Report from a UK incident

Engineer exposed after removing beta thickness gauge in paper manufacturing mill

Description of the incident

Scanning gauges incorporating a beta radiation source are used in paper manufacturing mills to measure the thickness of the final product. An incident occurred when a source shutter jammed in a partially open position during routine operation.

A maintenance engineer removed the gauge head containing the source from the framework and carried it to the workshop not realising that radiation was being emitted from the shutter opening. The gauge contained a 10 GBq krypton-85 beta source and was carried with the shutter directed towards his body. The engineer was wearing a personal dosemeter (TLD) at the time of the incident.

The incident was reported to the Radiation Protection Supervisor who carried out an investigation and dose assessment. The maintenance engineer was later given full radiological training, the local rules were modified, and a Perspex shutter cover was made for use in any subsequent maintenance work.

Radiological consequences

The doses recorded by the TLD worn by the maintenance engineer were as follows:

Effective dose equivalent (EDE)	0.0 mSv
Skin dose	55.9 mSv

Lessons learned

- The correct operation of safety and warning devices, including shutters, should be verified on a regular basis. All such devices must be maintained in working condition and undergo appropriate servicing and maintenance, as recommended by the manufacturer, to reduce the risk of malfunction.

- A radiation monitor must be used to confirm that the source shutter is closed prior to maintenance or movement of the gauge head. If the shutter cannot be closed then a temporary shielding arrangement is necessary. In fact, where practicable, it is good practice to fit a suitable (eg Perspex) shield over the source shutter mechanism to protect persons in the event of the shutter inadvertently opening.

- All maintenance engineers who work on equipment containing radioactive materials must be fully trained in the radiological hazards and the precautions to be taken.