



THE ROLE OF THE CENTRAL REGISTRY IN THE SAFETY AND SECURITY OF RADIOACTIVE MATERIALS IN HUNGARY

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Abstract. After a brief overview of the Hungarian legislation and regulatory infrastructure the report provides information on the number of companies and licensees using radioactive materials and explains also the role of the established central registry of radiation sources and radioactive materials in Hungary for improving the safety and security of radioactive materials in the country. It concludes that a reliable nationwide central registry can be very useful tool for increasing the safety and security of radiation sources and radioactive materials.

INTRODUCTION

The application of radioactive materials in Hungary started in the early '60s. At that time, the only company authorized to import and distribute artificially produced radioactive material was the Institute of Isotopes of the Hungarian Atomic Energy Commission. As new applications emerged and the demand continuously increased, the Institute of Isotopes became the first – and only – domestic producer of radioactive material. Realizing the serious health issues involved, the Institute exercised strict control over radioactive materials and established a registry of the imported and manufactured products at a very early stage. Many years later, when new legislation established the central registry of radioactive materials, the registry of the Institute of Isotopes served as the starting point, and the Institute was mandated to maintain the central registry. Due to this continuity, the central registry has an almost complete inventory and history of radiation sources and open radioactive substances in Hungary. After a brief overview of the Hungarian legislation and regulatory structure the paper discusses the role of the central registry in improving the safety and security of radioactive materials in Hungary.

LEGISLATION

The basic piece of Hungarian legislation related to the application of atomic energy is the Act on Atomic Energy⁽¹⁾. The Act declares that 'in the use of atomic energy, safety has priority over all other aspects'. In its last article, the Act describes in detail the responsibilities and authorizations of the different ministries in providing legislation to ensure that the above principle prevails in practice as well.

On the basis of this authorization, recently the Minister of Health issued a new Decree⁽²⁾ defining the basic rules of the application of radioactive materials. According to the Decree, all activities related to radioactive substances (application, production, marketing, export, import and transportation) are subject to licensing. Licences are granted for a fixed period, and the licensees must be regularly inspected. In order to increase the safety of radiation sources, the Decree requires that sealed sources should be regularly checked. Also, unused, superfluous radiation sources and old sources which have exceeded their service lifetime should be disposed of. The Decree also defines the basic qualifications necessary for the different types of activities related to radioactive materials, and describes the requirements of a training programme for radiation workers.

The Act on Atomic Energy also provides the legal basis for the central registry of radioactive materials. On the basis of this, a ministerial decree⁽³⁾ regulates the system of local and central registries of radioactive materials. Under the system, all licensees (producers, distributors, users and radioactive waste disposal facilities) should have a local registry of all radioactive materials in their possession. In parallel, the central registry should be maintained in such a way that the quality, quantity and location of all radioactive materials in Hungary could be established in any given time. In order to achieve this goal, licensees are required to report any changes in their stock (distribution, transfer, disposal, export, import etc.) to the central registry.

REGULATORY INFRASTRUCTURE

Licences for the application of radioactive materials are issued by the national or regional offices of the State Public Health and Medical Officer Services (SPHAMOS). General inspections is performed by the 20 regional SPHAMOS offices. The frequency of inspections are determined according to the level of hazard (type and amount of radioactive materials and the type of activity) involved. In the case of abnormalities, SPHAMOS may impose a fine or suspend or withdraw the licence.

The central registry of radioactive materials is supervised by the Hungarian Atomic Energy Authority (HAEA), and maintained by the Institute of Isotope and Surface Chemistry (IISC, a successor of the Institute of Isotopes mentioned in the Introduction). The registry contains information on the licensees, the licences (issued, expired or withdrawn) and on the actual amounts of radioactive materials on the premises of the licensees.

The central registry helps the SPHAMOS inspections by regularly providing the regional offices with a list of radioactive materials being held at the premises of licensees within their jurisdiction. In addition to that, the HAEA together with the IISC performs its own inspections as well. These inspections focus on the proper maintenance of the local registries, and they are vital for ensuring the validity of the central registry. In the case of irregularities the findings of the inspection are reported to the relevant authorities (SPHAMOS, Police etc.). In the case of serious or continued abnormalities, the HAEA may impose a fine, or initiate the withdrawal of the licence.

RADIOACTIVE MATERIALS IN HUNGARY

There are approximately 1000 workplaces where radioactive materials are being used regularly. Most of them are industrial facilities and hospitals, but there are many research places as well (see Table 1).

Table 1. The number of companies and licensed workplaces using radioactive materials

	<i>INDUSTRY</i>	<i>AGRICULTURE</i>	<i>HEALTHCARE</i>	<i>RESEARCH</i>	<i>OTHER</i>
<i>WORKPLACES</i>	370	7	277	131	154

The number of ‘significant’ radiation sources (with an activity greater than 10^{10} Bq at the time of writing this report) is about 3000. The most important ones are listed in Table 2. It is obvious, that the largest number and highest activity of sources are in industry and in the

medical sector. ^{60}Co and ^{137}Cs are still the most popular nuclides. ^{192}Ir is still extensively used in industrial radiography, while ^3H is mainly used in research applications. There are a relatively great number of ^{241}Am sources in industry and research, and the number of neutron emitting sources (Pu-Be and Am-Be) cannot be neglected either. In addition, many other isotopes are used in smaller numbers in industry, research and other applications.

Table 2. The number and total activity of radiation sources above 10^{10} Bq (as of 1. Oct. 2000)

	<i>INDUSTRY</i>		<i>HEALTHCARE</i>		<i>RESEARCH</i>		<i>OTHER</i>		<i>TOTAL</i>	
	<i>PCS</i>	<i>Bq</i>	<i>PCS</i>	<i>Bq</i>	<i>PCS</i>	<i>Bq</i>	<i>PCS</i>	<i>Bq</i>	<i>PCS</i>	<i>Bq</i>
<i>Am-241</i>	124	5.8E12	1	1.8E10	6	1.4E11	8	2.3E11	139	6.2E12
<i>Am-Be</i>	55	1.6E13	3	1.3E12			5	1.2E12	63	1.9E13
<i>Cm-244</i>	11	2.8E11							11	2.9E11
<i>Co-60</i>	1181	2.2E16	180	4.7E15	38	5.2E13	9	2.4E13	1408	2.6E16
<i>Cs-137</i>	171	4.6E14	4	1.2E14	8	1.8E12	36	1.8E14	219	7.7E14
<i>H-3</i>	437	8.4E13	4	8.2E11	1053	2.1E14	39	2.8E13	1533	3.2E14
<i>Ir-192</i>	81	1.5E13	24	2.2E12			194	7.6E13	299	9.4E13
<i>Kr-85</i>	4	4.0E10							4	3.9E10
<i>Pm-147</i>	4	1.2E11							4	1.2E11
<i>Pu-238</i>					4	1.3E12	1	2.1E11	5	1.5E12
<i>Pu-239</i>	3	4.4E10			20	4.7E12	5	2.7E11	28	5.0E12
<i>Pu-Be</i>	47	7.7E12			40	6.5E12	6	1.5E12	93	1.6E13
<i>Se-75</i>	1	6.4E11							1	6.4E11
<i>Sr-90</i>	7	1.4E11	4	4.2E11			39	1.3E11	50	6.9E11

THE ROLE OF THE CENTRAL REGISTRY IN INCREASING THE SAFETY OF RADIOACTIVE MATERIALS

As mentioned above, according to the regulations, all radioactive materials — sealed sources and open substances (radiopharmaceuticals) alike — must be reported to the central registry. The initial reporting is the duty of the distributor. Currently, there are only three licensed distributors (one of them is the only Hungarian producer of radioactive materials), so it is relatively easy to ensure that all materials really are registered. At the other end, before final disposal, the radioactive waste management company also reports to the central registry. During the useful lifetime of a radiation source, it is the duty of the user (licensee) to report all changes (transfer, export, etc.) in the status of the source. Throughout this stage, only continuous attention can ensure that the data in the central registry reflects the real owner, location and status of the sources. In order to facilitate this, the HAEA, together with the IISC,

performs regular inspections and checks the local registries at the premises of the licensees. Our experience shows, that no matter how low scale these inspections may be, they are very useful in drawing the attention of licensees to the importance of the safe handling of radiation sources. In the following, we list a few of the most interesting cases of inspections contributing to the safety and security of radioactive materials.

- A major industrial company reported some minor changes in its inventory to the central registry. During careful checks of the reports, the central registry revealed more minor discrepancies. To solve the problem, an inspection of the local registry was announced. Discrepancies found between the central and local registries during the inspection triggered a physical inventory taking. This revealed several dozens of old, unregistered radiation sources, which had been shipped to the site during the construction of the plant by the building company, and long forgotten. Now, all these sources are registered and most of them are disposed of.
- An inspection at a former manufacturer of radiation detectors revealed that over a hundred radiation sources listed in the central registry were missing from the local one. It also revealed that the company no longer engaged in radiation activities and, as a consequence, personnel responsible for the local registry had been laid off years before. The HAEA ordered a physical inventory taking, which established, that most of the sources in question had been exported as parts of radiation instruments, and others had been disposed of without the necessary reports having been sent to the central registry. The prolonged investigation — involving other authorities (SPHAMOS, police) as well — closed successfully with the updating of both the local and central registries, and drawing the attention of the managers of the company to the importance of the safety of radioactive materials.
- From the response to the announcement of inspections at a small company, the central registry learned that the company had recently gone out of business, and the personnel responsible for the local registry and radiation sources had been laid off. After the inspectors had draw the attention of local authorities to the few radiation sources on site, the sources were secured.

CONCLUSIONS

The Hungarian example demonstrates that a reliable nationwide central registry can be a very useful tool for increasing the safety and security of radiation sources and radioactive materials. Under normal operation the central registry, the reporting requirements and the regular inspections of local registries may draw the attention of licensees to the importance of handling radioactive materials properly. Our recent experience shows that even a limited inspection effort can have major effects. The central registry may be useful in cases of abnormal events as well. On the one hand, regular checks of inventories based on the local and central registries may facilitate early discovery of lost sources, or even prevent the operator from forgetting about or losing unused ones. On the other hand, the registry can be used to identify found sources or their owners or origin, or at least may help in narrowing the scope.

Taking into account the positive effects of our recent efforts spent on inspection and on improving the performance of the central registry, the HAEA is considering various ways of

improving these activities. Since the HAEA and the IISC have rather limited resources to devote to the on-site inspection of the local registries, the HAEA has decided to promote the use of computerized local registries and plans to exploit the opportunities provided by the modern devices of information technology.

REFERENCES

- [1] Act CXVI of 1996 on Atomic Energy
- [2] EüM Decree 16/2000 (VI. 8.) on the execution of several orders of the Act CXVI of 1996 on Atomic Energy
- [3] IKIM Decree 25/1997 (VI. 18.) on the Registration of Radioactive Materials and Preparations