

## Radiation Protection Concerns for Radiological Crime Scene Management

A crime scene is any physical scene, anywhere, that may provide potential evidence to an investigator. It may include a person's body, any building, vehicles, places in the open air, or objects found at those locations. "Crime scene examination" refers to an examination where forensic or scientific techniques are used to preserve and gather physical evidence of a crime.

The crime scene with radioactive or nuclear material can be understood as the crime scene where, in addition to the necessary measures for the preservation of evidence, it is necessary to use all radioprotection techniques to ensure the personal safety of experts and others involved in the evidence collection and preservation.

Several publications deal with the most different types of radiological protection:

- Occupational Radiation Protection General Safety Guide IAEA Safety Standards Series No. GSG-7, 2018;
- Occupational Radiation Protection: Protecting Workers Against Exposure to Ionizing Radiation Proceedings of an International Conference Held in Geneva, Switzerland, 26–30 August 2002;
- Occupational Radiation Protection in the Uranium Mining and Processing Industry, Safety Reports Series No. 100, 2020;
- Radiation Protection and Safety in Veterinary Medicine, Safety Reports Series No. 104, 2021;
- Protection against Exposure Due to Radon Indoors and Gamma Radiation from Construction Materials – Methods of Prevention and Mitigation, IAEA TECDOC No. 1951, 2021;
- Radiation Protection and Safety in Medical Uses of Ionizing Radiation, Specific Safety Guide, IAEA Safety Standards Series No. SSG-46, 2018;
- Radiation Protection of the Public and the Environment, General Safety Guide, IAEA Safety Standards Series No. GSG-8, 2018;
- Radiation Protection of Itinerant Workers, Safety Reports Series No. 84, 2015;

Each IAEA member state defines, based on its criteria, the person who can access a crime scene containing radiological and nuclear material. Whether from the police, military, secret service agents, firefighters, special groups of law enforcement agents, experts from regulatory authorities, scientists and professors from universities and research centers, and even prosecutors and other technicians and specialists at their own discretion.

Those who work at crime scenes with radiological or nuclear material (despite not always being occupationally exposed workers) may thus be considered temporarily during action in the crime area with radiological or nuclear material.

There is no specific IAEA guide on how to protect these agents in RSCM activities. The Occupational Radiation Protection General Safety Guide IAEA Safety Standards Series No. GSG-7, 2018 defines a group as the "emergency workers." This group of emergency workers can be further divided into three categories (I, II, and III – regarding different kinds of actions), but this is for emergency workers.

Eventually, the document Radiation Protection of Itinerant Workers Safety Reports Series No. 84 of 2015 could be used as a starting point for regulation or guidance on how to effect radiological protection for those involved in the management and handling of crime scenes with radiological and nuclear materials. The definition of Itinerant Workers is an occupationally exposed worker, who work in supervised and (or) controlled areas at one or more locations and are not employees of the management of the facility where they are working.

Along with the three fundamental principles of radiological protection (Justification, Optimization, and Limitation of individual doses), we could add the Prevention of accidents in workplaces, with risks considered and analyzed in the design of facilities and equipment and in work procedures involving the use of radiation sources or radioactive material to minimize the probability occurrence of accidents.

However, in this specific case, it is not possible to talk about a facility design or even a work plan, given the variety of situations where a crime scene can occur from smuggling material in postal, customs, or border facilities to theft in nuclear or radioactive facilities to even places subject to exposure from a dirty bomb or RDD.

To general recommendations such as

- Use adequate protection
- Avoid undue exposure to radiation
- Minimize exposures
- Avoid the unnecessary presence of people in the scene

- Correct handling of the Basic Principles of Time, Distance, and Shielding

More specific recommendations are added, such as

- Training and dissemination of concepts of radioprotection and work with radiation sources, mainly for professionals without training in the area, mainly military, police, law enforcement agents, health care personal
- Take all necessary preventive measures to avoid accidents that lead to its contamination as well as the contamination of evidence and evidence
- Maintenance of the evidence and evidence chain of custody
- Always use the individual monitor during working hours.
- Creation of dose databases of professionals involved in crime scene assistance.

IAEA Nuclear Security Series No. 22-G Implementing Guide ( under revision) is a 2014 document on the process used to ensure safe, secure, effective, and efficient operations at a crime scene where nuclear or other radioactive materials are known or suspected to be present. This publication focuses on the framework and functional elements for managing a radiological crime scene distinct from any other crime scene. The main suggestion of this work is the creation of a specific guide of radiation protection for this RCSM.

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