

## **Core of knowledge: Use of radioactive materials in laboratories**

This 'core of knowledge' is the basic level of training in radiation safety an applicant must demonstrate to be granted (additional conditions apply) a licence under the *Radiation Protection Act 1965* to use:

### ***radioactive material***

for the purpose of

### ***scientific practice.***

## **Continuing education**

Once every **3 years**, licensees will be required to demonstrate evidence of continuing education. Guidance on continuing education is available from National Radiation Laboratory (NRL).

## **Training courses based on this core of knowledge**

### **Practical component**

Practical experience with radiation measuring instrumentation is expected.

### **Assessment**

Following completion of a training course, each participant who intends to apply for a licence is required to complete a written assessment designed to confirm that the objectives of the training course have been met.

### **Duration**

It is expected that a training course (including assessment) will be approximately 8 hours in duration.

### **Modules**

Each core of knowledge is made up of standard-modules, and where applicable, one or more specific-modules. A standard-module (small variations can be expected between individual cores of knowledge) is common to all cores of knowledge.

## **Guide to depth of knowledge required**

The depth of knowledge required for each topic is indicated using the following scale:

- (1) Introductory.** Overview and familiarity only.
- (2) Working.** Knowledge gained should be able to be used in problem solving and practical situations.

## Core of knowledge

### Modules

- Standard 1 Nature and sources of ionising radiation**
- Radiation, radioactivity and half-life (1).
  - Types and characteristics of radiation (to include beta, X-ray and gamma) and its interaction with matter (1).
  - Quantities and units (activity, absorbed dose and effective dose) (2).
  - Sources of ionising radiation (natural and artificial) (1).
- Standard 2 Biological effects of ionising radiation and radiation risks**
- Damage mechanisms (1).
  - Whole body and extremity exposures (1).
  - Deterministic effects; skin erythema, cataracts, LD<sub>50</sub> etc (1).
  - Stochastic effects; cancer and hereditary effects (1).
  - International Commission on Radiological Protection's risk factors and radiation risks in perspective (1).
  - Public perception and communication of radiation risk (2).
- Standard 3 International Commission on Radiological Protection's principles of radiation protection**
- Justification (2).
  - Optimisation ('as low as reasonably achievable') (2).
  - Individual dose limits (occupational and public dose limits, extremity dose limits and pregnant workers) (2).
- Standard 4 Legal frame work and regulatory authority**
- The *Radiation Protection Act 1965* and amendments and the *Radiation Protection Regulations 1982* (2). Particular emphasis should be placed on owner and licensee obligations.
  - Role of the National Radiation Laboratory (NRL) and compliance monitoring (2).
  - The reporting of incidents to NRL (2).
- Standard 5 Transport of radioactive material**
- International Atomic Energy Agency's *Regulations for the safe transport of radioactive material 1996* (1).
- Standard 6 Unsealed radioactive materials**
- Internal (including the behaviour of radionuclides in the human body) and external radiation hazards (1).
  - Committed effective dose (1).
  - Types, characteristics and hazards associated with commonly used unsealed radioactive material (1).
- Standard 7 Sealed sources**
- Sealed source manufacture (to include how radionuclides are produced and encapsulated) (1).
  - The meaning and use of Special Form Certificates (1).

**Standard 8 Practical issues associated with the security and disposal of unsealed sources**

- Secure receipt of unsealed sources delivered to laboratories etc. (2).
- Storage of unsealed sources (2).
- Options for disposal of unsealed radioactive material (2).

**Standard 9 Practical issues associated with the security and disposal of sealed sources**

- Sealed source receipt and storage (2).
- Options for disposal of sealed sources (2).

## Modules

### Specific 1

#### Incidents

- Review of incidents reported worldwide (1).
- Practical exercises based on plausible scenarios (including surface contamination) (2).

### Specific 2

#### Practical radiation protection

- *Code of Safe Practice for the Use of Unsealed Radioactive Materials, NRL C1, 1996* (2).
- Radiation safety plans (2)
- Radiation measurement instrumentation likely to be encountered (2).
- Performance of radiation measurements (2).