

The law on radioactivity is of a complexity that defies belief. One part of it, on exemptions to the Radioactive Substances Act 1993, has just been modernised. This is the part of the law controlling what sources you ('you' in this context meaning a school) are allowed to acquire and keep, and, at the end of the material's working life, how it can be got rid of.

As an aside, to make the point that we are here writing about just one part of the law on radioactivity, albeit an important part, the complete set of legislation that wraps red tape around what is done in schools is shown (Table 1). This means that you cannot just follow one part of the law to get by. All of it has to be considered.

Many of you experienced the inadequacies of the old exemption orders. They were exposed by the National Survey of 2006 and subsequent disposal. From the Survey it was found that almost half of the radioactive articles or materials were being kept without the legal right to do so.

When it came to trying to dispose of those unlawfully-held sources, there were often no easy means of disposal that were within the law. A special contractor, at great expense, was engaged by the government to remove this waste. These difficulties arose because the old exemption orders were not fit for purpose.

There is now one new exemption order replacing the eighteen old ones. The new one strikes a balance between, on the one hand, the recognition that radioactivity is harmful – and, in large quantities, dangerous – and, on the other hand, the fact

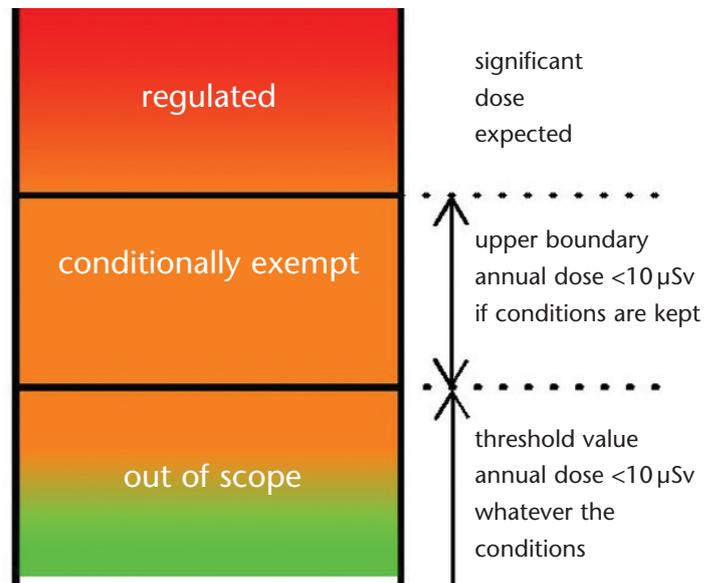


Figure 1 - Control status.

that everything, absolutely everything, whether natural or manmade, is radioactive.

The new law sets threshold values for every type of radionuclide, or concentration thereof. If the activity of a material is below the threshold, the material is 'out of scope' meaning that regulation is not necessary (Figure 1).

If the material is above the threshold, but still within certain bounds, the material is conditionally exempt from regulation, meaning that the controls are a light touch. Anyone wanting to buy an exempt source or dispose of it would not have to apply to the government regulator (SEPA) for a permit.

Legislation on radioactivity	Purpose
Radioactive Substances Act 1993 Exemption Order 2011 [1]	Controls the acquisition, keeping and disposal of radioactive materials
Ionising Radiations Regulations 1999	Sets health and safety regulations – relates to working practices
Justification Regulations 2004	To prevent use of radioactive materials unless there is good cause
Education (Amendment) (Scotland) Act 1984 Circular 1166 (1987)	Sets restrictions and conditions on work by children, students, teachers and schools Controls the acquisition of sources by schools
Transport of Dangerous Goods etc Regulations 2009	Controls shipment by road of radioactive materials

Table 1 - Legislation relevant to schools.

Radioactive material	Regulatory status on acquisition and disposal	Means of disposal
Sealed sources, < 200 kBq	Conditionally exempt	Dustbin
Sealed source, 370 kBq Cs-137	Conditionally exempt	Dustbin after decaying for 30 years
Ba-137m eluting source, < 40 kBq	Conditionally exempt	Article to dustbin Eluate to drain
Thoriated gas mantle	Out of scope	Dustbin
Geological specimens	Out of scope	Dustbin
Protactinium generator (seek advice)	Conditionally exempt	Dustbin (unopened), or chemical waste
Thoriated welding rod	Conditionally exempt	Dustbin
Potassium and compounds	Out of scope	As chemical waste
Orphan source, any article < 40 kBq	Not applicable	Dustbin

**Table 2** - Status of school sources under new exemption order.

However a school must still apply to the Scottish Government Education Directive for permission to purchase a radioactive source. That rule still holds under different legislation (Table 1). To work with materials outside these boundaries, a government permit would have to be applied for and obtained. The materials are then said to be 'regulated'.

The threshold values referred to above are based on the maximum dose of radiation a member of the public might get from keeping and working with out-of-scope materials. This is a dose of 10  $\mu$ Sv/year. It is generally accepted that the risk of harm from a whole-body dose of 10  $\mu$ Sv/year is insignificant.

To understand how this risk-based approach to regulation applies to exempt sources – the second tier of regulation – consider the example of a teacher-demonstration experiment with a sealed source emitting either beta or gamma radiation. The dose to the teacher, provided that standard precautions are taken, is unlikely to exceed 0.1  $\mu$ Sv. With this figure in mind,

only the most dogged teacher-experimenter, of febrile intent, could possibly amass a dose of 10  $\mu$ Sv in one year with one such source. In other words, the annual dose from work with an exempt source is very unlikely to reach the threshold value.

SSERC has put much effort into helping the government draft this new legislation. Here (Table 2) is how it applies to the types of materials now held in schools.

In conclusion, the replacement of the old exemption orders with the single new one is good news for schools. Do take care that although the sources listed in Table 2 are either marked as 'exempt' or 'out of scope' from regulation, these qualifications relate to the Radioactive Substances Act. All of the other regulations in Table 1 apply and should be followed. The law is complicated. That's why schools are obliged to consult with a radiation protection adviser (RPA). The above report is only a rough guide to the new law.

## Reference

[1] <http://www.defra.gov.uk/publications/2011/09/14/pb13624-ep-guidance-radioactive/>