

CURRENT STATUS OF THE REGULATIONS OF THE NUCLEAR ACTIVITIES AND ACTIVITIES INVOLVING IONISING RADIATION SOURCES IN THE REPUBLIC OF MOLDOVA

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Abstract. The paper gives a brief overview of the Moldovan regulatory framework and the authority implementing it, as well the main principles guiding the authorization process. The interaction of the regulatory body with scientific infrastructure is assured through consultative National Radiation Protection Committee (NRPC) under the Government. Also, there is presented the national priority in nuclear and radiation technologies.

National Infrastructure and Regulatory System. The first law regarding radiation protection and nuclear safety was adopted in December 1997. According to the laws, the regulatory system was split among five national regulatory authorities: Ministry of Health, Ministry of Ecology and Natural Resources, State Service on Standards and Metrology and Department of Emergency Situations. The licenses are issued by the Chamber of Licensing, but most radiation facilities required previously two authorizations for operation: from the Ministry of Health and from the State Service on Standards and Metrology. Taking into account the existing five regulatory bodies, there were adopted additional Government Acts: Regulations regarding the organization of activity of regulating bodies in the area of radiation protection and nuclear safety and of the above mentioned NRPC.

The Republic of Moldova has established in 1997 a National Radiation Protection Committee as the highest governmental consultative advisory body dealing with the nuclear matter. The NRPC consists of specialists and researchers from different fields linked with nuclear and radiation technologies and is chaired by the Vice-Prime Minister. The Vice-Prime Minister has designated, for its part, the President of the Academy of Sciences to act as the main counterpart for all IAEA matters. Until 2007 the NRPC plays also the role of interface between different regulatory bodies from the country and determines the domestic priorities in nuclear transfer technologies. According to his Statute, the NRPC is responsible for the final expertise and selection of projects to be funded by the IAEA. We would like to mention that central criteria for consideration during appraisal of the national projects are:

- the orientation towards an end-user;
- to respond to a major need of the country;
- to be realistic;
- strongly sustained by the Government;
- visible socio-economic impact;
- significant role of the nuclear technology in sustainable development.

Establishment of an independent and efficient regulatory authority with adequate infrastructure and resources was recognized as government priority the last two years. In these views, on May, 11, 2006 was approved the new law #111-XVI "On safe nuclear activities and activities involving ionizing radiation sources". According to this law, in the country, will be established a single regulatory body - National Agency of Regulation of the Nuclear Activities and of the Activities with Ionizing Radiation Sources (the Agency). The Agency will be affiliated to the Ministry of Ecology and Natural Resources, but with the necessary financial and decision independence in the matter. The Agency will be responsible for the authorization, review and assessment on regulation and other normative acts,

inspection and enforcement. However, issuing, suspending or revoking of licenses remains in the competence of the Chamber of Licensing.

In spite of corresponding of the new law to the main international recommendations, the deficit of the state budget did not allow till present to establish the Agency.

The principles of authorization. According to the new law the following major activities are subject to prior authorization by the Agency:

- manufacturing of radionuclide or of products or devices containing them;
- distribution of radioactive sources;
- import or export of radioactive sources;
- hold or use of radioactive sources;
- storage of radioactive sources and of radioactive waste

The authorization will be issued if beneficiaries respect fully conditions of legal acts and norms in matter. The Agency pursues the following objectives:

- to verify that the practice is justified;
- to be sure that security and radiological protection measures are implemented during the use of the sources;
- to notify the general or specific prescriptions to be followed by the beneficiary of the authorization.

Authorization is delivered under the form of license or certificate of registration, depending on categorization of used radioactive source. Certificate of registration is issued by the Agency, but the license – by the Chamber of Licensing on the base of written notification of the Agency. A license may be issued for limited fields of activities and for maximum of five years. All services offered by the Agency to the licensees are free of charge.

Inspection. A specialized inspection department, radiation safety inspectors are established by the new law too. This department is planned to be in the framework of the Agency and is subordinated directly to the General Director. The inspectors will perform inspections in addition of those already performed by the labor inspection and by the Center of Preventive Medicine, who are not specifically focused on radiation safety issues. Domestic legislation suggests that all mentioned inspections are recommended to be performed simultaneously.

The radioactive waste management has been improved the last years through upgrading the radioactive waste repository from the Chisinau City. The upgrading included the assurance of pre-treatment (segregation), treatment and conditioning of solid and liquid waste, the establishment of subsurface temporary storage of spent high-activity sealed sources and QC techniques. Also the environmental monitoring surrounding of the repository has been established. The upgrading meets existing and future demands for radioactive waste management in accordance with international standards and criteria. A new waste storage for the low level waste was designed and constructed. As per three parties' initiative (USA, Russian Federation and IAEA) a new storage facility for the high activity radioactive sources was commissioned, a new physical protection system was established; some high level radioactive sources were removed from the country through the IAEA and USA assistance.

Metrology. The National Institute of Standards and Metrology is responsible for the state policy in the field. But, for the nuclear techniques applications field its laboratory is not equipped enough. At present time, is on going the IAEA project regarding the establishment of a Calibration Laboratory for Radiation Dosimetry.

Categorization of sources. Until present there are no official categorizations of sources in the country. Regarding the new adopted law, the categorization of sources will be done in full compatibility with the categorization used in the IAEA Code of Conduct on the Safety and Security of Radioactive Sources and in the IAEA Safety Guide # RS-G-1.9.

National inventory. The Agency will manage the Central Register of Ionizing Radiation Sources which involves information regarding sources, licenses, licensees and controls. The duplicate of the electronic form of the Register are also in the Department of Emergency Situations and in the National Center of Preventive Medicine.

Establishing capabilities for **emergency preparedness and response** at the national levels are under the responsibilities of the Department of Emergency Situations from the Ministry of Internal Affairs. The department has a qualified staff and centralized emergency communication room which works on a 24 hour basis. The Department is also involved in the national monitoring network of radiological pollution of the environment.

Nuclear power status. The Republic of Moldova has no nuclear power plants and currently has no plans for the construction of the nuclear power plant. But the problem may be reviving, because there is a strong dependence of the country's economy on the import of energetic resources.

Science and technology transfer policy. National science is formed around the Academy of Sciences. The Academy of Sciences is nominated as the sole public authority of the national significance in the field of science and innovations, plenipotentiary coordinator of scientific and innovation activities, supreme scientific forum of the country and scientific consultant of the public authorities of the country. Any domestic scientific institution or organization (including University Departments, Laboratories, etc.) may obtain budget financial support only on competition base through the Supreme Council for Science and Technological Development of the Academy of Sciences. The Academy of Sciences is in the process of reform and nowadays has the structure of six thematic scientific divisions (in economy and mathematics; biology, chemistry and ecology; physics and engineering; medicine; agriculture; humanitarian and arts), institutional, profiled or affiliated members. In 2005 within the Academy of Sciences were organized the National Agency for the Technology Transfer, the Center of Expertise, the Center of the International Projects and the National Agency for Intellectual Property. By the law No 259-XV from 15.07.2004 the Code on Science and Innovations was approved. This code regulates legal relations, connected with elaboration and implementation of the state policy in the field of science and innovations.

At present time the supervision of the relations with the IAEA are carried out by the national liaison officer from the Academy of Sciences.

Nuclear research. In 1972 the State Agrarian University of Moldova constructed a Gamma Field designed to study the impact of gamma radiation on the genetic structure of plant cells. It was the largest in Europe Co-60 irradiator and was used for research in radiobiology. The irradiator is out of service and stored in the repository. In 1997 the Laboratory of Radiobiology was established at the same University. At the Ministry of Agriculture and Food Industry there is a Center of Applied Pedology with the Radiation Control Laboratory, responsible for the control of safe use of radiation sources in agriculture. This Laboratory is part of the national network of environmental monitoring (soil monitoring, and of the vegetable and zoo technical products) and studies also the impact of the radionuclide on the agrocenoze.

A 25 MeV electron accelerator has been partially installed (Microtron-25, Dubna production) in the Experimental Center “Biotron” of the Institute of Genetics and Plant Physiology of the Academy of Sciences. This accelerator originally designed for research in radiobiology was intended for the production of short and medium life radioisotopes for medical treatment. Despite strong support for the local production of radioisotopes, and support from the IAEA, completion of the project has been suspended due to lack of resources in the country. In the framework of this Institute there is a Radiobiological Laboratory also equipped with gamma source.

In the Nuclear Physics Laboratory of the Institute of Applied Physics are studied theoretical problems of nuclear physics and their practical applications. Scientific studies are carried out in cooperation with partners from Russian Federation, France, and Ukraine.

The National Scientific Practice Center of Preventive Medicine studies biological and medical effects of ionizing radiation on human health. The Center is also responsible for the hygienic norms of the radiological factors, medical supervision of the nuclear & radiological activities in the country and for monitoring of professional exposed personnel.

The State Service “Hidrometeo” is responsible for the monitoring regarding radioactive pollution of the environment and for the scientific studies of its influence on the natural ecosystem.

Nuclear and isotope technologies in medicine. Within the last 10 years the Oncological Institute obtained a new Treatment Planning System, simulator, computed Tomography system, THERAPAX X-ray therapy system, new Cobalt-60 sources to refurbish radiotherapy units and essential dosimetry facilities to ensure optimal dosage to radiotherapy patients. But some of the available radiotherapy facilities are in need of upgrading or replacement. The structure and organization does not correspond fully to international standards and the staff of the radiotherapy department should get additional training. There are currently three nuclear medicine facilities: Center of Nuclear Medicine, Republican Center for Medical Diagnostic and Scientific Center of the Health Protection of Mother and Child. The Center of Mother and Child involves the only laboratory in the country where children are examined. The last two mentioned Centers were recently equipped with IAEA support by the new modern Gamma cameras.

Near-term future policy. The Government considers nuclear and isotope techniques as an important component of the national policy in science, technology and human health, contributing to the development of the major national program. It is the Government’s policy to improve applications of non-power nuclear technology, assure radiation protection and safety, fully establish the regulatory framework and infrastructure in line with international obligations, harmonize the legal basis in nuclear area with international legislation and requirements and to make maximum use of the strength of the IAEA technical assistance to deal with national needs and priorities.

The following priority areas of future (2005-2012) focus of Technical Cooperation projects with the IAEA were identified in 2005 in the signed CPF agreement:

- Modern nuclear technique in human health (LINACS and PET technologies, OA & QC in radiotherapy and radio-diagnostic).
- Radiation processing for medical, pharmaceutical and cosmetic supply & for food industry, in other branches of science.
- Nuclear technique in agriculture for sustainable land water management, crop protection and improvement & for investigation of water resources.
- Continued capacity building for the strengthening of an adequate nuclear & radiation safety infrastructure.
- Human resources development and preservation.

International cooperation. The Republic of Moldova became a member of the IAEA in 1997 and cooperates very fruitfully with the Department of Cooperation and Department of Safeguards. The international relations of the Republic of Moldova are also based on the following international treaties and agreements (table I):

Table I

	in force	status
Vienna Convention on Civil Liability for Nuclear Damage	1998-08-07	Accession 1998-05-07
Convention on the Physical Protection of Nuclear Material	1998-06-06	Accession 1998-05-07
Convention on Early Notification of a Nuclear Accident	1998-06-07	Accession 1998-05-07
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1998-06-07	Accession 1998-05-07
Convention on Nuclear Safety	1998-08-05	Accession 1998-05-07
Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA (RSA)	1998-09-24	Signed 1998-09-24
NPT		Signed 1996-07-08
CTBT		Signed 1997-10-24
Strengthened Safeguards Systems: Status of Additional Protocols	2006-09-13	
Code of Conduct on the Safety and Security of Radioactive Sources		is accepted

Conclusions. The infrastructure of radiation protection in the Republic of Moldova, after its complete reorganization, will reflect the international standards for radiation protection. All radiation and nuclear related activities will be regulated and registered by the National Agency for Regulation of Nuclear Activities and Activities with Radiation Sources, under the Ministry of Ecology and Natural Resources. The Agency will have necessary financial and decision-making independence in the matter. The structures, the Regulation and the Head of the Agency are approved by the Government. The new concept of state system for control of radioactive sources is based on the registration, licensing, on-site inspection, national source inventory and corresponds to the international standards.

The science and innovation infrastructure is in a stage of radical reorganization the last two years. Interaction of science community and regulatory body is assured through the National Radiation Protection Committee, as the consultative body of the Government.

International cooperation is being supported. The Republic of Moldova signed the CPF, a bilateral agreement with the IAEA Department of Technical Cooperation, which underlined state priorities and the necessity to implement in the near future nuclear and isotope technologies in the country.

Country's annual budget (USD ~3 mlrd, the poorest country in Europe) did not assure fully, adequately and timely implementation of the international recommendations in the fields of radioprotection, nuclear safety & promotion of science technology in economy. In this way the multilateral international assistance for the Republic of Moldova would be required for the medium term in establishing a fully corresponding to international standards regulatory body, adequate implementation of the international treaties and agreements on the matter, and in helping the development of human resources and transfer of new nuclear technology in medicine, industry, agriculture and science.