

THE REGULATORY CONTROL OF IONIZING RADIATION SOURCES IN LITHUANIA



XA9949017

A. MASTAUSKAS, J. ZILIUKAS,
G. MORKUNAS
Radiation Protection Centre,
Vilnius,
Lithuania

Abstract

THE REGULATORY CONTROL OF IONIZING RADIATION SOURCES IN LITHUANIA.

The Radiation Protection Centre of the Ministry of Health is the regulatory authority responsible for radiation protection of the public and of workers using sources of ionizing radiation in Lithuania. One of its responsibilities is the control of radioactive sources, which includes keeping the registry, investigating persons arrested while illegally carrying or in possession of radioactive material, decision making and control of users of radioactive sources. The computer based registry contains a directory of more than 24 000 sources and some 800 users in research, medicine and industry. Most of these sources are found in smoke detectors and X ray equipment. The potentially most dangerous sources for therapy and industry (sealed and unsealed) are also listed in this registry. Problems connected with the regulatory control of radioactive sources in Lithuania are presented and their solution is discussed.

1. INTRODUCTION

Lithuania, with an area of 65 000 square kilometres and a population of 3.8 million, uses sources of ionizing radiation in research, industry and medicine, as do many other countries. The Radiation Protection Centre (RPC) of the Ministry of Health exercises the regulatory control of these sources.

The centre is responsible for the radiation protection of the public and of workers who occupationally use sources of ionizing radiation in Lithuania. Areas such as the creation of legislation on radiation protection, control of practices and users of sources of ionizing radiation, personal dosimetric control, control of foodstuffs and building materials, control of indoor radon are covered by the activities of centre. The regulatory control of sources is one of the principal responsibilities of the RPC.

2. DISCUSSION

The control of sources of ionizing radiation consists of several steps. While a primary inventory is kept by the users of sources, periodic inspections are carried out by the officials of local public health centres. The functioning of dosimetric and radiometric equipment, personal dosimetry control, medical examinations of workers and the security of sources are reviewed during these inspections. These reviews help to determine whether users are following the conditions stated in their licences. Currently, so-called 'hygienic passports' are being issued in Lithuania pending the adoption of new radiation protection legislation. The 'passports' contain the following information: name and address of the source user; person responsible for the source; type of source; activities carried out and location of the source; duration of validity of the 'passport'. This data is communicated to the RPC.

The centre has a computer based, regularly updated inventory of sources which uses the Fox-Pro code. The sources are classed according the following three conditional

categories: X ray machines, sealed sources and unsealed sources. Separate databases are kept for each category, and one database is specifically dedicated to sources which have been disposed of.

The use of sources of ionizing radiation decreased radically in the early 1990s owing to economic problems. At present, obtaining information about the frequency of usage of these sources can be complicated, because in some cases sources have simply been stored: indeed, some companies are unable to pay the fees charged for the disposal of their sources. Bearing these cases in mind, the RPC has initiated fund raising and taken steps to centralize the disposal of sources. Information is currently being collected in order to estimate the extent of this practise.

The registry of sources contains information on the total inventory of sources, as well as all 'hygienic passport' numbers and dates of expiry. Table I summarizes the data contained in the registry.

The following information, depending on the type of source, is kept in the registry:

- X ray machines: the name and address of the user, name of person responsible for the source, type of equipment, serial number, date of production, name of controlling institution;
- sealed sources: the name and address of the user, name of person responsible for the source, type and serial number of the equipment and, if available, of the block containing the source, type and serial number of the source, radionuclide of the source, type of radiation, date of production of the source, name of controlling institution;
- unsealed sources: the name and address of user, name of person responsible for the source, name of source, radionuclide, activity of one package, number and total activity of packages received within the last year, remainder for the following year, annual demand, name of controlling institution.

While the information on sources is extensive, it is sometimes incomplete. There are sources with unknown serial numbers, manufacturer and date of production. In some cases, an only approximate activity is known for a given source. Many problems arise with old sources, especially those of Soviet manufacture.

TABLE I. INVENTORY OF SOURCES OF IONIZING RADIATION IN LITHUANIA

Area of activities	Number of users	Number of sources		
		X ray units	Unsealed	Sealed
Research	26	48	58	466
Teaching	541	1151	30	176
Medicine	14	26	5	193
Industry	132	146		18 615
Miscellaneous	109	44	2	5338
Total	817	1415	95	24 828

With 19 555 units registered, smoke detectors represent the largest share of the inventory. Smoke detectors containing Pu-239 are registered by the Lithuanian Nuclear Power Inspectorate as nuclear materials. Owners of any kind of smoke detector are required to register their source. These sources are controlled once a year.

New problems have arisen with companies which sell smoke detectors. A temporary decision has been taken on their regulatory control: in the future these companies will probably be obliged to notify the RPC and to obtain licenses to sell this kind of source. Sellers will be required to inform the Centre whenever the number of sources sold per consumer exceeds a specific number (more than five, for example). Additionally, a commitment to dispose safely of a high number of sources will be required. Although the precise conditions to be met by companies selling smoke detectors still have to be finalized, the main principle behind them is that companies will have to set aside the funds necessary for the safe disposal of used sources.

The potentially most dangerous sources are used in therapy and industrial radiography and until now, their use and safety have been controlled once a year. The information held by local public health centres about such sources is as extensive as possible. However, since inspections on a yearly basis are not sufficient, the centres have been required by the RPC to carry out at least two inspections per year. Information currently being collected on these sources is to be included in the more detailed questionnaire and preliminary safety assessment developed by the IAEA.

The rules on the transportation of radioactive sources specifically prohibit the unauthorized use of a source. Whenever a source is to be transported, the user must obtain a transportation permit issued by the Ministry of Environmental Protection. The application for this permit is to be cleared by the Ministry of the Interior and the RPC. The centre approves this application on the basis of the information recorded in the 'hygienic passport' obtained from the local public health centre. These institutions work closely with the Lithuanian Border Police and Department of Customs.

Despite the existence of regulations to this effect, problems relating to the illegal transportation of sources of ionizing radiation have arisen. Because of its geographical location, Lithuania is a country of transit for various kinds of traded products and although facilities for dosimetric and radiometric control are available at some border checkpoints, sources of ionizing radiation do get smuggled into Lithuania. For the most part, the items introduced into the country are contaminated metals. These sources are investigated by means of nuclear spectroscopy and X ray diffraction. Usually, to satisfy the concerns of public opinion and the media, these sources are disposed of at the repository for low and intermediate level radioactive waste, even if their activities do not exceed the levels of exemption provided in the relevant legislation [1]. This problem needs the attention of the regulatory body.

New radiation protection standards based on ICRP Publication 60 will perhaps help to solve this and other problems. Currently it is difficult in certain cases to make decisions on exemption and reutilization of sources. The Basic Safety Standard being created by the RPC will describe clearly the procedure for exemption.

The IAEA is involved in radiation protection activities in Lithuania in the framework of the Model Project for upgrading radiation protection and waste safety infrastructure. One of the most important items of this project is the regulatory control of sources of ionizing radiation. New software for databases, computers and training have been received to this effect.

3. CONCLUSIONS

1. In Lithuania, the inventory of radioactive sources is the basis for the regulatory control of sources.
2. The inventory needs to be reviewed, taking special account of the principle of exemption.
3. Problems in the regulatory control of radioactive sources in Lithuania arise mainly with inspections by users.
4. Special attention is to be paid to slightly contaminated materials.

REFERENCE

- [1] Norms of radiation protection NRB-76/87, Main sanitary regulations OSP-72/87, Moscow (1988).