National report
of Kyrgyz Republic


Bishkek 2017
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This report is the National Report of the Kyrgyz Republic for the 6th Review Meeting of the Convention, to be held in 2018. The report is prepared in accordance with the Guidelines on the Form and Structure of National Reports (IINFCIRC/604/ Rev.3, 31 December 2014), established by the Contracting Parties in accordance with Article 29 of the Convention. There are no nuclear power plants and nuclear reactors on the territory of the Kyrgyz Republic. Regardless of it, this report reflects information related to radioactive waste and sources of ionizing radiation.
Despite the fact that our country does not have nuclear power plants on its territory, the Kyrgyz Republic carries out practical cooperation with the International Atomic Energy Agency (IAEA) in priority areas from the point of view of the realization of national interests. Key areas of cooperation include the strengthening of nuclear and radiation safety, preparedness and response to a nuclear or radiological emergency, the implementation of IAEA safeguards, the use of nuclear technology in medicine, reclamation of uranium legacy facilities.

The most important and effective areas of cooperation with the IAEA in the field of assuring of radiation safety of the population and the environment are the following:

- Modernization of nuclear medicine and improvement of radiotherapy services. Supply and installation of new equipment for the National Cancer Center of the Ministry of Health of the Kyrgyz Republic for the treatment of cancer, as well as the modernization of radionuclide diagnostics.

- Establishment of a radioecological monitoring network at the uranium legacy sites in the Kyrgyz Republic.

- Evaluation of the radiological situation and the exposure of the population living in the vicinity of former mining sites (Min-Kush, Kaji-Sai, Ak-Tuz, Mailu-Suu, Shekaftar, etc.);

- Strengthening of quality control in order to ensure radiation safety in diagnostic radiology, radiotherapy, nuclear medicine;

- Development of radioactive waste management.

- Strengthening of physical protection of sources of ionizing radiation.

- Development of regulatory legal acts in the field of radiation safety.

It should also be noted that the following activities are carried out within the framework of the cooperation with the IAEA:

- Work is under way to restore nuclear medicine and improve the radiotherapy service. The supply and installation of new equipment (linear accelerator) for the National Center of Oncology and Hematology, Ministry of Health of the Kyrgyz Republic (NCOH MOH), for the treatment of cancer is being discussed as well as modernization of nuclear medicine;

- On September 18, 2017, a meeting of the delegation of the Kyrgyz Republic with the International Atomic Energy Agency, the European Bank for Reconstruction and Development, the European Commission, was held within the 61st Conference of IAEA, during which the Strategic Master Plan of Environmental Remediation of Uranium Legacy Sites in Central Asia was
signed. The aim of this Plan is to attract investments from international donors for reclamation at the uranium legacy sites of the Kyrgyz Republic. The Plan outlines approaches for reclamation of uranium legacy sites in the Kaji-Say, Kara-Balta, Mailuu-Suu, Min-Kush and Shekaftar.

- It was developed and is being coordinated within the Government of the Kyrgyz Republic (APKR) project "Country Program Framework of Cooperation with the IAEA in the 2018-2022", which defines the framework of the IAEA technical cooperation plan with the Kyrgyz Republic for the period 2018-2022 years;

- The implementation of projects for 2018-2019 years on improving the regulatory infrastructure of the Kyrgyz Republic to establish a training center for radiation safety, for the certification of tailings and recovery of nuclear medicine, to strengthen and improve the material base of state authorities (NCOH MOH, DSES MOH, SIETS) involved in the system for ensuring of radiation protection and safety in the health, industrial and environmental sectors;

- Within the framework of the development of the regulatory infrastructure for radiation safety in the Kyrgyz Republic, a unified State Regulatory Authority has been established to address the problems of ensuring radiation safety.

- Work is constantly being done to develop normative legal acts (NAPs), taking into account international requirements in the development of the system for ensuring of radiation protection of the population of the Kyrgyz Republic (KR).

- An interdepartmental working group on radiation safety has been set up, in accordance with international IAEA standards, a meeting of which is being called ad hoc when issues and problems arise;

- Negotiations are underway to conduct inventory and search for radiation sources outside the regulated control;

In addition, in the preparation of this report, information was used in the scope of activities with sources of ionizing radiation in the Kyrgyz Republic in the following areas:

- Medicine (radioactive sources and generators)
- Industrial enterprises (radioactive sources and generators)
- Airports (radioactive sources and generators)
- Mining industry (radioactive sources and generators)
As it was previously said, there are no nuclear power plants on the territory of the Kyrgyz Republic and there is no spent fuel, and as regards the safety of handling radioactive sources, there are sealed sources on the territory of the Kyrgyz Republic in the following areas:

- Medicine (radioactive sources and generators);
- Industrial enterprises (radioactive sources and generators);
- Airports (radioactive sources and generators);
- Mining industry (radioactive sources and generators).

**Authorization system**

In accordance with the Resolution No. 256 of the Government of the Kyrgyz Republic dated May 7, 2014, the Department for the Prevention of Diseases and Department of Sanitary and Epidemiological Surveillance of the Ministry of Health of the Kyrgyz Republic (DSES MOH) has been assigned for issuing "Sanitary and Epidemiological Conclusion on the Right to Work with Sources of Ionizing Radiation."

At present, a draft of the law "On Update of the Law "On System for Licensing and Approval in the Kyrgyz Republic" has been prepared, in which provisions for issuance of licenses for the use, storage, transportation and disposal of a source of ionizing radiation are being outlined. This draft is under review of the Jogorku Kenesh of the Kyrgyz Republic.

Safety of radioactive sources at sites:

Appointed persons are assigned and approved by a decision of the administration of the organizations on the following aspects:

- Appointed person for accounting, storage and delivery of radioactive sources;
- Appointed person for radiation safety at the facility;
- Appointed person for radiation control;
- Provisions for safety and radiation safety;
- Emergency response plans;

2007-2009 in the Kyrgyz Republic, an inventory of ionizing radiation sources (IRS) was conducted, during which 378 IRS were registered in 25 organizations. All IRS are of the sealed type. Based on the results of the inventory, a database (source register) was created using the RASOD program developed with the help of the US Nuclear Regulatory Commission.
SECTION D
INVENTORIES AND LISTS

A list of inactive sets obtained in the framework of the IAEA project KIG / 6/002, sets for the preparation of RFD, Brachytherapy equipment, and Radiation therapy equipment are given in Appendix 1.
A list of sealed sources is given in the Appendix 2.
**LEGISLATIVE AND REGULATORY SYSTEM**

**Legislative and regulatory base of the Kyrgyz Republic in the field of radiation safety**

The legal basis of the Kyrgyz Republic in the field of radiation safety is based on the Constitution of the Kyrgyz Republic.

Current laws and other normative acts:

- Law of the Kyrgyz Republic "On Radiation Safety of the Population";
- Law of the Kyrgyz Republic "Technical Regulations on Radiation Safety";
- Law of the Kyrgyz Republic "On Public Health";
- Law of the Kyrgyz Republic "On tailings and dumps";
- Law of the Kyrgyz Republic "On Environmental Safety of the Population of the Kyrgyz Republic";
- The PP of the KR "On Approval of the Regulation on Conducting Radiation Control at the Border Crossing Points on the State Border of the Kyrgyz Republic" of October 26, 2011, No. 674;
- The PP of the KR "On Making Additions to the Resolution of the RCC No. 674 of October 26, 2011" of April 12, 2016 No. 207;
- PP "On Introducing Amendments and Additions to Some Decisions of the RCC" of August 10, 2015, No. 566.
- Law of the Kyrgyz Republic "On Environmental Protection" of June 16, 1999 No. 53; Law of the Kyrgyz Republic "On Environmental Expertise" of June 16, 1999 No. 54;
- PP of the KR "On Approval of Guidelines for the Management of Radioactive Substances and
Report of Kyrgyz Republic

Sources of Ionizing Radiation" of August 5, 2015, No. 558 (includes 8 normative acts approving qualification requirements, instructions and regulations)

Changes in the legislative framework according to the Government Decrees and the Action Plan for Radiation Safety

List of laws amended:

• Law of the Kyrgyz Republic "On Radiation Safety of the Population of the Kyrgyz Republic" of June 17, 1999, No. 58;
• Law of the Kyrgyz Republic "Technical Regulations" On Radiation Safety "" dated 29 November 2011 No. 224;
• Law of the Kyrgyz Republic "On Tailings and Dumps" of June 26, 2001, No. 57;
• Law of the Kyrgyz Republic "On Licensing and Approval system in the Kyrgyz Republic" of October 19, 2013 No. 195 (regarding the licensing of activities with radiation sources)

Newly developed laws and regulations:

• Law of the Kyrgyz Republic "On Radioactive Waste Management";
• Environmental Code (includes sections in the field of radiation safety (RB))
• Regulations on the industrial safety of personnel, on remediation measures in contaminated areas, on the decommissioning of facilities, on the management of medical radioactive waste
• Methodological instructions and instructions on the order of exploration in the areas in the construction sites, the order of exploration in coal deposits, construction materials, etc. (in relation to NORM)

In order to further analyze the requirements of national laws and regulations, Kyrgyzstan will review legislation and relevant laws to eliminate inconsistencies and to harmonize and develop a comprehensive and adequate legal framework in accordance with international legal standards, IAEA standards and guidelines.

Kyrgyzstan will also consider a possibility of adapting of relevant international legal documents issued under the auspices of the IAEA, to which it is not yet a party.

A comparative analysis of the requirements of national laws and regulations with the provisions of international legal instruments, standards and guidelines of the IAEA revealed the need:
- in the IAEA's new expert and advisory mission on the revision of the national radiation safety system;
- providing legal assistance to develop comprehensive national legislation covering security, safety and safeguards, in accordance with international legal provisions, IAEA standards and
requirements;
- harmonization of national laws and regulations with international legal documents, IAEA standards and provisions;

On the regulatory body in the field of radiation safety

• Until 2016, the Kyrgyz Republic did not assign any state body as a main regulator in the sphere of radiation safety. In total, it was decided to assign five state organizations that would be involved in the work in the field of the radiation safety - the State Agency for Environmental Protection and Forestry (SAEPF), the DSES of the Ministry of Health of the Kyrgyz Republic, the Agency for Geology, the Ministry of Economic Development of the Kyrgyz Republic, the State Inspection of Environmental and Technical Safety (SIETS).
• In early 2016 the Ministry of Economic Development was appointed by the Government Decree No. 100 as the main regulatory body. However in the same time, it was not taken into account that this state body does not have accordingly qualified staff.
• By the Decree of the Government of the Kyrgyz Republic No. 466-r dated 26.10.2016, the decrees No. 100-r of 14.03.2016 and 437-r of 05.11.2013 were declared invalid.
• In connection with the cancellation of decrees No. 100-r of 14.03.2016 and No. 437-r of 05.11.2013, and in accordance with the Regulation approved by the Government of the Kyrgyz Republic on February 20, 2012, No. 123, the SAEPF was appointed to carry out the state regulation in the field of environmental protection, nature sources utilization and ecological safety, including radiation, chemical and biological safety. In the same time, the Decree of the Government of the Kyrgyz Republic No. 817 "On Enhancing the Effectiveness of Cooperation of the Kyrgyz Republic with International Organizations, Integration Associations and International Treaty Bodies", dated 02.12.2015, for the SAEPF was assigned in line with its competence for coordination with IAEA.

*Functions of the Regulatory Body*

In order to fulfill its duties stipulated by law, the regulatory body determines the policy, principles of radiation and nuclear safety and related criteria.
1. Develops, distributes or approves rules and guidelines;
2. Reviews and evaluates reports submitted by operators on radiation and nuclear safety, observation reports and other reports prior to the issuance of official authorizations;
3. Performs the issuance, modification, suspension or cancellation of official approvals;
4. Ensures that corrective action is taken when unsafe or potentially dangerous conditions are identified;
5. Together with SIETS conducts inspections for regulatory purposes, takes necessary measures to apply sanctions in case of violation of security requirements;
6. Together with the Ministry of Economic Development and other state bodies, it coordinates the license for the import/export of radioactive sources and materials.

**Activities of the regulatory body**

In order to effectively perform functions of the state regulation in the field of radiation safety, the SAEPF:

- Developed a plan of measures to regulate matters in the field of radiation safety of the Kyrgyz Republic, which was approved by the Government of the Kyrgyz Republic on January 21, 2017, and was implemented during 2017;
- Drafted a Decree of the Government of the Kyrgyz Republic "On state regulation in the field of radiation safety". The draft is in the stage of clearance by ministries and state authorities;
- In order to effectively coordinate the activities of state bodies involved in ensuring radiation safety in the Kyrgyz Republic, a "Regulation on interaction between relevant ministries and departments, local authorities in the field of radiation safety" was developed, specifying the role and responsibilities of each state institution / ministry and providing details on how to interact with involved parties. The regulation is at the signing stage;
- Analyzes the regulatory legal acts of the Kyrgyz Republic in the field of radiation safety in accordance with the requirements of the IAEA standards for making changes and additions;
- Develops new regulatory provisions and introduces changes to existing NAPs in the field of radiation safety;
- Develops regulatory documents on RW management, IRS, radiation protection of personnel, radioecological monitoring aimed at assessing the compliance of radiation hazard facilities with established standards;
- Advises operators on activities in the field of radiation safety in accordance with regulatory requirements and inspection criteria;
- Establishes the criteria and safety requirements and the classification of radioactive waste (regulations, instructions and safety guidelines), with the help of which the operator's actions are assessed for safety standards for personnel, the public and the environment;
- Reviews reports and projects containing safety assessments, accident assessments, monitoring programs and monitoring results;

- Communicates with international organizations and governments of other countries (IAEA,
European Commission, NRPA, Government of Japan, RF, Kazakhstan, etc.);
- Work is underway to update data in the IAEA's Radiation Safety Information Management System (RASIMS). The RASIMS system lacks information on radiation safety in the country since 2013. With the approval of Decree No. 437-r of 05.11.2013, the National Coordinator did not work with the RASIMS system, which adversely affected the image of the country and the supply of equipment and sources of ionizing radiation for NCOs MH KR;
- Work is underway to provide quarterly and annual declarations pursuant to the Additional Protocol to the Agreement between the Kyrgyz Republic and the IAEA on the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons;
- A fruitful cooperation with the IAEA's financial department for the fulfillment of the country's financial obligations is carried out, due to which membership fees for the period 2012-2017 in the amount of 11675 US dollars and 20325 Euros were paid to the budget of this organization. These payments fully covered the debt of the Kyrgyz Republic to the IAEA on membership fees including 2017, which allowed our country to get the right to vote and to be withdrawn from the list of countries that do not have this right. The Kyrgyz Republic also paid 52404 euros in the framework of Technical Cooperation. As a result of it, in 2017, the TC projects for the cycle 2016-2017 which were frozen due to a late payment were commenced.

Functions of the Regulatory Body
In order to fulfill its duties stipulated by law, the regulatory body determines the policy, principles of radiation and nuclear safety and related criteria.
1. Develops, distributes or approves rules and guidelines;
2. Reviews and evaluates reports submitted by operators on radiation and nuclear safety, surveillance reports and other reports prior to the issuance of official authorizations;
3. Executes the issue, modification, suspension or cancellation of official permits;
4. Ensures that corrective action is taken when unsafe or potentially dangerous conditions are identified;
5. Together with SIETS conducts inspections for regulatory purposes, takes necessary measures to apply sanctions in case of violation of security requirements;
6. Together with the Ministry of Economic Development and other state bodies, it coordinates the license for the import / export of radioactive sources and materials.

- OJSC KGRK, specializing in the production of nitrous oxide of uranium (status - active);
- Low active waste (tailings and dumps) repositories of the former uranium industry;
- The point of burial of sources of ionizing radiation and radioactive waste (RADON) in Bishkek.
• NCO MH KR

Repositories of low active waste of the former uranium industry:

• 6 main waste disposal sites:
  - Mailu-Suu - 2.845 million m³
  - Khajisai - 0.4 million m³
  - Min-Kush - 1.961 million m³
  - Ak-Tyuz - 3.35 million m³
  - Orlovka - 3.55 million m³
  - Shekaftar - 0.7 million m³

• Altogether, together with the site of "KGRK" and other small objects, 48.31 million m³ (at 35 tailing dumps) and 83.582 million m³ (in 37 mountain dumps) have been accumulated in the republic.
SECTION F
OTHER GENERAL SAFETY PROVISIONS

Regulations in the field of radiation safety

1. **Guidance on radioactive waste management**

For the effective management of radioactive wastes, there was developed and approved by the Decree of the Government of Kyrgyz Republic #558 from August 5, 2015, the “Guidance on Radioactive Waste Management.”

This “Guidance on Radioactive Waste Management” (hereinafter “Guidance”) establishes the procedure on the state control and oversight in ensuring radiation safety during the handling with the radioactive wastes in the mining industry, medicine, scientific research and in other situations where goods or materials move to the category of radioactive waste.

The purpose of the Guidance is to establish elements of a management system for the safe handling of radioactive waste to achieve basic safety principles published in IAEA recommendations:

- the principle of justification;
- the principle of rationing;
- the principle of optimization.

The requirements of the Safety Guidance and criteria relate to the management of radioactive wastes of all types and cover the process from education to storage, including processing (collection, pre-treatment, processing, and conditioning), storage and transportation.

This Guidance fully meets the principle of process approach implementation within the framework of the radioactive waste management system.

In accordance with the Guidance, the classification of radioactive waste is used as a basis for the safe management of radioactive waste, according to which linked a relationship between the origin of radioactive waste, its composition, and activity with the degree of isolation of radioactive waste.

The dose limit is used as a quantitative criterion, determining the safety conditions during handling with the radiation-hazardous objects. An effective equivalent dose is used as a dosimetric value serving to express the criterion for ensuring radiation safety.

Limits of norms and dose limits for personnel and the public are established by the Law of the Kyrgyz Republic on “Technical Regulation “On Radiation Safety” and other normative legal acts of the Kyrgyz Republic.
In order to optimize protection and safety during occupational exposures and public exposures, the operator ensures the application of appropriate dose limits and limits for any particular source in the practice.

The criteria for determining the levels of safe conditions for other indicators related to the assessment of impacts on the population and the environment (for example, non-radiological chemical factors) are established by the regulatory legal acts of the Kyrgyz Republic.

Direct work with radioactive waste (collection, transportation, characterization, processing) can only be dealt by specially trained workers assigned to Group A personnel.

This Guidance is mandatory for implementation on the entire territory of the Kyrgyz Republic by persons engaged in activities related to the management of radioactive waste (RW).

The Guidance expands to organizations that generate radioactive wastes, and on organizations that collect, store, transport, reprocess and dispose of radioactive waste, as well as organizations that design and construct facilities where RW will be stored, stored, processed and disposed of.

The Guidance also applies to the tailing dumps and uranium mining dumps and other industries that are operated and decommissioned or projected and put into operation, where it is planned to store or stored wastes containing natural radionuclides concentration of which exceeds the levels of exemption from regulatory control.

The Guidelines do not apply to irradiated nuclear fuel and to the disposal of liquid radioactive waste into deep geological horizons (reservoirs).

This Guidance should lead operators, regulator and the body responsible for the environmental and technical oversight of radiation safety.

The subjects of supervision and control over radiation safety and safe management of radioactive waste are:

- compliance with the legislation of the Kyrgyz Republic in terms of ensuring radiation safety for the population, personnel, and environment;
- compliance with norms and rules that establish requirements for ensuring radiation safety;
- compliance with the established safety requirements for RW management;
- compliance with the conditions of validity of licenses issued in accordance with the legislation of the Kyrgyz Republic;
- RW accounting system;
- minimization of RW generation;
- the presence of a radiation monitoring system;
- ensuring the required level of qualification of employees engaged in the management of
the safe operation, maintenance of the technological process and ensuring departmental (production) control over radiation safety;

- control of operating conditions of enterprises for receiving, processing and storage of radioactive wastes;

- physical protection in places where RW is received, processed and stored;

- optimization of protection, development, and implementation of measures to protect personnel and public in case of radiation accidents at radioactive waste reception, treatment and storage facilities;

This Guideline lists the main requirements for the regulatory body and operator.

To ensure a safety guarantee when RW handling, the regulatory body:

1) develops regulatory documents on RW management, sources of ionizing radiation (IRS), radiation protection of personnel, radioecological monitoring aimed at assessing the compliance of radiation hazard facilities with established standards;

2) advises operators on activities in accordance with regulatory requirements and inspection criteria;

3) allocate responsibility for providing communication between specific stages of the waste management process (for receiving, processing, dumping waste).

4) establishes the criteria and safety requirements and the classification of radioactive waste (regulations, instructions and safety guidelines), with the help of which the conformity of the operator's actions to the safety standards for personnel, the public and the environment is carried out;

5) if necessary, the regulatory body develops regulatory requirements, makes changes to existing regulatory requirements;

6) the regulatory body issues licenses in accordance with the legislation of Kyrgyz Republic;

7) to verify the operator, the regulatory body performs an audit, radiation control, monitoring;

8) reviews reports containing safety assessments, accident assessments, monitoring programs and monitoring results;

9) the regulatory body has the right, independently or with the participation of other competent state bodies, to make decisions in the field of radioactive waste management;

10) the regulatory body has the right to require the operator to develop corrective actions based on the audit results, inspection, monitoring, examination and other implemented oversight measures.
11) the regulatory body exercises control and supervision over the execution of the prescribed measures, decisions announced by the operator on the management of radioactive waste;

12) the regulatory body requires the operator to comply with legislation in the field of radiation safety;

13) establishes the responsibility and obligations in respect of financial conditions for:
- closure of storage facilities, points and facilities, where radioactive waste was handled, and rehabilitation of waste storage and disposal sites from former activities;
- RW management, including different types of storage facilities;
- management of out-of-use IRS and generators.

The operator is the main responsible person for each specific facility where any operations are carried out on the management of radioactive waste. The operator is responsible for all process approaches. The operator must obtain a license for activities in accordance with the legislation of Kyrgyz Republic.

According to the Guidelines, operators are responsible for the safe handling of radioactive waste generated as a result of the operation or use of sources. They must have a radiation protection program that applies to all sources of occupational exposure and should characterize and classify radioactive waste that is under its responsibility.

To ensure effective management of waste when moving between operators, categorization schemes should be submitted to the regulatory body to verify compliance with the acceptance criteria established for subsequent steps.

The Guidance also set out the conditions for the formation, characterization, and classification of radioactive waste.

RW is formed during operation and decommissioning of nuclear fuel cycle facilities, nuclear power plants, ships with nuclear power plants and other radiation sources; when using radioactive substances in manufacturing, scientific organizations, and medicine.

RW is formed during the rehabilitation of territories contaminated with radioactive substances, as well as during radiation accidents.

RW are formed during the exploration, extraction and processing of ores containing radionuclides (uranium industry, rare earth metals mining), in the extraction of other minerals, in forced discharge and technological leakage of water formation, oil and oil products on the surface of the Earth from the fishing loop or reservoirs and subsequent concentration of radionuclides in the ground and oil sludge deposits.
Also, RW formed during the deposition of radioactive salts in the inner surfaces of tubing, pump, wellhead equipment and storage tanks in the operation of oil and gas industries, dismantling, transportation, warehousing, and cleaning of pipes and equipment contaminated with radioactive deposits at repair work and decommissioning of pump equipment;

RW formed in underground mining of uranium ore, peat, and coals, ores of ferrous and rare metals (separation of radon and thoron during drilling, blasting, loading, unloading, transporting, crushing rocks and etc.), during enrichment of crude on mining and processing facilities (concentration of radionuclides), during production of products at chemical and metallurgical enterprises (concentrating radionuclides in production wastes).

According to the Guidelines requirements, the operator must characterize and classify RWs that are under his responsibility.

The characterization shall provide information for the control and ensure compliance of waste or waste package to the acceptance criterion for handling, storing, transporting and disposing of the waste. The relevant characteristics of the waste should be recorded in order to facilitate further handling.

RW should be characterized in terms of their physical, mechanical, chemical, radiological and biological properties.

RW should be classified in accordance with the regulatory legal acts of the Kyrgyz Republic.

The RAW classification system can be viewed from various points of view, such as aspects related to safety, engineering requirements of the process or regulatory issues. The classification of radioactive waste can be useful at any stage from the moment of the fresh waste formation to their conditioning, storage, transportation, and disposal. To satisfy all needs that a classification system must meet, it must compile several objectives, including the following:

- consider all stages of radioactive waste management;
- to connect RW classes with the corresponding potential hazards;
- be flexible so that it can be applied to specific tasks;
- minimally change already accepted terminology;
- be simple and understandable;
- be universal for use, as far as possible.

RW is divided into discharged, very low-level waste (VLLW), very short-lived waste, low-level waste (LLW), medium-level (HLW) and high-level waste (HLW), spent IRS.
In order to ensure proper interdependence at all stages of radioactive waste management during the development of categorization scheme, the operator must take account acceptance criteria established for subsequent physical manipulation, processing, transportation or storage as part of a complete waste management process.

Typical characteristics used for the classification of radioactive waste are:

1) non-radioactive and radioactive materials;
2) half-lives of radionuclides present: short lived radionuclides (e.g., half-life periods not exceeding 100 days), suitable for aging, or long-lived radionuclides (e.g., half-lives greater than 30 years);
3) activity and content of radionuclides;
4) physical and chemical form:
   a) liquid;
   b) watery;
   c) organic;
   d) non-uniform (for example, with the content of slurry or suspensions);
   e) solid:
      - flammable / non-flammable;
      - compressible / incompressible;
      - metal or non-metallic;
5) fixed or non-fixed surface contamination;
6) spent sealed sources;
7) characteristics of non-radiological hazards (eg, chemical and biological toxicity).

The Guidance also includes a section “Permits and other official documents.”

According to the requirements of the Guidance, the operator receives licenses and permits in accordance with the legislation of the Kyrgyz Republic for the type of activity.

At the planning stage, the regulatory body, depending on the results of the safety analysis, accident analysis, and optimization analysis, coordinates the site selection, the RW management method, the control option, or issues an opinion to the operator on the need to revise the project. The regulatory body may decide in each individual case when considering an application for a license, based not only on a technical basis but also on public opinion.

At the operational stage, the regulatory body, depending on the results of the safety analysis and analysis of the optimization of protection, coordinates official statements of the operator or issues an order to carry out corrective measures and additionally optimize protection, or regards the situation as an intervention.
To assess the impact on the environment at all stages of the life of enterprise, the operator should use the relevant regulatory legal acts of the Kyrgyz Republic.

At the stage of development of the feasibility study and the project, the operator carries out an environmental impact assessment (EIA), at the construction stage – a section on “Environmental Protection” (EP) is developed, at the operational stage - the development of projects maximum permissible emissions, discharges, and wastes (MPE, MPD, PWNLR), at the closing stage - a section of the EP, for a repository closed a very long time ago and without any responsible enterprises, - an EIA section is being developed.

According to the requirements of the Guidelines, at the early stage of the development of the facility (feasibility stage and project stage), the Operator should prepare a Safety Report.

As the feasibility study and the project are implemented, the safety report should be gradually refined and refined. This approach ensures the quality of the technical program and the relevant decisions taken. The responsibility of the operator is the performance of the safety assessment in the preparation of the safety report in accordance with the requirements of the regulatory body.

The main requirements for the safe management of radioactive waste are provided in the section “Requirements for the RW Management System.”

The persons responsible for the selection of certain decisions in the management of radioactive waste at RW storage facilities or in the enterprises where RW is generated must perform their work, considering the identification of waste streams, waste characteristics and methods of transportation and storage of waste.

During consideration of possible waste treatment options, it is necessary to avoid contradictions with requirements that could jeopardize the safety of human health and the environment, which is incompatible with the integrated approach. In order to optimize RW management without contradictions, it is necessary to choose a method that excludes not viable options.

As required by the Guidance, any waste producer must ensure that appropriate measures are taken to support RW generation and environmental impact at the lowest possible level.

Responsible for the implementation of regulatory requirements is the organization which has the radioactive waste. The organization where the radioactive waste is formed, responsible for the safe handling of radioactive waste until the moment when RW is transferred to another organization.

Site selection, design, construction, operation and decommissioning of the RW management facility prior to disposal, should be carried out in accordance with applicable
regulations, rules for radiation safety and environmental protection.

In the project documentation of the operator, which may generate radioactive waste in the operation, a description of the generation of radioactive waste is given in the section on RW management: their annual quantity (mass), activity, radionuclide composition, aggregate state, as well as measures to prevent and eliminate accidental formation of radioactive waste.

For each type of waste, the handling system must be justified: the admission criteria, methods of collection, temporary storage with the indication of terms, packaging, transportation, conditioning (if necessary), long-term storage and/or disposal. In addition, the necessary facilities and equipment should be provided for the management of radioactive waste, the scope, frequency, and methods of radiation control, means for decontamination of workers (personnel), equipment, as well as methods and means for handling radioactive waste generated during decontamination.

The project should provide that irradiation of persons engaged in handling RW should not exceed the dose limits established for personnel. Operators should ensure the optimization of protection and safety.

To optimize protection and safety in occupational exposure and public exposure, operators must ensure that appropriate limits are applied to any particular source in the practical activity.

The choice of a site for the location of an enterprise on radioactive waste management is carried out in accordance with the established procedure. RW storage facilities should be located and operated so that safety is guaranteed throughout the life expectancy of the facility, under both normal and possible accident conditions.

Enterprises dealing with radioactive waste management and radioactive waste storage facilities should be built in accordance with a project approved by the regulatory body. Authorized state bodies should verify that the equipment, systems and components, and the enterprise as a whole are built and equipped as described in the project.

The operator is responsible for the construction and commissioning in accordance with the approved project.

Upon completion of the commissioning, the operator issues a final commissioning report. The report should describe all test results, all changes made at the enterprise or in the operating procedures. The report must ensure that all conditions for obtaining permission have been met. This report will be considered as part of the documentation required for operation, safety assessment and development of the closure plan.

Significant changes in the construction of the enterprise and storage facilities, which entailed changes in the safety parameters should be reviewed and approved by the same regulatory body.
Waste management is carried out in accordance with the guidelines, instructions, and standards approved by the regulatory body (NRB, OSPRB, SPORO, etc.).

Facilities for managing radioactive waste, including tailings and dumps, must be managed in accordance with a management strategy, a safety assessment, a permit or a license and a management plan. The plan should describe in detail all aspects of waste management. In addition, the plan must be compatible with the management program.

The plan and program should ensure that solid wastes under any scenario are under proper control and RW storage facilities, tailing pits and dumps are used accordingly.

Operators must ensure that radioactive materials and sources are not exempted from environmental protection obligations.

The operator should determine waste discharge levels based on the assessment of the radiological impacts of such discharges using appropriate modeling (such as the development of projects for maximum permissible emissions, discharges and wastes).

Expected doses for personnel and the population should also be assessed. In order to estimate the doses for the population, it is necessary to conduct a survey of the way of life of the population in order to identify the part of the population most vulnerable to the impact from the discharged waste (a representative person or the main recipient of the radioactive load).

Radioactive material should be treated as radioactive waste if further use of the material is not expected, and if the material features make it unsuitable for authorized discharge into the environment and to be exempted from regulatory control.

The operator must ensure the safety of operations in the treatment of waste, which should be carried out under normal conditions, i.e. conditions where measures have been taken to prevent incidents or accidents and where measures have been taken to mitigate the consequences in the event of an incident.

The separation of radioactive waste should be performed in accordance with their classification, taking into account the safety and adequate implementation of further steps for storage or disposal.

Before RW is formed, which may require subsequent management, the operator must ensure that the facility (warehouse, landfill, storage, etc.) is suitable for storing waste within their own organization or in the territory of another operator.

The operator must act in accordance with the policy and strategy of the Kyrgyz Republic whenever he must determine what type of waste should be stored for subsequently authorized discharge into the environment, authorized use, exemption from control or for processing and/or disposal later.
The operator should develop measures to verify whether the waste collected or received under its responsibility meets the acceptance criteria approved by the regulatory body when reviewing the safety assessment directly for the specified RW storage facility.

If the waste or sources that will be stored do not meet the acceptance criteria, the operator must establish conditions that compensate for non-compliance or should refuse to accept or transfer the waste.

The operator must ensure that radioactive waste and obsolete closed sources are stored in such containers, packages, and stores that meet the requirements approved by the regulatory body in the safety assessment.

The operator must ensure the integrity of the waste packages during storage until decisions are taken on further processing, creating conditions or clearing control, and the waste container will remain intact for the entire storage period.

The operator must take appropriate measures to ensure physical protection and safety in the company where radioactive waste is handled to prevent unauthorized persons from accessing and unauthorized movement of radioactive materials.

The physical protection measures should be implemented in such a way as not to jeopardize the safety of the enterprise and RW storage facilities.

Closure of waste management facilities should be considered at all stages of operations, where waste is generated, i.e. during site selection, design, construction, and operation.

A preliminary plan for closure and remediation should be prepared during project development. A preliminary plan for closure and remediation should be submitted to the regulatory body for approval.

In order to close the enterprise for radioactive waste management, operators should:

a) guarantee safety and protection of the environment during all actions of closure, resulting in an impact on personnel, the public and the environment, i.e. properly apply protective measures against radiological and non-radiological hazards;

b) determine the closing strategy on which the write-off planning will be based;

c) establish and implement a management strategy for RW at the stage of plant closure, including identification of an acceptable designation for all wastes resulting from the closure (for example, equipment is withdrawn from the process, waste from stripping equipment and territories, etc.);

d) prepare and implement appropriate security procedures; guarantee the training and competence of employees; develop reports and submit them to the regulatory body;

e) perform appropriate safety assessments, radiation monitoring and environmental
expertise in support of closure;

e) keep records and submit reports to the regulatory body;

g) establish a management system, including organization and administrative controls, human resources and skills, project management, documentation and record keeping, subcontractor involvement and security management;

h) notify the regulatory body of the closure of the enterprise before the completion of the activity.

After the closure, the responsibility for the enterprise and storage facilities can be transferred to the operator. Knowledge of the operational history of the enterprise must be preserved and transferred to the new operator. The new operator must have the necessary resources, expertise and knowledge.

The operator must ensure that it has sufficient financial resources to close the plant and manage the waste, even in the event of premature closure. In accordance with the legislation of the Kyrgyz Republic, the cost of closure and rehabilitation procedures for the enterprise must be determined in advance, i.e. well before closing.

Decontamination and demolition methods should be selected in such a way that the protection of workers, the public and the environment is optimized, and the volume of generated RW is minimized. Before using any new or untested closing methods, it must be demonstrated that the use of such methods is justified and acceptable within the optimization described in the closure plan. Such studies and their results should be reviewed and approved by the regulatory body.

Upon completion of the closing operation, the operator must demonstrate to the regulatory authorities that the regulatory requirements are being complied, as determined in the closure plan.

Decommissioning is preceded by a comprehensive check of RW management systems by a commission appointed by the organization. Based on the materials of the integrated check, the organization ensures the development of the project on decommissioning the RW management systems (facility) and prepares a report on the safety justification for decommissioning.

The final closure message must be prepared and submitted to the regulatory body for review and approval.

This manual also provides requirements for a waste management system for the mining and processing industry.

Tailings and mountain dumps, which are formed during mining operations and processing of minerals (for example, uranium ores, rare earth metals, oil, etc.), also represent a problem due to large volumes and composition, as they contain long-lived radionuclides and heavy metals.

The choice of the basic model of RW management from the mining and processing
industry depends mainly on the results of the safety assessment and the safety event. The choice should be made by the operator. The regulatory body approves the draft and the application for the planned activity after reviewing and evaluating the submitted safety assessment and safety case documentation.

The development of a waste management strategy is usually a complex process, which has the goal of achieving a reasonable balance between two, often conflictual, goals: maximizing risk reduction and minimizing financial costs. One of the stages in the strategy development is the optimization of protection, where adequate alternative options for selecting a site for RW storage, construction, operation, waste streams management are considered through assessment and comparison, with associated benefits and harm, any mandatory restrictions (such as annual dose). The features of the alternatives that need to be considered:

a) radiological and non-radiological effects on human health and the environment during operation and in the future;

b) requirements for monitoring, maintenance and monitoring during operation and after closure;

c) any restrictions on the future use of property or water resources;

d) financial costs;

e) volumes of various wastes and their hazard classes that will be generated;

f) Socio-economic impacts, including public participation in decision-making;

g) technical methods.

The operator must provide the regulatory body with the relevant documentation that contains the justification on the site selecting for disposal of RW, a project for construction, operation, closure and post-closure for waste storage facilities in the mining and processing industries.

The operator, submitting an application to the regulatory body, the mining and processing industry project, should plan the waste management, including tailings waste management, gangue, drainage control and production monitoring, quality control procedures. Good mining practice must be compatible with the requirements for radiological protection.

When deciding how to manage waste generated during mining and processing of minerals, it is necessary to consider the following:

a) definition of criteria for human health and environmental protection;

b) characteristics of waste;

c) identification and characterization of the site options for disposal of RW;
d) identification and characterization of RW management options, including management of storage facilities (infrastructure, facility design);

e) assessment of radiological and other consequences for each of the options considered (EIA, safety report and safety assessment), including scenarios of potential radiation exposure for each option;

e) comparison of expected doses and risks with appropriate limitations.

The evaluation criteria for selecting the optimal option and the waste management strategy should be clearly defined and presented to various stakeholders, including the public.

The project of an enterprise on mining and processing of minerals should be so designed that the amount of waste generation should be minimized to the feasible extent. This can be achieved through the selection of appropriate methods of the mining and processing industry, the reuse of equipment, materials and waste.

This manual specifies the requirements under which a site for the disposal of radioactive waste should be selected. It is necessary to consider the peculiarities of waste generated during the extraction and processing of mineral resources: in the first place - it is a very significant amount of waste, the presence of long-lived radionuclides (over 1,500 years), often accompanied by such a high moisture content waste and the presence of chemicals in the waste.

The tailings pond is usually located near the plant, which can be remote from the ore mining site. However, for the new field, which has not yet been developed, it is possible to identify a site for the reception and storage of radioactive waste, the most suitable for the protection of human health and the environment, and about the economic profitability. Location and design of the facility and storage facilities should provide effective waste management and prevent the unregulated distribution of waste from the site.

Radiological hazards associated with gangue and rocks with low concentrations of ores are usually much less significant than those associated with tailings. But non-radiological hazards persist, and they should be regarded as the most important issues in the selection and optimization of management options. There are many possible options for handling waste gangue and rocks with low concentrations of ores. The most optimal option will depend on the mineralogy, radiation and chemical activity of these wastes.

Options for handling waste gangue and rock with low concentrations of ores include their use for backfilling in open quarries and underground mine workings, as well as construction on the production site. It is necessary to take into account the need to cover rocks with low concentrations of ores of inert rocks.
As in the case of tailings (waste hydrometallurgical plants), consideration should be given to the extent to which the various options help to ensure safety. If the treatment is carried out on the surface, it is necessary to consider the stability and resistance to erosion processes, the infiltration of atmospheric precipitation from dumps of rocks and ores with low concentrations, and the fact that these processes will not lead to negative effects for the environment of the catchment areas.

Planning of wastes management generated because of mining and processing of ores should not be postponed until the stage of plant closure. For example, taking early steps to reduce the migration of pollutants and radionuclides carried by water and air to the environment will facilitate the handling of waste at the closing stage.

As soon as any part of tailing dumps or mountain dumps ceases to be necessary, it must be closed to the real extent of operation (for example, reclamation of a filled waste rock dump).

The operator shall, during operation and at least five years before the expected closing date, agree with the regulatory body the final closure plan. The objectives of closure should ensure the stable state of storage facilities for a long period in accordance with the requirements on protection of public health and environment.

In the case of underground disposal of radioactive waste, accounting the probability of disturbance of geological formations on the site and penetration of a person is expected to be sufficiently low, no further monitoring may be required, except the archiving of detailed records on the location and characterization of wastes, and site monitoring for a long period of time.

If it is not possible to implement underground disposal of radioactive waste due to any specific site problems for which there are no appropriate technical solutions, or because of the excessively high cost, the only option in such cases can be the use of specially constructed surface storage facilities.

For some specific site problems associated with underground disposal of radioactive waste, practical technical solutions can be identified. For example, if the water permeability of the tail mass is greater than the water permeability of the host rock, then the use of a high permeability barrier around the tailings should be considered as a means of removing groundwater from the tailings. In the case of a small spatial limited aquifer crossing the pit or the wall of the underground mine, a variant of localizing carburization should be considered.

The desirable passivity during waste disposal closure located in the excavation can be achieved if the waste either falls asleep in the pit and is covered from above with natural materials or creates a permanent pool with water above the RW. The latter option should include the use of coatings with low water permeability to reduce waste contact with the pool water. A full
investigation of near-surface conditions should be carried out. Hydraulic pressure above the foundation pit with waste should not create problems for groundwater contamination in the future.

As for the options, including the management of radioactive waste in land-based storages filled with water, RW should be placed in structures made of materials with low permeability to reduce leakage. The option to close a landgrave usually requires more institutional monitoring than an underground disposal option. Monitoring and technical support programs should be implemented during operation, closure, and after-closure. This approach assumes a lower initial cost, but higher subsequent costs. From the option of moving tailings to a more favorable site for closure, it is not usually expected to provide an optimal strategy for RW managing due to the large volumes of waste from mining and processing of ores that need to be moved. However, if the waste transfer is considered, it should be given attention to the optimization factor for significant radiological and non-radiological impacts that may be caused by the movement itself, including the problems of transporting large amounts of waste and decontaminating transport and equipment.

It is necessary to ensure that all materials placed in the tailings disposal facilities meet the requirements for closure.

The Guidance also contains “Requirements for the management system of obsolete IRS.”

According to the requirements of the Guidance, the operator must perform an inventory of his own sources of ionizing radiation each year in order to identify any sources that are not in normal use and have thus become obsolete.

Before announcing a disused radioactive source as a radioactive waste, the operator must first try to return the source to its supplier.

Once, the radioactive sources have become obsolete, the operator must ensure continuous monitoring of such sources.

The operator must periodically review the control program for such sources.

If an exemption from regulatory control is not possible, the operator must take measures to quickly transfer any disused radioactive sources to a centralized or authorized RW storage facility.

In cases when the operator does not have a special storage facility or the capacity to create adequate conditions for handling obsolete closed sources, the operator must conduct preparatory work for the transfer of sources to another operator who has such conditions.

Disused closed sources with a high potential hazard should be separated from all others and stored separately. For sources (such as radium sources) that have the potential to leak out of the package, specific protective measures must be applied, both during processing and during storage.

Attention should be paid to the control of the contamination of surfaces and air in the premises. Before being transferred to a centralized RW disposal facility, the sources should be
stored in a specialized workroom with adequate ventilation and equipment;

Disused sealed sources should be tested if the half-life of the radionuclides they contain is not short enough to release them from regulatory control. The created conditions and methods that can be used for such cases must receive approval from the regulator.

Particular attention is paid to measures ensuring guaranteed control over obsolete sources in order to prevent their loss.

The section of the Guidance on “RW Releasing and Facilities and Objects of RW from Regulatory Control” requires that the operator, in order to be released from regulatory control, should declare his intention to release materials from regulatory oversight during the operational phase.

In order to release radioactive waste from control, the operator must ensure that the released radioactive waste meets the release levels approved by the regulatory body and relevant regulatory legal acts of the Kyrgyz Republic; released materials are in a place where strict control measures are in place to demonstrate compliance with regulatory requirements.

Prior to the public access to materials, equipment, facilities or a site for unrestricted or restricted use, regulatory criteria should be established for:

a) release of material, equipment, structures, soil and rocks from regulatory control;

b) authorized reuse or recycling of equipment, structures and materials;

c) opening access to the entire site for authorized use (depending on future plans) at the end of the closure.

Each of these sets of criteria should be established based on realistic exposure scenarios.

An information on material that has been exempted from regulatory control should be recorded, stored within the control system and forwarded to the regulatory body at its request.

Control measures for the release of radioactive materials should include:

a) determination of waste activity;

b) isolation of such wastes to determine degradation products;

c) sampling in each batch of waste that will be exempted from control.

Whenever the specific activity of the waste exceeds the authorized levels of exemption from regulatory control, an optimal choice for the management of radioactive materials should be applied and the operator will have to receive regulatory approval for handling radioactive waste in the prescribed manner.

According to the Reporting requirements and messaging, a licensed operator must develop a suitable and comprehensive registration system for actions in the RW management system that are under its responsibility.
The registration system should include registers, registration of transportation, movement, volumes of forming and etc., by means of which it is possible to trace the management of radioactive waste from the point of collection to long-term storage or release from control.

All reports related to RW management elements, including obsolete sources, should be kept up-to-date and up-to-date, stored appropriately, to access information in the future (for example, when RW is transferred to other operators or to another waste management step-in) and submitted to the regulatory body for study.

The operator is obliged to ensure the annual inventory of RW and RW registration in accounting and reporting documents, in a special document that specifies:
- characteristics of radioactive waste in accordance with the classification;
- qualitative and quantitative composition of radioactive waste;
- source and place of formation of radioactive waste;
- amount of radioactive waste in accordance with the classification;
- methods for processing radioactive waste;
- date of collection and packaging of radioactive waste;
- type of packaging (container) of radioactive waste;
- identification mark of the packaging (container) of radioactive waste;
- characteristic of radioactive contamination of the surface of the packaging (container) of radioactive waste;
- the location of the packaging (container) of radioactive waste;
- the location of the packaging (container) of radioactive waste in the storage facility;
- the value of specific activity and radionuclide composition, the date of their measurement;
- officials and executors engaged in the management of radioactive waste;
- date of transportation of radioactive waste outside the site of the facility;
- the amount of radioactive waste transferred for disposal or disposal;
- other information on RW required for the system of state accounting and control of radioactive waste;
- any chemical, pathogenic or other hazards associated with radioactive waste and concentrations of hazardous material.

The operator must ensure proper control over all actions in waste management, and prepare reports containing information on the management and management of radioactive waste.

For enterprises where RW is processed and stored, RW management reports should include:
a) data on radioactive waste and obsolete sources collected or received from other enterprises;

b) the data required for the national waste management system;

c) data necessary for the characterization of waste;

d) reports on accounting actions for each cycle of the enterprise: from collection, processing, packaging and storage (temporary or long-term);

e) documents regarding the acquisition of containers for packaging RW;

f) Specification of waste packages and records for each of the containers and packages containing radioactive waste;

g) trends and changes in operation;

h) discrepancy with the specifications for packages and the actions taken to correct this discrepancy;

i) release and unloading into the environment.

Based on the established values of the permissible gas-aerosol release and the permissible liquid discharge, the working (control) levels of radionuclides entering the environment should be identified and included in the list of operational limits of the facility. Control levels should be confirmed annually and reviewed every three years, taking into account experience and technology improvements.

This Guidance reflects the section on Inspection Supervision that is carried out by the regulatory body.

Supervision of radiation and environmental safety at radioactive waste storage facilities is a continuous critical assessment and analysis of the safety and acceptability of RW management practices. This supervision contributes to the protection of public health and personnel, stimulating the improvement of the quality of management of radiation and environmental safety.

It is important to develop an oversight strategy, to compare, analyze and summarize the data, as well as to report and publicize the findings, which should be accompanied by remedial recommendations. To ensure the implementation of measures aimed at correcting the situation, control of execution is necessary. Supervision of radiation and environmental safety is also used to ensure this situation, if necessary, when any occurring violations are properly investigated and resolved.

In accordance with IAEA requirements GS-R part 1 (2010), the main objectives of regulatory inspections are to ensure that:

1) safety requirements are observed;
2) the instructions and recommendations given during previous inspections are followed;
3) installations, equipment and work performance comply with all mandatory requirements;
4) the relevant documentation and instructions are applied and respected;
5) persons hired by the operator (including contractors) have the necessary competence to perform their functions effectively;
6) deficiencies and derogations are identified and corrected or justified without undue delay;
7) the operator properly manages security.

Inspections for regulatory purposes should not lead to a reduction of the operator's primary responsibility for safety or to replace the monitoring, surveillance and verification activities that the operator is required to perform.

Carrying out of state inspection (planned, repeated or unplanned), methods of conducting, control lists, forms, and methods of processing results are established by the relevant instructions and regulatory legal acts of the Kyrgyz Republic.

Operators working in the field of radioactive waste management can apply to the regulatory body with a statement of disagreement with the decision taken by them from this regulatory body. Such a statement should contain an adequate justification for disagreement, references to normative acts and proposals for revision of the decision.

If the regulator receives an application, a complaint against a type of decision, it must investigate the reasons and, if necessary, take measures to eliminate them.

If the statement of the operator's disagreement is justified, the regulatory body is obliged to review the decision.
SECTION G

SAFETY OF SPENT FUEL MANAGEMENT

The Kyrgyz Republic acceded the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management on 18 December 2006 and ratified on 18 March 2007, despite the fact that there are no nuclear power plants and nuclear reactors in the Kyrgyz Republic, there are radioactive waste and sources of ionizing radiation/

Qualification requirements for activities related to radioactive waste management (approved by the Decree of the Government of Kyrgyz Republic #558 of August 5, 2015).

The qualification requirements for radioactive waste management activities include the availability of:

1) organizational structure of the applicant in the form of a graphic scheme or a textual description in which a hierarchy of officials and persons, responsible for ensuring radiation safety, has been defined - for all sub-activity within the framework of this type of activity;

2) production and technical base in accordance with the requirements of the rules and technical regulations on radiation safety necessary for the performance of the claimed work (specialized production buildings, engineering facilities, machinery, equipment, packaging, containers) - for all sub-activities within the framework this type of activity;

3) accounting and control system of radioactive waste (approved by the applicant instructions for recording and storing, acts of reception, transmission, storage, documentation of origin, species, quantity, radionuclide composition and waste activity) - for all sub-activity;

4) technological procedure approved by the applicant for the implementation of the claimed work, which determines the basic methods of work, sequence of operations, limits and conditions of work, including the way of collecting, sorting, storing, processing, waste dumping, decontamination of premises, equipment, materials - for all sub-activity within the scope of this type of activity;

5) radiation safety instructions approved by the applicant, instructions and a plan for the prevention and elimination of possible accidents in accordance with the requirements of technical regulations and rules for radiation safety and in the field of emergency prevention - for all subspecies of activities within this activity;

6) radiation control systems for carrying out the declared works (measuring instruments, schedules and procedures) - for all subspecies of activities within the scope of this activity;

7) qualified personnel of technical managers, specialists with relevant education and practical experience in the work submitted and approved (by the order of the applicant) in accordance with the requirements of technical regulations and rules on radiation safety for the...
implementation of the declared works - for all subspecies of activities within this type activities;

8) safety quality assurance programs for the implementation of the declared activity in accordance with the requirements of technical regulations and rules for radiation safety - for all subspecies of activities within the scope of this activity;

9) systems for measuring and accounting for personnel exposure doses (premises, instruments and means, measuring techniques) or a contract with a legal entity or an individual that provides for individual dosimetric control of personnel - for all subspecies of activity within the scope of this activity;

10) design documentation for the temporary storage, long-term storage or disposal of radioactive waste, including infrastructure (transportation, packaging, processing, etc.) - for all subspecies of activities within this activity;

11) the act of commissioning a storage or burial place for radioactive waste - for all subspecies of activities within the scope of this activity;

12) the plan approved by the applicant for the physical protection of radioactive wastes in accordance with the requirements of technical regulations and rules on radiation and physical security - for all subspecies of activities within this activity;

13) the contract on compulsory insurance of civil liability of the employer for causing harm to the life and health of the employee in performance of his duties (official) - for all sub-activity within the scope of this type of activity;

14) the contract on compulsory insurance of civil liability of owners of facilities whose activities relate to the danger of causing harm to third parties - for all subspecies of activities within the framework of this type of activity;

15) conclusions of environmental expertise and other permits issued to the organization, including the point of temporary and long-term storage;

16) a safety analysis report for organizations of categories 1, 2 and 3 of the radiation hazard category.
Qualification requirements for transportation activities, including transit, nuclear materials, radioactive substances, radioisotope sources of ionizing radiation, radioactive waste (approved by the Decree of the Government of the Kyrgyz Republic No. 558 of August 5, 2015).

Qualification requirements for transportation activities, including transit, nuclear materials, radioactive substances, radioisotope sources of ionizing radiation, radioactive waste within the territory of the Kyrgyz Republic, include the availability of:

1) licenses for the transportation (including transboundary) of toxic waste, including radioactive waste, in accordance with the Law of the Kyrgyz Republic "On licensing and licensing systems in the Kyrgyz Republic";

2) qualified personnel of technical managers, specialists with relevant education and practical experience in the work submitted and approved (by the order of the applicant) in accordance with the requirements of technical regulations and rules on radiation safety for the implementation of the claimed work;

3) approved by the applicant regulations for the implementation of the claimed work, determining the basic methods of work, the sequential order of operations, limits and conditions of work;

4) the radiation protection program approved by the applicant when transporting in accordance with the requirements of technical regulations and rules of nuclear and radiation safety;

5) radiation safety instructions approved by the applicant, instructions and plans for the prevention and elimination of possible accidents in accordance with the requirements of technical regulations and rules on radiation safety and in the field of prevention of emergencies;

6) the system of accounting for and control of nuclear materials, radioactive substances, radioisotope sources of ionizing radiation, radioactive waste (approved by the applicant instructions on accounting and control, acts of acceptance and transfer, issuance, accounting and storage journals);

7) systems for measuring and accounting for personnel exposure doses (premises,
instruments and means, measuring techniques) or an agreement with a legal entity or individual that provides for individual dosimetric control of personnel;

8) Radiation safety and radiation monitoring services in the workplace (order and position on the service, radiation monitoring schedule, measuring instruments);

9) systems for ensuring the physical protection of nuclear materials, sources of ionizing radiation, radioactive waste and radioactive substances during transport;

10) emergency kit and means of liquidating the accident during transportation in accordance with the requirements of technical regulations and rules for radiation safety;

11) safety quality assurance programs for the implementation of the declared activity in accordance with the requirements of technical regulations and rules for nuclear and radiation safety;

12) the sanitary-epidemiological conclusion on transport;

13) a document on approval by the regulatory body in the field of radiation safety of the design of a packaging kit for special form radioactive material;

14) the contract on compulsory insurance of civil liability of the employer for causing harm to the life and health of the employee in the performance of his labor (official) duties;

15) of the contract on compulsory insurance of civil liability of owners of facilities whose activities are connected with the danger of causing harm to third parties.

QUALIFICATION REQUIREMENTS FOR ACTIVITIES FOR THE HANDLING OF DEVICES AND FACILITIES GENERATING IONIZING RADIATION INCLUDE THE PRESENCE OF:

1) the organizational structure of the applicant, in the form of a graphical scheme or text description, which defines the hierarchy of officials and persons responsible for ensuring radiation safety - for all subspecies of activities within the scope of this type of activity;

2) production and technical base in accordance with the requirements of the rules and technical regulations on radiation safety necessary for the performance of the claimed work (specialized production buildings, engineering facilities, machinery, equipment) - for all subspecies of activities within this activity;

3) approved by the applicant of the technological regulations for the implementation of the claimed work, determining the basic methods of work, the sequential order of operations, limits and conditions of work - for all subspecies of activities within this activity;

4) a system for measuring and accounting for personnel exposure doses (premises, instruments and means, measuring techniques) or a contract with a legal entity or an individual that provides for individual dosimetric control of personnel - for all subspecies of activity within the scope of this activity;

5) service for radiation safety and production radiation control in workplaces (order and position on the service, radiation monitoring schedule, measuring instruments) - for all subspecies of activities within the scope of this activity;

6) approved by the applicant instructions for radiation safety, instructions and plans for the prevention and elimination of possible accidents in accordance with the requirements of technical regulations and rules for radiation safety and in the field of emergency prevention - for all subspecies of activities within this activity;

7) documentation on the procedure for ensuring the recording, control and storage of devices and facilities generating ionizing radiation (instructions, inventory records, issuance, accounting and storage logs) - for all subspecies of activities within this activity;
8) qualified personnel of technical managers, specialists with relevant education and practical experience in the work submitted and approved (by the order of the applicant) in accordance with the requirements of technical regulations and rules on radiation safety for the implementation of the declared works - for all subspecies of activities within this activity;

9) a program to ensure the quality of safety in the implementation of the declared activity in accordance with the requirements of technical regulations and rules for radiation safety - for all subspecies of activities within this activity;

10) means of individual protection of personnel admitted to radiation-hazardous work, in accordance with the requirements of technical regulations and rules for radiation safety - for all subspecies of activities within this activity;

11) the sanitary-and-epidemiologic conclusion on devices and facilities generating ionizing radiation, - for all subspecies of activity within the limits of the given kind of activity;

12) documentation on the quality control of devices and facilities generating ionizing radiation (schedules and protocols of conduct, measuring instruments), or contract with a legal or physical person authorized to perform quality control - for working with medical devices and installations generating ionizing radiation;

13) documentation on maintenance and repair of devices and facilities generating ionizing radiation (maintenance schedule, repair reports, measuring instruments) or agreement with a legal or natural person authorized to carry out maintenance and repair work - for all subspecies of activities in the scope of this activity;

14) contract on compulsory insurance of civil liability of the employer for causing harm to the life and health of the employee in the performance of his labor (official) duties - for all subspecies of activities within the framework of this type of activity;

15) contract on compulsory insurance of civil liability of owners of facilities whose activities are connected with the danger of causing harm to third parties - for all subspecies of activities within the framework of this type of activity.
The source used in JSC "KGRK"

Working time of the inventory process at the Kristall plant, Tash Kumyr

Sources stored in an isotope on the territory of OJSC "KGRK"

Sources in the Kumtor Operating Company
SECTION K
GENERAL EFFORTS TO IMPROVE SAFETY

During the course of 2017, the Kyrgyz Republic worked to improve and harmonize the legal framework and national legislation in the field of radiation safety:

1. A single regulatory body has been established and is functioning in Kyrgyzstan.
2. IAEA expert and advisory missions on the revision of the national radiation safety system have been carried out;
3. A strategic master plan was developed and signed.
4. A country-specific framework program for cooperation with the IAEA was developed and is in the Government.
5. A number of projects have been implemented and completed.

Establishment of a regulatory body.

By the Decree No. 466-r of the Government of the Kyrgyz Republic dated 26.10.2016, Decrees No. 100-r, dated 14.03.2016 and No. 437-r of 05.11.2013, where the Ministry of Economy of the Kyrgyz Republic was the authorized state regulating the Nuclear and Radiation Safety Authority, and the Deputy Minister of Economy of the Kyrgyz Republic was the National Coordinator of the Kyrgyz Republic for Technical Cooperation with the International Atomic Energy Agency were repealed.

In order to increase the effectiveness of cooperation of the Kyrgyz Republic with international organizations, integration associations and international treaty bodies and in accordance with the Regulations of the State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic approved by the Decree No. 123 of the Government of the Kyrgyz Republic of February 2, 2012 "On the State Agency Environmental Protection and Forestry under the Government of the Kyrgyz Republic "and, taking into account paragraph 33. Decree No. 817 of the Government of the Kyrgyz Republic of December 2, 2015, at a meeting of the Government of the Kyrgyz Republic of October 25, 2016. The State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic was again appointed as the authorized state regulatory body for ensuring radiation and nuclear safety.
Director of the Center for State Regulation in the Sphere of Environmental Protection and Ecological Safety of the State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic Tolongutov Baigabyl appointed as the national coordinator of the Kyrgyz Republic for technical cooperation with the International Atomic Energy Agency.

**Expert and advisory missions of the IAEA**

The purpose of the advisory missions is to assist the requesting State in assessing, establishing and, if necessary, improving its regulatory framework and regulatory infrastructure for radiation safety and the safety of radioactive sources:

- Conducting an assessment of the current state of the regulatory framework and the national regulatory infrastructure for radiation safety and security of radioactive sources, taking into account international standards, recommendations of the Code of Conduct on the Safety and Security of Radioactive Sources and other relevant IAEA publications. In some cases, the assessment can be conducted on the basis of a self-assessment questionnaire conducted by the receiving state in advance of the mission;
- by providing an action plan for establishing or improving the regulatory framework and the national regulatory infrastructure in accordance with international standards;
- providing advice and suggestions that can help improve the effectiveness of the regulatory infrastructure and / or the activities of the regulatory body, and identify and share good practices.

Tasks:

- Determination of the status of the regulatory framework and regulatory infrastructure for radiation safety and safety of radiation sources;
- Identify priority areas in which action is required;
- Submission of proposals and recommendations for any identified needs for improvement;
- Develop or update, if necessary, the relevant IAEA infrastructure profile on radiation safety;
- Training methodology for project planning and management and filling out electronic forms on the IAEA website;
- Promoting the harmonization of approaches to regulation among Member States, and promoting the application of IAEA safety standards and guidelines;
- Inventory of equipment acquired by IAEA facilities and their current status;
- Meeting on the development of a roadmap to assist in the rehabilitation of legacy uranium sites;
- Acquaintance with the existing regulatory and legal framework in the field of radiation safety in Kyrgyzstan.
As part of the development of the system for ensuring radiation protection of the population of the Kyrgyz Republic, more than 15 documents have been developed. The analysis of regulatory and legal acts of the Kyrgyz Republic in the field of radiation safety in accordance with the requirements of the IAEA standards for making changes and additions was made. Also:

- The draft decree of the Government of the Kyrgyz Republic "On state regulation in the field of radiation safety" was developed. Draft resolution at the stage of coordination with ministries and departments;
- Draft decree of the Government of the Kyrgyz Republic "On Amendments to the Decree of the Government of the Kyrgyz Republic" On the State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic "dated February 20, 2012 No. 123 was developed. Changes and additions were made to the Regulations of the SAEPF on the Regulatory Body in accordance with the requirements of the IAEA standards, in terms of ensuring nuclear and radiation safety. Draft resolution at the stage of coordination with ministries and departments;
- Together with the Ministry of Health of the Kyrgyz Republic, a draft resolution of the Government of the Kyrgyz Republic "On approving the NAP of the Kyrgyz Republic in the field of ensuring radiation safety in public health" was developed and the following Sanitary Rules and Norms are in the stage of agreement with ministries and departments:
  1) Sanitary rules and regulations (SRR) on "Hygienic requirements for ensuring radiation safety when handling radiation screening units (RSU)"
  2) SRR on "Hygienic requirements for ensuring radiation safety when using sealed radioactive sources in conducting remote and intracavitary radiotherapy";
  3) SRR on "Hygienic requirements for ensuring radiation safety during radionuclide diagnostics using radiopharmaceuticals";
  4) SRR on "Hygienic requirements for the design and operation of X-ray rooms, apparatus and conducting X-ray studies";
  5) "Safety rules for the deployment and operation of medical accelerators of electrons with an energy of up to 25 MeV";

- the optimization of the system of state accounting and control of sources of ionizing radiation has been carried out, the latest (new) version of the program for the registration of IRIS "ARIS v2.5" has been installed.
- "Regulations on the National Register of Ionizing Radiation Sources" have been developed. Draft provisions at the stage of coordination with ministries and departments;
- the Regulation on interaction between relevant ministries and departments, local authorities in the sphere of radiation safety was developed and at the stage of coordination, specifying the role and responsibilities for each institution / ministry and detailing how different actors will interact.

**Strategic master plan.**

The strategic master plan was developed by the working group of the Coordination Group for Former Uranium Objects (CGULS) on behalf of the Central Asian Republics on the basis of a basic technical document. The working group includes representatives of the European Bank for Reconstruction and Development (EBRD), the European Commission, the International Atomic Energy Agency (IAEA), Kyrgyzstan, the Russian Federation and Tajikistan. In addition to developing the Strategic Master Plan, the working group will be responsible for monitoring its implementation and for periodic updates. A key prerequisite for the successful implementation of the Plan and for obtaining international support is a clear commitment on the part of the Central Asian republics to implement and / or adopt the principles outlined in the Plan and a broad approach.

The strategic master plan has now been approved by the Government of the Kyrgyz Republic No. 406 of September 18, 2017. The strategic master plan was submitted for consideration and approval to the Economic Council of the Commonwealth of Independent States (CIS). It was also submitted to the EBRD's Environmental Reconciliation Account (ERA) Assembly of Accountants in the second half of 2017, requesting its approval as a basis for action within the framework of the ERA in Central Asia.

September 18, 2017 in the margins of the 61st IAEA General Conference, a meeting of the delegation of the Kyrgyz Republic with representatives of the International Atomic Energy Agency, the European Bank for Reconstruction and Development, the European Commission was held, at which the "Strategic Master Plan" on the restoration of the environment at the sites of the uranium legacy of Central Asia was signed.

If necessary, national plans and strategies for remediation of uranium legacy sites in the three republics will be updated to fully comply with this Plan. Likewise, the Plan will be constantly in the field of view and will be updated to reflect any significant changes in national priorities and plans for remediation of uranium legacy sites.

The Strategic Master Plan provides an integrated, logically related, systematic, transparent and effective approach to environmental restoration at the sites of the uranium legacy in Central Asia, which ensures the best use of available resources. As such, this plan will provide confidence between the affected republics and potential donors that the risks and problems associated with the
sites of uranium legacy in Central Asia will be eliminated in a timely, coordinated, cost-effective and sustainable manner.

The strategic master plan was developed in the context of relevant international agreements and strategies and was aligned with them. It takes special account of the UN Sustainable Development Goals (SDGs), which are based on the UN Millennium Development Goals (MDGs).

**Country program framework.**

The concept of the Country Program defines the structure of the planning of IAEA technical cooperation in the Kyrgyz Republic for the period 2018-2022. The document is the result of a comprehensive consultation process involving relevant ministries and agencies to identify priority areas for cooperation with the IAEA.

The analysis took into account:

- The goals of sustainable development (hereinafter GSD);
- Priorities of the United Nations Framework Program of Assistance (UNDAF).

This document includes:

- revised materials submitted by the IAEA;
- A brief description of the relevant activities supported by other international partners in each priority area;
- a review of past and present technical cooperation activities with the IAEA, including a summary of the achievements made in each sector.

This document reflects a full understanding of the priorities established for the IAEA technical cooperation request in the period 2018-2022.

Priority areas of technical cooperation between Kyrgyzstan and the IAEA can be summarized as follows:

- Harmonization of the national legislative framework with international legal documents, standards and instructions of the IAEA.
- Development of a national licensing system for the maintenance, commissioning and decommissioning of nuclear facilities, the restoration of contaminated sites, the management of radioactive waste and the system of accounting and control and proper protection of nuclear material, sources of ionizing radiation and radioactive waste;
- Enhancing the safety assessment capacity.
- Ensuring the radiation safety of people and the environment with respect to uranium heritage sites on a national scale, including:
- bringing the regulatory infrastructure in line with international standards and norms;
- creation of a stable state system for the safe storage (storage) of uranium sites;
- improving the management of radioactive waste by adopting international quality management standards (ISO standards, etc);
- creation of a system of continuous radioecological monitoring of the legacy sites of uranium production, public health and the environment;
- Clear definition of responsibilities and capacity building of government bodies;
- Taking preventive measures to protect uranium heritage sites from natural phenomena such as earthquakes, landslides, proximity to water bodies, mudflows, landslides, etc., which are difficult to control or manage and pose a threat to local people and the environment; 
Building the capacity of research institutes and creating or modernizing laboratories.
- Improvement of the national system of education and continuing education in the field of radiation safety:
- raising the level of education and training in nuclear physics and the peaceful use of nuclear energy;
- capacity building for the preservation of nuclear knowledge.
- Improve the infrastructure and capacity of the national health system to diagnose and treat cancer, such as lung cancer, thyroid cancer, breast cancer, cervical cancer, gastrointestinal cancer and colon and rectal cancer, and other diseases by acquisition of equipment and development of human resources. Improvement of the national system for ensuring the quality and safety of patients in the field of radiation medicine.
- Establishment of national infrastructure and capacity building in the field of nuclear technologies through the creation of facilities, the acquisition of equipment and instruments, the establishment of protection and human resource development systems.
- Strengthen the capacity of research institutions by encouraging research and the establishment or modernization of research centers to incorporate the latest technologies in peaceful uses in such areas as medicine, agriculture and energy production.
- To create an interactive database of uranium legacy sites and other radioactive sources and wastes, as well as a system allowing the Kyrgyz authorities to work together on licensing, accounting and control of nuclear materials, radioactive waste, etc.
- Strengthened capacity to evaluate, plan and implement actions to ensure sustainable food security.
- Strengthening food security and developing sustainable agriculture, taking into account the impacts of climate change;
- Increase agricultural productivity using nuclear techniques and advanced technologies to ensure environmental sustainability;
- Improvement of culture using mutational selection;
- Develop best practices for managing soil, nutrients and water resources to improve soil fertility, improve nutrient quality for crops, reduce nutrient losses to the atmosphere and water resources, and combat land degradation.

List of projects in the framework of cooperation with the IAEA and the results achieved.

The information below shows past projects, partner organizations and achieved results.

1) Health and nutrition

KIG6002: Modernization of nuclear medicine (2007-2012), National Center of Oncology (NCO). Nuclear medicine installations (gamma cameras) have been modernized since 1993. Services related to single-photon emission computed tomography (SPECT), including the associated ECS machine, were purchased for further use by the NCO, along with the appropriate training of the NCO staff.

KIG6004: Modernization of Nuclear Medicine (Phase II) (2009-2016), National Center of Oncology (NCE). Within the framework of the project, medical personnel were trained and rendered visualization services using nuclear medicine for practical use in the diagnosis of cancer and other pathological conditions. IMPACT's mission in 2015 informed the NCOs about its nuclear medicine unit and welcomed the creation of a specialized unit for nuclear diagnostics.

KIG6003: Modernization of radiotherapy services (2007 - 2011), National Center of Oncology (NCO). This project contributed to the further strengthening of the diagnosis and treatment of cancer in the NCO. In particular, the possibilities for treating cancer have been expanded and the functionality of the NCO has been maintained at a modern international level.

KIG6005: Modernization of radiotherapy services (Phase II) (2009 - 2016), National Center of Oncology (NCE). Thanks to this project, radiotherapy and brachytherapy services have been modernized through the provision of modern equipment, training of staff and expert advice on relevant technical and clinical aspects. The medical and support staff received more opportunities in the planning and treatment of cancer, as well as in the creation of modern equipment. As part of this project, it was noted that due to the lack of a functioning regulatory infrastructure, further supply of radiation sources (Tc-99, etc.) cannot continue.

2) Water and the environment

KIG7002: Enhancing radioecological monitoring (2009-2016), the project of the State Agency for Environmental Protection and Forestry has helped to establish regulatory requirements and criteria for conformity monitoring, as well as the development of a national program for radiation
monitoring, initiation of monitoring of geotechnical stability assessment and implementation of the recovery planning process in specific locations.

KIG9002: Professional and environmental monitoring (preliminary membership in 1994), State Agency for Environmental Protection and Forestry. The project helped to strengthen personnel dosimetry services for radiation safety workers in hospitals and industry by providing a computerized system for reading thermoluminescent detectors (TLDs) of Harshaw to the State Committee for Environmental Protection in Bishkek. In addition, the environmental assessment mission assessed the radiological situation in the area of mining and processing of uranium in Mailuu-Suu, concluding that the radiological impact of radon released from the reconstructed tailings is very low, and Ra-226 concentrations in drinking water and in the river Mailuu-Suu is also much lower than the maximum permissible levels for this radionuclide in drinking water.

KIG9003: Establishment of a radio ecological monitoring and assessment network (2005-2010), National Academy of Sciences of the Kyrgyz Republic; Institute of Biology and Soil Science. A baseline condition was established for current conditions that would allow for more accurate assessment of future changes in pollution levels, as well as facilitate any assessment of any improvements achieved through any corrective actions that are planned. Support was provided in strengthening the capacity of IGOs and the Institute of Biology and Soils (BSI) of the National Academy of Sciences to coordinate various activities on radiological monitoring and assessment; to obtain representative samples and analyzes performed in various areas, with a data bank created and used to assess the situation and determine recovery options.

3) Energy

KIG0002: Establishment of the National INIS center (2009 - 2012), State Agency for Environmental Protection and Forestry. The establishment of a functioning national center for the International Nuclear Information System (INIS) provided the provision of relevant information services for the peaceful application of nuclear sciences and helped to collect report and preserve all types of literature published on a national and unreleased level, to transmit and exchange information in support of the national nuclear program. Slavic University; Laboratory of Biophysics.

4) Security

KIG9004: Assessment of the radiation situation and public exposure in Minkush uranium sites, Ministry of Health; Department of State Sanitary and Epidemiological Surveillance. The radiation situation in places close to some of the tailing dumps of the mining industry has been clarified to the extent possible, including an assessment of the potential of people living near the tailing dumps. Recommendations for further remedial action and requests for enhanced international
support were developed and presented to all stakeholders.

KIG9005: Strengthening the regulatory infrastructure in the Kyrgyz Republic for the safe use of nuclear technologies (2012-2016) The State Agency for Environmental Protection and Forestry; Center for Environmental Security. The Consultative Mission in August 2013 developed a comprehensive set of recommendations to the Government and relevant bodies on overcoming and further eliminating gaps in the country's regulatory and legal framework for ensuring radiation safety. A comprehensive workshop on the latest changes in the legislative framework and law enforcement practices regarding rehabilitation activities for uranium tailings completed the project with the participation of fifteen mid-level managers of Kyrgyzstan. In addition to the aforementioned national projects, Kyrgyzstan has participated in several regional IAEA technical cooperation projects.

Conventions and international treaties signed in the framework of cooperation with the IAEA.

Safeguards Agreements:

Conventions ratified in the framework of cooperation with the IAEA.

The current situation in the field of radiation safety

With the collapse of the USSR, the system of management, supervision, regulation based in special institutions located in Moscow and other cities, mainly in central bodies, for example, the Minsredmash, Mintsvetmet and other centralized agencies, was completely destroyed.

In the Kyrgyz Republic, all these years, the primary task is to build or create an operational system to ensure the safety of objects and systems that pose a threat and risk to the environment, through water, soil, air, and a threat to the health of the country's population.

In the construction of this system, our country desperately needs methodical and consultative assistance from international organizations, as well as the use of the experience and skills of the
employees of the so-called institutional memory that have survived in the Kyrgyz Republic.

Problems in the field of radiation safety and personnel strategy

• Provision of equipment and technical support to state organizations involved in the field of radiation safety,

• Support of laboratories in the field of alpha spectrometry, individual dosimetry, in providing climate control of premises and electrical safety (for gamma spectrometry and individual dosimetry, laboratory plants-generators for liquid and gaseous nitrogen, UPSs, air conditioners);

• Support of laboratories for participation in professional testing (including individual dosimetry using Harshaw 6600).
Annex 1

Development of Nuclear Medicine

Within the framework of the IAEA Project KG 6/002 (Phase 1) "Modernization of Nuclear Medicine in Kyrgyzstan" in 2012, MEDISO engineers installed one-photon emission computed tomography and a protective fume hood for the packaging of radiopharmaceuticals. Also in 2012-2013, inactive reagents were received:

1. List of inactive sets obtained in the framework of the IAEA Project KIG / 6/002

<table>
<thead>
<tr>
<th>№</th>
<th>Name</th>
<th>Shelf Life</th>
<th>Debited Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tc-MIBI</td>
<td>21.03.2013, 21.01.2014</td>
<td>17.10.2014</td>
</tr>
<tr>
<td>2</td>
<td>Tc-DTPA</td>
<td>21.03.2012, 11.11.2013</td>
<td>17.10.2014</td>
</tr>
<tr>
<td>5</td>
<td>PYROPHASPHATE</td>
<td>01.01.2013, 03.02.2014</td>
<td>17.10.2014</td>
</tr>
<tr>
<td>6</td>
<td>Tc-KoLoid</td>
<td>01.01.2013, 28.01.2014</td>
<td>17.10.2014</td>
</tr>
<tr>
<td>7</td>
<td>MDP Tc-Medronate</td>
<td>07.03.2012, 01.01.2014</td>
<td>17.10.2014</td>
</tr>
<tr>
<td>9</td>
<td>MAK 3</td>
<td>15.10.2012, 01.08.2014</td>
<td>17.10.2014</td>
</tr>
<tr>
<td>10</td>
<td>MAK RO</td>
<td>03.11.2012, 21.05.2014</td>
<td>17.10.2014</td>
</tr>
</tbody>
</table>

1. Kits for the preparation of a radiopharmaceutical with the intended purpose:
2.1. Tc-99m-Sodium pertechnetate (Thyroid gland, salivary glands, brain)
2.2. Tc-99m-Sulfur colloid (Liver, spleen, bone marrow)
2.3. Tc-99m-Pyrophosphate (Scintigraphy of acute myocardial infarction and skeleton)
2.4. Tc-99m-Diphosphonate (Scintigraphy of bones)
2.5. Tc-99m-Macroaggregated albumin (Perfusion of the lungs, ventriculography)
2.6. Tc-99m-Red blood cells (Bleeding of the gallbladder, hepatic hemangioma)
2.7. Tc-99m-Human serum albumin (Blood pool)
2.8. Tc-99m-DTPA (Genitourinary system, brain)
2.9. Tc-99m-MAG3 (Scintigraphy of the kidneys)
2.10. Tc-99m-DMSA (Scintigraphy of the kidney cortex)
2.11. Tc-99m-HIDA (Hepatobiliary scintigraphy)
2.12. Tc-99m-Sestamibi (Perfusion of the myocardium)
2.13. Tc-99m-HMPAO (Perfusion of the brain)

**Brachytherapy equipment**

<table>
<thead>
<tr>
<th>Name of apparatus</th>
<th>Year of supply</th>
<th>Appointments</th>
<th>Power consumption (kV/t)</th>
<th>A country-manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gamma Therapeutic Apparatus «AGAT-BT»</td>
<td>2016 y.</td>
<td>Brachytherapy (contact intracavitary radiotherapy) of cancer patients</td>
<td>5kV/t</td>
<td>JSC «НИИТФА, Rosatom, Moscow, Russia</td>
</tr>
</tbody>
</table>

Within the framework of the IAEA projects KG 6/003 and KG 6/005 "Modernization of nuclear medicine in Kyrgyzstan" since 2011, the brachytherapy apparatus was not delivered due to the financial indebtedness of Kyrgyzstan to the IAEA and the absence of the Regulatory Authority for Radiation Safety in Kyrgyzstan at that time.

**Radiotherapy equipment**

<table>
<thead>
<tr>
<th>№</th>
<th>Name of apparatus</th>
<th>Year of supply</th>
<th>Appointments</th>
<th>Power consumption</th>
<th>A country-manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Gamma Therapeutic Apparatus «Babatron»</td>
<td>2016 y.</td>
<td>Remote radiation therapy of cancer patients</td>
<td>3 kV/t</td>
<td>India</td>
</tr>
<tr>
<td>2.</td>
<td>Gamma Therapeutic Apparatus «Terabalt»</td>
<td>2006 y.</td>
<td>Remote radiation therapy of cancer patients</td>
<td>3 kV/t</td>
<td>Czech Republic through the IAEA</td>
</tr>
<tr>
<td>3.</td>
<td>Linear Accelerator ЛУЭВ-15М</td>
<td>1991 y.</td>
<td>Remote therapy of patients</td>
<td>80 kV/t</td>
<td>Russia</td>
</tr>
<tr>
<td>4.</td>
<td>RUM-17</td>
<td>1968 y.</td>
<td>Remote therapy of patients</td>
<td>25 kV/t</td>
<td>Russia</td>
</tr>
</tbody>
</table>
Currently, the National Center for Oncology and Hematology operates gamma therapeutic devices TERABALT (works, requires the replacement of the Co 60 source), Babatron, linear accelerator LUEV-15M (Russia).

On Babatron and TERABALT there are two sources of Co60 and two sources in the verification and dosimetry laboratory, the period of half-age Co60 has expired on Terabalt, preparations are being made for writing off the latter.

Gamma device for brachytherapy "AGAT-VT" (Russia). Date of manufacture 2015y. It was installed and launched in November 2016. The radiation source Co 60 is used. The source activity is 2.32 Ku. The source was manufactured on 06/07/15. The source was manufactured on 06/07/15.

X-ray therapy devices РУМ-21, РУМ-17 (USSR). Date of manufacture 1968y. and 1984. They were installed in 1973 and 1984, respectively. Apparatuses are morally obsolete, they work in incomplete mode. There are no accessories.

AGAT-C morally and physically obsolete, in 2016 it was decommissioned in accordance with the established procedure, disposed of, the source of Co60 was handed over for disposal in the radioactive waste disposal site.

To monitor the safety and use of a source of ionizing radiation in offices where sources of ionizing radiation are used, there is alarm system and video surveillance.

Video surveillance and alarm systems were installed in 2014 by the American firm Orion.
Internationale Group for the GTRI (Global Initiative for Threat Reduction) project, a video surveillance system and signaling in the recovery process. The works are on tender.

For the entire period of operation of ionizing radiation sources thefts and illegal use and loss have not been established.

In accordance with the Law of the Kyrgyz Republic "On Radiation Safety of the Population of the Kyrgyz Republic" and Order No. 544 p. 3.1. of the Ministry of Health of the Kyrgyz Republic dated Dec. 30, 2002, "On Measures to Improve the Radiation Safety of Personnel and Patients in Radiological Surveys in Healthcare Institutions" conducts radiation monitoring for compliance with standards and radiation safety (establishing dose limits in offices and in adjacent areas), radiological monitoring of devices and installations with approved schedule (2 times a year). The results are recorded in the journals.

The above-mentioned works were transferred to the National Center of Oncology due to the presence in the PDL of the only qualified specialists in dosimetry and medical physicists in the Republic.

The results of radiation control are sent to the monitoring body of the Department of Disease Prevention and State Sanitary and Epidemiological Surveillance once a year.

Clinical dosimetry of released therapeutic doses is carried out and, if necessary, their correction is carried out. The results are recording in the journal.

Every year an inventory and control of the storage of IRS accounting is conducted.

Individual dosimetry of employees working in the field of ionization under the contract concluded with the Chui Ecology Laboratory is conducted from 2012 onwards. Based on the results of quarterly, protocols of measurements of the equivalent doses received and effective doses for the skin are given out.

In accordance with the schedule, once a year, the safety technique routine instruction is held and emergency instruction and force majeure events are conducted without instruction. When applying for work with an employee, an introductory instruction on safety technique is conducted. With the employees working in the ionization zone, the classes on safety technique are systematically conducted.

There is a visual information on the safety technique.

In accordance with the requirements of regulatory documentation, quality inspection is carried out and a guarantee report is issued.

**Information about the operation of the video surveillance system in the National Center of Oncology and Hematology**

At present, the National Center of Oncology and Hematology operates gamma-therapeutic...
devices Terabalt, Babatron, linear accelerator LUEB-15M, AGATH-BT, X-ray therapeutic devices RUM-21, RUM-17. To monitor the safety and use of ionizing radiation source in offices where ionizing radiation source is used, an alarm system and video surveillance are installed.

To ensure video surveillance and fire alarm work, biometric readers, electromechanical locks on entrance doors, video surveillance cameras and a fire alarm annunciator are installed.

All equipment, SD disks, hard drives HDD 3Tb, switchboard, QMS RDD radio magnetic contact sensor, etc., it is necessary to ensure uninterrupted operation of video surveillance and fire alarm installed in special metal cabinets.

The monitor intended for visual monitoring of the safety of ionizing radiation source is located in the radiogynecology department. At the end of the work in the premises where the ionizing radiation source is located, at the set time, the fire and burglar alarm is automatically switched on.

**Information of the National Center of Oncology and Hematology about Babaron.**

After acquainting himself with the technical characteristics and parameters of the cobalt apparatus Babatron-2 and the simulator to the National Center for Oncology and Hematology, India's Extraordinary and Plenipotentiary Ambassador to Kyrgyzstan, Mr. Jayant Khobragade, was invited to coordinate organizational matters. During the visit, the Ambassador was provided with the following information: the layout of the rooms where these devices are planned to be installed, the technical condition of the existing National Center of Oncology and Hematology radiotherapy devices and their intensity of the source. Required premises are located in radiological buildings and correspond to UXO. The issues related to the transportation and installation of apparatus and sources, and their coordination by the relevant departments were discussed.

During the visit, the ambassador familiarized himself with the premises in the radiological buildings of the National Center for Oncology and Hematology for the installation of the cobalt apparatus Babatron-2 and the simulator for planning radiation therapy (INDIA), and recommended accelerating the dismantling of the Agath-S radiotherapy apparatus in order to free Room for the repair and installation of the Indian cobalt apparatus Babatron-2.

Interdepartmental commission for writing off the radiotherapy apparatus «Агат-С» under the Ministry of Health of the KR17.0117. on the basis of acts of the Department of State Sanitary and Epidemiological Supervision, the Department of Medicines and Medical Equipment and the National Center of Oncology recognized that the radiotherapy apparatus «Agath-S» (1985y.) morally and physically obsolete and poses a threat to the safety of patients and staff, and recommended that the radiotherapy apparatus «Agath-S» with the subsequent burial according to the requirements of the concerned departments and ministries. On the recommendation of the
Interdepartmental Commission «Agath-S» was decommissioned and buried at the point of disposal of radioactive waste.

Annex 2

The following types of sources of ionizing radiation are registered in the republic:

<table>
<thead>
<tr>
<th>Nuclide</th>
<th>Chui and Bishkek</th>
<th>Issyk-Kul</th>
<th>Jalal-Abad</th>
<th>Osh</th>
<th>Batken</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Am-241</td>
<td>12</td>
<td>14</td>
<td>2</td>
<td>-</td>
<td>18</td>
<td>46</td>
</tr>
<tr>
<td>Cs-137</td>
<td>71</td>
<td>27</td>
<td>24</td>
<td>-</td>
<td>6</td>
<td>128</td>
</tr>
<tr>
<td>Cd-109</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Co-57</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Co-60</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Cf-252</td>
<td>2</td>
<td>-</td>
<td>-</td>
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Note:
* The set of OSGI is a set of control sources used for laboratory research.