



## NATIONAL POLICY FOR CONTROL OF RADIOACTIVE SOURCES AND RADIOACTIVE WASTE FROM NON-POWER APPLICATIONS IN LITHUANIA

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### 1. State Register of Sources of Ionizing Radiation

According to the Law on Radiation Protection of the Republic of Lithuania [1] (passed in 1999), the Radiation Protection Centre of the Ministry of Health is the regulatory authority responsible for the radiation protection of public and of workers using sources of ionizing radiation in Lithuania. One of its responsibilities is the control of radioactive sources from the beginning of their "life cycle", when they are imported in, used, transported and placed as spent into the radioactive waste storage facilities.

For the effective control of sources there is national authorization system (notification-registration-licensing) based on the international requirements and recommendations [3, 4, 5] introduced, which also includes keeping and maintaining the Register of Sources, controlling and investigating events while illegally carrying on or in possession of radioactive material, decision making and performing the state radiation protection supervision and control of users of radioactive sources, controlling, within the limits of competence, the radioactive waste management activities in nuclear and non-nuclear power applications.

According to the requirements set out in the Law on Radiation Protection [1] and the Government Resolution "On Establishment of the State Register of the Sources of Ionizing Radiation and Exposure of Workers" (1999) and supplementary legal acts, all licence-holders conducting their activities with sources of ionizing radiation have to present all necessary data to the State Register after annual inventory of sources, after installation of new sources, after decommissioning of sources, after disposal of spent sources, after finishing the activities with the generators of ionizing radiation. The information to the Radiation Protection Centre has to be presented every week from the Customs Department of the Ministry of Finance about all sources of ionizing radiation imported to or exported from Lithuania and the information about the companies performed these procedures.

The State Register of Sources of Ionizing Radiation is managed in local software, based on the FOX PRO database system. The software provides to print out various kinds of reports about the sources – couple of options are available to investigate the "source's life". The RAIS (Regulatory Authority Information System), version 2.0, provided by the International Atomic Energy Agency (IAEA) is now under examination and after necessary changes it will be translated into Lithuanian language and adopted to the local conditions. Improving the system, the database on spent sealed radioactive sources will be also included

that will allow to have clear and objective information about the sources disused or sources sent for disposal.

## 2. Inventory of Sources in Lithuania

The principal users of sources of ionizing radiation in non-power applications in Lithuania can be splitted up into different categories, namely: industry, hospitals, research institutions and others (i.e. museums, libraries).

The inventory of sources of ionizing radiation in Lithuania and the principal users of sources are presented in Table 1.

Table 1. Number of sources of ionizing radiation in Lithuania (as for September 2001)

Area of practice	Number of institutions	X-ray tubes	Sealed sources		Total
			Total	Sources of them installed in smoke detectors	
Scientific research	24	75	489	360	564
Health care	533	1658	153	0	1811
Industry	79	144	32118	23250	32262
Others	207	87	13518	6992	13605
<b>Total</b>	<b>843</b>	<b>1964</b>	<b>46278</b>	<b>30602</b>	<b>48242<sup>a</sup></b>

<sup>a</sup>including radioactive sources used at the Ignalina nuclear power plant.

The maximum activities of the most important sealed sources are presented in Table 2.

Table 2. Maximum activities of the most important sealed sources used in Lithuania

Radionuclide	Maximum activity, Bq
Cs-137	$3.5 \cdot 10^{12}$
Ir-192	$2.6 \cdot 10^{12}$
Co-60	$2.6 \cdot 10^{14}$
Pu-239	$9.6 \cdot 10^9$
Cf-252	$5.0 \cdot 10^{10}$
Pu-Be	$1.3 \cdot 10^{10}$
Ra-226	$4.7 \cdot 10^8$

## 3. Processing and Storage of Radioactive Waste outside Nuclear Area

Radioactive waste generated during the use of sources of ionizing radiation (excluding those generated in the nuclear fuel cycle) shall be managed according to the basic radioactive waste management principles and requirements set out in the Law on the Management of Radioactive Waste [2] and in the Lithuanian Hygiene Standard HN 89:2001 "Management of Radioactive Waste" [6], approved by the Minister of Health in 2001. There are requirements for the local waste management (at users' premises) established. Detailed requirements for the management of solid (including spent sealed sources), liquid, gaseous radioactive waste are

established, basic requirements for the temporary radioactive waste management facilities, located at users' premises, are set out. There shall be three options for the management of radioactive waste generated during the licensed practice applied:

- waste below clearance levels shall be managed as ordinary waste or disposed of to environment;
- waste containing short lived radionuclides (with half-life less than 100 days) shall be stored at user's premises until the clearance levels will be reached and disposed of to environment;
- if the above mentioned conditions are not met, radioactive waste shall be transported to the interim radioactive waste storage facility [6].

Local waste management operations include collection, segregation, sorting and storage for decay. Liquid radioactive waste generated at users' premises shall be in addition solidified.

Radioactive waste generated at users' premises and at the Ignalina nuclear power plant (Ignalina NPP) are transported to one radioactive waste interim storage facility, located on-site and operated by the Ignalina NPP operating organization. The institutional waste is accepted since September 1990, after at the end of 1988 the Maisiagala radioactive waste repository was closed.

Until 2000 radioactive waste was segregated by the type of radioactivity (alpha, beta, gamma, neutron) and was placed straight to the appropriate canions (designated for alpha, beta or gamma radioactive waste) into interim storage facility. Since September 2000 the INPP offers the placement of sources into appropriate protective cast iron containers of type K-50, K-100, K-150, specially designed for sources emitting alpha, beta and gamma radionuclides (with the wall thickness of 50, 100 and 150 mm respectively) to be stored at the interim waste storage facility. The procedures are co-ordinated according to requirements of legal acts.

According to the Law on Management of Radioactive Waste [2], the Radioactive Waste Management Agency is established in 2001. The principal aim of the Agency is to manage and dispose all radioactive waste transferred to it, assuring nuclear and radiation protection. The Agency shall be the operator of storage facilities and repositories assigned to it.

It shall be noted that no final radioactive waste disposal site is available in Lithuania yet. The Agency and other authorities shall take proposals to initiate projects related to investigation of sites suitable for final disposal. This important point will be reflected in the National Radioactive Waste Management Strategy which is planned to be approved in September 2001. It will provide future plans and financial estimations for the management and final disposal of radioactive waste.

Problems could arise with the retrieval of the waste from the interim storage facility and Maisiagal repository in order to make proper characterization of the waste intended for final disposal. Especially this may be sensitive questions with Maisiagala repository because of not exact inventory of radioactive waste known. Several research projects are initiated in order to solve this problem.

#### **4. Conclusions**

1. The State Register of Sources of Ionizing Radiation allows to have a clear picture about the inventory of radioactive sources in Lithuania, which is the basis for the regulatory control of sources.
2. Management of institutional radioactive is regulated by a number of national legislation and is a inseparable part of the whole legislation system related to radioactive waste management in Lithuania.
3. There are no final radioactive waste disposal sites available in Lithuania yet. The National Radioactive Waste Management Strategy will be approved in September 2001.

#### **References**

- [1] Law on Radiation Protection of the Republic of Lithuania, Vilnius (1999).
- [2] Law on the Management of Radioactive Waste of the Republic of Lithuania, Vilnius (1999).
- [3] Radiation Protection and the Safety of Radiation Sources, Safety Series No.120, IAEA, Vienna (1996).
- [4] International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No.115, IAEA, Vienna (1996).
- [5] Recommendations of the International Commission on Radiological Protection. ICRP Publication 60. Pergamon Press. Oxford, New York, Frankfurt, Seoul, Sydney, Tokyo (1991).
- [6] Lithuanian Hygiene Standard HN 89:2001 "Management of Radioactive Waste", Vilnius (2001).