NATIONAL REPORT OF THE REPUBLIC OF BELARUS

UNDER

THE JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

MINSK

2005

CONTENTS

Section A. INTRODUCTION

The Republic of Belarus covers an area of 207,600 square kilometers. Being situated in the center of Europe, it borders on Russia, Poland, Lithuania, Latvia and Ukraine. The population of the republic is about 10.2 million. About 2 million people live in the territory with the level of radioactive contamination density by Cs-137 of over 37 kBq/m^2 as a result of the Chernobyl catastrophe. Belarus became an IAEA Member State on July 29, 1957.

Belarus has not got any nuclear power plants on its territory, however, radioactive sources, nuclear and radioactive methods and technologies were widely used and are still being used in medicine and different fields of national economy of the republic. The republic places high emphasis on the issues of provision of nuclear and radiation safety.

In recent years the legal base in the field of radiation safety has been reviewed and adjusted in accordance with the international principles of radiation safety and interagency "International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources" (1996). Belarus joined the number of international agreements in the field of radiation safety such as Convention on Nuclear Safety (1999), Convention on Early Notification of a Nuclear Accident (1987), Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency (1987), Convention on Physical Protection of Nuclear Material (1993).

"Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management" (hereinafter referred to as "Convention") was ratified by the Republic of Belarus on July 17, 2002 and, in accordance with the Article 40 of the Convention, entered into force for the Republic of Belarus on February 24, 2003. According to the Law of the Republic of Belarus "On the Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management" of 17 July, 2002 №130-3, the Ministry for Emergencies of the Republic of Belarus together with the Ministry of Foreign Affairs of the Republic of Belarus are responsible for meeting the engagements on the Convention.

For 2 years since the First National Report was introduced the following measures have been undertaken to enhance the safety of the spent fuel and radioactive waste management:

- Sanitary Regulations of Decontamination Waste of Chernobyl Origin Management (SPOOD-2004) have been developed and put into force;
- Sanitary Regulations of Radioactive Waste Management (SPORO-2005) have been developed and put into force;
- The new storage for sealed radiation sources has been put into operation;
- The Governmental Resolution on financing the second starting complex of the radioactive waste management facility "Ekores" has been taken.

This National report is the second one submitted for consideration at review meeting of Contracting Parties. The first one was introduced in 2003.

Section B. POLICY AND PRACTICE

1. Spent Fuel Management

Since 1970 the works on construction of Mobile Nuclear Power Plant (MNPP) "Pamir" have been carried out in Belarus by the order of the Ministry of Defence of the USSR. In 1991 in the result of "Pamir" decommissioning the active zone of the reactor was discharged into the specialized facility of the experimental bulk of the plant "Pamir". In accordance with the working plan the whole active zone was supposed to be handed to the Russian enterprise "Mayak" for recycling. However, as a result of the USSR break-up, these works were not completed.

Currently the spent fuel of the Mobile NPP "Pamir" (43 kg of highly enriched uranium) is stored in the cooling pond of the Joint Institute of Energy and Nuclear Research – Sosny of the National Academy of Sciences of the Republic of Belarus. The storage is a provisional facility, which is designed as a backup system for the time of testing "Pamir".

After the Russian Federation legislative authorities had taken the decision on importing the spent nuclear fuel from other countries for recycling purpose, the Government of the Republic of Belarus initiated the negotiations on the return of the spent fuel of the MNPP "Pamir" into the Russian Federation.

Further policy in this field is aimed at obtaining an affirmative decision from Russia and organizing safe unloading and transportation of the fuel to Russian specialized facilities for reprocessing.

As for the realization of the above stated policy, the Republic of Belarus hopes for international cooperation, in particular, for the support of the Republic of Belarus in the framework of trilateral initiative of the IAEA, the Russian Federation and the USA on the return of spent fuel of research reactors into the country of origin. At the present time, within the initiative of the Russian Federation Federal Atomic Energy Agency, the negotiations on the taking out of the irradiated fuel of the MNPP "Pamir" for interim storage and processing are resumed.

2. Radioactive Waste Management

In August 2005 on the territory of the Republic of Belarus the new Sanitary Regulations of Radioactive Waste Management (SPORO-2005) have been put into force. They contain radioactive waste classification, main principles of radioactive waste management, criteria of radiation safety in the field of radioactive waste management, basic requirements, providing safety of public and personnel at all stages of radioactive waste management (collecting, storage, transport, processing, disposal of waste).

SPORO-2005 set up the requirements on radiation safety of public and personnel for all aspects of radioactive waste. These requirements don't apply to irradiated fuel and nuclear materials, industrial waste with high concentration of natural radionuclides, to the disposal of liquid waste in deep geological horizons (reservoir beds).

According to SPORO-2005 requirements, the waste producer is responsible for safe management of these waste until they are delivered to another organization.

The regulations set up the requirements for the project documentation of a radiation object and the system of radiation safety control while radioactive waste management.

According to SPORO-2005, liquid waste include organic and inorganic liquids, pulps and tailings which are of no more use and have specific activity of nuclides more than 10 times higher than the intervention levels, given in Annex 3 of the Radiation Safety Standards NRB-2000.

Solid waste include spent radionuclide sources, materials, manufactures, equipment, biological units, soil and solidified liquid radioactive waste which have specific activity of radionuclides exceeding the level figured in Appendix 19 of NRB-2000.

If the nuclide content of the waste is known, the waste are considered as the radioactive ones if the sum of the ratio of the specific activity of the radonuclides to their minimal activity doesn't exceed 1.

In case of unknown radionuclide content, solid waste are considered radioactive if their specific activity is more than:

100 κBq/kg - for beta emitters;
10 κBq/kg - for alpha emitters;
1 κBq/kg - for transuranium radionuclides;

Gamma-emitting waste of unknown content are considered as the radioactive ones if the dose rate at their surface (0.1.m) exceeds the phone by 0.001 mSv/h meeting the conditions of approved methods of measurements.

Solid and liquid waste are divided by their specific activity into three categories:

Classification of solid radioactive waste by their specific activity

Waste category	Specific activity, kBq/kg		
	Beta emitting radionuclides	Alpha emitting radionuclides (except the transuranium ones)	Transuranium radionuclides;
Low activity	Less than 10^3	Less than 10^2	Less than 10^1
Medium activity	from 10^3 to 10^7	from 10^2 to 10^6	from 10^1 to 10^5
High activity	More than 10^7	More than 10^6	More than 10^5

Beside the aggregative state and the specific activity of the waste, in process of radioactive waste management the other physical and chemical characteristics also must be considered, such as fire risk and explosion proof, organic or inorganic etc.

SPORO-2005 set up the following stages of radioactive waste (RW) management:

- collecting and sorting RW is carried out at the places of their producing and/or processing taking into account radiation, physical and chemical characteristics according to the system of waste classification and considering the further methods of managing these waste;
- primary sorting of the waste includes the separation of radioactive compounds from non-radioactive ones;
- sorting of primary liquid and solid waste is aimed to the separation of waste by different categories for their processing using the approved technologies and for preparation to their further storage and disposal;
- waste conditioning is fulfilled to enhance the safety of waste management at the expense of their volume decreasing and transformation into form suitable for transport, storage and disposal;
- transport of waste provides for their safe relocation between the places of their producing, processing, storage and disposal using special loading and transport facilities;
- radioactive waste disposal is aimed to their safe isolation from human and environment.

SPORO-2005 also set up the requirements to clean up and decontamination of special premises, equipment and special vehicles; requirements on prevention and elimination of consequences of emergencies while RW management; measures on individual protection and personal hygiene; requirements to manufacturing control execution.

Special category of radioactive waste includes the waste of Chernobyl origin. According to SPOOD-2004 (Sanitary Regulation on Decontamination Waste of Chernobyl Origin Management, came into force after the introduction of the First National Report), the waste of Chernobyl origin is defined as substances formed as a result of work on elimination of the consequences of the Chernobyl accident with a view to bring the state of environment in industrial and civil facilities in the contaminated areas to an acceptable radioecological level.

According to SPOOD-2004, decontamination wastes are divided into liquid and solid ones. Waste which have the specific activity of Cs-137 more than 1 kBq/kg or the levels of surface contamination exceeding 20 beta-particles/cm^2 *min are related to the solid ones.

Liquid decontamination waste are organic and inorganic liquids, pulps and tailings produced as a result of decontamination works where the Cs-137 content is more than 10 times higher than the intervention levels with the water entry for population according to the Appendix 3 of the Radiation Safety Standards NRB-2000.

Works on transport, processing, long-term storage and disposal of the radioactive waste are carried out only by the specialized enterprises having the license of the Promatomnadzor of the Ministry for Emergencies.

The radioactive waste management facility “Ekores” realizes collection and storage/disposal of non-Chernobyl origin waste from all the territory of the republic. The producers of the radioactive waste (scientific and medical institutions, industrial

plants) are responsible for collection, segregation and if necessary for primary treatment and interim storage of waste (see Annex 1).

The radioactive management facilities «Polesie» (Gomel city) and "Radon" (Mogilev city) carry out collection, transportation, storage and disposal of Chernobyl origin radioactive waste. These facilities are also responsible for the maintenance and safe operation of the Chernobyl waste repositories.

Section C. SCOPE OF APPLICATION

This Convention is applied to:

- the safe management of spent fuel resulted from the operation of Mobile Nuclear Plant "Pamir";
- the safe management of waste resulted from use of radioactive materials in industry, medicine, scientific research, education and other branches of national economy and civil activities within the territory of Belarus if the level of radionuclide contamination of these materials is higher than the one defined in the point 187 of the OSP-2002 (see Section B (2) of this Report);
- safe management of waste left in the territory of the Republic of Belarus by Russian Federation military units;
- safe management of the decontamination waste of Chernobyl origin.

Section D. INVENTORIES AND LISTS

<u>List of spent fuel management facilities</u>

1. Spent fuel storage facility of Joint Institute for Energy and Nuclear Researches (Sosny) of the National Academy of Science of the Republic of Belarus.

The facility is situated in the territory of the Joint Institute for Energy and Nuclear Researches- Sosny, Minsk.

The capacity is of 207 cells

Inner dimensions:

Length- 4,5 m
Width – 8 m
Height – 42 m

Distilled water with circulation and purification in capacity of 28 cube m is used for biological protection and cooling. Biological protection (concrete) is not less than 18 m.

The facility is equipped with the system of water and air purification and with permanent system of radiation control with autonomic signalling if the level of

gamma radiation above the depository is exceeded. Physical protection measures are in compliance with the appropriate requirements in the field.

An inventory of spent fuel

106 fuel assemblies, one of which is leaking and provided with a special cover;
Total weight of uranium is 43.2kg, including 18.5 kg of uranium – 235;
Total weight of the assemblies - 730 kg.

List of radioactive waste management facilities

1. Radioactive waste storage/disposal facility "Ekores"

The site is situated 2 km from Minsk. It is a typical near surface Radon-type facility, widely known in the post-soviet area.

It was commissioned in 1963 to accept waste from a research reactor of the Academy of Science of the Republic of Belarus. It provides the disposal of a wide range of radioactive waste produced in medicine, industry and research in the territory of the Republic of Belarus. At the present time at the site are located:

- 2 closed "old repositories" (1963-1979)
- 2 "new generation" near surface repositories intended for solid waste

4 "wells" for disposal of spent sealed radioactive sources (in the buildings of new repositories

Two old repositories represent rectangular reservoirs with 225 m^3 volume each, the walls and bottom being a concrete monolith structure with the covering of precast concrete slabs. Their designed dimensions are 5.0*15.0 m, their depth is 3.0 m. During the conservation the upper surface is covered by hot bitumen, and after that by the layers of asphalt (0.03 m) and soil (1.2 m).

Two new repositories (were constructed in 1977) have the above-ground floor with a precast metal frame (the designed dimensions are 12*30 m) and the underground floor (830 m^3) consisting of 8 vaults (the depth is more than 3 m and designed dimensions are 6*6 m) made of concrete monolith. The facilities are equipped with a suspension cat-crane with lift capacity of 3,2 tons. By means of it one or two floor slabs are removed, and the radioactive waste packages are loaded into the vaults.

The designed capacities of the "new generation" repositories are intended for loading solid waste having specific activity and total annual activity not exceeding 3,7 MBq/kg and 7,4 TBq correspondingly.

Currently 6-10 tons of waste and over 6 000 various types of spent sources annually come to the "Ekores" facility for being disposed of. They are loaded into the vaults in the producer's package or container. Till recently segregation of incoming waste hasn't been carried out. The contents of the filled vaults represents the conglomerate of different materials (plastics, glass, rag, etc.), contaminated with both short-life and long-life isotopes.

Wells for disposal of sealed spent radioactive sources are equipped with S-type pipe of 108 mm diameter for source loading. The depth of these wells is 6 m.

The designed well capacity doesn't exceed 20kg-ekv.of Ra of total activity in a single well without any time limitation for loading. The planned operation term of the wells is 20 years.

While managing with spent sealed sources (SCS), the following methodology was accepted:

- SCS, delivered in transport containers with bottom unloading, are loaded into the wells through the S-type pipe;
- SCS, delivered in containers not providing for bottom unloading and some radiation devices with built-in protection (for example, gamma- radiography units) are stored in special vaults under a concrete slab together with their shielding, since there is no equipment for their reloading at the Ekores facility;
- SCS with radioactive isotopes Pu, Am are collected into a separate container, which is stored in one of the concrete vaults.

Currently the wells are not operated. A new facility for SCS storage/disposal is recently commissioned.

An inventory of radioactive waste, disposed of at the "Ekores" Facility, is specified in Annex 2.

2. Disposal facilities for decontamination waste of Chernobyl origin (DFDW).

The waste originated from works on decontamination of the inhabited localities, facilities and installations in the area of radioactive contamination of Chernobyl NPP are stored in the disposal facilities for decontamination waste (DFDW). Taking into account the formation history, control requirements and operation regulations, these facilities are subdivided into three categories:

DFDW-I are near-surface facilities with special engineering barriers intended for waste with the activity more than 96 κBq/kg according on Cs-137. Currently there is only one disposal facility of such kind–"Khatki". It is situated in the South of Chernobyl zone several kilometres away from the border with Ukraine. It constitutes 9 trenches, equipped with concrete cells (3x3x3x m), where 3088 tons of radioactive meat with the total activity of $74,5*10^{10}$Bq (20,1488 Ci) were disposed in 1991.

DFDW-2 are near-surface disposals with clay bottoms, which were constructed in 1991-1992 for waste, originated from decontamination of contaminated areas. The waste (predominately soil, construction wastes) are of low or very low level of activity (less than 96 kBq/kg according to Cs-137). **There are 8 disposal facilities belonging to DFDW: 4 – in Mogilev Region, 3 – in Gomel Region, 1 – in Brest Region.**

DFDW-3 are facilities formed as temporary units while mass decontamination of inhabited localities carried out by civil defence forces in Gomel Region (1986-1989). The total number of **DFDW-3** is 82. Almost all of them were created in extreme conditions and equipped spontaneously as a rule without projecting, in former pits, ravines, lowlands, sometimes in the specially dug trenches or on flat sites. Only three of them have base protection in the form of clay layer or plastic foil, 11 of them have test bore holes for control over contamination of ground water.

As it was already indicated, collection, transportation and disposal of waste originated from decontamination of territory and construction, maintenance and radiation control of DFDW is executed:

in Gomel Region – by the waste management facility “Polesie”,
in Mogilev Region – by the waste management facility “Radon”,
In Brest region – by the facility “Bresoblselstroi”.

3. Facilities at sites of former dislocation of the Russian Federation military units

At the present time one of the major tasks in the field of radioactive waste management is the provision of safety of the radioactive waste repositories located at sites of former dislocation of Russian Federation military units.

These facilities are located in Gomel (disposal facility Gomel-30) and Minsk (disposal facility “Kolosovo” Regions. There is not any documentation on the construction and the contents of these facilities. According to the results of preliminary examination, they represent concrete wells, loaded with sealed control, diagnostic or calibration radioactive sources (Cs-137, Sr-90, Co-60).

Currently the advanced examination of the disposal sites is being carried out to assess the level of their radiation hazard and to take precautions against the potential negative effect of the facilities on the public and environment.

DF “Kolosovo” represents a well made of concrete collars sealed by a metal cover. Its depth is about 6 m, about 1 m of which is lower than at the ground level. The upper part of the concrete well where the sources have been loaded, with the external diameter 1480 mm and wall thickness 240 mm, left unloaded. In the upper layer of the disposal zone are placed the sources in lead containers, covered with sand. Lower, presumably, are disposed the concreted capsulated sources.

DF “Gomel-30” is a concrete well with its external diameter 1900 mm and wall thickness 200 mm, loaded lower than the depth of 700 mm by the concreted “layers” of capsulated ionizing radiation sources.

The disposal zone is a concrete monolith with the 1900 mm diameter and sources inside.

Currently it is planned to take measures on prevention of the negative influence of these objects on the population and the environment.

The critical problem is also the utilization of a large amount of ionizing radiation sources left on the territory of the Republic of Belarus by the military units of the Russian Federation. These sources contain the following radioactive elements: caesium-137, strontium-90, yttrium-90, cobalt-60, promethium-147, radium-226. At the present time the total weight of the waste being subject to disposal is more than 25 kg. The long-term storage of unused radiation sources in the overloaded and outmoded military storages and bases can decrease the level of radiation safety, impair the radiation and ecological environment at the places of former dislocation of the mentioned above military units.

Considering the high probability of the unauthorized disposal of the radiation sources at places of former dislocation of the military units, the in-depth study of these objects is needed.

Section E. Legal and regulatory framework

During the last five years the legislation in the field of radiation safety has been reviewed and put into compliance with the existing internationally agreed principles and standards of radiation safety. The legal framework in the field of radiation safety is provided for by the following laws of the Republic of Belarus: "On Radiation Safety of Public"(edition of 1998, at the present time it is being reviewed and the new law is passed in the first reading in April, 2005) and "On Hygiene and Epidemic Wellbeing of Public"(edition of 2000). To implement the above-mentioned laws, the new Radiation Safety Standards (NRB-2000) and Basic Sanitary Regulations to assure radiation safety (OSP-2002) have been developed and put into force. Since August 2005 the Sanitary Regulations of Radioactive Waste Management (SPORO-2005) have been implemented.

Management of decontamination wastes of Chernobyl origin is regulated by the law of the Republic of Belarus " On legal regime of the territories, contaminated as a result of a catastrophe at the Chernobyl Nuclear Power Plant" (edition of 1999) and Sanitary regulations " On management of decontamination wastes, resulted from the activity on overcoming the consequences of Chernobyl Catastrophe" (SPOOD-2004).

The safety requirements for the spent fuel storage facility are set in the "Regulations for storage and transport of nuclear fuel at atomic energy facilities."(PNAE G-14-029-91).

Along with

- Order on State Supervision of Industrial and Nuclear Safety in the Republic of Belarus (approved by Regulatory Resolution of the Council of Ministers №786 of May 29, 2001);
- Order on Licensing of Activities in the Field of Industrial Safety (approved by Regulatory Resolution of the Council of Ministers №1357 of October 20, 2003)
- Order on the Comprehensive State System of Accounting for and Control of Individual Exposure Doses of Citizens of Different Categories (approved by Regulatory Resolution №929 of June 17, 1999)
- Order on Implementation of State Sanitary Supervision in the Republic of Belarus" (approved by Regulatory Resolution of the Council of Ministers №1236 of August 10, 2003)
- Order on State Management in the Field of Radiation Safety of the Public (approved by Regulatory Resolution of the Council of Ministers №298 of March 16, 2004),

these documents form the regulatory base for the protection of public and workers against harmful effects of ionising radiation.

The stated regulations take into account requirements set by BSS and establish a system of licensing of activities in the field of spent fuel and radioactive waste

management.

The system provides that any activity in the area of spent fuel management, as well as in the area of transportation, storage, processing and disposal of radioactive waste is realized only on the basis of special authorisations (licences), issued by the Department for Supervision of Nuclear and Industrial Safety of the Ministry for Emergency Situations (Promatomnadzor). To start the stated activity, the operator must also get the permission from the Ministry of Health, namely - a sanitary passport, that is an obligatory preliminary condition for the licensing procedure in Promatomnadzor. The established system definitely provides that operation of a spent fuel and radioactive waste management facility is prohibited without a licence.

On the basis of the article 10 of the law of the Republic Belarus "On Radiation Safety of Public", OSP-2002, and the other existing normative documents, all organizations dealing with radioactive waste are subjects of institutional control. They should conduct appropriate documentation and records on radioactive waste management activity and submit reports to Promatomnadzor about transfer of waste to the "Ekores" facility. "Ekores" has a computerised database for waste disposal/ storage registration. This information is duplicated as paper documentation.

The compliance with the existing regulatory requirements and licence conditions is provided within the established state system for supervision of industrial and nuclear safety and within the system of state sanitary supervision.

It includes regularly inspections of the licensed activities and check-up of the compliance with the regulations and licence conditions. According to inspector's report, persons responsible or guilty for the breach of the radiation safety rules can be brought to administrative (fine, removal) or criminal responsibility (imprisonment up to 10 years).

The enforcement measures for non-compliance with the regulations in the field of radiation safety are defined by the Criminal Code of the Republic of Belarus and the Administrative Code of the Republic of Belarus (Annex 5).

The implementation of the stated legislative and regulatory framework is entrusted by the Government to three republican bodies.

The Ministry for Emergencies is a state regulatory body in the field of nuclear and radiation safety. Department for Supervision of Industrial and Nuclear Safety of the Ministry for Emergency Situations of the Republic of Belarus (Prornatornnadzor) is a department of the Ministry with the rights of a legal entity. As it heads the system of bodies of technical supervision, it exercises the state supervision over the facilities producing radioactive waste or implementing their treatment, transport, store or disposal, issues licences for radioactive waste and spent fuel management and exercises the state account for nuclear and radioactive materials (radioactive waste).

The Ministry of Health is a state regulatory body responsible for sanitary control at all stages of radioactive waste management, including waste of Chernobyl origin. It controls radiation doses on personnel and population, issues permissions (sanitary passports) for radioactive waste management, organizes development and introduction of sanitary norms and regulations on radioactive safety.

Committee on the problems of eliminating consequences of the catastrophe on the Chernobyl NPP under the Council of Ministries of the Republic of Belarus (Komchernobyl) - organizes the development of the normative legal acts and other documents, regulating the management of radioactive waste of Chernobyl origin, and realizes the system established for these waste collection and disposal.

Some duties in the field of radioactive waste and spent fuel management are entrusted by the legislation to the other governmental institutions/organizations:

National Commission on radiation protection is a consultative and expert body in the field of radiation safety;

Ministry of Natural resources and Environmental Protection executes the radiation monitoring of the environment (air, water, soil) and the radiation monitoring in the regions of influence of possible radiation contamination sources, including the monitoring to assess the transboundary release of radioactive substances; carries out the forecasting of spreading of radiation contamination in case of possible emergencies; organizes the operative radiation control over the environment to detect the emergency radiation contamination of the environment and informs the corresponding state regulatory bodies and the local executive and administrative authorities. The Ministry develops legal acts in the field of radiation monitoring.

Committee on standardisation, metrology and certification under the Council of Ministers of the Republic of Belarus (Gosstandart) accredits the laboratories and radiation control stations, attests the methods of performing radiological measurements; executes the verification and certification of measuring devices.

National Academy of Sciences of the Republic of Belarus carries out the scientific maintenance of works on developing technologies and safety assurance in the field of radioactive waste management; takes part in development of corresponding legal basis.

The structure of the existing state system of radioactive waste management is shown in the Annex 6.

Section F. OTHER GENERAL SAFETY PROVISIONS

The main responsibility of a license-holder is defined by the article 37 of the OSP-2002, that states that operators, i.e. the enterprises/organizations, storing, transporting, and disposing radioactive material, are responsible for radiation safety and ensure the fulfilment of the requirements of the law of the Republic of Belarus «On Radiation Safety of Public» and the other laws and legal acts of the Republic Belarus in the area of radiation safety of public. In accordance with the article 12 of the law mentioned a license-holder should:

- develop and realize arrangements on ensuring radiation safety;

- execute the systematic control of radiation situation on working places, the territory of facility, in sanitary zone and zone of the observation, as well as for discharges of radioactive materials into the environment,
- account for and control of the individual irradiation doses of the personnel;
- conduct training of the personnel;
- organize preliminary and periodic physical examinations of the personnel;
- regularly inform the personnel about the results of their working places monitoring;
- regularly inform the state bodies (Ministry for emergencies, Ministry of Health) about accidents and breaches of the regulations, creating threat to radiation safety;
- ensure the realization of the rights of people in the area of radiation safety.

The regulatory bodies take measures for providing the facilities of spent fuel and radioactive waste management with qualified personnel in the field of radiation protection. The training of personnel is conducted at the course on radiation monitoring under Promatomnadzor, other training courses, and by means of self-education.

The necessary level of training the specialists engaged in the management of the radioactive waste and spent fuel is also provided by involving high-qualified and experienced professionals of the former Institute of Nuclear Engineering of the National Academy of Sciences of the Republic of Belarus and training at the IAEA Training Courses that contributes very much into the development of national radiation safety culture and methodology while managing radioactive waste.

In accordance with the requirements of the regulations, the personnel must get training, instruction and prove the knowledge on the safety of works before being granted an access to works involved handling of radioactive wastes and spent fuel. Examination of personnel for safety rules knowledge is conducted not less than one time per year, the managers are examined not less than 1 time in 3 years.

All the facilities for management of radioactive waste and spent fuel are state enterprises, so the financial resources for providing safety during the facility operation are envisaged and allocated from the republican budget on demand of the licensee, if needed. The financing of the works, necessary for safety assuring and institutional supervision of the management of decontamination waste of Chernobyl origin is realized within the framework of state programs to overcome the consequences of the Chernobyl Accident.

Quality assurance in the respect of radiation safety when managing spent fuel and radioactive waste is reached at the expense of development and enforcement of detailed instructions and regulations, which define local procedures of collection, handling and remove of radioactive waste, personnel protective equipment, radiation safety measures, etc. These regulations must be adjusted with the regulatory bodies.

To keep the radiation exposure of the workers and public as low as reasonably achievable, economic and social factors being taken into account, national regulations provide for the following measures:

- development and establishment of appropriate reference levels taking into account the optimisation and upgrading of protection and safety measures;

- development of procedures and organizational arrangements for implementing the relevant requirements of the regulations at local conditions, providing appropriate protective devices and monitoring equipment;
- systematic control of radiation situation on working places, the territory of facility, in sanitary zone and zone of the observation, as well as for discharges of radioactive materials into the environment, which must not exceed the established limits;
- holding the control of and account for the radiation exposure of workers on the basis of individual monitoring in accordance with the requirements of the comprehensive state system of account for and control of individual exposure doses.

The effective dose to the members of public, conditioned by radioactive waste at all stages of its management, including waste storage and disposal, must not exceed 10 mkSv/a (p. 204 OSP-2002).

The regulatory documents (the section IV of OSP-2002, article 17-19 of the Law of the Republic Belarus "On Radiation Safety of Public") provide that design documentation of the facility must include the list of potential radioactive emergencies with the forecast of consequences, as well as the section "Engineering and technical measures of the civil defense, measures on warning emergency situation, defining nomenclature, size and places of storage of the disaster facilities, necessary for ensuring elimination of consequences of a radioactive emergency" ;

The facility must have a Radiation Emergency Plan, coordinated with the Ministry for emergencies, Ministry of Health and local administrative authorities. The requirements concerning the content of the plan are provided in the Annex 7.

The implementation of the plans of emergency responding in the event of radioactive contamination of the territory of Belarus as a result of radioactive emergency at the facility managing spent fuel or radioactive waste in the neighboring countries(Lithuania, Ukraine, Russia) is done within the State program for prevention and elimination of emergency situation of natural and technogenic character.

The body for everyday supervision of this system is the Ministry for emergencies, which co-ordinates and organizes the measures on provision of preparedness to specified kinds of emergencies. It includes training, exchange of information and organization of the cooperation with the states that have facilities for managing spent fuel or waste.

The National requirements for decommissioning of the facility are determined by the chapter 14 of OSP-2002, which points to the need of development of the detailed project of decommissioning of the radioactive facility at least 5 years before the fixed term of decommissioning.

Two types of nuclear facilities are of real concern in Belarus. The first of them is the facility for storing spent fuel in the National Academy of Sciences of the Republic of Belarus, which was mentioned before. In the event of taking the final decision on its decommissioning and the detailed elaboration of the corresponding project, the regulatory bodies will take all necessary measures for keeping the provisions of the Convention.

The second type of objects, being subject to decommissioning, is represented by 10 high-capacity gamma facilities, basically research-oriented, operating period of which is already expired, and that are no longer used. The question about their decommissioning is a serious problem, mainly, because of lack of experience and financial resources within this project. With the help of IAEA, the high-capacity gamma facility Stavrida has been decommissioned and transported to the Ekores facility for long-term storage in September of this year.

The Republic of Belarus considers it possible to propose that preparation of the project on decommissioning of used high-capacity gamma facilities is a hot topic for discussion and cooperation within the Convention between the interested Contracting parties.

Section G. SAFETY OF SPENT FUEL MANAGEMENT

All necessary measures are taken in the Republic of Belarus to ensure proper protection of personnel, population and environment from radiological risks, associated with spent fuel storage at the facility of the Joint Institute of Energy and Nuclear Research – Sosny of National Academy of Sciences of Belarus. For the mentioned purpose the following activity is being carried out:

- annual commission inspection of the facility nuclear safety;
- weekly inspection of assemblies leakage ability and sticks with spent fuel, assessment of radioactive aerosols concentration;
- regular inspections of the facility by the inspectors of Promatomnadzor of the Ministry for Emergencies;
- biannual commission inspection of operational capacity of assets of fire alarm and physical protection of the facility;
- biannual inventory of spent fuel.

The procedure of the facility operation, service and maintenance is specified by appropriate regulations.

However starting from the fact that the disposal, where the spent fuel is currently stored, is of provisional character and the republic does not have the conditions necessary for long-term storage of irradiated fuel, further measures on safety management with the indicated fuel should provide for its return to the country of origin – Russia.

Currently the republic does not intend to carry out works on engineering and construction of new facilities for spent fuel management. Provided the situation is changed, the relevant package of the regulatory documents will be developed to specify the procedure of the facility siting and construction, taking into account provisions of Section 2 of the Convention.

Section H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT

General requirements for the safety of radioactive waste management are defined by laws and regulations, specified in Section E. The special law concerning

radioactive waste is supposed to be drawn and passed within several years in the Republic of Belarus. It will include provisions related to the commitments on the Convention, which were not implemented in the previously adopted legislation.

OSP-2002 states the necessity while managing radioactive materials to ensure the following:

- the minimised irradiation of personnel;
- highest automation and mechanization of operations;
- the lowest discharge of radioactive materials into the environment;
- safety operation of processing equipment.

These and other requirements followed from the Contracting Parties commitments according to Section 3 of the Convention, are defined by the new national "Sanitary Regulations of Radioactive Waste Management" which came into force in 2005.

The major task is to ensure radiation safety of the existing facilities and radioactive waste disposals, originated from practices in the past. It is being resolved regarding all the facilities, listed in Section D.

Since 1997 the reconstruction of the waste management facility "Ekores" has being conducted to enhance its safety at the expense of the republican budget. For the moment the first starting complex is completed and are put in operation

- new disposal for spent sealed sources;
- test holes for subterranean waters sampling;
- garage for special transport;
- fence with intruder alarm.

This year the Governmental Resolution is passed on financing the second starting complex of the waste management facility "Ekores. The second starting complex provides for the construction of the waste processing block and implementation of modern methods of their sorting, cementation and compacting.

It is planned that the methods indicated will be applied both for new-coming waste and waste disposed in the closed "old" repositories.

While implementing the third starting reconstruction complex, waste from old disposal facilities will be, where possible, retrieved, identified, processed and put into conditioned forms suitable for long-term storage and transportation.

The reconstruction plan of the "Ekores" site was supported with the IAEA technical assistance program. In its framework the design appraisal, equipment delivery, assistance in emergency situation assessment, technicians training were provided. Further long-term co-operation on "Ekores" site rehabilitation is still of urgent character.

Primary work on enhancing radiation security of decontamination waste of Chernobyl origin disposal facilities comprised the following:

- inventory and certification;
- DFDW safety assessment;
- DFDW maintenance in compliance with the requirements of SPOOD-98.

Radiological monitoring of the sites led to the conclusion, that any doze, associated with ground waters contamination resulted from radionuclide migration

form the DFDWs, is small compared to other sources, contaminating the surrounding soil.

In this connection further measures on enhancing safety of this waste do not involve the task of their re-entombment. Regular preventive and protective measures, supervision over DWDF maintenance and radiological control over soil conditions and subterranean waters in the surrounding zone are stipulated.

Advanced examination of radioactive waste repositories, which were left in the territory of Belarus in places of former dislocation of the Russian Federation military units was initiated by the decision of the Commission for Emergencies under the Council of Ministers of the Republic of Belarus. In soil samples taken on the levels of burial bases and below and in subterranean wasters samples taken from drilled holes as well, high concentration of Cs-137 and Sr-90 was detected noticeably exceeding the level typical for the Belarusian soil. The presence of radionuclides in soil and subterranean waters shows that the engineering barriers of the repository are broken and there are certain defects in the leakproofness of the biological protection.

Along with the specified radiological danger, there is a potential threat of using these sources in criminal or terrorist activity. Because of the reorganization of the military units, dislocated at the area including the repositories, the last ones can rest without the proper protection needed.

In the near future it is planned to develop the technologies of removal of "Gomel-30" and "Kolosovo" radioactive waste repositories with the extraction of the sources, placed in a concrete matrix, from the repository wells and their re-disposal at the "Ekores" site.

Taking into account the difficulty and the absence of analogs of such works in the Republic of Belarus, international cooperation is needed. As such "military" repositories are located at the territories of a number of countries of the ex-USSR, it seems appropriate to initiate the regional research project or the IAEA technical co-operation project in this field with the assistance of Belarus, Russia, Ukraine, Kazakhstan etc.

The activities, defined in articles 13-17 of the Convention, concerning siting, design and operation of the proposed radioactive waste management facilities are regarded as planned activities in the Republic of Belarus. They are to be considered while drawing up the law on radioactive waste management and relevant regulations. The appropriate law-making activity is also included in the Draft Program on siting new republican radioactive waste disposal facility, which is currently being drawn up by the National Academy of Sciences of Belarus and the Ministry for Emergencies on the instruction of the Government.

Safety assessment of the *existing* facilities is currently going on, accounting the following parameters:

- characteristic of radioactive contamination of the environment;
- analyses of measures on radiation safety and compliance of norms, rules and sanitary guidelines;
- probability of radiation emergencies and their estimated scale;
- level of preparedness for efficient elimination of emergencies and their consequences;

- radiation doze analyses, which certain groups of population were exposed to from all sources of ionising radiation.;
- number of people, exposed to irradiation beyond the defined level of irradiation doze.

Assessment results are annually registered in the radiation - sanitary certificate of the facility, which is the main document confirming its safety for personnel, population and the environment. On the ground of the radiation - sanitary certificate regulatory bodies take decision to issue, prolong, suspend operation or withdraw the license (permission) on carrying out relevant operations while managing radioactive waste.

The regulatory bodies of the Republic of Belarus are currently drawing up a new version of radiation - sanitary certificate, which comprises the approaches and methodology on facility safety assessment, recommended by the BSS.

Section I. TRANSBOUNDARY MOVEMENT

The Law of the Republic of Belarus " On Legal Regime of the Territories, Contaminated as a Result of a Catastrophe at the Chernobyl Nuclear Power Plant" determines that "the receipt of radioactive waste for disposal from outside of the republic is prohibited, except the cases of return of radioactive waste, originated from the services provided by the Republic of Belarus to another country and which are covered by the agreement on return of such waste to the Republic of Belarus".

Adherence to the mentioned article of the Law and the principal requirements of article 27 of the Convention are guaranteed by introducing the order, which requires the submission of special authorisation issued by Promatomnadzor of the Ministry for Emergencies while importing/exporting any radioactive materials over the custom border of the Republic of Belarus.

The permission for the transit movement of the spent fuel and radioactive waste or export of domestic fuel or waste to another country can be issued, provided the state of destination agreed to the receipt of the specified materials and possesses the appropriate administrative and technical capabilities (it is to be confirmed with appropriate documents).

Custom services bear responsibility for detection of illicit trafficking of nuclear and radioactive materials across the custom boundary of the Republic of Belarus and inform the relevant administration bodies about such movements.

The Republic of Belarus does not yet belong to the countries, engaged in transboundary movement of the spent fuel or radioactive waste, therefore measures on keeping within article 27 of the Convention are of incomplete character. Given the situation changes (for example, taking decision on transportation of the spent fuel into Russia or fuel transit to Russia from other countries) additional measures will be taken on implementation of such movement in compliance with the requirements of the Convention.

Section J. DISUSED SEALED SOURCES

With relation to regulation, sealed radionuclide sources not designed for further use are regarded as radioactive waste. In accordance with the regulations, the term of its interim storage in the facilities of previous operation must not exceed six months. Within this term the source is to be handed to the facility "Ekores" for centralized long-term storage.

During the term of storage the control over sources security and safety is executed in accordance with the regulations specified in Section E. The control provides for the enforced requirements and proves to be efficient, since no incident with the spent sources under regulatory control has occurred so far.

The construction of a new storage facility for the spent radioactive sources is completed at the "Ekores" site. In view of the adopted concept of site reconstruction these storage facilities are regarded as *long-term storage facilities* which provide for relatively simple technical possibility of sources extrication in case of the necessity of their relocation to another disposal/storage site.

The Republic of Belarus does not fall under the paragraph 2 of the article 28 of the Convention, as far as it produces radioactive sources in limited amount only for domestic needs. However, the republic is interested in implementation of this paragraph by other countries, since it does not possess enough capabilities for disposal/storage of all spent gamma-sources received from abroad.

Section K. PLANNED ACTIVITY FOR SAFETY UPGRADING

As is obvious from the above Sections, the implementation by the Republic of Belarus of its commitments on the Convention has been carried out so far in conjunction with the development of general legal and regulatory base for providing radiation safety. In the framework of the common legislation there were established important elements, stipulated by the Convention, as follows:

- licensing system;
- prohibition system to operate facility without license;
- system of respective institutional and regulatory control;
- documentation and accountability;
- system of ensuring the execution of the regulatory provisions;
- ensuring emergency action plans preparation, etc.

However, the legislation has not specified narrower areas, which are subject to special regulation. In this connection part of measures, provided by articles 13-17, 22,23, 26 of the Convention, turned out to be not included in details.

These measures are supposed to be considered while carrying out further legislative activity, i.e. making changes and additions to the law on radiation safety of public and developing the corresponding regulations.

Major directions of the planned activity in the field of radioactive waste management include:

- putting legal base in the field of radioactive waste management in compliance with requirements of national legislation and international treaties;
- establishment of the state system of radioactive wastes accounting;
- completion of the "Ekores" site reconstruction and ensuring its radiological safety;
- ensuring long-term safety of radioactive sources storage facilities in sites of former dislocation of the Russian Federation military units;
- selecting site for the construction of centralized republican waste management facility;
- taking measures for returning the spent nuclear fuel stored in the territory of the Republic of Belarus into the Russian Federation;

establishing efficient mechanism of financing different stages of works on radioactive waste management (including control of closed facilities).

By the decision of the Commission on State Scientific and Technical Policy under the Council of Ministers of the Republic of Belarus of May 16, 2005 it is recommended to develop a plan for developing arrangements for constructing of a new republican radioactive waste disposal facility. This plan should include the implementation of the applied researches to justify the construction and siting of the facility, the development of justifications of investments in the construction of the facility, the development of design documentation for the construction, the construction and put into operation of the facility (2010-2011 y.).

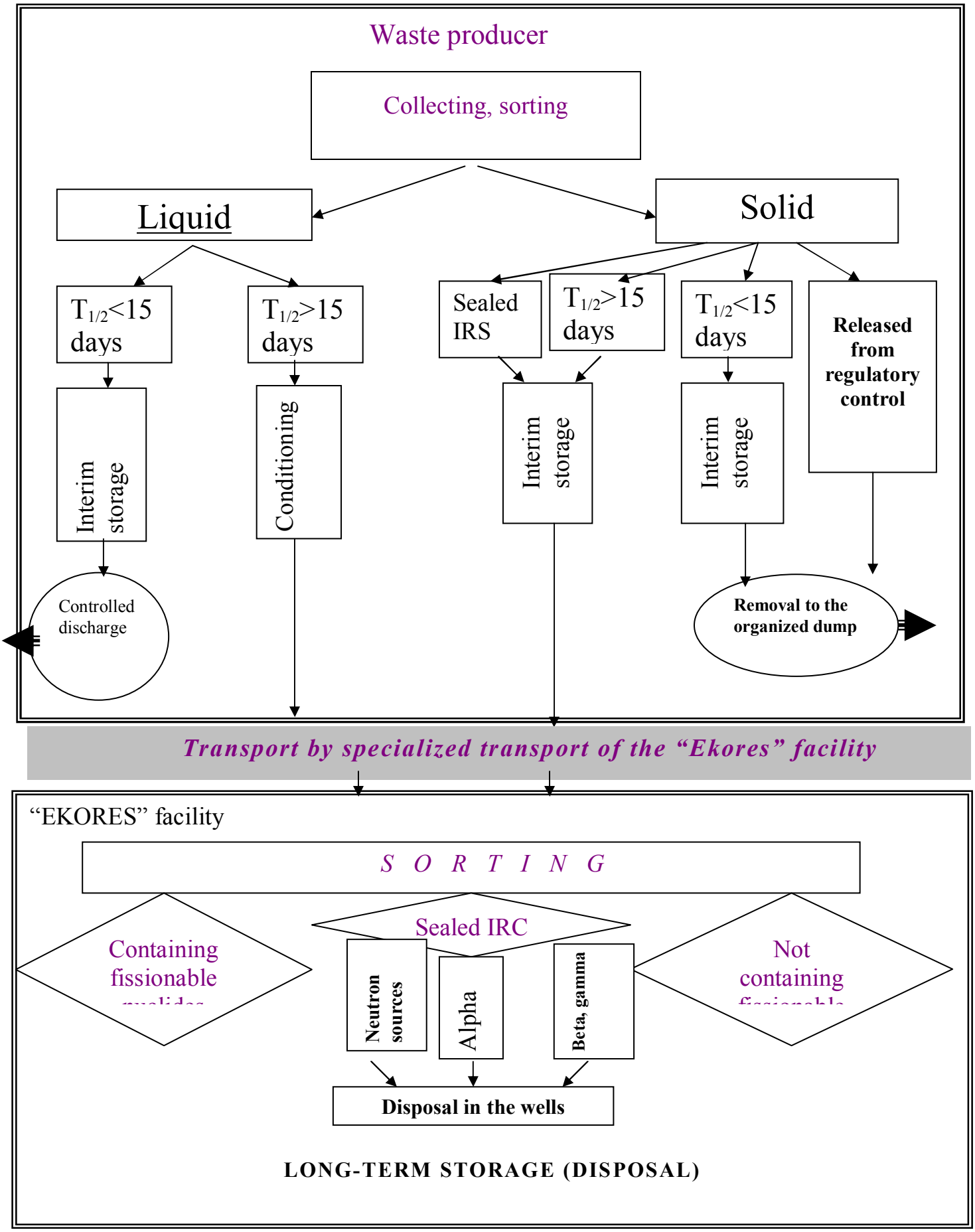
In 2005 the applied research to justify the construction and siting of the facility has been started. As a result of it, the following works should be implemented:

- development of the design decisions on the construction of the facility on the basis of defining categories, volumes, conditioning ways of radioactive waste being subject to disposal and the requirements to the technical equipment and the system of engineering barriers;
- development of regulations determining the basic requirements on the content of the research while choosing the site for the facility and defining the basic criteria and requirements, needed for the comparative analysis of the supposed sites ;
- search of possible sites using the stock data and the results of the regional reconnaissance, development of a specification on the justification of investments in the construction.

In conclusion it should be noted that the system of ensuring radioactive waste safety and safety management of the spent fuel in the Republic of Belarus is being improved. There will be required substantial efforts, financial and other means from the part of the Government and regulatory bodies of the Republic of Belarus to ensure its development in compliance with the Convention provisions. We hope that international cooperation will favour this activity and our shared goals - to maintain high level of radioactive waste management and spent fuel safety in the whole world – will be best achieved efficiently due to such kind of cooperation.

Annex 1

Centralized scheme of radioactive waste management in the Republic of Belarus



Annex 2

Bill of radioactive waste having $T_{1/2}$? 30 years at the Ekores facility for 31.12.2004

Nuclide	Number of Sources/Total Activity of Sources (GBq)			Category unconditioned	Total Activity for all Groups (GBq)	Decay Date (if all sources are decay corrected to the same date) yyyy.mm
	Group I less than or equal 4GBq	Group II more than 4GBq but less than or equal 4E+4GBq	Group III more than 4E+4GBq			
	num./activity	num./activity	num./activity			
Sr-90	1119 7.220E+01	138 1.987E+03		Yes - 0	2.059E+03	2000.01 estimate No
Sr-90	3915 1.840E+03	120 1.893E+03		Yes - 0	3.733E+03	1990.01 estimate No
Se-75	15 1.270E+01	9 7.420E+03		Yes - 0	7.433E+03	2000.01 estimate Yes
Se-75	6 2.040E+01	63 2.080E+04		Yes - 0	2.082E+04	1990.01 estimate Yes
Se-75	13 3.800E+01	76 8.840E+03		Yes - 0	8.878E+03	1980.01 estimate Yes
Co-60	39 1.060E+01	66 9.500E+05	5 9.440E+05	Yes - 0	1.894E+06	2000.01 estimate No
Co-60	432 4.070E+02	821 2.280E+06	9 1.730E+06	Yes - 0	4.010E+06	1990.01 estimate No
Co-60	127 2.260E+02	1841 1.300E+05		Yes - 0	1.302E+05	1980.01 estimate No
Ir-192	471 5.870E+00	3198 5.890E+04		Yes - 0	5.891E+04	2003.01 estimate No
Cs-137	2 2.400E-01			Yes - 0	2.400E-01	2000.12 estimate No
Cs-137	12 2.700E+01	27 1.890E+04		Yes - 0	1.893E+04	1999.12 estimateNo
Cs-137	2 5.930E-03			Yes - 0	5.930E-03	1998.12 estimate No
Cs-137	3 9.700E-01	1 8.510E+00		Yes - 0	9.480E+00	1997.12 estimate No
Cs-137	10 1.200E-01	4 4.030E+02		Yes - 0	4.031E+02	1996.12 estimate No
Cs-137	1 4.000E-04	1 2.590E+02		Yes - 0	2.590E+02	1995.12 estimateNo
Cs-137	3 3.700E-02	1 1.860E+02		Yes - 0	1.860E+02	1994.12 estimate No
Cs-137	14 1.080E+01			Yes - 0	1.080E+01	1993.12 estimate No

Cs-137	123 1.850E+00	2 2.960E+03		Yes - 0	2.962E+03	1992.12 estimate No
Cs-137	19 5.720E+00	53 1.070E+04		Yes - 0	1.071E+04	1991.12 estimate No
Cs-137	25 7.120E+00	101 6.720E+03		Yes - 0	6.727E+03	1990.12 estimate No
Cs-137	229 1.270E+02	559 3.140E+05	5 4.800E+05	Yes - 0	7.941E+05	1990.01 estimateYes
Cs-137	185 2.740E+02	508 2.020E+05		Yes - 0	2.023E+05	1980.01 estimate Yes
Y-90	2290 5.310E+02			Yes - 0	5.310E+02	estimate No

Bill of radioactive waste having $T_{1/2}$? 30 years at the Ekores facility for 31.12.2004

Nuclide	Number of Sources/Total Activity of Sources (GBq)		cond	uncond	Category	Total Activity for all Groups (GBq)	Decay Date (if all sources are decay corrected to the same date) yyyy.mm
	Group I less than or equal 2GBq	Group II more than 2GBq					
	num./activity	num./activity					
Am-241	274 7.450E+00	25 2.890E+02	-	Yes	0	2.965E+02	2004.12 estimate No
Ni-63	1 1.200E+00		-	Yes	3	1.200E+00	1998.12 estimate No
Ni-63	1 3.000E-01		-	Yes	3	3.000E-01	1995.12 estimate No
Ni-63	1 1.200E+00		-	Yes	3	1.200E+00	1994.12 estimateNo
Ni-63	1 1.200E+00		-	Yes	3	1.200E+00	1992.12 estimate No
Ni-63	11 1.300E+01		-	Yes	3	1.300E+01	1991.12 estimate No
Ni-63	4 3.100E+00		-	Yes	3	3.100E+00	1990.12 estimateNo
Ni-63	14 6.400E+00	1 4.100E+01	-	Yes	3	4.740E+01	1989.12 estimateNo
Ra-226	419 1.200E+00	5 3.500E+01	-	Yes	3	3.620E+01	estimateNo
Pu-239	54838 6.700E+02		-	Yes	3	6.700E+02	2003.12 estimate No

Annex 3

Summarized inventory data on the Decontamination waste of Chernobyl Origin

DFDW-III characteristics

Number, site	82, Gomel and Brest Regions
Area (total)	731 000 m^2
Total waste volume	323 500 m^3
Total activity of the isotopes, including: Cs-137 Sr-90 Pu-239,240	➢ 2 *10^{12} Bq 2,01*10^{12} Bq 1,94*10^{11} Bq 3,40*10^{9} Bq
Maximal specific activity Cs-137 Sr-90 Pu-239,240	 10^{5} Bq/kg 4,8*10^{3} Bq/kg 48Bq/kg
Thickness of natural defensive barriers	0,5 - 8 m
Presence of engineered barriers	Only in 3 DFDWs

DFDW-II characteristics

Number, site	3 – Gomel Region 4 – Mogilev Region 1 – Brest region
Area (designed)	from 11 to 19 000 m^2
Capacity (designed)	from 30 to 55 000. m^3
Waste activity in the storage	from 18,5*10^{10} to 67,5ч*10^{10} Bq
Maximal specific activity* Cs-137 Sr-90 Pu-239,240	 3,7*10^{3} - 32*10^{3} Bq/kg 51 - 358 Bq/kg 0,19 - 0,7 Bq/kg

*At the present time only the waste with specific activity not exceeding 10^{5} Bq/kg are disposed

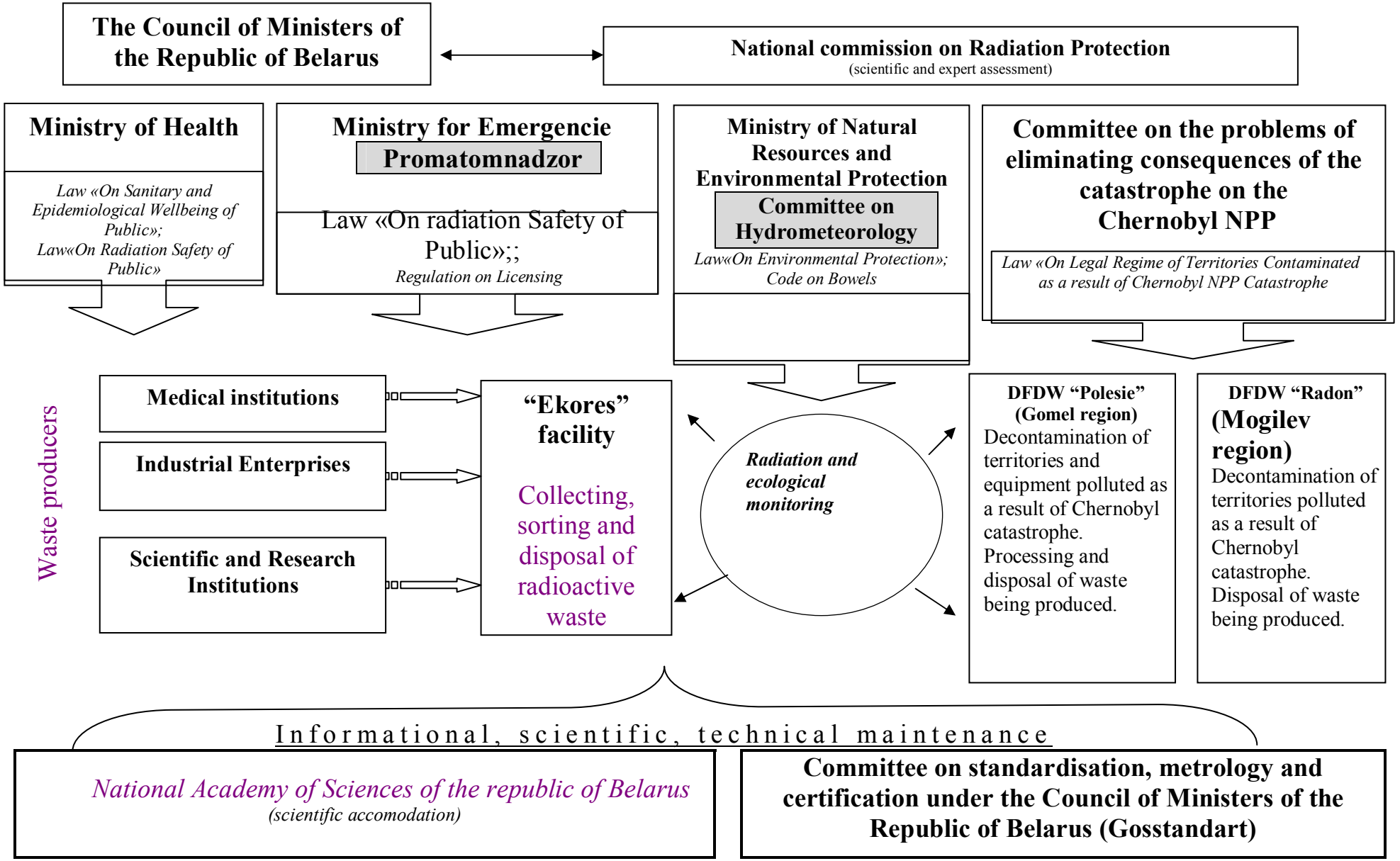
Annex 4

Articles of the Criminal code of the Republic of Belarus
regulating responsibility for breaches in the field of radiation safety

Article	Content
268	Hiding or deliberate distortion of the information concerning with environmental contamination
278	Breach of safety rules while managing ecologically dangerous substances and waste
301	Breach of industrial and technical discipline rules or safety rules at the facilities concerned with the use of nuclear energy
322	Illicit acquisition, storage, sale or destruction of radioactive material
323	Theft of radioactive materials
324	Threat of the dangerous use of radioactive materials
325	Breach of rules of managing radioactive material
326	Breach of rules of radiation control

Annex 5

Administrative structure of radioactive waste management system in the Republic of Belarus



Annex 6

Plan of Protecting Personnel and Public in case of a Radiation Emergency

- Forecast of possible emergencies at a radiation facility considering the probable reasons, types and scenarios of the emergency, and also of the emergency situations expected at different types of emergencies
- Criteria for making decisions on protective measures taking
- List of participating organization involved in elimination of the emergency and its consequences
- Organization of emergency radiation Control
- Assessment of the character and the scale of the emergency
- Order of coming into force of the emergency plan
- Order of notification and information
- Conduct of personnel while an emergency
- Responsibilities
- Measures for protecting personnel
- Fire prevention
- Measures for protecting public and environment
- Medical assistance
- Measures on localization and elimination of the source of contamination
- Training the personnel for the case of a radiation emergency