

Bulletin 268 Health & Safety

©SSERC 2019 - ISSN 2631-794X

AUTUMN 2019

Aged protactinium generators

- Protactinium generators 8 years old or older will need to be disposed of;
- Disposal will require a specialist contractor.

If you attend a SSERC course on working with radioactive materials, we will show you all the sources you are allowed to buy to study radioactive decay and half life. Two years ago, we made a short video on the subject for SQA [1]. We always stress that, although it is relatively cheap to buy, getting a protactinium generator may be a false economy.

A protactinium generator (figure 1) contains uranyl nitrate (toxic and radioactive), very strong hydrochloric acid (corrosive) and hexyl ethanoate (flammable). If there was a competition for a piece of school science apparatus with the most hazard symbols affixed to it, the protactinium generator would probably win.

Protactinium generators were quite commonplace in schools in the nineteen eighties. The Surplus Source Disposal initiative that took place around 12 years ago removed most of them. At that time, there was no replacement on the market. This changed in late 2011, meaning that the oldest protactinium generators are now around eight years old, an age that, as we shall see, is significant.

Any time you buy a radioactive source, the manufacturer will inform you of its recommended working life (RWL). Sealed sources used to demonstrate absorption of radiation, inverse square law and so on have RWLs of between 5 to 10 years. However, experience has shown that leakage is very rare even after 3 or 4 RWLs. If a sealed source appears in good condition (check using a mirror) and continues to pass its leak test, its RWL can be extended. We cannot do the same with a protactinium generator. The risk of leakage is too great. Its RWL is 8 years. Disposal will involve a specialist contractor. Although it is its chemical toxicity rather than the fact that it is radioactive that necessitates this, most hazardous chemical disposal companies do not handle radioactive material.



Figure 1 - Protactinium generator.

What to do if you have a protactinium generator

- Check your inventory to find out how old it is.
- If it is 8 years old or older contact SSERC on rpa@sserc.scot for advice on getting a contractor to dispose of it.
- If you don't know how old it is and can't find out by contacting former staff members, assume it requires disposal.

Make sure that what you have is actually a protactinium generator. Some schools who went on to buy barium isotope generators (eluting sources) continued to refer to them as 'protactinium generators'.

Unfortunately, disposal costs are likely to run well into three figures, hence the comment about 'false economy'. Please note that hanging on to radioactive material that you cannot use is not an option. <<

Reference

- [1] https://www.youtube.com/watch?v=hCVaLQ_bJ1g&t=5s (accessed August 2019).