Radiation Emitting Devices
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Appendixes

- Application for Registration of Designated Radiation Equipment in the Province of Alberta
- Application for Radiation Dosimetry Service
1. Radiation Emitting Devices Safety Program

The University has established Radiation Safety Programs for radiation emitting devices specifically the Laser Safety Program and the Radiation Emitting Devices Safety Program – for Diffraction, Analytical, Cabinet and research based x-ray equipment. The safety programs reference the applicable sections from the Alberta Radiation Protection Act and Regulations. All occupational exposures to both ionizing and non ionizing radiation shall be limited in accordance with the ALARA principle (As Low As Reasonably Achievable) and within legislated prescribed dose limits. The University of Calgary’s Radiation Emitting Devices Safety Program is designed to keep exposures to ALARA through training and implementation of standard operating procedures and protocols to control the storage, use and disposal of X-ray generating and emitting equipment.

2. Scope

The Radiation Emitting Devices Safety Program applies to all faculty, staff and students working with research X-ray generating equipment and devices.

Research x-ray equipment is an electrically powered device with a primary purpose of producing x-rays. These machines may analyze materials or structures or are medical devices that are being used in novel and new applications and are therefore not intended or approved for use in any medical purpose on humans or animal exposure.

Research X-ray source is any part of a device that emits x-rays, whether or not the device is an x-ray machine. The Alberta Radiation Protection Regulations list the following types of equipment and refer to the equipment as “radiation emitting devices” these devices are subject to this program:

- Cabinet x-ray equipment;
- Diffraction and analytical x-ray equipment;
- Industrial x-ray equipment;
- Irradiation x-ray equipment;
- Particle accelerators;
- Diagnostic or therapeutic x-ray equipment;
- Computed tomography equipment;
- Baggage inspection x-ray equipment;
- Security x-ray equipment

The Radiation Protection Act and Regulation regulates all aspects of radiation emitting devices this includes registration, usage, training, labeling and safety features for all X-ray equipment.

The following documents are the reference supporting standards for some of the designated equipment.

- Radiation Emitting Devices Regulations, (Canada) C.R.C. Vol. XIV, c. 1370
- Safety Code - 35, "Radiation Protection in Radiology – Large Facilities"
- CSA standards - "CAN/CSA-Z-386-14 Safe Use of Lasers in Health Care" published by the CSA International
3. Administration

3.1 Authority and Responsibility

Responsibility for controlling all activities related to Radiation Emitting Devices Safety Program at the University of Calgary rests with the office of General Counsel and Corporate Secretary. The authority in this regard is received from the President of the University of Calgary.

3.2 Radiation Safety Officer

The position of Radiation Safety Officer receives its authority from the Vice President (Finance and Services), through the Director, Environmental Health and Safety. The Radiation Safety Officer is responsible for coordinating all activities related to radiation safety, this includes radioactive materials and radiation emitting devices and for making recommendations to the General Counsel and Corporate Secretary, through the Radiation Safety Committee, regarding the controlling of all activities related to radiation emitting devices and radioactive materials.

3.3 Principal Investigator

Each principal investigator who uses or directs the use of a radiation emitting device is responsible for complying with the requirements outlined in the Alberta Radiation Protection Act and Regulations, as well as with any additional requirements prescribed in referenced Standard or Health Canada Safety Code.

a) The principal investigator will ensure that all equipment is registered with Environmental Health and Safety office prior to operating any radiation emitting device covered by the Radiation Protection Act and Regulations. Copy of the application form is in Appendix.

b) The principal investigator will ensure that all authorized users are trained on each specific radiation emitting device under their control.

c) Ensuring that personnel wear appropriate personal radiation monitors, if required.

d) Maintain a list of authorized Radiation Workers.

3.4 Authorized Radiation Workers

Each Radiation Worker who uses a radiation emitting device is responsible for complying with the requirements outlined in the Alberta Radiation Protection Act and Regulations, as well as with any training requirements prescribed in University of Calgary Safety Programs.

Authorized Radiation Workers will be faculty members, technical support staff, graduate students, or individuals under the direct supervision of the PI with experience in the safe use of X-Ray equipment and who have successfully completed training.

Each authorized Radiation Worker is responsible for:

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a) Following the standard operating procedures as prescribed by the manufacturer of the equipment and any requirements specified by the Principal Investigator or the Radiation Safety Officer.

b) Allowing only authorized persons to enter rooms that are specified as restricted areas for reason of radiation protection.

c) Supervising students using the x-ray equipment and instructing them in safe and responsible procedures for using these devices or machinery.

d) Wearing personal radiation monitors, if required.

e) Reporting to the Radiation Safety Officer any incidents involving suspected exposures to ionizing radiation exceeding permissible standards.

f) Ensuring all X-ray equipment when left unattended is in a secure and safe condition.

g) Coordinating all acquisitions of X-ray equipment and with the Radiation Safety Officer, prior to the sources arrival.

h) Coordinating all disposal activities with the Radiation Safety Officer prior to any equipment leaving the campus.

4. General Precautions

Where ever possible, exposure shall be reduced by using appropriate shielding, increasing the distance from the source and reducing the amount of time spent working with or around the energized x-ray source.

5. Permissible Doses

All occupational exposures from radiation emitting devices shall be limited in accordance with legislation and the ALARA principle.

5.1 Radiation Worker

a) The exposure from sources of ionizing radiation shall normally be controlled in such a way as to provide assurance that no individual or user shall receive an absorbed dose in excess of the values outlined in the Table below.

<table>
<thead>
<tr>
<th>Maximum allowable occupational exposure – Annual Dose limits</th>
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<tbody>
<tr>
<td>Column A</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Applicable Body Organ or Tissue</td>
</tr>
<tr>
<td>Whole body</td>
</tr>
<tr>
<td>Lens of the eye</td>
</tr>
<tr>
<td>Skin</td>
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September 1, 2016
b) “Radiation Worker” means any person who in the course of his work or occupation is potentially exposed ionizing radiation in excess of the annual dose list in Column C in the Table above.

c) Any Radiation Worker who becomes pregnant shall notify her supervisor and complete the Declaration of Pregnancy form and inform the Radiation Safety Officer as soon as she is aware of her condition. The dose limit for the balance of the pregnancy will be 4 mSv received by the abdomen of a pregnant Radiation Worker.

5.2 Personal Dosimeter and Exposure Reports

All persons required to wear a dosimeter must complete an Application for Radiation Dosimetry Service form and forward to EH&S. Application form is at the end of this document. All dose records are reviewed and retained by the Radiation Safety Officer and a copy of each report will be mailed out to each Principal Investigator to forward to the Radiation Worker.

6. Radiation Level Surveys of X-Ray Equipment

For x-ray equipment, an annual radiation level survey is required. Contact the Radiation Safety Officer to arrange for a survey.

7. Obtaining and Registration of X-Ray Equipment

All purchases or acquisitions of X-ray equipment must be registered with the Radiation Safety Officer. Acquisitions include gifts, loans, purchases, and transfers from external off-campus institutions.

When receiving any X-ray equipment:

a) Report receipt of equipment by Principal Investigator or designate to the Radiation Safety Officer.
b) All equipment must be inspected immediately upon receipt.
c) Ensure a radiation survey is available from supplier.
d) A radiation survey of new x-ray equipment shall be carried out before it is put into operation. Contact the Radiation Safety Officer to arrange survey.
e) All X-ray equipment must be registered with the University of Calgary Environmental Health and Safety as per Radiation Protection Act. Application forms for registering the equipment is available for EH&S.

f) All X-ray equipment must be CSA or ULC approved prior to use.

8. Security

a) Only authorized Radiation Workers may have access to X-ray equipment and all X-ray equipment must be secured at all times from unauthorized personnel.

b) Energized X-ray equipment must be attended at all times. Non-energized equipment must be secured by locking the laboratory door when not attended.

9. Equipment Inventory

A current inventory of X-ray equipment shall be maintained by the Principal Investigator, and a copy forwarded to the Radiation Safety Officer. The inventory is to include equipment in use and equipment in storage.

10. Warning Signs and Labels

Rooms where X-ray equipment is used must be signed.

a) Entrances to areas containing X-ray equipment must have a sign that has a warning symbol and the words “Caution X-ray Radiation”.

b) Contact the Radiation Safety Officer for posting of warning signs.

11. Disposal of equipment

Contact the Radiation Safety Officer for the disposal of all X-ray equipment. Arrangements will be made through the Radiation Safety Officer for disposal.

12. Emergency Procedures

September 1, 2016
All radiation incidents (excessive exposure, loss of equipment, etc.) must be reported immediately to the Radiation Safety Officer. Contact Campus Security at (403) 220-5333 at any time.

13. Training

All authorized radiation workers will participate in a training program.

14. Communication

The Radiation Safety Policy and program will be communicated to all authorized users of X-ray equipment and relevant administrative support units in consultation with departmental chairs/academic directors.

15. Program Performance

The policy and program will be reviewed biannually.
Application for Registration of Designated Radiation Equipment in the Province of Alberta

Environmental Health and Safety
MSC 260, 2500 University Dr. NW
Calgary AB T2N 1N4
Telephone (403) 220-7653
Fax (403) 284-1332
Email: radsafe@ucalgary.ca

A. Reason for Application (check one for each line)

Owner:  
- [ ] New
- [ ] Reapplication
- [ ] Renovation

Facility:  
- [ ] New
- [ ] Reapplication
- [ ] Reactivation

Equipment:  
- [ ] New
- [ ] Reapplication
- [ ] Modification
- [ ] Replacement
- [ ] Relocation

B. Owner information

Name:  University of Calgary
Address:  2500 University Dr. NW
City:  Calgary  Postal Code:  T2N 1N4

C. Facility Information

Facility Name:  
(if applicable)
Building:  Room:
Faculty:  Department:

D. Principal Investigator and Equipment Contact Person Information

Principal Investigator Name  Email address
Contact Name  Email address

September 1, 2016
E. Equipment Information

Location of equipment within facility: ________________________________

Type of equipment (select one)

- [ ] Stationary
- [ ] Portable
- [ ] Mobile
- [ ] Temporary use until ________________________________ yyyymm/dd

Manufacturer: ________________________________

Model Number: ________________________________

Serial Number: ________________________________

Manufacture Date: ________________________________

F. Type of Designated Equipment (choose one type of laser or x-ray equipment)

**Laser Equipment**

- [ ] Laser Class 3b (IIIb)  Beam path fully enclosed - yes no
- [ ] Laser Class 4 (IV)  Beam path fully enclosed - yes no

**X-ray Equipment**

Group 1 Equipment - Construction and occupancy information must be available for review by an Authorized Radiation Protection Agency for Group 1 equipment.

- [ ] Fluoroscopic
- [ ] Radiographic (including dental)
- [ ] Computed Tomography

Group 2 Equipment

- [ ] Cabinet
- [ ] Diffraction and/or Analytical x-ray
- [ ] Industrial Radiographic

G. Owner acknowledgement

Owner Signature: ________________________________

Date: ________________________________

I certify that to the best of my knowledge the information contained in this application is complete and accurate and that this equipment and the radiation facility associated with its use comply with the Radiation Protection Act and Regulation.
### Application for Radiation Dosimetry Service for X-ray Use ONLY

**PLEASE PRINT**

Name: __________________________ Surname: __________________________
 Previous Surname: __________________________ Given Name: __________________________ Initial: __________________________

Date of Birth: __________________________
 Year/Month/Day

Place of Birth: __________________________
 Province: __________________________
 Country: __________________________

Social Insurance Number: __________________________

**X-ray Safety Course Date:** __________________________
 *(The National Dose Registry maintains records by S.I.N.)*

University of Calgary Email Address: __________________________

**Classification:**

- [ ] Undergraduate Student
- [ ] Faculty Member
- [ ] Post-Doctoral Fellow
- [ ] Research Associate
- [ ] Graduate Student
- [ ] Other: __________________________

**Year of Program:**

- [ ] 1st Year
- [ ] 2nd Year
- [ ] 3rd Year
- [ ] 4th Year

**PROGRAM:** __________________________

**COURSE:** __________________________
 *(Environmental Sciences, Veterinary Medicine, Chemistry, etc.)*

**Participant Supervisor:** __________________________

**Signature:** __________________________

**DOSIMETER TYPE**

- Whole Body
- Left Ring
- Right Ring
- Pregnant Worker

Please indicate type of dosimeter(s) you are applying for. For extremity dosimeter indicate S, M, L for ring size.

**DOSIMETER STORAGE**

<table>
<thead>
<tr>
<th>Building</th>
<th>Room</th>
</tr>
</thead>
</table>

**Previous U of C Service?**

- [ ] Yes
- [ ] No

Do you have a current Dosimeter?

- [ ] Yes
- [ ] No

**AUTHORIZED**

Signature of Responsible Authority for X-ray Unit: __________________________

Location of X-ray: __________________________

Building | Room
----------|------

Responsible authority for x-ray unit is responsible for the cost of unnecessary, lost, damaged, or late dosimeters.

Radiation Safety Use

Delivered by: __________________________

Date Issued: __________________________

Subaccount: __________________________

The information on this form is collected under the authority of the Freedom of Information and Protection of Privacy Act. It is required to for the acquisition of a Dosimeter to measure personal radiation dose estimates. This information will be provided to the Dosimetry service provider, the Canadian Nuclear Safety Commission, Radiation Protection Branch of Health Canada. If you have any questions about the collection or use of this information, contact Radiation Safety at 220-6345.

September 1, 2016