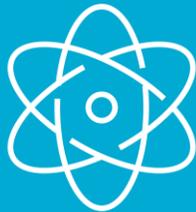


Personal exposure monitoring for ionizing radiation (dosimetry)

OHS information for employers and workers

Key information

Radiation workers who use ionizing radiation equipment or an ionizing radiation source **must** wear a personal exposure monitoring device (dosimeter) provided by the employer.



Dosimetry is the simplest, most cost-effective method available to monitor personnel working with radiation.

- Alberta's Radiation Protection Regulation requires that radiation workers – workers who use or are directly involved in the use of ionizing radiation equipment or an ionizing radiation source – are provided with an appropriate monitoring device (dosimeter) “badge”, supplied by the employer, to monitor their personal exposure to ionizing radiation.
 - This includes students undergoing a course of instruction involving the use of ionizing radiation equipment.
- The dosimeter **must** be provided by a dosimetry service provider licensed by the Canadian Nuclear Safety Commission.
- Radiation exposure is measured in millisieverts (mSv).



Who needs to be “badged”?

Radiation equipment operators and personnel who routinely participate in radiological procedures **must**

wear personal dosimeters when using the following equipment:

- Diagnostic or therapeutic x-ray equipment used by medical, dental, chiropractic, veterinary or other health professionals.
- Industrial x-ray equipment.
- Irradiation x-ray equipment.
- Particle accelerators.

Operators of the following radiation equipment do not need to wear personal dosimeters, unless they are likely to receive a radiation dose in excess of one mSv over a 12-month period.

- Analytical x-ray equipment (including portable, hand-held open-beam XRF devices).
- Cabinet x-ray equipment.
- Security x-ray equipment.
- Baggage-inspection x-ray equipment.

Any worker who exceeds this dose limit **must** be classified as a radiation worker and be provided with a personal dosimeter, supplied by the employer.

Alberta's Radiation Protection Regulation specifies the following maximum effective dose limits for ionizing radiation:

Person	Exposure Period	Effective Dose Limit (mSv)
Radiation worker	One year	50
	Rolling five calendar years	100
Pregnant radiation worker	Balance of pregnancy after informing employer	4

Person	Exposure Period	Effective Dose Limit (mSv)
Student undergoing a course of instruction involving the use of ionizing designated radiation equipment	One year	1
Person who is not a radiation worker	One year	1

Professionals such as physicians, dentists, chiropractors and veterinarians are not required to wear personal dosimeters unless they routinely participate in radiological procedures. However, their professional colleges and associations recommend that they be badged, as they move around within the radiation facility.

How do I use and maintain my dosimeter?

For whole body monitoring, dosimeters **must** be worn on the trunk of the body, either at the waist or chest level. When protective clothing is worn, e.g. a lead apron, the personal dosimeter **must** be worn underneath the apron. If eyes or extremities are likely to be exposed to significantly higher doses due to the radiological workload at the facility, additional dosimeters should be worn at the neck level or on the hands. Personal dosimeters **must** be worn by only one individual, not shared. Dosimeters should be worn throughout the workday. This will ensure measurement of any exposure a staff member may receive, even if they are not participating directly in a radiological procedure at the time.

Occupational exposures to pregnant workers arise mainly from scattered radiation. In this case, the

most effective method of monitoring exposures to the fetus is to use a personal dosimeter to measure the equivalent dose to the surface of the abdomen. Dosimetry service providers offer pregnancy dosimetry services for workers over their gestation period, where the dosimeters are exchanged on a more frequent basis.

Whole body dosimeters are exchanged quarterly, except for industrial radiographers, who exchange their whole body badges bi-weekly. In addition to a personal dosimeter, industrial radiographers **must** use an electronic alarm dosimeter (active dosimeter) that will emit an audible signal when the equivalent dose rate reaches or exceeds five millisieverts per hour (mSv/h) or where the total equivalent dose reaches or exceeds 2 mSv.

Between periods of use, the dosimeters **must** be stored according to the dosimetry service provider's recommendations. Dosimeters should be stored in a secure, properly shielded location to avoid registering exposures from the radiation equipment in the facility and from extraneous sources such as direct sunlight or fluorescent lighting.

Can I wear my badge at more than one facility?

Although there is no regulatory guidance for this, most professional colleges and associations have a policy that each dosimeter badge registered within a facility remains at that one facility and is not used or transferred by any means to another facility. If an owner owns more than one facility, each facility **must** register, use and monitor its own dosimeter badges. Staff cannot use the badge(s) for multiple facilities. Also, in the case of an overexposure investigation, the use of the same badge at multiple facilities would make it very difficult to determine where the exposure came from.

It is recommended that each facility have a control badge to differentiate elevated exposures that may have occurred at the facility from those that may have occurred during shipping of the dosimeter badges. It is also recommended that each radiation facility have a visitor's badge, which can be used by

temporary staff, students or visiting professionals. The visitor's badge is not to be worn by more than one person.

Record keeping

Employers submit the badges to a licensed dosimetry service provider, who reads the badges and sends the results back to the radiation facility and to the National Dose Registry (NDR). Dosimetry records **must** be kept for at least five years, and the radiation workers **must** be informed of and have access to these records. It is recommended that facilities keep dosimetry records for as long as the radiation worker is employed at the facility.

What if I don't agree with my exposure report?

In some cases, a worker may identify a perceived inaccuracy in their exposure report and request a correction to their dose-related information. This requires federal, provincial, or territorial jurisdiction approval and the worker **must** complete a Dose Information Change Request. The submission includes:

- An investigation of the event prompting the request.
- Reasons for requesting the dose information change.
- Description of the circumstances and time frame involved.
- Calculations to support the request, when applicable.
- Other relevant information, as determined by the regulator or a radiation protection specialist, e.g. a brief description of the person's work history and dose history.

Upon approval by the appropriate regulatory authority, the Dose Information Change Request is sent to the dosimetry service provider for submission to the NDR.

(From: Health Canada's Guidelines for Making Changes to Dose-Related Information in the National Dose Registry webpage -

www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/federal-provincial-territorial-radiation-protection-committee/guidelines-making-changes-dose-related-information-national-dose-registry.html.)

The National Dose Registry

Health Canada's National Dose Registry (NDR) maintains a database of occupational exposures to ionizing radiation going back to the 1940s. It contains the dose records of individuals throughout their career. The main functions of the NDR are to:

- Assist in regulatory control by notifying regulatory authorities of overexposures within their jurisdiction. Provide dose histories to individual workers and organizations for work planning and for compensation and litigation cases.
- Evaluate dose trends and statistics to answer requests from regulators and others.
- Contribute to health research and to the scientific knowledge on risks from occupational exposure to ionizing radiation.

(From Health Canada's National Dose Registry webpage - www.canada.ca/en/health-canada/services/environmental-workplace-health/occupational-health-safety/occupational-radiation/national-dose-registry.html.)

NDR provides the following services to workers and employers:

- **High Exposure Notifications (HEN)** – If a worker exceeds a radiation dose limit set by a federal, provincial, or territorial jurisdiction, a HEN is sent to the employer, the appropriate jurisdictional regulatory authority and the Canadian Nuclear Safety Commission (CNSC).
- **Personal Dose History Summaries (PDHS)** – Workers can request a PDHS from the NDR, showing the details of any radiation exposures they may have received throughout their career.
- **Employee's Dose History Summary (EDHS)** – Employers and prospective employers can obtain an EDHS from the NDR upon written consent of the radiation worker. The employer or prospective

employer can obtain personal dosimetry records from workers who are engaged in services with multiple employers to ensure the worker's annual permissible occupational dose limit has not been exceeded prior to undertaking the work at hand.

Collection and use of personal information by the NDR is in accordance with the federal *Privacy Act* and the *Department of Health Act*. Social insurance numbers (SIN) are required as unique identifiers, and the NDR is authorized to collect them as per the Directive on Social Insurance Number.

If a person chooses not to provide their SIN, the dosimetry service provider will not be able to maintain that person's accumulated lifetime exposure record, and the record will not be passed on to the NDR. In this situation, the radiation facility will be responsible for updating the individual's dose record when dose reports are received. Also, in the absence of centralized radiation dose records, there will be no notification of an overexposure sent to the radiation facility.

If a person decides they want to have their exposure records updated in the NDR and failed to previously provide the required information to the dosimetry service provider, a fee will be charged for creating or updating this information. At that time, the NDR will only be able to enter the data if the mandatory information (including SIN) is provided, and lifetime dose may be incomplete as past doses will not have been recorded in the NDR.

By using dosimeters and a licensed dosimetry service provider, individuals establish their personal dose history that shows the details of any radiation exposures they may have received over the course of their career. This can provide peace of mind to workers who have worked with sources of radiation.

Contact Us

OHS Contact Centre

Anywhere in Alberta

- 1-866-415-8690

Edmonton & area

- 780-415-8690

Deaf or hearing impaired:

- 1-800-232-7215 (Alberta)
- 780-427-9999 (Edmonton)

PSI Online Reporting Service

alberta.ca/report-potentially-serious-incidents.aspx

Website

alberta.ca/occupational-health-safety.aspx

For more information

Radiation health and safety resources

www.alberta.ca/radiation-health-safety-resources.aspx

National Dose Registry

www.canada.ca/en/health-canada/services/environmental-workplace-health/occupational-health-safety/occupational-radiation/national-dose-registry.html

Dose information change requests

www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/federal-provincial-territorial-radiation-protection-committee/guidelines-making-changes-dose-related-information-national-dose-registry.html#appendixb

Get copies of the *Radiation Protection Act* and Regulation

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Occupational Health and Safety

<https://www.alberta.ca/radiation-legislation.aspx>

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