



## Lost radiography source leading to exposure of many personnel

### Description of the incident

A remote exposure radiography container, containing a 550 GBq iridium-192 source, was being used to examine a weld on a steel vessel. On completion of the exposure, the winding mechanism was used to return the source to its container. During this procedure the portable dose rate monitor located at the winding position recorded a drop in the external dose rate from the source, and this was assumed to mean that the source had been returned to the container.

However, when the equipment was used five days later the resulting radiographs were all blank, revealing that the source was missing from the radiography container; obviously the source had been lost. After a search the source was found near the location at which it was last used.

Later investigation showed that the source had become detached, for some unknown reason, and had fallen from the guide tube during dismantling. The dose rate monitor had not been used correctly to ascertain that the source had fully returned to its container. The noted drop in dose rates at the winding position had arisen because the source had become detached from the drive cable close to the source container, which shielded the dose rate meter from direct radiation from the source.

The source was recovered in a controlled manner by the Radiation Protection Supervisor.



**Source became detached but shielded by container during winding in operation**

## Radiological consequences

It was found that during the five days since the source had been lost 78 persons had been irradiated to some degree. Their estimated doses (effective dose equivalent) are given below.

Number of staff	Dose range (mSv)
2	100–150
4	30–100
9	11–30
63	< 11

The source was in a readily accessible position and had it been picked up during the five days it was missing this would have led to radiation burns and possibly fatalities.

## Lessons learned

1. Sources becoming detached are usually caused by wear in the joint between the source pigtail and the windout cable. It is vital that the level of wear is monitored and repairs carried out as necessary, along with annual servicing of the container and windout gear.
2. The monitor should have been used to fully check around the container to verify the source was in the safe position.
3. Monitoring should have been carried out when the container was returned to the source storage location. This would have identified the source as missing a lot sooner as the dose rate would have been much lower than normal.



**Monitoring close to source container to ensure that source is fully shielded**