

*Section 10***Radiation Producing Equipment**10.01 Description

Radiation producing equipment includes X-ray fluorescence, X-ray diffraction, cabinet radiography, accelerators, field radiography machines, medical radiography machines, and electron microscopes. Other machines may qualify depending on the intended application of the radiation produced.

All such radiation producing machines must be registered with the California Department of Health Services within 30 days of acquisition or disposal. Contact Radiation Safety sufficiently in advance of purchase or disposal.

10.02 Authorization Procedures

Individuals procuring radiation producing equipment must complete and submit to EH&S an "Application for Authorization to Use Radiation-Producing Machines" form (Appendix B-14). Depending on the machine type and proposed use, the application may require the review and approval of the full Radiation Safety Committee.

An "Ionizing Radiation Authorization for Radiation-Producing Machines" (Appendix B-13) is issued to a user whose application has been approved. The IRA for radiation producing machines describes the operating parameters of the machine, name of authorized user, personnel dosimetry requirements, and controls related to machine use.

10.03 Machine Use Requirements*Training*

For each specific machine used, radiation producing machine operators must be trained and familiar with the machine's engineering controls, administrative procedures and polices related to machine safety. This On-the-Job-Training must be documented on the "Training and Experience Record for Radiation Producing Machine Use" form (Appendix B-12). This form must be completed for each individual user and submitted to EH&S within 30 days of the beginning of work with ionizing radiation producing machines.

In addition, all analytical X-ray machine users must either view the video "The Double-Edged Sword" or attend an EH&S sponsored X-ray safety course. The video is available at Kerr Hall's Learning Lab (Room 2160) and at the EH&S Bldg. for viewing. Contact the Radiation Safety Office for more information on upcoming courses.

Operator Safety

Operators who use a machine under an IRA must maintain an operational guide specifically designed for their particular machine. Each individual assigned responsibility for operating the machine must be thoroughly familiar with the operational guide prior to assuming duties as an operator. The operation guide and safety instructions for each machine shall be posted nearby or made readily available for review. In order to prevent operation of a machine by unauthorized personnel, positive control of the machine must be maintained at all times. This may be in the form of a key or computer password which is required to energize the machine.

A use log for each machine must be maintained and made readily available for review. The use log includes information regarding the machine operator, date of operation, tube current, and voltage. Additionally, a current list of users authorized to operate the machine must be posted near the machine or readily available.

When working with an accessible beam, machine adjustments should be made, whenever possible, with the beam off or shutters closed. No modifications in the operational safety features may be made unless these have received prior approval of the Radiation Safety Office, EH&S. No part of the body should be within 3 inches of the main beam or high-level scatter. Shielding the beam with an interlocked enclosure is strongly recommended. Fail-safe warning lights, which warn of the production of X-rays, must also be clearly visible and installed near the beam shutter and the control console. Personnel not involved in machine operation should not be in close proximity to the machine. If required by the IRA, radiation monitoring badges must be worn by operators during machine operation.

Posting/Labeling

A current copy of the IRA must be visibly posted near the radiation producing machine. The State of California Dept. of Health Services "Notice to Employees" must be displayed in a conspicuous location where machine users may observe it on their way to or from work. EH&S approved "Caution: X-ray" stickers or signs must be posted on all entrances to the room(s), near the machine key switch, and near the tube head or shutter(s).

Radiation Surveys

Prior to use, newly acquired machines will be surveyed by Environmental Health and Safety in order to determine the effectiveness of shielding and other engineering and procedural controls. EH&S will also conduct an annual radiation survey and inspection of machines. Radiation survey measurements of machines should also be conducted whenever major repairs or tube replacements have been made. It is recommended that a radiation survey meter be kept nearby to survey for scatter radiation and to verify that X-rays are being generated.

10.04 Disposal or Transfer of Machines

Environmental Health and Safety must be notified prior to disposition, transfer of ownership, or change in machine location. The State Department of Health Services must be notified within 30 days of changes in machine status.

10.05 Exemptions

Users of electronic products which produce X-rays only incidental to operation may, depending on the product and/or the results of radiation survey measurements, may be exempted from the issuance of an IRA. Such exemptions may include electron microscopes (scanning electron microscopes), ion-implanters, and cathode ray tubes. Users of exempted machines are not obliged to comply with the training requirements detailed in Section 10.03.