

STUDY CASE N° 16: INCIDENT IN A TEXTILE TREATMENT PLANT IN FRANCE

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□ Description of the incident

In 1995, at 1.30 a.m. in the depollution department of a textile treatment plant, Mr A notices that the machine which measures the density of detergents to be released into the environment is dirty. He undertakes the cleaning of it. This machine is situated in a noisy, cramped location on an extremely hot pipe. It is located at a height of 3.5 m and is not accessible except with a ladder. There is a warning sign making the risks due to the sealed caesium source (activity 7,4 GBq - 06/30/1989) clearly visible at 2 m from the ground.

Indications relating to the source are written on an engraved plaque, fixed on the container housing this source. To clean the machine, Mr A takes the container completely apart and removes the source. He wedges a piece of paper in the collimator tube and then decides to take it off and to unplug it with compressed air. For this, he takes the tube in his right hand and brings it into another workshop. Suspecting then the presence of the source at the end of the tube, he searches for a dosimeter pen which confirms this presence. He then decides to replace the source in the « source carrier » with a pair of tweezers.

At the end of this operation, he feels a burning sensation in his right hand and is accompanied to the nearest hospital. A few days later he goes to the Institut Curie at the request of the labour physician.

Exposure duration of his hand was 30 to 45 minutes. During the whole operation, Mr A was not wearing any dosimeter.

□ Radiological consequences

Mr A was the only exposed person. An erythema appeared immediately at the end of his period of work, together with a burning sensation (first degree burn). This was followed by an oedema and the development over the course of 2-3 weeks of a large lesion, about 5 cm in diameter. The final result was local necrosis.

Taking into account clinical observations, the dose delivered to the patient's right hand was most likely above 30 Sv. Furthermore, Mr A had a biological "dosimetry" (searching chromosomal aberrations) revealing a whole body dose of 200 mSv.

□ Lessons learned

- The installation of the source in noisy, cramped location, situated on an inaccessible very hot pipe, does not allow for normal surveillance and maintenance and led to the unfortunate initiative of Mr A.
- Mr A's behaviour denotes a poor knowledge of the risks linked to the presence of the source in the machine. The one-week training he received was too basic and it did not make clear the incurrent risks.

- Before undertaking the cleaning of a machine, one must make sure that the radioactive source is properly shielded using a dose-rate meter. In this example, Mr A failed to check the dose rate before cleaning the machine. All of this clearly demonstrates a lack of “radiation protection culture” on the part of the employee who was otherwise a “competent person”.
- The wearing of an electronic dosimeter with alarm could have compensated for forgetting to use a dose rate meter and could have avoided the incident.