



RADIATION SOURCES SAFETY AND RADIOACTIVE MATERIALS SECURITY REGULATION IN UKRAINE

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Abstract. Radiation sources are widely used in Ukraine. There are about 2500 users in industry, science, education and about 2800 in medicine. About 80 000 sealed radiation sources with total kerma-equivalent of 450 Gy·m²/sec are used in Ukraine. The exact information about the radiation sources and their users will be provided in 2001 after the expected completion of the State inventory of radiation sources in Ukraine.

In order to ensure radiation source safety in Ukraine, a State System for regulation of activities dealing with radiation sources has been established. The system includes the following elements: establishment of norms, rules and standards of radiation safety; authorization activity, i.e. issuance of permits (including those in the form of licences) for activities dealing with radiation sources; supervisory activity, i.e. control over observance of norms, rules and standards of radiation safety and fulfilment of conditions of licences for activities dealing with radiation sources, and also enforcement.

Comprehensive nuclear legislation was developed and implemented from 1991 to 2000. Radiation source safety is regulated by three main nuclear laws in Ukraine: On the use of nuclear energy and radiation safety (passed on 8 February 1995); On Human Protection from Impact of Ionizing Radiation (passed on 14 January 1998); On permissive activity in the area of nuclear energy utilization (passed on 11 January 2000). The regulatory authorities in Ukraine are the Ministry for Ecology and Natural Resources (Nuclear Regulatory Department) and the Ministry of Health (State sanitary-epidemiology supervision).

According to the legislation, activities dealing with radiation sources are forbidden without an officially issued permit in Ukraine. Permitted activities with radiation sources are envisaged: licensing of production, storage and maintenance of radiation sources; licensing of the use of radiation sources; obligatory certification of radiation sources and transport packages for shipment of radiation sources; State registration of radiation sources; licensing of radiation material transportation.

In 1997, the Government of Ukraine decided to establish a unified computerized system of accountancy, control and registration of radiation sources – the State Register of Radiation Sources (Register). In 1998, under the Ukrainian State Production Enterprise “Isotope” a separate subdivision “State Register of Radiation Sources” was established. This subdivision functions as the main registration centre, and has been supplied with computer equipment with the assistance of the IAEA. During 1999-2000, the basic documents that regulate the legal status of the Register, the radiation source registration procedure and the State inventory of radiation source procedure were developed and approved by the relevant ministries.

Urgent commissioning of the Register and starting the State registration of radiation sources will form a good basis for considerable upgrading of the level of safety and security of radiation sources, reduction of illicit trafficking in radiation sources, and investigation of illicit trafficking cases. Lack of funds is the main problem impeding the commissioning of the Register.

On the basis of analysis of safety regulation system for activities dealing with radiation sources in Ukraine, we can draw a conclusion about its sufficiency for effective safety regulation of radiation sources and security of radioactive materials.

INTRODUCTION

Radiation sources are widely used in Ukraine. Nowadays radiation sources are in use at more than 2500 non-medical enterprises (organizations, institutions). In medical application, there are 2435 X-ray rooms where 10 677 X-ray instruments are in use; 64 departments for radionuclide diagnostics; 130 gamma-therapy and 176 X-ray apparatuses are in use for radiation treatment. According to the data available for 1995, in Ukraine 80 000 sealed radionuclide sources with total KERMA- equivalent of about 450 Gy·m²/c were in use, 1000 items of which are sources of high power. In 2001, the State inventory of radiation sources will be completed, which will provide an accurate list of all the sources that are in use in Ukraine to the end of 2000.

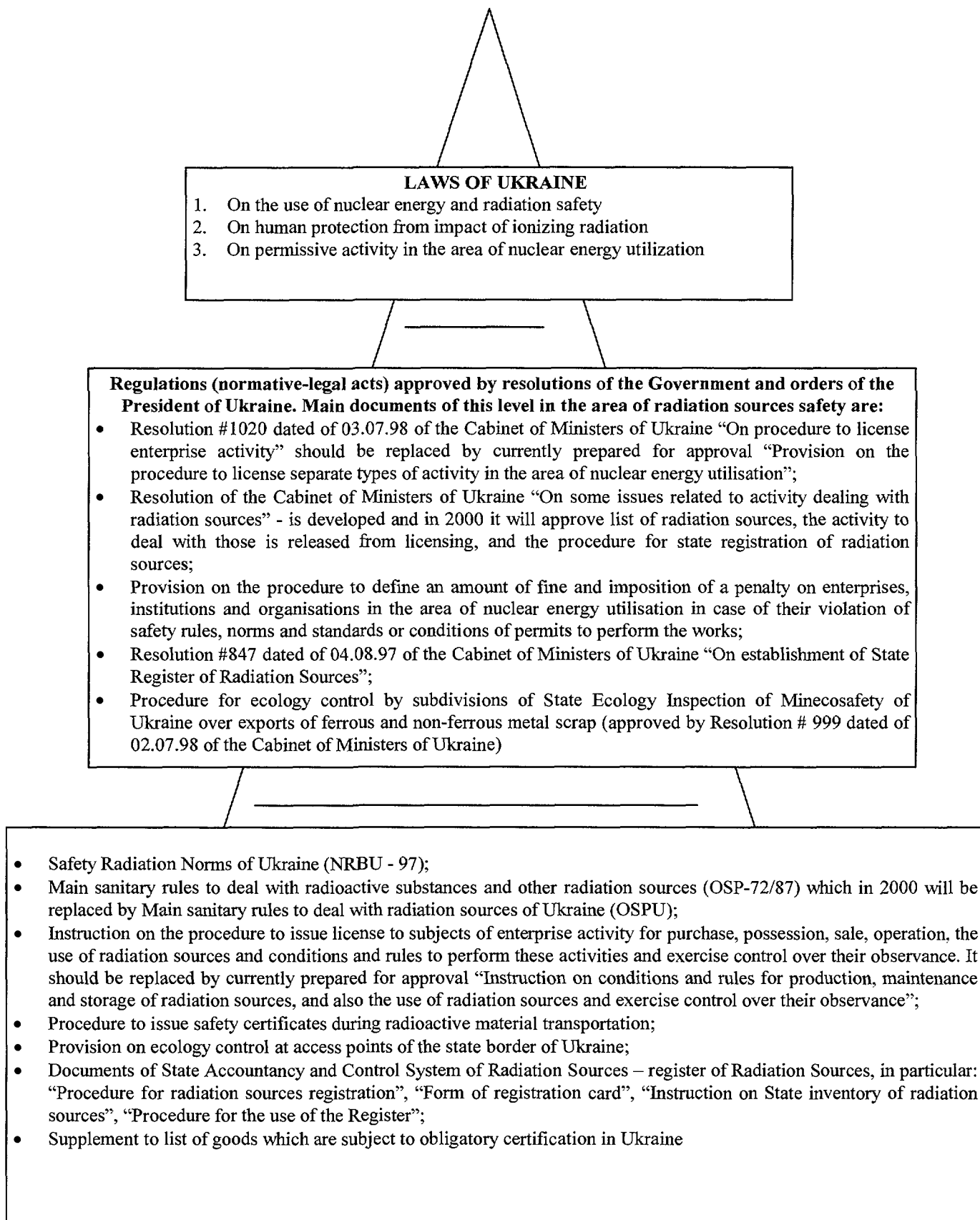


Figure 1. Legislative basis of Ukraine in the area of radiation sources safety.

STRUCTURE AND LEGISLATIVE BASIS OF RADIATION SOURCE SAFETY REGULATION

In order to ensure safety of activities dealing with radiation sources in Ukraine, a State system for regulation of activities dealing with radiation sources has been established. The system comprises:

- the establishment of norms, rules and standards of radiation safety;
- permissive activity, i.e. issuance of authorizations – permits (including in a form of licence) for activities dealing with radiation sources;
- supervisory activity, i.e. control over:
 - observance of norms, rules and standards of radiation safety;
 - fulfilment of conditions of permits for activities dealing with radiation sources;
 - enforcement.

LEGISLATIVE BASIS FOR RADIATION SOURCE SAFETY

From 1991 to 2000, during nine years of independence, Ukraine has developed and implemented comprehensive nuclear legislation. Safety of activities dealing with radiation sources is regulated by three main nuclear laws:

- On the use of nuclear energy and radiation safety (passed on 8 February 1995);
- On human protection from the impact of ionizing radiation (passed on 14 January 1998);
- On permissive activity in the area of nuclear energy utilization (passed on 11 January 2000).

These three laws create the first level of the legislative basis for activities dealing with radiation sources. On the basis of these laws, regulations (normative-legal acts) have been developed. These regulations can be conditionally called documents of second and third levels.

The second level is composed of regulations approved by resolutions of the Government and orders of the President of Ukraine. The third level is represented by regulations approved by separate or joint orders of State regulatory authorities and other central executive authorities discharging separate regulatory functions.

STRUCTURE OF STATE REGULATION OF RADIATION SOURCES SAFETY

In accordance with the law of Ukraine “On the use of nuclear energy and radiation safety”, State regulatory authorities on nuclear and radiation safety in nuclear energy utilization, including the activity dealing with radiation sources, are Ministry for the Environment and Natural Resources of Ukraine (Minecoresources) and Ministry of Health of Ukraine (see Figure 2).

Pursuant to the “Provision on the Ministry for the Environment and Natural Resources of Ukraine”, approved by the President of Ukraine, this Ministry is in charge of the central co-ordination role in discharging regulatory functions of other executive authorities and all three *main regulatory functions that are mentioned in Section 2*. The Ministry for the Environment and Natural Resources of Ukraine is authorized by the Cabinet of Ministers of Ukraine to grant permission for nuclear energy utilization and is the State authority to issue licences (permits) to carry out activities dealing with radiation sources.

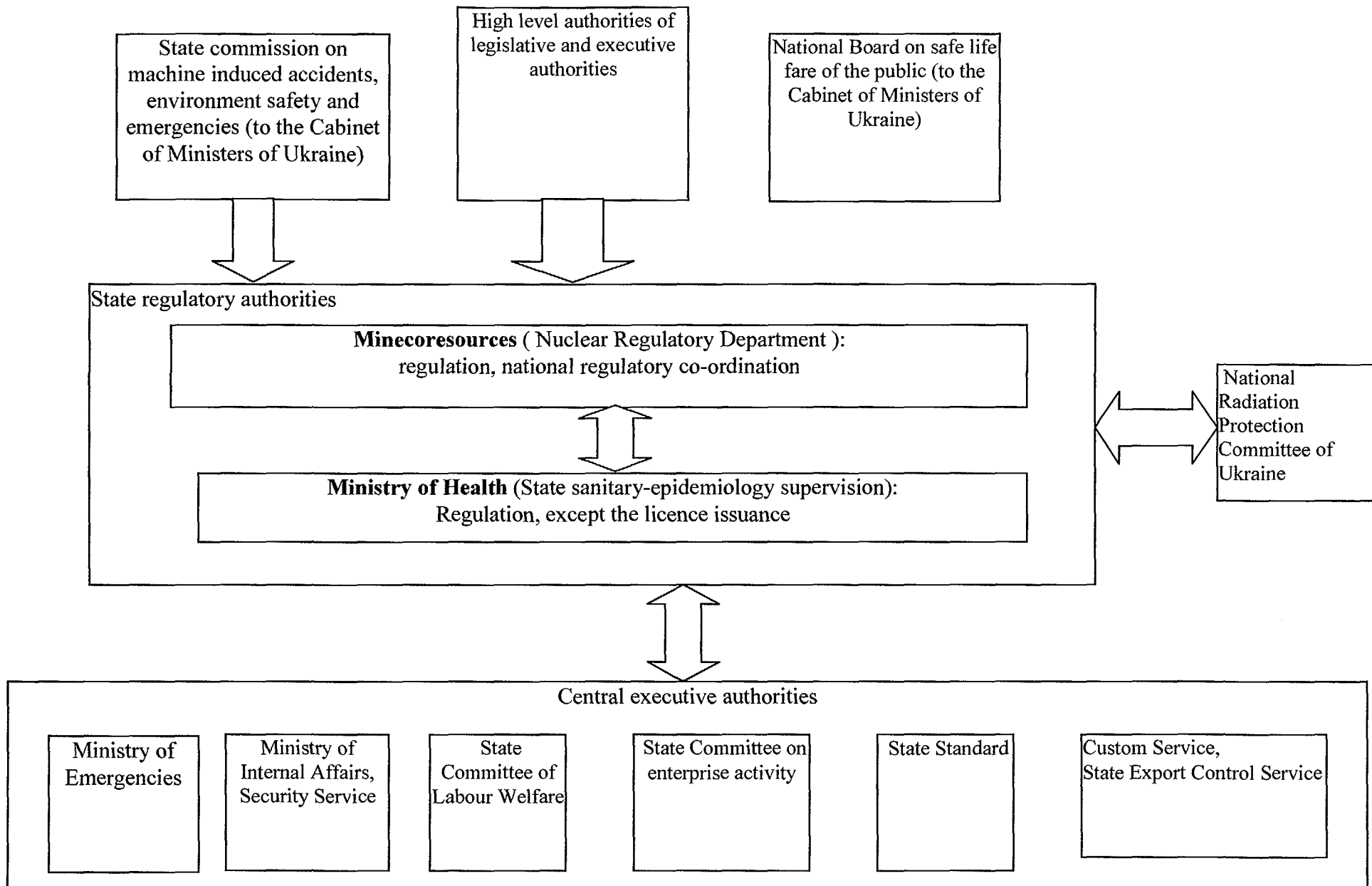


Figure 2. Infrastructure of State Radiation Sources Safety Regulation.

One of the key principles of the State regulation is not implemented in the existing system: this is the principle of independence of the regulatory authority. The Ministry for the Environment and Natural Resources to a lesser extent and the Ministry of Health to a larger extent are a part of the infrastructure performing activities dealing with radiation sources and are responsible for the development of some types of these activities. The Ministry of Health is in charge of medical application of radiation sources; the Ministry for the Environment and Natural Resources is in charge of the use of radiation sources in geology and environmental studies. During a nine-year period, an independent regulatory authority of the central executive authority has been established twice but then was terminated due to administrative reform. Recently, the authority — the State Nuclear Regulatory Administration of Ukraine — was established in 1999, but since 2000 has discharged its functions with reduced a number of personnel and is functioning as a part of Minecoresources headquarters.

Separate regulatory functions are carried out by the National Commission on Radiation Protection of the Population of Ukraine, the Ministry for Emergency Situations and Protection of the population from the consequences of the Chernobyl Accident, the Ministry of Internal Affairs, the Security Service, and the State Committee on Regulatory Policy and Enterprise Activity.

In the creation of State system of radiation protection, Minecoresources co-operates closely with the State Supervisory Department of Labour Welfare of Ukraine. A joint order “On arrangement of radiation safety training” of the State Nuclear Regulatory Administration and State Supervisory Department of Labour Welfare of Ukraine defined the main measures to establish a common State system of training and verification of knowledge on radiation safety. The State Committee on Standardization and Certification of Ukraine is in charge of certification of radiation sources and metrology control over instruments and methods of radiation monitoring.

PERMISSIVE AND SUPERVISORY SYSTEM FOR ACTIVITIES DEALING WITH RADIATION SOURCES

In Ukraine, the performance of activities dealing with radiation sources is forbidden without an officially issued permit.

Permissive activity for radiation sources envisages:

- licensing of production, storage, maintenance of radiation sources;
- licensing of the use of radiation sources;
- licensing of radioactive material transportation;
- obligatory certification of radiation sources, transport packages for shipment of radiation sources; and
- state registration of radiation sources.

No permit is required for an activity dealing with radiation sources if the radiation impact is so low as not to require preventive measures. These sources meet exemption levels freeing them from regulatory control.

The exempt sources are entered into a “list of radiation sources of activity that is exempted from licensing”. At present, the list comprises some types of smoke detectors, sources for

calibration and verification of radiometric instruments, reference sources. Levels of release from licensing are established for different types of sources and exceed relevant exemption levels not more than 20 times. The regulatory field is presented in Figure 3.

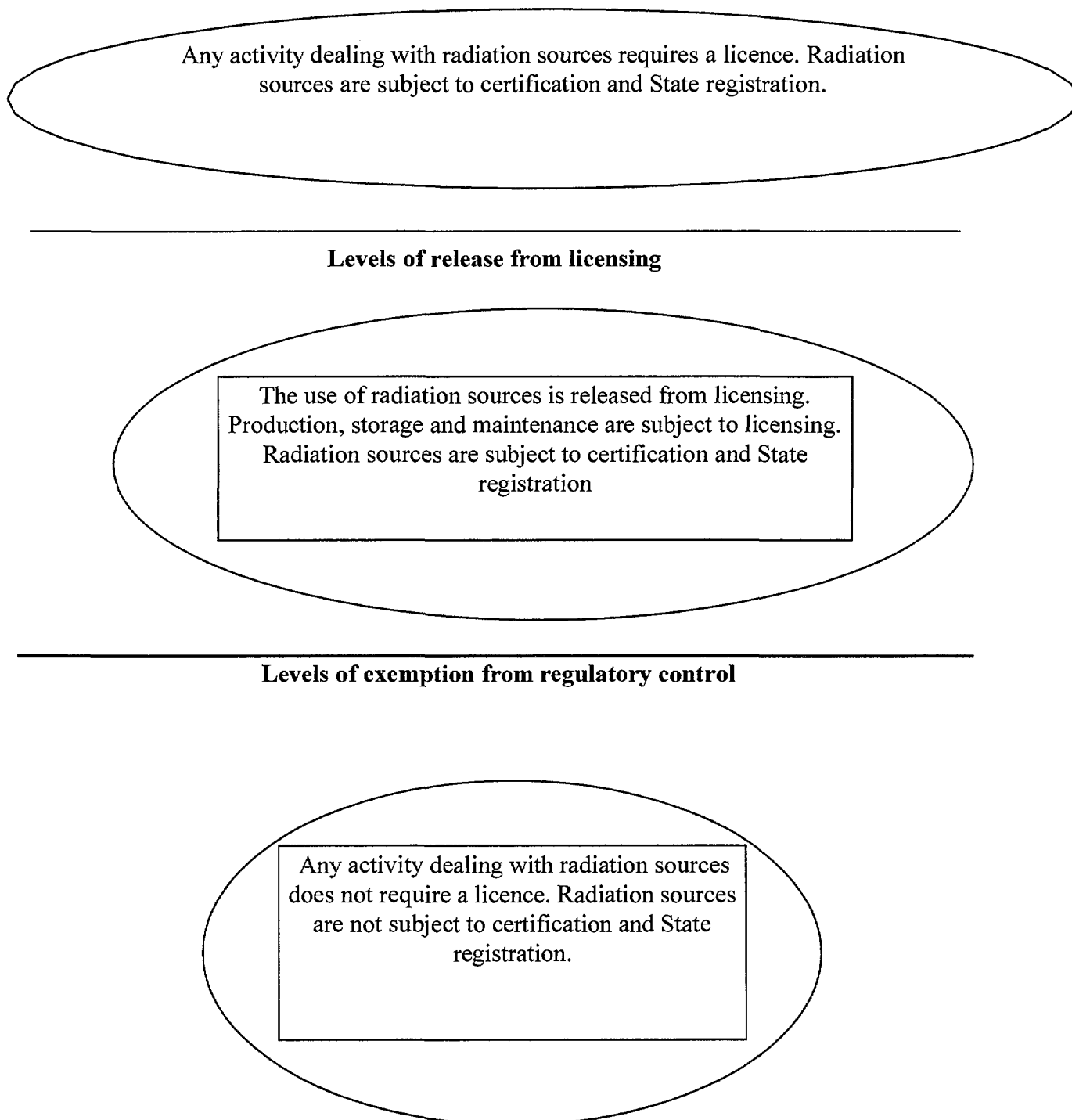


Figure 3. Regulatory field.

LICENSING

The Ministry for the Environment and Natural Resources of Ukraine is in charge of licence issuance for the production, storage, maintenance and use of radiation sources and transportation of radioactive materials. "Instruction on procedure for licence issuance to a subject of enterprise activity to purchase, own, sell, operate, use radiation sources, and for conditions and rules for performance of these activities and control over their observance" was approved by Order of Minecoresources of Ukraine. The instruction gives a detailed procedure for licence issuance. The Ministry for the Environment and Natural Resources has delegated the right to issue licences to use radiation sources with relevantly low level of potential hazard to 27 territory authorities.

The Licence issuance process started in 1995. At first enterprises dealing with high activity level radiation sources were granted licences. However, the legal basis for licensing medical application of radiation sources has been created only recently. Previously, medical institutions were not subject to licensing and medical application of radiation sources was under the control of Ministry of Health of Ukraine. Licensing of industrial enterprises is planned to be completed in 2002. In 1997, 20 licences were issued; in 1998, 52 licences were issued; in 1999, 99 licences; in 2000, more than 200 licences. The dynamics of issued licences is presented in Figure 4.

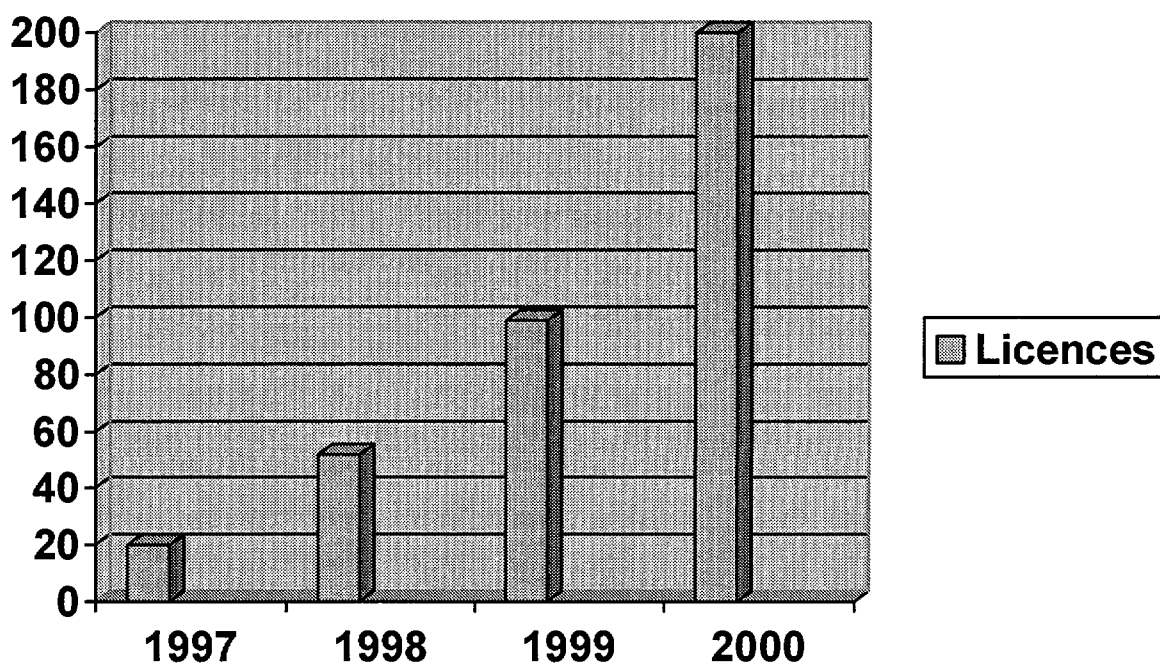


Figure 4. Dynamics of the licence issuance for 1997–2000.

STATE REGISTRATION OF RADIATION SOURCES

In order to ensure national system for accountancy and control of the status and location of radiation sources in 1997, the Government of Ukraine decided to establish a computerized national system of accountancy and control of radiation sources – the State Register

(hereinafter referred to as the Register). In 1998 under the Ukrainian State Production Enterprise “Isotope”, a separate subdivision, the “State Register of Radiation Sources”, was established. This subdivision discharges the functions of a main registration centre, which has been equipped with the assistance of the IAEA. Establishment of a network of regional registration centres is under way.

All radiation sources that are not exempted from regulatory control shall be subject to registration. Registration is obligatory and is chargeable. The Register shall file the data of all radiation sources in electronic form starting from the moment they appear on the territory of Ukraine till their export from Ukraine or transfer to a special enterprise for radioactive waste disposal (or for radiation generators — till their liquidation). According to the established procedure of the Cabinet of Ministers of Ukraine, an interaction between the Register and State Customs Service, the State Export Control Service and the Radioactive Waste Register is ongoing.

Information about registered sources shall be updated not less than once per year and also when there is a change of owner of radiation source, place of location (address) of a storage facility, or during import or export of a radiation source across a border of Ukraine. Information about type of source, isotope, activity, accelerating potential, manufacture number, the facility to which a source is allocated, the owner of the source, postal address, licence number etc. is entered in the Register.

Upon request of State authorities involved in handling radiation sources, the Register provides information of sources in illicit trafficking. Upon request of regulatory authorities, the Register provides any information on sources. The Register also provides an annual report to regulatory authorities.

Urgent launching into operation of the Register and State registration of radiation sources will perform a good basis for considerably upgrading the level of safety and security of radiation sources, reduction of illicit trafficking of radiation sources, and investigation of illicit trafficking cases. Lack of funds is the main problem impeding the commissioning of the Register.

SUPERVISION

Inspection of enterprises during licensing and day-to-day supervision over their activity dealing with radiation sources are performed by the following agencies: at nuclear facilities — Main State Inspectorate of Nuclear Safety of Minecoresources, at the rest of enterprises — Main Ecology Inspectorate of Minecoresources.

SECURITY OF RADIATION MATERIALS AND PREVENTION OF ILLICIT TRAFFICKING OF RADIATION SOURCES

PREVENTION OF ILLICIT TRAFFICKING OF RADIATION SOURCES

The Ministry for the Environment and Natural Resources of Ukraine, acting through special subdivisions, exercises control at access points of the State border of Ukraine. One of key elements of this control is radiation monitoring. The access points are equipped with fixed detecting systems of ionizing radiation. The Ecology Control Service has at its disposal portable radiometric instruments.

Furthermore, Ukraine carries out obligatory radiation monitoring of exported metal scrap which is followed by issuance of the relevant certificate. Enterprises dealing in metal scrap procurement are under the vigilant control of the State Ecology Inspection and State Sanitary Supervision. This attention on a large scale is related to contaminated metal scrap resulting from the Chernobyl accident in 1996, which is constantly revealed in Ukraine. Also this attention brings positive results in detection of abandoned radiation sources.

ENSURING SAFETY AND SECURITY OF RADIATION SOURCES

An applicant's emergency preparedness and security of radiation sources through strict accountancy and physical protection shall be examined during the course of the licensing process and planned inspections. A condition for licence issuance is that the applicant shall have an emergency plan and suitably trained response personnel and financial capabilities to indemnify for damages in a case of radiation accident. As a probable radiation accident, an applicant must take into account loss (smuggling) of radiation sources.

NATIONAL DECISIONS ON SEPERATE SAFETY ISSUES FOR RADIATION SOURCES

MANAGEMENT OF SPENT SEALED SOURCES

During the obtaining of a licence for an activity to deal with radiation sources, an applicant must demonstrate his spent source management plans in a safety analysis report. The optimal way is when an applicant concludes an agreement for procurement of sealed radiation sources by assuming obligations of a procurer to return the radiation sources to the originating country upon the request of the customer. Since at this time radionuclide radiation sources are not produced in Ukraine, spent sources are subject to return to the country of origin. However, problems arise when the matter concerns the return of radiation sources procured by Ukraine from Russian vendors during the time of the former Soviet Union, especially since the Russian Federation has legislative constraints for the mentioned return. During the past two years, preparations for negotiations with the Russian Federation concerning the return of spent radiation sources have been under way.

The current rules in Ukraine state that when the service life of a radiation source has expired, the user must transfer this radiation source to a special enterprise for radioactive waste storage or prolong the service life of the radiation source.

In Ukraine, the procedure to prolong the service life of radiation sources by conducting a certification test at accredited test centres and certificate issuance has been developed and is being put into effect. If a user does not plan to prolong the service life of radiation sources or the radiation source fails to pass certification tests, the radiation source shall be transferred to a special enterprise for radioactive waste storage, i.e. to one of six State interregional special enterprises of the Ukrainian State Enterprise "Radon".

In recent years, the number of radiation sources transferred to special enterprises for long-term storage has increased. Due to the unfavourable economical situation, the activity of such enterprises has been suspended or terminated and, according to the current legislation, these enterprises are obliged to transfer all radiation sources to other licensees or special enterprises. The State Ecology Inspection of Minecoresources of Ukraine is in charge of supervision over the observance of this rule.

The inspection keeps a continuous control over enterprises that have disused radiation sources but lack funds to pay the transfer of the radiation sources to special waste disposal enterprises. In certain cases, local authorities assign funds to pay for the transfer of radiation sources and sometimes the funds are appropriated from the State Budget for this purpose.

RESTORING CONTROL OVER ORPHAN SOURCES

The Cabinet of Ministers of Ukraine by the Resolution # 207 of 04.03.97 approved "Procedure for interaction of executive authorities and involved legal entities in the case of revealing of radiation sources in illicit trafficking". The procedure specifies that legal or physical persons who have detected suspicious material (a physical object with properties or characteristics of a radiation source) shall inform to local executive authorities or internal affairs bodies. These authorities shall arrange for the security of the material and detected site and also inform local authorities of the State sanitary epidemiology supervision, which shall conduct a preliminary examination of the material and inform the local executive authorities and territory authorities of the Ministry of Emergencies, and internal affairs bodies about necessary individual protection measures. Law enforcement authorities shall institute criminal proceedings and conduct an investigation. The source shall be taken away by a team of specialists in waste management to a waste disposal, where the source will be stored until an owner is found or the criminal case is closed. Minecoresources of Ukraine shall be responsible for searching for the owner of the radiation source through the Register of radiation sources, and for informing the IAEA, competent authorities of interested countries and the mass media. Every case of radiation source detection (in 1999 – five cases, in 2000 – 12 cases; in two cases the owners of the sources were found) is reported on television and in newspapers. Radiation inspections of a considerable number of buildings, houses, land areas have been conducted in Ukraine.

CONCLUSION

On the basis of the analysis of the safety regulation system for activities dealing with radiation sources in Ukraine, we can draw a conclusion about its sufficiency for effective regulation of radiation sources safety including radioactive material security.