



# Performing Forensic Identification Tasks in a Radiation Environment

Produced by the Canadian Nuclear Safety Commission and Royal Canadian Mounted Police  
for First Responders

**THE FOLLOWING ARE RECOMMENDATIONS ONLY.  
LOCAL OR PROVINCIAL PROCEDURES AND PROTOCOLS MUST BE FOLLOWED.**

## WORKING SAFELY

- Establish maximum permissible doses and back-out dose rates. Personal Alarming Dosimeter (PAD) should be set to alarm at 500  $\mu\text{Sv}$  for dose and 1 mSv/h for dose rate.
- Stage in a clean environment at background dose rates (0.25  $\mu\text{Sv/h}$ , and contamination free) and establish proper personal protective equipment (PPE).
- Use any prior RECCE information to your advantage; in the absence of any information, a quick gamma dose rate survey of the outside of the building/scene perimeter may indicate the location of any "hot spots".
- Calculate potential doses (dose = dose rate x time spent near source).
- Use the ALARA principle and utilize time, distance and shielding to reduce dose.
- If trained to safely work in a radiation environment and equipped with a calibrated gamma survey meter, contamination meter, remote handling tools of various lengths and a dense shielded container (lead pig), remediate radioactive sources to lower radiation dose rate fields. **IF UNSURE, SECURE SCENE AND CALL FOR HELP:**
  - Find radioactive sources and document location. If required, take a photograph including the gamma survey meter to show the dose rate reading at the location.
  - Weigh dose rate threat against likelihood of finding prints on a source before swiping (prints are extremely unlikely on a stainless steel sealed source).
  - Swipe exterior using tongs (with latex gloves on the tips) and check for loose contamination.
  - If the swipe is clean, place source in shielded container using tongs. If swipe is dirty, place source in plastic bag first (always handle with tongs).
  - Verify that dose rate at source location has decreased.

## CONTAMINATION CONTROL

- Avoid cross contamination. Assume all surfaces are contaminated. Take swipes to check for loose radioactive contamination before touching anything. Measure the swipe in a location where background levels are at their lowest.
- Lay plastic sheets or plastic bags under your gear to prevent it from coming into contact with potentially contaminated surfaces.
- Wear disposable boot covers (e.g. Tyvek® booties) when entering the scene and remove them before leaving the scene.
- Bring garbage bags and containers for all the radioactive waste.
- Practice Clean-Person/Dirty-Person techniques. Dirty-Person takes all samples and lifts prints while the Clean-Person provides support by retrieving equipment and measuring for contamination.
- Always double glove (Dirty-Person changes gloves often).
- All personnel, equipment and exhibits must exit the controlled area through a decontamination point.

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**Canadian Nuclear Safety Commission 24-hr Duty Officer's number: (613) 995-0479**





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(continued)

## FINGERPRINTS AND DNA

Swiping surfaces to check for radioactive contamination may destroy fingerprint or DNA evidence. Balance the value of collecting evidence with the need to check for contamination.

- Check for contamination on surfaces that are poor for finding fingerprints or DNA.
- If using powder, check the brush and powder container for radioactive contamination after dusting each potentially contaminated area. Discontinue use of contaminated brushes and powder and dispose of them as radioactive waste.
- Photograph prints at the scene. The lifts may pick up contamination and must be checked before being taken from the scene. If a print lift measures more than twice the background level it should never be removed from its plastic bag. If the photograph is good, consider leaving lift behind.
- Check for radioactive contamination on DNA swipes/swabs. One swipe can be used to check for removable contamination and kept for DNA analysis (if clean).

## COLLECTING RADIOACTIVE SAMPLES

The Canadian Nuclear Safety Commission enforces the *Nuclear Safety and Control Act* and therefore must be contacted for any crime scene involving radioactive materials. Samples of radioactive materials are collected to identify the type of radiation and the origin of the radioactive material. If taking samples of radioactive material, consider the following:

- Almost any media (soil, water, clothing, etc.) is acceptable.
- Avoid samples with other hazards (biological material, chemicals, etc.).
- Choose samples with no other forensic value.
- Small samples (a few millilitres or a few grams) are generally enough.
- Ideally, radiation readings from samples should be approximately 10 to 100 times the background levels.
- Any container with a good seal will do. Always double bag.
- Consider setting up secure (temporary) storage of contaminated exhibits at the scene.

## TAKING CONTAMINATED EXHIBITS THROUGH DECONTAMINATION

Most forensics laboratories will not accept contaminated exhibits. However, removal of some contaminated exhibits for safekeeping or for analysis by nuclear laboratories may be required.

- Ensure all potentially contaminated exhibits are well sealed in their evidence bags.
- Swipe the outside of the bag and measure the swipe in a location where background levels are at their lowest to confirm the absence of loose contamination.
- Contamination meter readings more than twice the background level are a clear indicator of the presence of contamination.
- Maintain continuity of evidence through decontamination by having the collecting officer (on the dirty side of the line) maintain visual contact until exhibits are placed in a locked container (on the clean side of the line), or having one officer on the clean side take custody of exhibits as they pass through decontamination.
- Under Section 1.19 (1) of the *Transportation of Dangerous Goods Regulations* (SOR/DORS/2001-286), law enforcement officers are exempt from the regulations for the purpose of transporting forensic samples. Ensure transport of samples is always done safely.

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