms for accelerator and SOR facilities Purchase, transfer, transportation, and disposal of radioisotopes Installation and change of radiation facilities Registration of X-ray equipments and electron microscopes Report of the result of tests of X-ray equipments and electron microscopes Unusual radiation incidents, accidents, and problems	Radiation Management Office

Radiation Management Office, School of Science, The University of Tokyo

locality in Room B283, School of Science Bldg. 1 East, B2F
staff H. A. Torii, M. Tanikawa, H. Tozawa and N. Hyogo
E-mail ri-jimu@chem.s.u-tokyo.ac.jp
TEL ext. 24606 direct line/ mobile phone (03)5841-4606
FAX ext. 21363 direct line/ mobile phone (03)5841-1363

Tips for Safe Handling of X-ray Equipments (Categories A and B)

- 1) Never invalidate the safety device.
- 2) Follow the equipment manager's directions.

Tips for Safe Handling of X-ray Equipments (Categories C, D, and E)

- 1) Never insert any parts of your body into X-ray beam.
 - 2) Shut down the generator power when exchanging your samples.
 - 3) When the above is impractical, confirm the shutter being closed.
 - 4) Improve working process and/or the equipment, make possible exposure time shorter.
 - 5) Users of equipment with exchangeable targets should check leakage of X-rays by survey meter at each time.
- It is desirable to keep record in a fixed format.

Safety in Radiation Generating Equipment Facilities (Accelerators, SOR Facilities, Reactors etc.)

- 1) Follow the rules of the facility.
- 2) Follow the directions of the radiation manager of the facility.
- 3) Wear your personal dosimeter while you work in controlled area. As a general rule, a dosimeter capable of detecting neutrons must be used.
- 4) Do not enter the accelerator zone while beams are generated from the accelerator. The radiation level in the zone is very high during the time.
- 5) Be careful of radiation from radioisotopes produced by nuclear reactions. Measure the dose rate by using a survey meter when you start your work.