



**THE REPUBLIC OF BULGARIA**

**NATIONAL REPORT**

**ON IMPLEMENTATION OF THE CODE OF  
CONDUCT ON THE SAFETY AND SECURITY OF  
RADIOACTIVE SOURCES**

**FIRST EDITION**



**Sofia, May 2007**

## **REPUBLIC of BULGARIA**

### **REPORT ON IMPLEMENTATION OF THE CODE OF CONDUCT ON THE SAFETY AND SECURITY OF RADIOACTIVE SOURCES**

#### **EXECUTIVE SUMMARY**

The Nuclear Regulatory Agency (NRA) as a State Regulatory Body responsible for safe use of nuclear energy and sources of ionising radiation in Republic of Bulgaria in 2004 has notified the IAEA of the acceptance of the obligations ensuing from the Code of Conduct on the Safety and Security of Radioactive Sources /2004/ and its associated Guidance on the Import and Export of Radioactive Sources /2005/.

Maintaining high level of safety and security during the use and storage of Sources of Ionising Radiation (SIR) and prevention of illegal activities and incidents with SIR are top priority tasks of NRA. In order to ensure the radiation protection and the security of SIR in the country a **national regulatory infrastructure** has been developed which is based on the legislative requirements in this field.

The functions of the competent State authorities responsible for ensuring radiation protection and safety of radioactive sources are clearly and unequivocally defined in the respective legislation thus avoiding overlapping of activities and contradictions.

The report contains 5 parts as follows:

- **PART I: CURRENT STATE OF THE REGULATORY INFRASTRUCTURE FOR MANAGEMENT AND CONTROL OF SOURCES OF IONISING RADIATION IN THE COUNTRY**
- **PART II: NATIONAL REGISTER OF RADIOACTIVE SOURCES**
- **PART III: STRATEGY FOR RETRIVING REGULATORY CONTROL OVER ORPHAN RADIOACTIVE SOURCES. NOTIFICATION, CO-ORDINATION AND PREVENTION OF INCIDENTS IN CASE OF FOUND OR LOST RADIOACTIVE SOURCES**
- **PART IV: REGULATORY APPROACH UPON EXPAIRATION OF RADIOACTIVE SOURCES LIFETIME**
- **PART V: CONCLUSION**

The licensing and inspection activities of NRA are carried out jointly and in cooperation with Ministry of Health and Ministry of Internal Affairs. A systematic information exchange is carried out between NRA and the specialised control authorities concerning the ensurance of radiation protection and the safe use and storage of radioactive sources.

**An infrastructure for RAW management** is developed which functions according to the legislature in this field.

**A Special Program for Transfer of RAW from Previous Activities** is developed which by 2010 expects the delivery to the SE RAW – Novi Han which are declared as RAW and are stored in unsuitable conditions.

**Infrastructure for emergency response** during radiation incidents and accidents has been developed.

A system of specialized training and for acquiring qualification for persons working with sources of ionizing radiation is developed and implemented.

Among the competent authorities there is a good joint activities and cooperation in the process of carrying out regulatory control on activities with radioactive sources. Procedures for actions upon discovery of orphan sources and illicit trafficking of radioactive materials have been developed.

According to item 11 of the IEAE **Code** there is developed in the country **The National Register of Sources of Ionising Radiation (NR SIR)**. NR SIR contains data on the type, activity, radionuclide content, technical characteristics and location of the controlled radioactive sources of categories 1 through 5.

The regulating and the legislative system for control and management of the activities with radioactive sources and provision of their safety is in compliance with the basic principles and requirements underlined in the IAEA Code.

There are measures planned to overcome of some problems in the area of radiation protection and safe management of the radioactive sources, given in the, **National Report on Radiation Protection in Republic of Bulgaria - 2006'**.

## INTRODUCTION

The Nuclear Regulatory Agency (NRA) as a State Regulatory Body responsible for safe use of nuclear energy and sources of ionising radiation in Republic of Bulgaria in 2004 has notified the IAEA of the acceptance of the obligations ensuing from the Code of Conduct on the Safety and Security of Radioactive Sources /2004/ and its associated Guidance on the Import and Export of Radioactive Sources /2005/.

In compliance with the Act on the Safe Use of Nuclear Energy (ASUNE) ensuring protection of human life, health and living conditions of both present and succeeding generations, the environment and property against harmful impact of ionising radiation has the highest priority over the use of nuclear energy and sources of ionising radiation and during the management of Radioactive Waste (RAW) and Spent Nuclear Fuel (SNF).

Maintaining high level of safety and security during the use and storage of Sources of Ionising Radiation (SIR) and prevention of illegal activities and incidents with SIR are top priority tasks of NRA. In order to ensure the radiation protection and the security of SIR in the country a **national regulatory infrastructure** has been developed which is based on the legislative requirements in this field.

## PART I

### CURRENT STATE OF THE REGULATORY INFRASTRUCTURE FOR MANAGEMENT AND CONTROL OF SOURCES OF IONISING RADIATION IN THE COUNTRY

The ASUNE and the ensuing secondary legislation for its application comply with the EU legislation and the IAEA recommendations. The ASUNE, Law on Health, Law on the Protection of the Environment and the Regulations associated with their application define the principles, the requirements, the terms and procedure for:

- ensuring radiation protection of the personnel and the population during operation of nuclear facilities and facilities with SIR and during the management of Radioactive Waste (RAW) and Spent Nuclear Fuel (SNF);
- maintaining of emergency preparedness and response in case of incidents and accidents with SIR and radioactive contamination;
- ensuring of physical protection in the controlled nuclear facilities and facilities with SIR and safety during the use and storage of radioactive sources;
- inventory and control of nuclear materials and radioactive substances;
- transport of nuclear materials and radioactive substances
- protection of the environment from the harmful effects of ionising radiation;
- participation of the competent State bodies in the process of regulation and control of activities in the nuclear facilities and facilities with SIR;
- financing of the regulatory and control activities;
- conducting of specialized training and acquiring professional qualification for work in the ionising radiation environment;
- issuing of licenses and permits for activities in nuclear facilities and SIR;
- assessment and control of the professional exposure and the exposure of the population.

The functions of the competent State authorities responsible for ensuring radiation protection and safety of radioactive sources are distributed as follows:

- NRA performs regulatory control of the activities using nuclear energy and ionising radiation and the management of Radioactive Waste (RAW) and Spent Nuclear Fuel (SNF);
- Ministry of Health (MH) performs the specialised control of professional exposure and the exposure of the population, carries out medical surveillance of the personnel and monitoring of the workspace and its quality;
- Ministry of Environment and Water (MEW) manages the National system for control of the environment and performs radio ecological control;
- Ministry of Interior (MI) manages the specialised control over the physical protection of the nuclear facilities and facilities with SIR and storage of radioactive sources;
- Ministry of State Policy for Disasters and Accidents (MSPDA) manages activities connected with emergency planning, emergency response and maintains emergency preparedness for protection of the population in case of disasters, accidents and catastrophes;
- Ministry of Agriculture and Forests (MAF) manages the specialised control of the radioactivity content of the agricultural products;
- State Agency for Metrology and Technical Control (SAMTC) manages activities connected with the metrological control of the devices dedicated to measurement of ionising radiation.

Their functions and responsibilities, as well as terms of interaction and coordination between them are clearly and unequivocally defined in the respective legislation thus avoiding overlapping of activities and contradictions.

The activities that are liable to regulatory control under ASUNE are:

- operation of nuclear facilities and facilities of RAW management;
- use and storage of radioactive sources and generators of ionising radiation in industry, medicine, and control purposes;
- site selection, design, construction, commissioning and decommissioning of nuclear facilities and facilities with SIR;
- import and export of radioactive sources and generators of ionising radiation;
- transport of nuclear material and SIR;
- work with radioactive sources and generators of ionising radiation for maintenance and services.

NRA is an independent specialised authority of the executive body and its Chairman is designated by a decision of the Council of Ministers and appointed by the Prime Minister. The Chairman of NRA is vested with powers and is responsible for:

- issue of licenses and permits for safe conduct of the activities indicated in ASUNE;
- performs analysis and assessments of safety;
- conducts inspections of the controlled facilities and enforces sanctions for violation of the safety requirements.

NRA is provided with the financial and material resources, with qualified and experienced personnel carrying out its functions and obligations with competence. An internal

set of rules and procedures has been developed which regulate the licensing and inspection activities, maintaining of emergency preparedness and emergency response.

The licensing and inspection activities of NRA are carried out jointly and in cooperation with Ministry of Health and Ministry of Internal Affairs. A systematic information exchange is carried out between NRA and the specialised control authorities concerning the ensurance of radiation protection and the safe use and storage of radioactive sources.

NRA, jointly with the Ministry of Health and Ministry of Interior, perform preventive, routine and follow up control for fulfillment of the conditions of the issued licenses and permits, for observation of requirements and the rules of radiation and physical protection at the facilities and for observation of the issued prescriptions and recommendations given by the control authorities. Administrative measures or sanctions are imposed in accordance with ASUNE upon establishing of violations. If necessary the NRA inspectors issue compulsory for implementation prescriptions in order to ensure radiation safety and security.

In accordance with ASUNE, NRA keeps strict inventory and control of nuclear materials, radioactive substances and other sources of ionising radiation. NRA maintains also a National Register of Radioactive Sources and a Public Register of issued licenses and permits.

**An infrastructure for RAW management** is developed which functions according to the legislature in this field. A State Enterprise Radioactive Waste (SERAW) has been established. A Fund “Radioactive Waste” has been set up with the aim to finance the activities of management of RAW generated at nuclear facilities and facilities with radioactive sources. A thorough reconstruction and modernisation of the National Repository for RAW (NR RAW – Novi Han) where RAW from industry, science and medicine is stored. Strict inventory of RAW in the country is kept. SERAW and the licensees keep the required documentation and data bases for stored RAW according to type, activity and radioactive content (disused radioactive sources and other type of RAW).

**A Strategy for Management of Spent Nuclear Fuel and RAW** has been approved and implemented which contains the performed analysis, measures and time limits for overcoming the problems connected with RAW in the country. **A Special Program for Transfer of RAW from Previous Activities** is developed which by 2010 expects the delivery to the SE RAW – Novi Han which are declared as RAW and are stored in unsuitable conditions.

A decision is taken to construct and commission by 2015 a new National Repository for medium and low waste. A preliminary study of the possible sites has been performed.

**Infrastructure for emergency response** during radiation incidents and accidents has been developed. Ministry of State Policy for Disasters and Accidents encompasses structural units for prevention, response, management and rehabilitation in case of accidents, disasters and catastrophes. There is an approved “National plan for implementation of rescue and urgent emergency activities in case of disasters, accidents and catastrophes” which is periodically updated. A National Situation Centre for management of emergencies has been created. In case of radiation accident the country possesses the necessary manpower and material resources for maintaining emergency preparedness and response. Emergency action teams are formed and they are equipped with all the necessary technical means to ensure radiation protection during the liquidation of the emergency consequences. Periodically training and exercises are conducted on institutional, local, national and international levels.

A system of specialized training and for acquiring qualification for persons working with sources of ionizing radiation is developed and implemented.

The competent State authorities lead an open and honest dialogue with the public on all questions and topics dealing with the use of nuclear technologies and radioactive sources, the state of the radiation protection in the country and the occurred accidents with the radioactive sources. Informing the public facilitates the understanding of the policy, actions and measures for ensuring the radiation protection in normal operating conditions and during emergencies.

The country created an adequate organizational structure of the competent authorities responsible for the application of the system of regulatory control in accordance with the legislation in the field of radiation protection and safety of radioactive sources. The technical means for radiometric, dose and spectrometric measurements have been ensured including mobile laboratories and equipment for discovering of radioactive sources and equipment for liquidation of radiation incidents and accidents.

Among the competent authorities there is a good joint activities and cooperation in the process of carrying out regulatory control on activities with radioactive sources. Procedures for actions upon discovery of orphan sources and illicit trafficking of radioactive materials have been developed. The activities of the Ministry of Interior dealing with ensuring physical protection and prevention of illicit trafficking of nuclear and radioactive materials is carried out in cooperation with other concerned authorities and in accordance with the Act on the Ministry of Interior and the Regulation for the provision of physical protection of nuclear facilities, nuclear material and radioactive substances.

According to ASUNE the responsibility for safe storage of nuclear and radioactive materials, RAW and spent nuclear fuel is assigned to the respective licensees who are obliged to ensure the necessary safety measures up to the moment of their delivery to the SE RAW.

## **PART II**

### **NATIONAL REGISTER OF RADIOACTIVE SOURCES**

According to item 11 of the IEAE **Code** there is developed in the country **The National Register of Sources of Ionising Radiation (NR SIR)**. The NR SIR complies with the requirements of the **Code** concerning the categorization of radioactive sources, security of the information, standard data format, possibilities of information exchange and tracking of the registered sources. The information in the Register is analogous with the RAIS software developed by IAEA.

NR SIR contains data on the type, activity, radionuclide content, technical characteristics and location of the controlled radioactive sources of categories 1 through 5 as well as generators of ionizing radiation (all together more than 90 000 type of sources), including data of the persons carrying out activities with these sources. **Figure 1** shows the functional structural diagram of NR SIR. The separate modules work on the software platform IBM Lotus Domino & Notes. The further development of NR SIR includes visualization of the location of the facilities with radioactive sources on the geographical map of Bulgaria.

Up to 31.12.2006 the total number of registered in the NR SIR facilities is **2849**, distributed as of type of application as follows:

- for production (industry) – 379 facilities;
- in medicine 1 640 facilities;
- science (research, education, agriculture) – 140 facilities;
- control and other purposes – 119 facilities;
- facilities with smoke detection devices (SDD) - 571

The total number of radioactive sources build in the smoke detection devices is **79 475**

The total number of radioactive sources (sealed, open, SDD) registered in the country up to 31.12.2006 is **87 719** (excluding the sources used in brachiatherapy).

In the country there are a total of 33 gamma irradiators (category 1) with a total activity of about 4 150 TBq (assessment for the end of 2006). Of them 18 gamma irradiation facilities have a license of NRA for use (7 in industry and 11 in medicine) with 288 radioactive sources with total activity of 3 150 TBq – Cs-137 (126 sources in 3 irradiators) and Co-60 (162 sources in 15 irradiators)

From safety considerations the stored gamma irradiators are dismantled and transferred for safe storage to NR RAW – Novi Han (by the end of 2006 a total of 14 irradiators are received).

To category 2 pertain activities and radioactive sources for non destructive testing (devices for industrial radiography). NRA issued 53 licenses for use and storage of devices for industrial radiography (in use – 109, in storage - 129). To category 2 pertain also activities with highly active sources used in for scientific and applied activities (125 sources) as well as brachiatheapy.

According to their activity the radioactive sources used in the technological control gages (TCG – level gages, density and thickness gages, moisture detectors, etc.) belong to category 3 or category 4. The total number of the built in sources in TCG is 1407. There are registered 64 moisture-density gages and 523 level and level-signalling gages with total activity 5 200 GBq. Radioactive sources of category 3 and 4 are used in calibration set ups for metrological check up and calibration of dosimeters and radiometric devices.

Static electricity eliminators (SEE) pertain to 4-th category. The total number of SEE is 285 and the number of plates in them is 4 069 having total activity of 609 GBq. With NRA license are 6 facilities which use a total of 99 SEE (1 457 plates 270 GBq) while the remaining 186 SEE are in storage in various places of the country.

The smoke detection devices (SDD) pertain to category 5 as well as radioactive sources used in laboratories and radiation measurment devices, Mossbouer spectrometers, detectors for finding contraband etc. The greatest is the number of radioactive sources built in SDD (Pu-239, Am-241 or Kr-85 with activity ranging from 0.185 to 18.5 MBq) which are used in public and office buildings.

The total number of sealed sources of categories 1 to 5 is 4 338 (without Ir-192). Their activity is conservatively assessed to about 4 750 TBq (99% of this activity is due to sources of categories 1 and 2). The total activity of sealed sources of categories 3 to 5 built in technological control gages, static electricity eliminators or used for other purposes (without SDD) does not exceed 30 TBq. The total activity of the sources built in SDD is under 1.5 TBq.

Open SIR are used in 81 facilities for scientific applied research and madical purposes (nuclear diagnostics, metabolic radiotherapy and meico-bailogical research).

To 31.12.2006 in the NR SIR are registered **2 807** generators of ionising irradiation. The greatest is the number of X-ray devices used in medicine – **2 464** (about 88% of the total number). Registered are: computer thomographs – 130, mamographs – 150, diagnostic X-ray devices – 1 450, dental X-ray devices 580, flourographs 34, angiographs – 25, osteoporosis densitometer – 12. For radiotherapy are used 2 accelerators, while for X-ray therapy – 36 devices. Outside of the field of medicine are used 343 generators of ionising radiation from which X-ray industrial radiography devices – 103, electron microscoopes – 49, X-ray devices for control of the luggage and parcels – 100, X-ray structural analysis and X-ray flourescent assay - 28, accelarators – 5.

NR SIR contains data for **1 159** licensees registered in NRA to 31.12.2006 (223 use and store radioactive sources, 863 – use generators of ionising radiation, 73 – perform services).

**NOTE:** For inventory and control of nuclear materials and radioactive waste separate information sets (data bases) are maintained by SE RAW, Institute of Nuclear Research and Nuclear Energy (INRNE) – Bulgarian Academy of Sciences and NPP Kozloduy which are



*licensed by the NRA for the respective activities. For control purposes the necessary data is periodically submitted to NRA.*

### **PART III**

#### **STRATEGY FOR RETRIVING REGULATORY CONTROL OVER ORPHAN RADIOACTIVE SOURCES. NOTIFICATION, CO-ORDINATION AND PREVENTION OF INCIDENTS IN CASE OF FOUND OR LOST RADIOACTIVE SOURCES**

In accordance with the ASUNE, any person or organisation, that manufactures, processes, stores or uses nuclear material, radioactive substances and other sources of ionising radiation or that manages radioactive waste or spent fuel, are obligated to:

1. make inventory and keep records of the nuclear material, radioactive substances and other sources of ionising radiation and of the radioactive waste and spent fuel;
2. provide periodic information on the records to the NRA Chairman;
3. appoint competent personnel to take charge of the internal control over the nuclear material, radioactive substances and other sources of ionising radiation, of the radioactive waste and spent fuel, and of the sources of ionising radiation and the radioactive waste; data concerning such personnel shall be provided to the Agency;
4. report immediately any accidental loss or theft of nuclear material, radioactive substances and other sources of ionising radiation, radioactive waste and spent fuel to the Regional Directorate or the Police Department of the Ministry of Interior, the NRA Chairman and the Minister of Health;
5. report to the NRA Chairman any incident involving an actual or potential breach of the integrity of the nuclear material or of a source of ionising radiation;
6. assure access to the regulatory authorities under this Act and to provide them the requisite assistance, including activities of inspectors of international organisations concerning nuclear material, radioactive substances and other sources of ionising radiation, radioactive waste and spent fuel.

The terms and procedure for accounting of the nuclear material, other sources of ionising radiation, radioactive waste and spent fuel, and for documentation management, information and notification are established by a Regulation for Radiation Protection during Activities with Sources of Ionising Radiation. The sources of ionising radiation received at the facility shall be placed on account in the logbook of receive-transfer operations. The hand over and return of sources of ionising radiation used in the working process shall be registered in the logbook of receive-transfer operations of the facility.

A commission, appointed by the order of the manager in charge, which possesses license and/or permit for activities with sources of ionising radiation, checks on a yearly basis, the presence, location and status of the used and stored sources of ionising radiation at the respective facility. A copy of the audit document is submitted to the Nuclear Regulatory Agency not later than the end of the first quarter of every following year. In case of establishing a absence or unregulated use of sources of ionising radiation, the person holding a license and/or a permit for activities with these sources of ionising radiation, is obliged to notify immediately the Nuclear Regulation Agency and the Ministry of Interior.

The Nuclear Regulatory Agency periodically and also on request informs the authorities performing specialised control from the MI and MH about the registered facilities with radioactive sources within the country by submitting to them all necessary information. NRA sends periodically to the MI and MH copies of issued licenses and permits for use and storage of radioactive sources.

Maintained by NRA NRSIR is a necessary and important tool for realisation of effective control and for tracing the large number of radioactive sources used and stored in the country.

With the financial support from the EU a project “Assistance of NRA regulatory activities for improving of the management of the high activity sealed sources” was performed and successfully completed. As a result from the implementation of this project in 2006 the Regulation for Radiation Protection during Activities with Sources of Ionising Radiation was amended and the requirements of the EC Directive 122/2003 on the management of highly active sources have been transposed in the Bulgarian legislation in respect to:

- control of the integrity of the radioactive sources;
- identification and labelling of the radioactive sources and their shielding containers;
- prolongation of the commissioning period of the radioactive sources after expiration of the term recommended by the producers;
- requirements to the producers of radioactive sources and to licensees using sources;
- requirements to the content and record keeping on accounting and control of the radioactive sources.

**Figure 2** shows the distribution of the events with radioactive sources that have occurred in the period 1998 – 2006. The total number of these events is 167 for the 9-year period. **Figure 3** shows their distribution by the type of events. 74 % of the cases are related to the detection of radioactively contaminated materials in scrap metal (in 120 of these cases were found details with naturally occurring radioactive materials and only in 5 cases orphan sources were found -  $^{137}\text{Cs}$  and  $^{60}\text{Co}$ ). The total numbers of thefts of radioactive sources for the mention period is 11. The average number of the events occurred for the reported period in the country is 17 per year. For the liquidation of emergency cases and emergency inter institutional response team has been formed by experts from the NRA, MH, MI, MSPDA and if deemed necessary the SERAW.

All orphan sources or radioactive contaminated materials that were found were collected for temporary storage on proper location and afterwards were transferred to the SERAW for long term storage. For all cases of illicit trafficking or authorised transportation of nuclear or radioactive materials the IAEA, as well as the regulatory authority of the interested countries have been notified, according to the Conventions ratified by the Republic of Bulgaria. NRA keeps records of the events. Information of these events is distributed to the public by the NRA annual reports and Internet.

The competent Bulgarian authorities have undertaken co-ordinate measures for prevention of events with orphan sources and illicit trafficking of radioactive materials. NRA and Border police" apply standard procedures for acting in case of discovering of materials with increased radiation. The preventive border control for discovery of goods and materials with increased radiation and developed system for co-operation between the specialised control authorities contributes for the prevention of illicit trafficking and radiation incidents with orphan sources. A special procedure has been developed for actions in case of discovering of orphan sources, which is part of the off-site emergency plan (National emergency plan).

The Bulgarian legislation implements requirements on the management and control of the radioactive sources ensuring reliable physical protection in nuclear facilities and the facilities using radioactive sources.

In accordance with the ASUNE, anyone who loses or finds any nuclear material, radioactive substance or other source of ionising radiation, radioactive waste or spent fuel is obligated immediately to notify the NRA Chairman, the specialised state body for civil protection, or the specialised authorities of the Ministry of Interior. Any nuclear material, radioactive substances and other sources of ionising radiation, whose owner is not known are state property. The NRA Chairman designates the person to whom such orphan sources shall be provided and designates the terms and conditions for this activity.

In accordance with the ASUNE licensees performing activities with radioactive sources are obliged to create organisation and to foreseen measures for emergency preparedness and response. The licence for performing activities with radioactive sources is issued only after submitting by the applicant the on-site emergency plan.

According to the Regulation on Emergency Planning and Emergency Preparedness in Case of Nuclear or Radiation Emergency the waste and scrap metal storage and processing facilities, as well as the national border check points of the country, were classified in 5 threat categories, which require available emergency plan for action in case of discovering of radioactive sources or increase of the radioactivity.

The Act of MI defines the organisational measures for control over the general dangerous items and for prevention of illicit trafficking of nuclear and radioactive materials.

The NRA is actively collaborating with the IAEA and other international organisations, countries from the European union and neighbouring and other countries in the filed of radiation protection, management of radioactive sources and emergency planning.

With the finance and expert assistance of the EU, IAEA and USA in the period 2004 – 2006 a significant progress has been achieved in relation to:

- management of high activity sources;
- prevention of incidents with orphan sources;
- prevention of illicit trafficking of nuclear and radiation substances.

Based of the successfully implementation of the international projects the following specific results were achieved:

- the Bulgarian legislation was harmonised with the EU Directive 122/2003;
- decommissioning and transferring for long-term safe storage at Novi Han repository of five gamma-irradiators which first had been stored in unsuitable conditions;
- decommissioning and transferring for long-term safe storage at Novi Han repository radioactive sources (more than 8000) from the company facility for construction of nuclear devices (in liquidation);
- for the needs of NRA, NH and SERAW a modern measurement equipment have been delivered, including mobile laboratory for NRA;
- the physical protection in 13 medical and industrial facilities using industrial gamma-irradiators and others high activity sources (a special security and other equipment have been installed);
- equipment for radiation monitoring of the transit commodities and materials at the border checkpoints has been supplied.

At the border checkpoint at Ruse and Captain Andreevo are installed portal monitors for automatic radiation monitoring of the crossing transport vehicles and commodities. The staff

of the checkpoints is equipped with handheld radiation monitors (40 units) and pagers (50 units). At the sea border checkpoint Burgas have been supplied portal monitors for automatic radiation monitoring and other type of handheld equipment. Under the joint IAEA and EU project during the 2007 is planned a supply of radiation monitoring equipment for the sea border checkpoint Varna and Sofia Airport. In place is also other EU projects in the field of radiation protection and management of radioactive sources. The purpose of the projects is to assist the NRA regulatory activities.

At the entrance of the metal processing facilities in the country there were mounted automatic radiation monitoring equipment for monitoring of the scrap metal. In use are also mobile radiation devices. On-site emergency plan for performing actions in case of determination of increased radioactivity in scrap metal was developed. Documentation for the origin of the scrap is required for the scrap metal received for smelting. Special places are identified for isolation and unloading of the transport vehicles in case of discovering radioactive contaminated scrap metal.

NRA is issuing licensees to the organisations and companies specialised in the performing radiation monitoring of the scrap. The Licensees are obliged to notify immediately NRA in case of discovering of radioactive contamination.

In 2006 the NRA started to develop guidance for prevention of radioactive incidents with scrap metal. The guidance is designated for large number of persons in the country.

NRA co-ordinates and organises the participation of Bulgarian experts in international training courses and seminars connected with the radiation and physical protection of the facility using sources of ionising radiation, emergency planning and illicit trafficking of nuclear and radioactive materials. In these fields a common exercises and training are performed with neighbouring countries.

#### **PART IV REGULATORY APPROACH UPON EXPIRATION OF RADIOACTIVE SOURCES LIFE TIME**

According to the definition of „radioactive waste”, given in ASUNE each radioactive source whose term of safe use is expired according to his production documentation shall be proclaimed as radioactive waste.

From other side the operational term of the radioactive sources, given by their producers can not be leading and final for their integrity and safety, respectively shall not exclude the possibility for their secondary use or recycling in the cases of non-violation of the requirements of the radiation protection and safety.

(Such conclusion is made in the report on realization of the Project „Support of the Regulating Activities of NRA for Upgrade of the Management of High Activity Sealed Sources”, financed by the EU).

According to item 14 of the IAEA Code, each country should encourage the reuse or recycling of radioactive sources, when practicable and consistent with considerations of safety and security.

The declaring of a particular radioactive source as radwaste on „operational life time” criteria basis, determined by the producer (ASUNE) is not substantiated and pragmatic. Обявяването на даден радиоактивен източник за РАО въз основа на критерия ”срок за експлоатация, определен от производителя” (ЗБИЯЕ) не е обосновано и прагматично.

That is why in 2006 the Regulation for Radiation Protection During Activities with Sources of Ionizing Radiation, was revised concerning the possibility for extension of the term of safe use of radioactive sources after the expiration deadline shown in the producer documentation.

In the regulation are put into force the following requirements:

1. Each licensee shall provide control over the condition of used and stored radioactive sources by periodical tests for source integrity. The Chairman of NRA defines test frequency. Furthermore additional integrity tests may be provided by NRA Inspector prescription.

1. After termination of the operational term, given in the producer documentation, the integrity of the used radioactive sources shall be checked not less than once per year. Commission, appointed by the NRA Chairman shall access the results from the performed tests.

3. The Commission gives conclusion for the further safe use of the source after the termination of term of operation, shown into the producer's documentation (i.e. issues permits for use or does not allow its further use).

According to the Bulgarian legislation the disused (spent) radioactive sources, declared, as radwaste are liable to conditioning, storage and further disposal.

In certain specific cases a radioactive sources can be returned for secondary use or recycling to the country-producer.

For instance in 2007 it is planned and contracted to return back to Canada 10 Cobalt sources, used 15 years in the gamma-irradiator of the pharmaceutical enterprise, Sofarma" (Sofia).

ASUNE permits return import of disused radioactive sources produced in Bulgaria.

## PART V

### REGULATION OF THE IMPORT AND EXPORT OF RADIOACTIVE SOURCES

According to ASUNE the import and export of sources of ionizing radiation and the generators of ionizing radiation and/or parts of them are subject of permission regime.

As an inseparable part of the issued by the NRA permissions for every particular import/export case of a source of ionizing radiation applies a confirmation for import/export of goods, according to the form, required by the Regulation for the conditions and the order for registration and permission of foreign trade deals.

A permit for import of radioactive sources shall be issued with the following conditions:

- the person to who is intended has the required license or permit for use and/or storage of sources;

- ensured is a transport, by a person having license or permit for this activity.

The following radioactive sources are mainly imported into the country:

- for medical purposes : Technecium generators ( $\text{Tc}^{99\text{m}}$  approximately 370 per year), radiopharmaceuticals ( $\text{P}^{32}$  – 30 packages,  $\text{I}^{131}$  –440 packages,  $\text{I}^{125}$  – 520 packages,  $\text{I}^{123}$  –20 packages –average per year),  $\text{Ir}^{192}$  – for brachithrapy (on the average 8 sources per year)
- for reloading of industrial radiography devices -  $\text{Ir}^{192}$ -(on the average 75 sources per year);
- technological control gauges-  $\text{Cs}^{137}$  (on the average 40 per year).

Episodically there is an import of control and metrological sources ( $\text{Sr}^{90}$ ,  $\text{Ba}^{133}$ ,  $\text{Na}^{22}$ ,  $\text{Kr}^{85}$ ,  $\text{Cm}^{244}$ ,  $\text{H}^3$  and others).

The country does not produce and export radioactive sources.

According to ASUNE, NRA is the competent body for issuing of permissions and licenses for transport of radioactive sources.

Episodically through the country territory transit transports of radioactive sources is realized in accordance with the Bulgarian legislation and the international requirements for transport of radioactive materials (**ST-1/IAEA, ADR**).

The practice shows good collaboration in this field and co-ordination between NRA and the regulatory bodies of other countries.

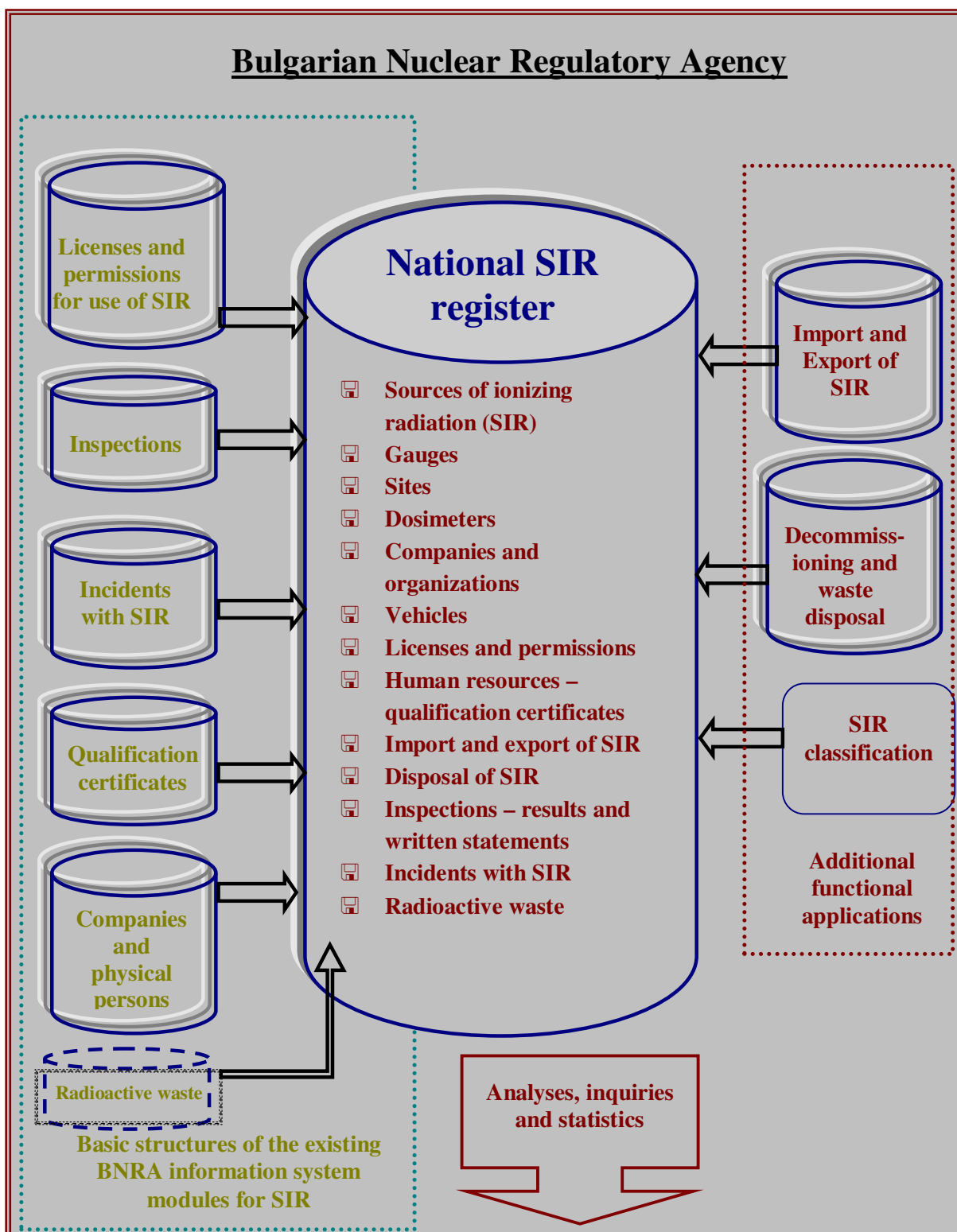
## **CONCLUSION**

Republic of Bulgaria adheres to the basic principles and requirements underlined in the IAEA Code.

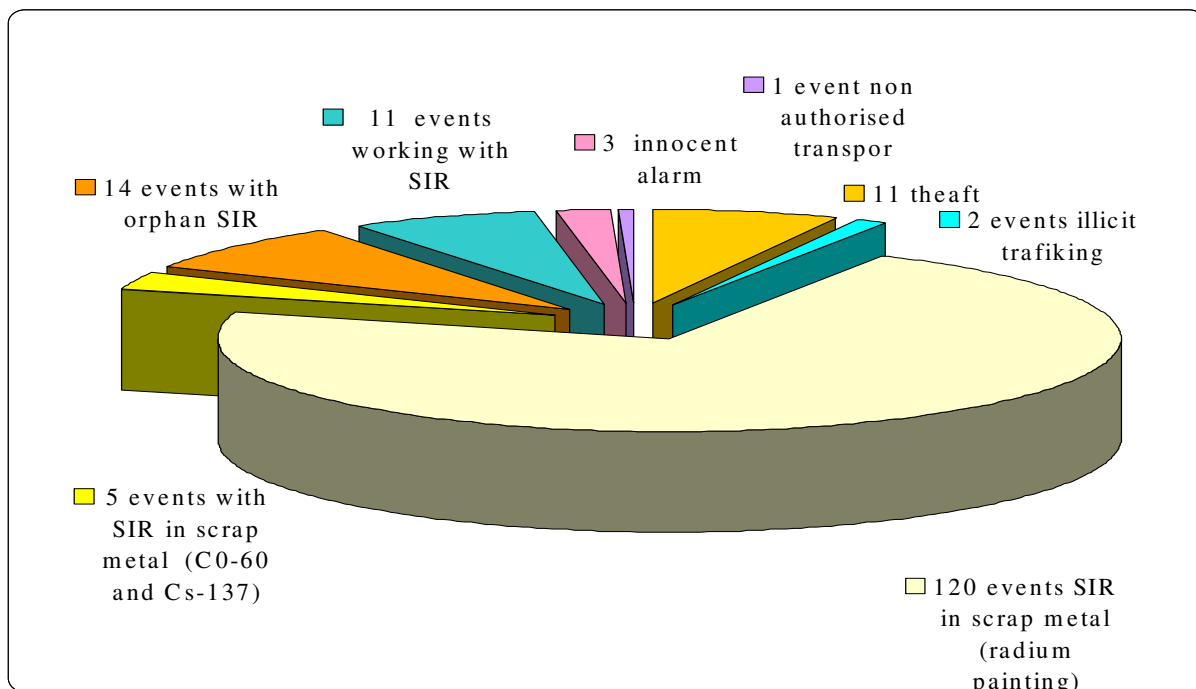
There are measures planned to overcome of some problems in the area of radiation protection and safe management of the radioactive sources, given in the „**National Report on Radiation Protection in Republic of Bulgaria - 2006**”.

The regulating and the legislative system for control and management of the activities with radioactive sources and provision of their safety is in compliance with the IAEA recommendations and is functioning adequately.

**Fig.1.** Functional structural diagram of NR SIR



**Fig.2.** Distribution of the events for the period 1998 – 2006 per type of event



**Fig.3.** Distribution of the events per year for the period 1998 – 2006.

