



Incident during an industrial radiography training session : stuck source

Description of the incident

During a training session on gamma radiography, the trainee, connects the wind-out mechanism and projection tube to the source container but forgets to connect the cable to the source holder. When he tries to expose the source (Ir-192, 740 GBq), the source holder immediately blocks after one turn of the crank, at approximately 25 cm from the container. The trainee is then unable to return the source holder to its storage position.

The trainee calls his supervisor, who is also the qualified radiation protection officer. The supervisor first verifies that it is not necessary to extend the demarcated area, and then decides to solve the problem himself.

Based on the number of turns of the crank by the trainee, the supervisor estimates the position of the source. He plans the recovery accordingly, for example, to not place his hands close to source. He then decides to handle the projection tube at about 1.5 m from the radiograph and then to lift the tube to make the source go back down to its storage position under gravity. The supervisor practices (and times) this operation several times using a dummy projection tube (without a source). He then undertakes the operation and succeeds in recovering the source.

Radiological consequences

The supervisor was wearing passive and active dosimeters as well as an electronic dosimeter on the wrist. His exposure time was very short (a few seconds). The doses recorded were therefore low: 70 μSv for the entire body and 110 μSv for a hand. It should be noted, however, that the dose rate at 1.5 m from the source was approximately 45 mSv/h.

The trainee was classified and was also wearing his dosimeters. The incident happened in a bunker: the trainee stood outside during the recovery of the source, and therefore he was not exposed.

Lessons to be learned from the incident

During gamma radiography, the operator must not force a connection between components, which was done in this case between the wind-out and the source container.

It is expected that radiography companies should have the necessary equipment and procedures to deal with the common failure modes of projection-type containers.. Only in the case of a complex incident, should it be necessary to seek external assistance, for example from the gamma radiography equipment manufacturer.

In this type of incident, it is essential to locate the source. Undertaking radiological checks (dose rate measurements) is the most precise and safest method (i.e. rather than basing it on the number of cranks) .

As was done in this case, it is good practice to plan recovery operations, and then to perform several dummy runs without a source, in order to optimize the actions and the exposure time.

This incident emphasizes the need to closely supervise trainees during their first use of radiography equipment, and internal training procedures should be designed accordingly.

During training, it is also important to instruct trainees on how to act in response to incidents. In this case, the trainee reacted well since he contacted the supervisor immediately and did not seek to recover the source himself.