



National
Defence

Défense
nationale

CHIEF MILITARY PERSONNEL / CHEF DU PERSONNEL MILITAIRE



CAF Museum Radiation Safety Program

CAF Museum Radiation Safety Program

09 June 2025, OMMC

Cplc/MCpl Mary-Pier Touchette

DHH-5

Mary-Pier.Touchette@forces.gc.ca

Canada



- Definitions
- Use of radium
- Why it is important
- Radium in the CAF Museums
- CAF Museums Radiation Safety Program
- What's new
- Goals & Challenges
- Museum categories
- Swipe test
- Questions and suggestions



- Radioactive: “Sending out powerful and very dangerous rays when the nuclei (=central parts) of atoms are broken up” (OED)
- Radium: “a radioactive element found naturally in the environment (...) long-lived (it’s half-life is more than 1,600 years) and decays with time into radon gas, and then finally stabilizes as lead” (CNSC)
- Contamination: “the process or fact of making a substance or place dirty or no longer pure by adding a substance that is dangerous (...) ” (OED)



Source: gallica.bnf.fr / Bibliothèque nationale de France

- Discovered by Marie Curie in 1898
- Did many experiments
- FWW Mobile “X ray” units

Use of radium



- 1920's -1930's
- Promoted as a miracle substance

12 New York Tribune November 10, 1918

Radium and Beauty

HERE are the first toilet preparations to embody Actual Radium, an astonishing new force for betterment, applied as an aid to Beauty. Learn how the amazing Energy of Radium has proved a boon to the human skin. Learn what Radium actually means to Beauty and how its power is employed in "Radium" Preparations. Study our \$5,000 guarantee. Then turn to "Radium" Toilet Requisites. When you have used, enjoyed and tested them you will adopt them as your own first aid to Beauty.

PREHISTORIC woman first discovered her change in skin quiet jungle pool. Ever since Beauty has engaged the world's attention. Radium, though new to the world, is no less of a shining wonder. Its marvellous energy and vitality is all that is needed to make the most ordinary woman a Beauty. Radium is the only element that has been found to be so beneficial to the human skin. It is the only element that has been found to be so beneficial to the human skin. It is the only element that has been found to be so beneficial to the human skin.

Write Today for This Vastly Interesting Booklet

Radium Beauty

RADIUM CO., LTD., of LONDON, 235 Fifth Ave., New York

Customers: Please mail me a copy of your booklet, "Radium and Beauty". I understand that this request places no burden or obligation upon me.

Name: _____ Address: _____

RADIUM TOILET REQUISITES OBTAINABLE AT Leading Department Stores of New York, Brooklyn and Newark and Liggett's Drug Stores

Radium Co., Ltd., of London 235 Fifth Avenue, New York 107th Street, London, W. 1

If your Dealer cannot supply you immediately with a...





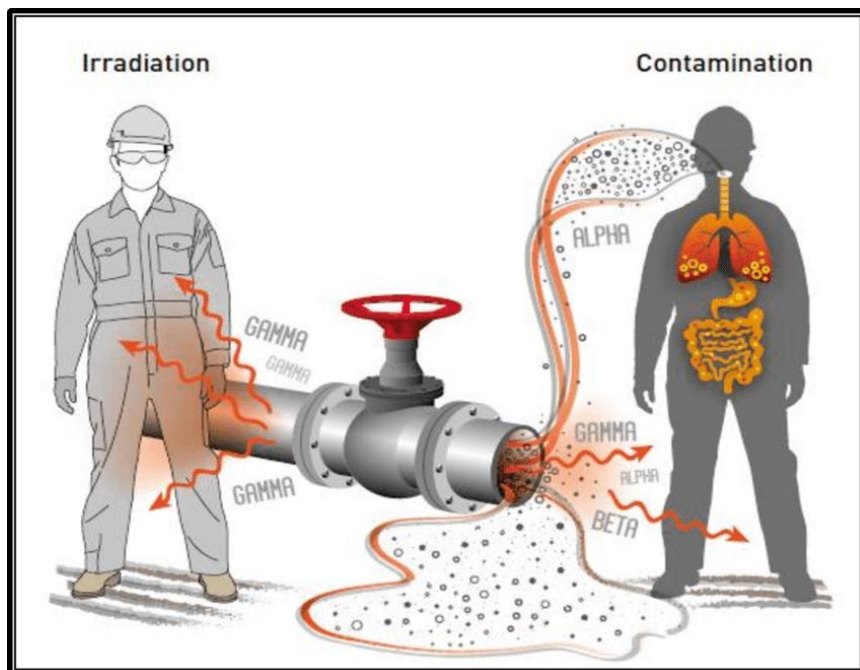
- 1930's – 1940's
- UNDARK
 - Radium Corporation
 - Use of radium paint applications
 - Watches and Military Dials





- Radium Girls
- The Beginning of Labour Rights and workers compensation
- Physiological effects
 - Bone seeker
 - Alpha Radiation
 - External vs Internal Hazard

Why it is important



Radium in the CAF Museums



Radium in the CAF Museums





CF Museum Radiation Safety Awareness Guidance for Museum Staff and Volunteers



Introduction

Prior to 1970, Radium self-illuminating paint was applied to many military and civilian devices. This radioactive paint would cause the display faces of dials and gauges to "fluoresce", or glow in low light or in the dark. The paint was composed of a phosphorus base that would glow when exposed to the energy emitted from the radioactive isotope Radium-226.

Most radioactive dials today will no longer glow in the dark because the radioactive energy has degraded the fluorescent properties of the paint. However, although the paint may not glow, the dial remains as radioactive as it was the day it was manufactured.

Today there are thousands of these dials and gauges in Canada. Many of these dials and gauges are in the possession of CAF Museums and Historical Collections. Although NATO countries stopped using Radium in the 1960's, former Warsaw Pact (Soviet) countries continue to use radium equipment with Radium self-illuminating paint.

Identifying Self-illuminating artefacts

Some artefacts may be marked with the following radiation-warning symbol:



However, numerous items are donated to museums and these may not have been screened for Radium paint. Without the proper survey equipment, it is impossible to definitively identify Radium dials. However, if the dial, gauge, or compass is from a vehicle or aircraft predating 1970, look for paint on the hands or face of the dial that is off-white or yellowish in colour. In most cases the dials will no longer glow in the dark, yet remain radioactive.

Here are some of the typical artefacts that you may encounter that use Radium paint:



Toggle Switch with Radium Tip.



Avionic Panel with Radium Toggles, Stencilling and Dials.



Aircraft Instrument Panel.



Military Magnetic Compass.

The main applications of Radium were used on aircraft dials, military communications equipment and

Hazards

Under normal display conditions, the risk associated with these items is low. However, if these artefacts may release small particles, they could come in contact with you. In turn, this could result in ingestion of small particles of radioactive material, which has the potential to present health hazards.

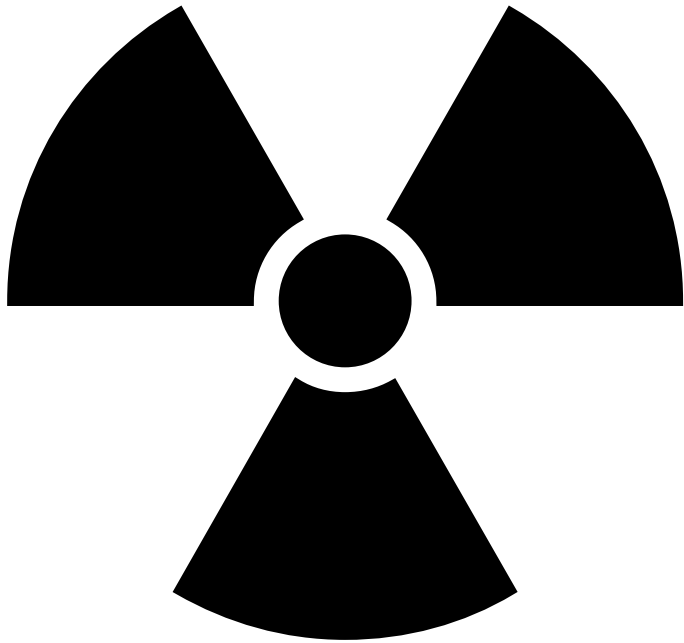
Radium dials that are not damaged are not a source of penetrating radiation. While this is normally at low risk, personnel should limit their contact with these artefacts.



A Damaged Gauge from a Willis Jeep.

Accessioning Artefacts that may be Radioactive

Any artefact which has not been screened for radioactive paint and is suspected to have radioactive paint, should be "bagged". Bagging an artefact in a Zip Lock bag with any loose contamination is considered an artefact with a trefoil alerts other personnel to suspected radioactive source present.



Training now available on DLN through self-registration:

- Ionizing Radiation Safety Awareness – MITE 301562
- Radiation Safety Specialist – AIOL

Swipe testing through mail for category 2 museum



Category 1 Museums

Have 11 or more radioactive items

Category 2

Have 1-10 radioactive items

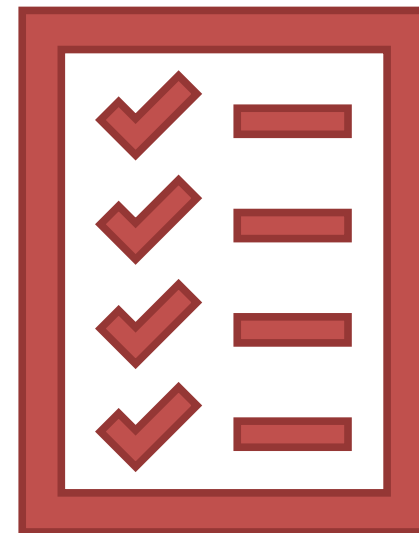
Category 3

No Radioactive Items

- Limited on-site visits by DHH RadSO
- **DHH will respond to situations or coordinate with a RadSO in your region to assist**



- Get all museums radiation safety program established
- Provide Radiation Safety Awareness Training
- Coordinate DHH and D N Safe visit by establishing 3 groups
- Coordinate Annual report
- Coordinate swipe testing for category 2 museums



Museum Check List for each category



Item	Details	Cat 1	Cat 2	Cat 3
1	RadSO Qualification:	Radiation Safety Specialist – AIOL	✓	N/A
		Ionizing Radiation Safety Awareness (DLN) – MITE 301562;	✓	N/A
		Appointed individuals shall receive informal training from the DHH RadSO.	✓	✓
2	A/RadSO qualification	Radiation Safety Specialist – AIOL	✓	N/A
		Ionizing Radiation Safety Awareness (DLN) – MITE 301562;	✓	N/A
		Appointed individuals shall receive informal training from the DHH RadSO.	✓	✓
3	Record of Appointment	The RadSO and A/RadSO require a letter from the Museum Director or the Commanding Officer appointing them to these duties.	✓	N/A
		Annual radiation safety awareness training for the staff and volunteers of the museum and attendance logs retained on file as proof of program delivery. Radiation safety training can be done by using the Radiation Safety Awareness Pamphlet provided by DHH. Contact information in case of emergency or questions should also be provided.	✓	✓
4	Awareness Training			
5	Radiation Monitoring Equipment			
6	Equipment Identification	Any received artifacts which are screened and contain radioactive isotope(s) must be identified as such with a warning label (trefoil) from DHH.	✓	✓

Museum Check List for each category



7	Controlled Access	loose artifacts in storage are kept in a storage locker in a locked room with controlled access from the general public.	✓	✓	✓
8	Inventory Control and Shipping	radioactive artifacts in their holdings. When the museum sends items via freight, the corresponding, paperwork must be retained on file.	✓	✓	✓
9	Authorization	The museum's authorization (permit) must be publicly posted (such as on the health and safety board).	✓	✓	✓
10	May or may not apply: Inventory Posted (storage)	if the dose rate of the storage container exceeds 2.5uSv/h outside the storage box, the room used for storage requires a listing of the isotopes in the room, including contact information for the RadSO and	✓	✓	N/A
11	May or may not apply: Radiation Hazard Warning (storage)	The door to the storage room requires a warning label (trefoil) if the dose rate in parts of the room exceed 2.5uSv/h.	✓	✓	N/A
12	Fire and Police Notification (storage)	isotopes and their storage location needs to be made to police and fire services and records of these transmissions to be held on file (template is provided	✓	✓	N/A
13	Swipe Test	storage container when holdings change and/or annually (depending on the Museum category) coordinated by DHH in April every year or every three years.	every year	every three years	N/A
14	Annual Report	Each Category 1 Museum shall submit an annual report outlining critical program activities no later than 15th April of each calendar year using form DND 4540. Category 2 and 3 Museums across DND/CAF shall be consolidated into one annual report to be submitted by	✓	N/A	N/A



0 Radioactive artefacts

- Only 2 CAF museums in this section
 - RadSO and A/RadSO
 - Qualification: Annual radiation safety awareness training
 - Record of appointment and training
 - Equipment: TBM3
 - Authorization (permit) must be posted
 - Annual report is completed by DHH

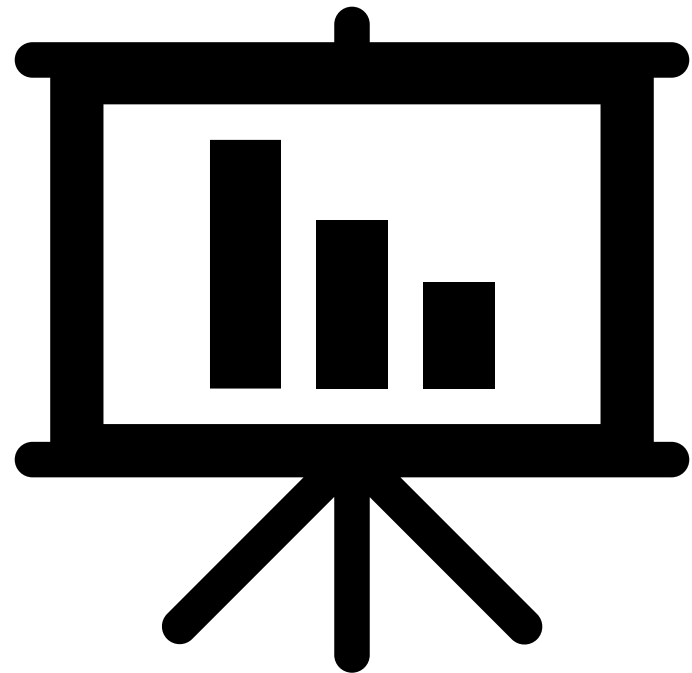




1-10 radioactive artefacts

Most of the CAF Museums

- RadSO and A/RadSO
- Qualification: Annual radiation safety awareness training and Ionizing Radiation Safety Awareness – MITE 301562
- Record of appointment and training
- Equipment: TBM3
- Radioactive artefacts need to be identified and under controlled access
- Inventory of radioactive artefacts
- Authorization (permit) must be posted
- Swipe test of the storage every three years
- Annual report is completed by DHH





11+ radioactive artefacts

About 15% of the CAF Museums

- RadSO and A/RadSO
- Record of appointment and training

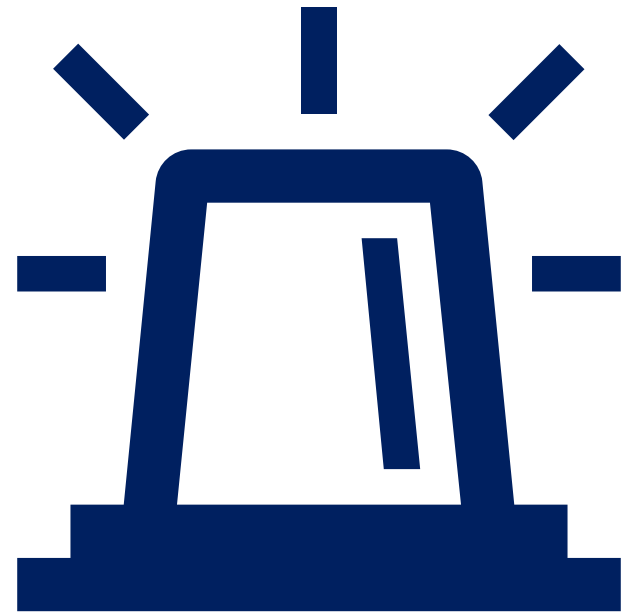
Qualification:

1. Annual radiation safety awareness training
 2. Ionizing Radiation Safety Awareness – MITE 301562
 3. Radiation Safety Specialist – AIOL
- Record of appointment and training
 - Equipment: TBM3
 - Radioactive artefacts need to be identified and under controlled access





- Inventory of radioactive artefacts
- Authorization (permit) must be posted
- Might need to notify fire and police department
- May need to label their storage
- Swipe test of the storage every year
- Annual report is completed by the museum



Swipe test



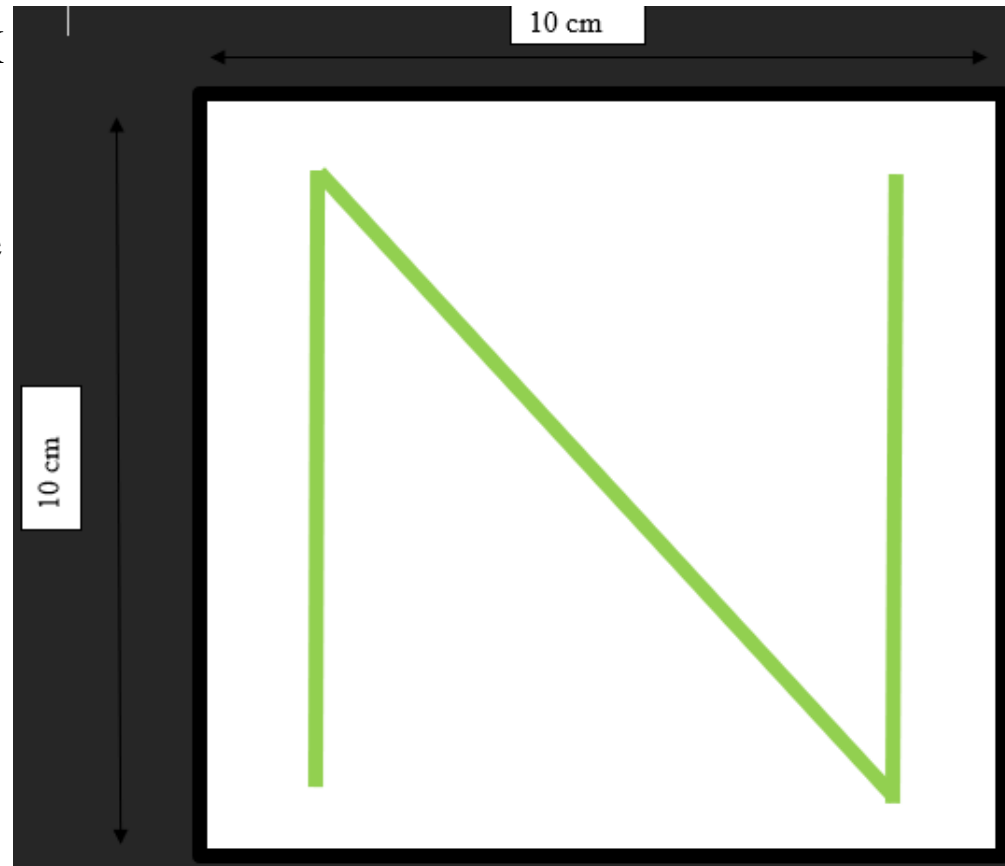
- Detect removable radioactive contaminations from surfaces
- Purpose:
 1. Monitor for contamination
 2. Ensure compliance
 3. Identify contamination
 4. Evaluating decontamination



Swipe test procedure



1. Put gloves on
2. With a sharpie or tape, trace a 10cm X 10cm square
3. Take a swipe
4. Trace a N or Z in your square with the absorbing surface facing the area being swiped
5. Fold the swipe in two, with the absorbing surface facing in
6. Put the swipe in a plastic bag (Ziploc)
7. Put the sealed swipe in the bigger plastic bag
8. Remove and throw your gloves in any normal garbage bin
9. Wash your hands





**Questions &
suggestions?**