

STUDY CASE N° 17: INCIDENT INVOLVING A GAUGE SYSTEM

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□ Description of the incident

The incident occurred in the UK, and involved a level gauge system containing a 1 GBq caesium-137 source. The source assembly fell out of the shielded housing onto the ground below. An employee subsequently picked it up and took it to a control room where it remained for almost 2 days. The presence of an unshielded source was eventually recognised by a supervisor, who was investigating the non-operation of the gauge. He immediately threw the source assembly out of the window, after which he buried it in a soft mud bank around which he set up an appropriate exclusion zone. The source was subsequently recovered (by NRPB) and placed in a shielded container.

□ Doses to workers

Workers did not wear personal dosimeters. Consequently, a reconstruction of the incident, and dose rate measurements were used to estimate the doses received by the employee and the supervisor. The results are given in the table below.

Person	Estimated whole body (effective dose)	Estimated (equivalent) dose to fingers
Employee	2 – 3 mSv	300 mSv max
Supervisor	0.05 mSv	0.04 mSv max

It is worth noting that the doses received could have been considerably higher.

□ Lessons learned

- Gauging systems are a very common application, and it is extremely rare for the source to fall out under normal operating conditions. In this case, the source housing was subject to constant vibration, and this certainly was a major factor in a securing bolt becoming loose. This problem can readily be addressed at the design stage, for example through the addition of a locking pin. Operators should also ensure that regular checks on the integrity of source housings are undertaken, especially where harsh environmental factors exist.
- An early indication of the loss of the source was provided by the failure of the gauge system itself. Operators should be aware of this and put procedures in place to immediately check the location of the source in the event of such a failure.
- Providing employees with suitable information, instruction and training is important - even for those who do not directly work with radiation sources. In this case, simple radiation awareness training (location of the sources on site, what they look like inside and outside their containers, basic precautions, who to contact, etc) could have helped avoid any radiation exposures.