



Statement on the Factors to Consider when Selecting a Radioactive Source

June 2008

The Radiation Health Committee has considered the matters which must be addressed as part of a decision about whether to purchase a radioactive source, including an assessment of all alternatives to using radioactivity. The Committee recognises that the initial cost of purchasing a radioactive source is an important consideration; however the responsible management of a radioactive source has associated with it other costs which will be incurred during the cradle to the grave management of the source. Both regulators and prospective users need to ensure that the following factors are considered prior to purchase so that, if it is decided that a radioactive source is required for a particular purpose, the most appropriate source is selected. The radioactive isotope, its half life and activity, and the structural integrity of the source selected, are the key characteristics to be considered. Wise choices, as far as these characteristics and the factors mentioned below are concerned, will decrease the likelihood and extent of problems in the future.

- Technical factors
- Security factors
- Waste management factors
- Transport factors
- Incident response factors

These factors are described in greater detail below.

Technical Factors

The following factors should be considered when choosing a radioactive source for a particular purpose to ensure that the source is able to withstand the conditions under which it is to be used and stored. The source selected should be such that:

- the ISO and/or special form certification is appropriate for the purpose for which the source will be used, including the environment in which it is used and stored
- its half life is as short as practicable
- its radiotoxicity is as low as practicable
- the types and energies of radiation emitted from the source are optimum for the purpose for which the source will be used and are as confined as practicable to those radiations of direct use in that particular application
- the source meets the technical specifications detailed in the applicable Code of Practice for the radiation practice being conducted
- the activity of the source is as low as practicable to carry out the radiation practice
- the premises in which the source is used and stored are appropriate as far as radiation safety is concerned.

Security Factors

The following factors should be considered to minimise possible security implications when choosing a radioactive source for a particular radiation practice. The source selected should be such that:

- if the source is orphaned, the radiation health risks to a person are as low as practicable
- the categorisation of the source, as calculated using Schedule A of the *ARPANSA Code of Practice for the Security of Radioactive Sources*, will result in the source presenting as low a security risk as practicable; i.e. the source should have the lowest practicable A/D ratio
- the chemical and physical form of the source render the source not able to be dispersed easily if a malevolent event occurs
- existing arrangements for the storage or handling of radiation sources will remain appropriate as far as security is concerned if the source is to be added to an existing inventory of sources.

Waste Management Factors

The following factors should be considered to minimise possible waste issues when choosing a radioactive source for a particular purpose. The source selected should be such that:

- its half life is as short as practicable
- an arrangement is in place for the disposal of the source when it is no longer required
- it may be able to be re-used for another application
- it will be able to be safely stored for an extended period, without physical deterioration, once it has reached the end of its working life
- the financial and human resource implications of maintaining on-going control over the source are minimised, should the need to use the source cease (e.g. if the company goes bankrupt) and the source becomes waste.

Transport Factors

The following factors should be considered to address potential transport concerns when choosing a radiation source for a particular purpose:

- whether the source has a current special form certificate as defined in the ARPANSA *Code of Practice for the Safe Transport of Radioactive Material*
- the cost and practicality of transporting the source, e.g. for return to the supplier, should the special form certificate expire
- whether the other packaging and transport requirements of the ARPANSA *Code of Practice for the Safe Transport of Radioactive Material* can be achieved and the cost of doing this
- whether the Customs Prohibited Import/Export requirements can be met.

Incident Response Factors

A radiation incident may occur while a radiation source is being used in carrying out a radiation practice. Therefore, the following factors should be considered when choosing a radioactive source:

- the consequences of an accident involving a breach of the source encapsulation
- the radiation health risks to a person if the source is involved in an incident.

Recommendation

The Radiation Health Committee recommends that, if consideration is being given to purchasing a radioactive source for a particular purpose, the prospective purchaser should establish the full cost of the cradle to the grave management of the source by considering the characteristics and factors mentioned above as part of the decision-making process.