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## Core of knowledge for a licence to use irradiating apparatus for the purpose of installation and servicing (veterinary x-ray equipment)

This core of knowledge summarises the basic level of radiation safety knowledge an applicant must demonstrate to be granted a licence under the *Radiation Protection Act 1965* to use irradiating apparatus for the purpose of Installation and Servicing, restricted to veterinary x-ray equipment.

Applicants can demonstrate that they have the required knowledge by:

1. completing an NRL-recognised training course (including an end-of-course assessment), or
2. providing documented evidence of other training addressing the core of knowledge.

Please contact the National Radiation Laboratory for further information regarding recognised training courses.

### Required knowledge

Applicants must display knowledge in all of the modules set out below.

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.

#### Module                      **Nature and sources of ionising radiation**

- Standard 1
- Electrical production of X-rays (1).
  - Types and characteristics of radiation (*X-ray, gamma and beta*) and its interaction with matter (1).
  - Quantities and units (activity, absorbed dose and effective dose) (2).
  - Sources of ionising radiation (natural and artificial) (1).

#### Module                      **Biological effects of ionising radiation and associated risks**

- Standard 2
- 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).

#### Module                      **International Commission on Radiological Protection's principles of radiation protection**

- Standard 3
- Justification (2).
  - Optimisation ('as low as reasonably achievable') (2).
  - Individual dose limits: occupational (whole body, extremities and pregnant women) and public (2).
  - Dose constraints (2).

- Module**  
Standard 4
- Legal framework and regulatory authority**
- The *Radiation Protection Act 1965* and amendments and the *Radiation Protection Regulations 1982*. Particular emphasis should be placed on owner and licensee obligations (2).
  - Role of the National Radiation Laboratory (NRL) and compliance monitoring (2).
  - Reporting of radiation incidents to NRL (including NRL's incident report form) (2).
- Module**  
Specific 1
- Incidents (focussing on veterinary x-ray equipment)**
- Review of incidents reported worldwide (1).
  - Discussion of lessons learned (2).
  - Practical exercises based on plausible scenarios (2).
  - Recognition of a radiation incident, immediate actions, and how it should be investigated and reported (2).
- Module**  
Specific 2
- Practical radiation protection**
- *Code of Safe Practice for the use of X-rays in veterinary diagnosis, NRL C21 2005* (2).
  - Model radiation safety plan (2).
  - Critical safety assessment (2).
  - Radiation measurement instrumentation likely to be encountered (2).
  - Performance of radiation measurements (2).
  - The need for and the benefits of personal monitoring. To include: advantages and uses of different types (electronic and passive) of personal monitors and the meaning of doses reported in relation to dose limits and dose action levels (2).
- Module**  
Specific 7
- Characteristics of irradiating apparatus (focussing on veterinary x-ray equipment)**
- Types, principles and known hazards of operation (2).
  - Primary beam characteristics (filtration, kV, mAs) (2).
  - Scattered radiation (characteristics; dependence on radiation output, beam area, distance; angular dependence) (2).
  - Leakage radiation (1).
  - Practical application of the 'as low as reasonably achievable' principle with a particular emphasis on minimising personnel doses (time, distance, shielding) (2).
  - Typical patient doses (1).