

Deadly Flat in Kramatorsk

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Apartment number 85, building 7, Mariyi Pryimachenko Street, Kramatorsk (formerly USSR, now Ukraine), was truly cursed and brought its tenants nothing but misery. Between 1980 and 1989, two families lived here in turn and watched helplessly their children die from leukemia. An 18-year-old daughter died suddenly in 1980, followed by her 16-year-old brother and mother in 1982. Neither of this deaths attracted the attention of the authorities, and the apartment was given to new tenants. Unfortunately, they were not lucky either, as their son soon died of leukemia as well.



Figure 1: The house in Kramatorsk where mysterious deaths occurred

Karansky Quarry Accident

Only after another death, and thanks to the persistence of a new tenant, was the apartment inspected. The inspectors were shocked. They discovered that the children's room was a strong source of radioactive radiation. A large part of the wall had been cut out and examined. Careful examination revealed a radiation emitter in the panel, the kind used in quarries. The marking on the emitter revealed that it

Results matter!

was lost in the late 1970s at the Karansky Quarry.

In quarries, radioactive materials can be used, for example, to determine the density of rocks or the fill level of opaque containers. Despite the fact that the handling of these materials is subject to strict regulations, an accident sometimes occurs. Similar accident happened in early 2023 in Australia. There, an emitter was lost during transport over a distance of 1,400 kilometers. The search was indeed like looking for a needle in a haystack. The emitter is a button-battery-sized cylinder, 8 millimeters in size. Fortunately, the Australian emitter was found at the road the transport was travelling on. Unfortunately, the Ukrainian emitter was not so lucky and ended up in the panel which was used in the construction of the ill-fated house.

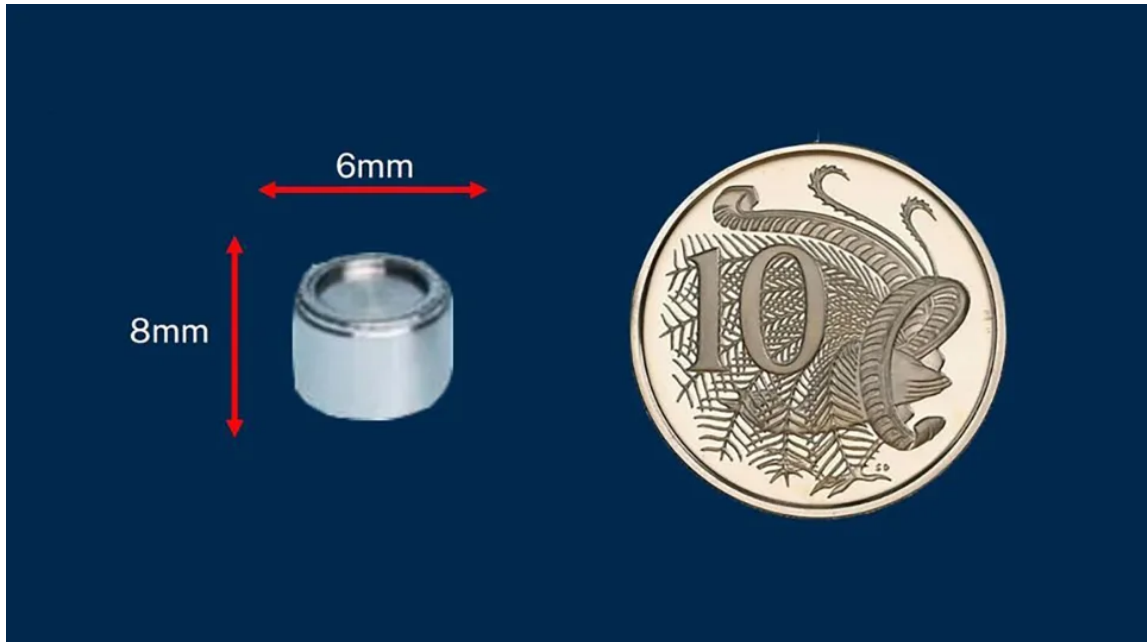


Figure 2: A similar type of radiation source lost in 2023 in Australia

Problem 1. The panel forming the wall of the children's room contains a radioactive emitter. By unfortunate coincidence, it is located right next to one of the children's beds. Try to estimate how much the radiation dose would be reduced if the child's bed was moved to the opposite side of the affected room. Assume that the emitter radiates evenly in all directions. Also, assume that the distance of the emitter from the child's bed was half a meter, and that after moving the bed to the opposite side of the room, the distance increases to three meters, i.e., six times.

Problem 2. The cesium used as the source of radioactive radiation in the incident described has a half-life of 30 years. Determine how long it would take for the radioactivity to decrease by the same factor as after the relocation of the bed as in the previous problem.

References and Literature

Literature

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