STUDY CASE N° 9: RADIOGRAPHY INCIDENT IN ITALY

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❑ Description of the incident

In September 1997, firm A asked firm B to carry out some non-destructive testings on its behalf in the installation of firm A. According to the contract, firm A was to supply its gammagraphic apparatus, whereas firm B would supply its personnel and its radiation protection organization.

On September 29th, 1997 some radiography had to be carried out on a very large 15 cm thick vessel. Since the exposure was expected to last seven hours, workers of firm A and B agreed that the two operators of firm B would return the source to the shielded position at the end of the exposure, collect all the exposed films and leave them in the radiographic laboratory. The next morning a worker of firm A was to replace the apparatus in the source store. The exposure was carried out with a cobalt-60 source of 1221 GBq (33 Ci) between 9 p.m. of September 29th and 4 a.m. of September 30th. At 5.30 a.m. Mr BM of firm A was the first who went to the installation and, as agreed, worked to replace the gammagraphic apparatus in the source store. While collecting the projection sheath, he noticed a metallic noise and he immediately understood the significance and danger. He hurried towards the entrance of the installation and stopped the incoming workers. In a few hours all normal operating conditions were restored.

The doses of Mr BM were estimated as follows:

- Whole body dose: 890 mSv;
- Hand dose: 3.56 Gy;
- Eye lens: 3.56 Gy.

Mr BM was immediately admitted to a hospital; some symptoms of a radiation dermatitis were present but soon faded away.

With regard to the radiation protection organization, both firms A and B had a very good record: apparatuses were frequently checked, safety procedures were adequate and available on site, all the workers had been given good quality portable monitors and were normally used to record the dose rates. Furthermore, all the workers of the two firms had been adequately informed about risks associated with radiations; in particular, the workers of firm B had attended a refresher course just three months before.

It was concluded that the two workers of firm B misconnected the remote control cable with the source holder, so that the source was pushed to the working position, but it could not be returned to the safety position at the end of the irradiation. Further they did not switch on their portable dose rate monitor. When they collected the exposed films at the end of the irradiation, they had to be in a position quite close to the source, but the vessel thickness shielded the two workers from significant irradiation, as none was detected by their personal dosimeters.

❑ **Lessons learned**

Cable-source holder connection: All the overexposures were triggered by a misconnection between the source and the remote control cable. It is evident that this is the weakest point of the gammagraphic apparatus. Researches should be stimulated to design new systems. Furthermore, this problem is not limited to the Italian situation, since all the apparatuses used are produced abroad.

Periodic safety controls: Firms operating with such apparatus should be more careful with the periodic checks on the safety systems of their apparatus.