



Exposure during the transportation of sealed sources of Iridium 192

Description of the incident

Following the receipt of a package by company X, an abnormally high dose rate was measured - 4 mSv/hr at 25 metres instead of 2 mSv/hr on contact. The type B package contained 366 TBq of iridium 192 in tablet form (intended for the manufacture of sources for industrial radiography). The tablets (3000) were packaged in three tubes (cases) in screw top metal capsules.

The package had been sent by company Y to company X by aircraft. The transport company, T was responsible for delivery of the package which was channeled through airport Z. The sequence of events was as follows:

6:00 pm: Reception of the package at airport Z. The package was grouped with other packages in an aircraft container. It is then handled by company T which takes care of unloading it using an elevator platform and transferring it using a cart to the dangerous substances storage and sorting area located 100 metres from the aircraft parking area.

Having arrived at the storage area, the individual packages were removed from the container and dispatched according to their final destination. The defective package was deposited in another aircraft container, on a mechanical palette in the area reserved for hazardous products. It was then taken to the parking area in order to limit the loading time. The handling is undertaken with a forklift truck, and the package was not moved manually during its passage through airport Z.

11:30 p.m.: The container with the package in question was transferred to the foot of another aircraft to be sent to company X.

The package remained in transit at airport Z for about five and a half hours, and assuming 30 minutes transfer time to/from the storage area, the package was present within Transport company T's facilities for four and a half hours.

The assessment of the package demonstrated that two of the three cases containing the tablets were open, probably because of poor attachment of the screw lids.

Radiological Consequences

The sender of the package (company Y) said that checks carried out upon the package's departure did not highlight abnormal dose rates around the package and that the values were consistent with those expected for this type of package, i.e.:

- less than 2 mSv/hr. on contact, and.
- 25 µSv/hr. at 1 metre, and a Transport Index of 2.5 (Yellow Label III).

The measurements taken in the aircraft (cockpit) before departure, and the dosimeters of the aircraft pilots, did not detect any radiological anomalies, although this could be due to orientation of the package, the distance between the cockpit and the package (20 metres), and the shielding provided by other freight.

The destination company X measured 4 mSv/hr at 25 meters from the upper side of the package, and 0.01 mSv/hr on the other sides. Thus, the radiation leak was in the form of a beam, rather than uniformly around the package.

Biological dosimetry indicated that two agents of company T had received doses of 100 and 15 mSv respectively.

Lessons to be learned from the incident

- At the entrance to the dangerous substances storage area, install a radiation detection system with a pre-programmed alarm threshold. In case of an alarm, additional measurements should be made by suitably trained persons.
- Employees of transportation companies, called upon to handle a large quantity of packages containing radioactive materials, can potentially receive significant radiation doses - high enough to require (category A) classification – even where no abnormal incidents occur. Appropriate measures to optimise the exposures of such staff, including individual dosimetry, should be implemented.
- As well as training on the requirements of the regulations for the transport of radioactive materials, relevant staff should receive training on radiation protection requirements.