



Report from a UK incident

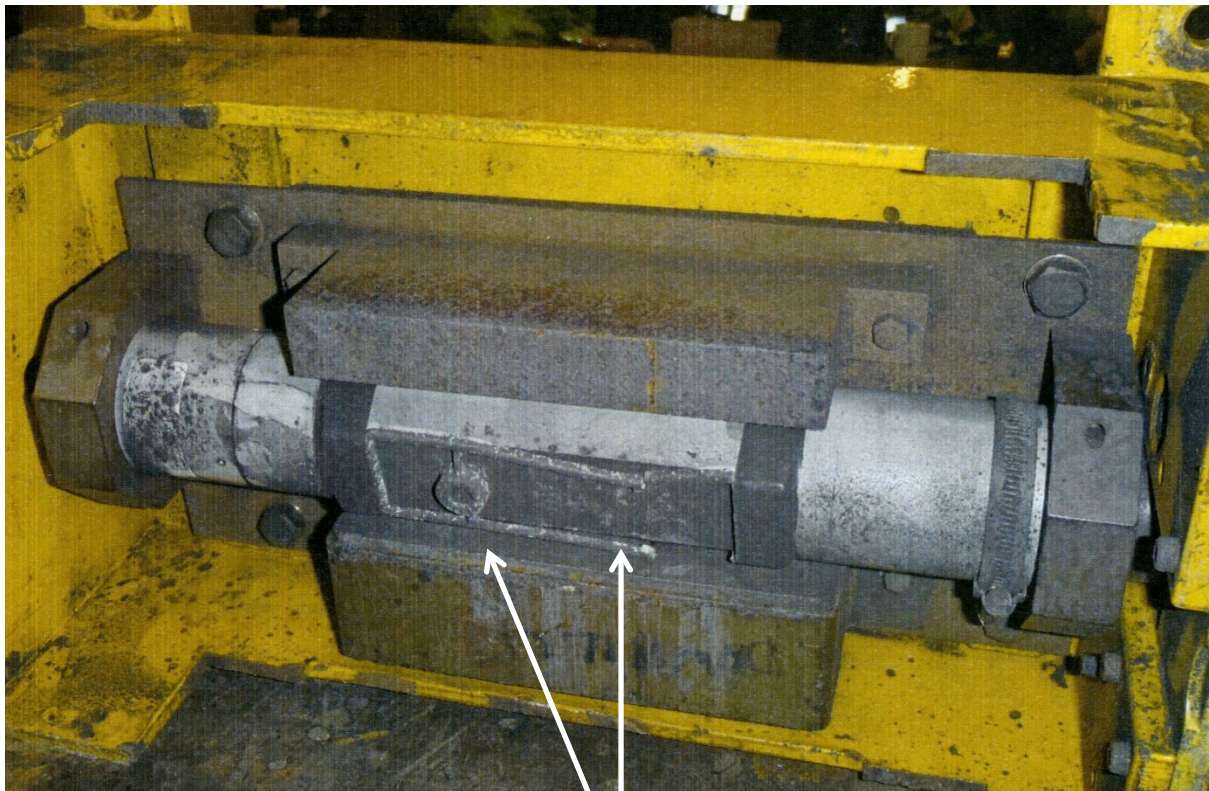
Loss of a source that became detached from a coal ash analyser gauge

Description of the incident

A gauge installed above a coal conveyor contained two 74 MBq plutonium-238 (Pu-238) sealed sources, used to analyse ash content. The two sealed sources were attached to the underside of the gauge.

One of the sources became detached from the gauge and was carried away with the coal on the conveyor. The loss of the source was not discovered until after a few days, by which time the coal had been transported onwards to other sites.

One particular site was identified as the most probable recipient of the coal, and extensive radiological surveys of this site were undertaken. Due to the low energy of the x-ray emissions from the source and the very large stockpiles of coal at the site the probability of detecting the source was considered to be extremely low. Additional surveys were done at locations within the plant and several samples from the site were analysed for the presence of plutonium-238. No evidence of the source was detected.



Picture of the gauge showing location of the sources (the one to the right is missing)



Picture of one of the radiological surveys undertaken to try to locate the missing source

Radiological consequences

The source was not found, and no estimate of doses (to workers or other persons) is available. However, the dose rate at 30 cm from the intact source was less than 10 $\mu\text{Sv/h}$, and it is likely that any such doses (if they were received) were very low.

As a further precaution, an assessment was made of the doses to the public from the possible combustion of the source at the site. These indicated a maximum dose to a member of the public of less than 10 μSv .

Lessons learned

- An additional cover over the underside of the gauge would have prevented the loss of a detached source: a proper risk assessment would have identified this. The design of such an installation should always be optimised, bearing in mind the industrial environment in which it is used.
- Gauge installations must be subject to regular safety inspections: to verify the source location; and also to monitor the physical condition of the gauge installation, so that it can be maintained in good condition.
- It is unclear why the loss of the source was not immediately apparent in the control room, ie from the gauge indicator. Ideally, such indicators should be actively monitored (ie to sound an alarm). If gauges are not operational, then consideration should be given to moving them into a secure storage location.
- Prompt identification and reporting of lost sources is essential.