On approval of the Sanitary rules “Sanitary and epidemiological requirements for radiation safety”

Unofficial translation

Order of the Minister of Health of the Republic of Kazakhstan dated June 26, 2019 No. ҚР ДСМ-97. Registered in the Ministry of Justice of the Republic of Kazakhstan on June 28, 2019 No. 18920

Unofficial translation

In accordance with paragraph 6 of Article 144 of the Code of the Republic of Kazakhstan dated September 18, 2009 "On people’s health and healthcare system", **I HEREBY ORDER**:

1. To approve the attached Sanitary rules “Sanitary and epidemiological requirements for radiation safety”.

2. To recognize as invalid the order of the Minister of National Economy of the Republic of Kazakhstan dated March 27, 2015 No. 261 “On approval of the Sanitary rules “Sanitary and epidemiological requirements for radiation safety” (registered in the Register of state registration of regulatory legal acts under No. 11205, published on June 23, 2015 in the legal information system "Adilet").

3. The Committee for control of quality and safety of goods and services of the Ministry of Health of the Republic of Kazakhstan, in the manner prescribed by the legislation of the Republic of Kazakhstan, to ensure:

1) state registration of this order in the Ministry of Justice of the Republic of Kazakhstan;

2) within ten calendar days from the date of registration of this order, its sending in the Kazakh and Russian languages to the Republican state enterprise on the basis of the right of economic management “Institute of Legislation and Legal Information of the Republic of Kazakhstan” for official publication and inclusion in the Reference Control Bank of regulatory legal acts of the Republic Kazakhstan;

3) placement of this order on the Internet resource of the Ministry of Health of the Republic of Kazakhstan;

4) within ten working days after the state registration of this order in the Ministry of Justice of the Republic of Kazakhstan, submission of information to the Department of Legal Services of the Ministry of Health of the Republic of Kazakhstan on implementation of measures provided for in subparagraphs 1), 2) and 3) of this paragraph.

4. The Vice Minister of Health of the Republic of Kazakhstan K. Nadyrov shall be authorized to oversee the execution of this order.

5. This order shall come into force twenty one calendar days after the day of its first official publication.

Minister of health of the
Republic of Kazakhstan
"AGREED"
Ministry of national economy of the
Republic of Kazakhstan
"___" _____ 201__
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Ministry of energy of the
Republic of Kazakhstan
"___" _____ 201__

Approved by the order
dated June 26, 2019
No. ҚР ДСМ-97

Sanitary rules "Sanitary and epidemiological requirements for radiation safety"

Chapter 1. General provisions

1. These Sanitary rules “Sanitary and epidemiological requirements for radiation safety” (hereinafter - the Sanitary rules) establish sanitary and epidemiological requirements for radiation safety when choosing a land plot, designing, construction, reconstruction, overhaul, commissioning, during operation and decommissioning of the facility or structural subdivision of the facility, where they handle sources of ionizing radiation (hereinafter - radiation facility), radioactive waste management, ionizing radiation sources management (closed and open radionuclide sources, radioactive substances, radioisotope means, devices, generating the ionizing radiation), the use of materials and products contaminated or containing radionuclides, radiation monitoring, the use of means of personal protection and personal hygiene, during medical exposure, exposure to natural sources of ionizing radiation and radiation accidents.

2. Sanitary rules apply to all individual and legal entities engaged in:

1) design, construction, reconstruction, overhaul, commissioning, operation and decommissioning of radiation facilities, extraction, production, storage, use, transportation of radioactive substances and other sources of ionizing radiation;

2) collection, storage, processing, transportation and disposal of radioactive waste;

3) installation, repair and set up of instruments, units and apparatuses, the operation of which is based on the use of ionizing radiation sources, and devices (source) generating ionizing radiation;

4) radiation monitoring of manmade sources of ionizing radiation.

Sanitary rules also apply to individual and legal entities, whose activities influence the level of exposure of people to natural sources of ionizing radiation, and organizations performing work in the territory contaminated with radioactive substances.

3. The following concepts are used in these Sanitary rules:

1) the dose in an organ or tissue (hereinafter - DT) - the average absorbed dose in a specific organ or tissue of the human body:

$$D_T = \frac{1}{m_T} \int_{m_T} D \times dm \ ,$$

where: mT is the mass of an organ or tissue;

D – the absorbed dose in the mass element dm;

2) intervention - an action aimed at reducing the likelihood of exposure, or dose or adverse effects of exposure;

3) the level of intervention (hereinafter - LI) - the value of the dose to be prevented, upon reaching which, in cases of chronic or emergency exposure, protective or post-emergency measures are taken;

4) a special container - transport equipment designed to facilitate the transportation of packaged or unpacked goods by one or several types of transport without intermediate transshipment of goods placed in it, which prevents spontaneous opening, is sufficiently rigid and durable for repeated use. Large freight containers and transport packaging kits can be the special containers;

5) surveillance zone - the territory outside the sanitary protection zone where radiation monitoring is carried out;

6) control level - the value of the controlled dose, dose rate, radioactive contamination and others, established for operational radiation monitoring, in order to consolidate the achieved level of radiation safety, to ensure further reduction of exposure of personnel and the population, radioactive contamination of the environment;

7) equivalent dose (hereinafter - HT,R) - is the absorbed dose in an organ or tissue multiplied by the corresponding weighting coefficient for a given type of radiation, WR:

$$H_{T,R} = W_R \times D_{T,R} \ ,$$

where: DT,R is the average absorbed dose in the organ or tissue T, and WR is the weighting coefficient for radiation R.

$$H_T = \sum_R H_{T,R}$$

When exposed to different types of radiation with different weighting coefficients, which are given in Table 1 of appendix 1 to these Sanitary rules, the equivalent dose is defined as the sum of equivalent doses for these types of radiation:

The unit of equivalent dose is Sievert (hereinafter - Sv);

8) activity (hereinafter - A) - a measure of the radioactivity of an amount of a radionuclide in a given energy state at a given time:

$$A = \frac{dN}{dt},$$

where: dN - the expected number of spontaneous nuclear transformations from a given energy state occurring over a period of time – dt. The unit of activity is Becquerel (hereinafter - Bq). The previously used off-system unit of Curie activity (hereinafter referred to as Ci) is 3.7x1010 Bq;

9) decontamination - the removal or reduction of radioactive contamination from any surface or from any environment;

10) the determined radiation effects - clinically detectable harmful biological effects caused by ionizing radiation, for which there is a threshold, below which the effect is absent, and above - the severity of the effect depends on the dose;

11) dose rate - radiation dose per unit of time (second, minute and hour);

12) dose limit (hereinafter - DL) - the value of the annual effective or equivalent dose of anthropogenic radiation, which should not be exceeded in normal operation. Compliance with the annual dose limit prevents the determined effects, while the likelihood of stochastic effects remains at an acceptable level;

13) preventable dose - the predicted dose due to a radiation accident, which is prevented by protective measures;

14) the planned increased exposure - the planned exposure of personnel in doses exceeding the established basic dose limits in order to prevent the development of a radiation accident or to limit its consequences;

5) workplace - a place of permanent or temporary stay of an employee during the performance of labor duties in the course of labor activity;

16) class of work - the characterization of work with open sources of ionizing radiation according to the degree of potential danger to personnel, which determines the requirements for radiation safety depending on the radiotoxicity and activity of nuclides;

17) annual effective (equivalent) dose - the sum of the effective (equivalent) dose of external exposure received in a calendar year and the expected effective (equivalent) dose of internal exposure due to the intake of radionuclides in the body for the same year. The unit of annual effective dose is Sievert (Sv);

18) annual intake limit (hereinafter - AIL) - the admissible level of intake of a given radionuclide in the body during the year, which, during the mono-factored influence, leads to the exposure of a conditional person with an expected dose equal to the corresponding annual dose limit;

19) a source of ionizing radiation (hereinafter - a source of radiation) - radioactive substances, apparatus or devices containing radioactive substances, as well as electrophysical apparatus or devices emitting or capable of emitting the ionizing radiation;

20) handling of ionizing radiation sources - activities related to the manufacture, supply, receipt, possession, storage, use, transfer, processing or disposal, import, export, transportation, maintenance of ionizing radiation sources;

21) a device (source) that generates ionizing radiation - an electrophysical device (x-ray machine, accelerator, generator, etc.), in which the ionizing radiation arises due to a change in the speed of the charged particles, their annihilation, or nuclear reactions;

22) an open source of ionizing radiation - a radiation source, using which it is possible to release the radionuclides contained in it into the environment;

23) a closed source of ionizing radiation - a radiation source, the structure of which excludes the flow of radionuclides contained in it into the environment under the conditions of use and wear, for which it is designed;

24) quota - part of the dose limit established to limit the exposure of the population from a specific manmade source of radiation and the route of exposure (external, intake with water, food and air);

25) disposal - placement of spent nuclear fuel or radioactive waste in a disposal site without the intention of removing them;

26) minimum significant activity (hereinafter - MSA) - the activity of an open or closed source of ionizing radiation, exceeding which the source is subject to accounting and control. Unit of measurement of MSA is Becquerel (hereinafter - Bq);

27) minimum significant specific activity (hereinafter - MSSA) - the specific activity of an open source of ionizing radiation above which the source is subject to accounting and control. For the closed radiation sources, the decision on the need to obtain permission for handling is determined by comparing its activity with the MSA, without taking into account the MSSA. The unit of measurement of the MSSA is Becquerel per gram (hereinafter - Bq / g);

28) personnel - individuals who permanently or temporarily work with sources of ionizing radiation (group A) or who, under working conditions, are in the area of their influence (group B);

29) radiation accident - violation of the limits of safe operation of the facility for the use of atomic energy, in which there was a release of radioactive products and (or) ionizing

radiation beyond the boundaries stipulated by the normal operation project, which could lead to or led to exposure of people or radioactive contamination of the environment above the established standards;

30) radiation accident zone - the territory in which the fact of a radiation accident is established;

31) radiation monitoring - obtaining information about the radiation situation at the facility, in the environment and about the levels of exposure to people, in accordance with the requirements of regulatory legal acts in the field of sanitary and epidemiological welfare of the population (includes dosimetric and radiometric monitoring);

32) category of radiation hazard - a characteristic of the object of use of atomic energy by the degree of its radiation hazard to the population and (or) the environment when handling it or in the event of a potential accident;

33) ensuring radiation safety - the implementation of a set of organizational, technological , technical, sanitary and epidemiological and medical and preventive measures aimed at reducing the levels of exposure of personnel and the population;

34) radioactive substance - any materials of natural or manmade origin in any state of aggregation containing radionuclides;

35) radioactive waste - radioactive substances, nuclear materials or radionuclide sources with a radionuclide content higher than the seizure level, the further use of which is not provided for;

36) handling of radioactive waste - all types of activities related to the collection, transportation, processing, storage and (or) disposal of radioactive waste;

37) radioactive contamination - the presence of radioactive substances on the surface, inside the material, in the air, in the human body or elsewhere, in an amount exceeding the levels established by the Hygienic standards “Sanitary and epidemiological requirements for radiation safety”, approved by the order of the Minister of National Economy dated February 27, 2015 No. 155, (registered in the Register of state registration of regulatory legal acts under No. 10671) (hereinafter - the Hygienic standard) and these Sanitary rules;

38) radiation - the exposure of ionizing radiation to a person;

39) stochastic irradiation effects - harmful biological effects caused by ionizing radiation that do not have a dose threshold for occurrence, the probability of occurrence of which is proportional to the dose and for which the severity of the manifestation is dose-independent;

40) critical group - a group of people from the population (at least ten people), homogeneous by one or several characteristics (gender, age, social or professional conditions, place of residence, diet), which is exposed to the greatest radiation exposure from the radiation source;

41) absorbed dose (hereinafter - D) - the amount of energy of ionizing radiation transferred to the substance:

$$D = \frac{d\bar{e}}{dm},$$

where :

$d\bar{e}$

is the average energy transferred by ionizing radiation to a substance located in an elementary volume, and dm is the mass of a substance in this volume.

Energy can be averaged over any given volume, and in this case the average dose will be equal to the total energy transferred to the volume divided by the mass of that volume. In the units of the International System of Units, the absorbed dose is measured in joules divided by kilogram (J / kg), and has a special name - gray (hereinafter - Gy). The previously used off-system unit rad is 0.01 Gy;

42) natural source of radiation - a source of ionizing radiation of natural origin, which is governed by the Hygienic standards and these Sanitary rules;

43) natural radionuclides - radioactive elements of the uranium-238 and thorium-232;

44) risk - the probability of a person or his offspring to have any harmful consequences as a result of exposure;

45) manmade radiation source - a source of ionizing radiation, specially created for its beneficial use or is a by-product of this activity;

46) effective dose (hereinafter - E) - the value used as a measure of the risk of the long-term effects of irradiation of the entire human body and its individual organs and tissues, taking into account their radio-sensitivity. It represents the sum of the products of the equivalent dose in organs and tissues by the corresponding weighting factors, which are given in table 2 of appendix 1 to these Sanitary rules:

$$E = \sum_{T} W_T \times H_T,$$

where: HT is the equivalent dose in the organ or tissue T, and WT is the weighting coefficient for the organ or tissue T. The unit of effective dose is Sievert (Sv);

47) collective effective dose - a measure of the collective risk of stochastic irradiation effects, it is equal to the sum of individual effective doses. The unit of effective collective dose is man-Sievert (hereinafter - man-Sv);

48) specific (volumetric) activity - the ratio of the activity A of a radionuclide in a substance to the mass m (volume V) of a substance:

$$A_m = \frac{A}{m}; \quad A_v = \frac{A}{V}$$

The unit of specific activity is Becquerel per kilogram (hereinafter - Bq / kg). The unit of volumetric activity is Becquerel per cubic meter (hereinafter - Bq / m3);

49) unremovable (fixed) surface contamination - radioactive substances that are not transferred upon contact to other objects and are not removed during decontamination;

50) removable (unfixed) surface contamination - radioactive substances that are transferred upon contact to other objects and removed during decontamination;

51) population - all persons, including personnel outside of work with sources of ionizing radiation;

52) radiation safety of the population - the state of protection of present and future generations of people from the effects of ionizing radiation harmful to their health;

53) equivalent (hereinafter - HT (τ)) or effective (E(τ)) dose expected with internal exposure – the dose over time t that passed after the intake of radioactive substances in the body:

$$H_T(\tau) = \int_{t_0}^{t_0+\tau} H_T(t)dt,$$

$$E(\tau) = \sum_T W_T \times H_T(\tau),$$

where: to - is the moment of intake, and HT (t) is the power of the equivalent dose by the time t in the organ or tissue T.

When τ is not defined, it should be taken equal to 50 years for adults and 70 years for children;

54) D-value - activity threshold values for individual radionuclides, above which the determined effects are detected and a radioactive source is considered dangerous. Hazard categories are given in the Hygiene standards;

55) equivalent equilibrium volumetric activity (hereinafter - EEVA) of the daughter products of radon isotopes - 222Rn and 220Rn - the weighted sum of volumetric activities of short-lived daughter products of radon isotopes - 218Po (RaA); 214Pb (RaB); 214Bi (RaC); 212Pb (ThB); 212Bi (ThC), respectively:

$$(ЭРОА)_{Rn} = 0{,}10\, A_{RaA} + 0{,}52\, A_{RaB} + 0{,}38\, A_{RaC},$$

$$(ЭРОА)_{Tn} = 0{,}91\, A_{ThB} + 0.09\, A_{ThC},$$

where: ARa, ATn are the volumetric activities of daughter products of radon isotopes.

4. The receipt, storage of radiation sources and work with them is allowed if there is a positive sanitary and epidemiological conclusion drawn up in accordance with appendix 17 of the order of the Minister of National Economy of the Republic of Kazakhstan dated May 30, 2015 No. 415 "On approval of the forms of accounting and reporting documentation in the field of sanitary and epidemiological welfare of the population" (registered in the Register of state registration of regulatory legal acts under No. 11626) (hereinafter - the sanitary and epidemiological conclusion) in accordance with the instructions for filling out the sanitary and epidemiological conclusion, specified in appendix 2 of these Sanitary rules, and the license in the field of atomic energy use. The sanitary and epidemiological conclusion is issued by the territorial subdivisions of the department of the state body in the field of sanitary and epidemiological welfare of the population (hereinafter referred to as the territorial subdivisions) upon the applications of individual and legal entities.

Individual and legal entities receive a new sanitary and epidemiological conclusion when changing the conditions for handling the radiation sources at the workplace (type and characteristics of radiation sources or type and nature of work), including radiation monitoring (hereinafter referred to as the work with a radiation source) and when organizing temporary storage of radiation sources.

5. It is not required to obtain a sanitary-epidemiological conclusion and license in the field of the atomic energy use in the cases where:

1) the maximum energy of electrophysical devices generating ionizing radiation of not more than 5 keV and under any possible modes and operating conditions of which the equivalent dose rate at any accessible point at a distance of 0.1 meters from the external surface of the device does not exceed 1.0 mSv / h;

2) the activity of open and closed radionuclide radiation sources is below the MSA established in the Hygienic standards;

3) the dose rate at any point located at a distance of 0.1 meters from the surface of a closed radionuclide radiation source does not exceed 1.0 mSv / h above the background, and its reliable pressurization is ensured;

4) at the workplace, the specific activity of open radionuclide sources is less than the MSSA or the activity of an open radionuclide source of radiation is less than the MSA given

in appendix 26 to the Hygienic standards, while the sum of the ratios of the activity of individual radionuclides to their tabulated values is less than 1;

5) in the organization, the total activity of open radionuclide radiation sources does not exceed the MSA more than 10 times or the sum of the activity ratios of different radionuclides to their tabular values given in appendix 26 to the Hygienic standards does not exceed 1.

Chapter 2. Sanitary and epidemiological requirements for radiation safety

6. Radiation safety of personnel, the population and the environment is considered to be ensured if the basic principles of radiation safety (justification, optimization, regulation) and the requirements established by the Law of the Republic of Kazakhstan dated April 23, 1998 "On the radiation safety of the population", Hygiene standards and these Sanitary rules are observed.

The justification principle is applied when designing new radiation sources and radiation facilities, when issuing licenses, approving regulatory and technical documentation for the use of radiation sources, as well as when changing operating conditions. The practical implementation of the basic principles of radiation safety is carried out in accordance with the approaches set forth in appendix 3 to these Sanitary rules.

In a radiation accident, the justification principle applies not to radiation sources and exposure conditions, but to a protective measure.

As a measure of benefit, the dose prevented by this measure should be evaluated. Activities aimed at restoring control over radiation sources are carried out without fail.

The optimization principle is applied in the normal operation of radiation sources in accordance with appendix 3 to these Sanitary rules.

In a radiation accident, when the higher levels of intervention are used instead of the dose limits, the optimization principle applies to the protective measure, taking into account the preventable dose of radiation and the damage associated with the intervention.

The principle of standardization is ensured by all individual and legal entities, influencing the level of human exposure and provides for non-exceeding the individual dose limits of citizens, established by the Hygienic standards, from all radiation sources.

To control the effective and equivalent radiation doses regulated by the Hygienic standards, the acceptable levels of mono-factored exposure (for one radionuclide depending on the route of entry or one type of external exposure) are introduced, which are derived from the basic dose limits: dose rate, annual intake of radionuclides in the body and other indicators.

Derivative standards for irradiation from manmade radiation sources under both in normal and emergency conditions, with the exception of medical exposure to patients (hereinafter referred to as the manmade irradiation) are calculated for mono-factored exposure and each of

them depletes the entire dose limit, their use is based on the condition of non-exceeding the unit by the sum of the ratios of all monitored values to their permissible values.

To prevent the use of a dose limit established for the population for only one manmade radiation source or for a limited number, quotas are applied for the basic manmade radiation sources.

The justification of the quotas is contained in the projects of radiation facilities. Instructions for establishing quotas for irradiation of the population from individual manmade radiation sources are given in appendix 4 to these Sanitary rules.

7. Assessment of radiation safety at the facility and in each region is carried out on the basis of the:

1) characteristics of radioactive contamination of the environment;

2) analysis of the provision of measures for radiation safety and implementation of norms, rules and Hygienic standards in the field of radiation safety;

3) determining the probability of radiation accidents and their scale;

4) degree of preparedness for the effective elimination of radiation accidents and their consequences;

5) analysis of radiation doses for the personnel of groups “A” and “B” according to the results of regulated forms No. 1 DOZ, No. 2 DOZ, as well as those received by certain groups of the population from all radiation sources;

6) number of persons exposed to radiation above the established dose limits.

The assessment results specified in subparagraphs 1), 2), 3), 4), 5) and 6) of this paragraph are annually recorded in the form of a document characterizing the state of radiation safety at the facility and containing recommendations for its improvement (hereinafter - the radiation-hygienic passport of a radiation facility) and submitted to the territorial subdivision in accordance with the procedure for maintaining and using the radiation-hygienic passport of a radiation facility specified in appendix 5 to these Sanitary rules.

8. Analysis of the data provided in the radiation-hygienic passports of a radiation facility should be carried out by comparing them with the requirements of the Hygienic standards, these Sanitary rules and with data from previous years.

9. Radiation safety at and around the radiation facility is ensured by:

1) compliance with the requirements of regulatory legal acts in the preparation of design documentation for a radiation facility, including the justification of the selection of the area and site for placement of the radiation facility, the level of physical protection of radiation sources, zoning of the area around and inside the facilities of categories 1 and 2, established in accordance with paragraph 23 of these Sanitary rules;

2) creation of safe operating conditions for technological systems;

3) sanitary-epidemiological assessment of activities with radiation sources;

4) organization and conduct of radiation monitoring;

5) planning and implementation of measures to ensure radiation safety of personnel and the population during normal operation of the facility, its reconstruction and decommissioning, as well as in radiation accidents;

6) the advanced training and knowledge of the rules by the personnel of group “A” for working with radiation sources.

10. Radiation safety of personnel is ensured by:

1) the organization of radiation monitoring;

2) knowledge and observance of the rules for working with radiation sources;

3) the organization of accounting and control of radiation sources;

4) the use of personal protective equipment;

5) restrictions of access to work with radiation sources by age, gender, health status, level of previous exposure and other indicators;

6) the creation of working conditions that meet the requirements of Hygienic standards and these Sanitary rules;

7) the transfer of a pregnant woman to a work not related to radiation sources, from the day of receiving information about the fact of pregnancy, for the period of pregnancy and breastfeeding of the child;

8) the sufficiency of protective barriers, shields and the distance from radiation sources, as well as limiting the time of work with radiation sources;

9) compliance with control levels of radiation factors at a radiation facility;

10) the organization of an information system on radiation situation;

11) carrying out effective measures to protect personnel when planning increased exposure in the event of a threat and an accident.

11. Radiation safety of the population is ensured by:

1) the creation of conditions for the life of people in accordance with the requirements of these Sanitary rules;

2) the establishment of quotas for radiation from various radiation sources;

3) the organization of radiation monitoring;

4) the effectiveness of the planning and implementation of radiation protection measures under normal conditions and in the event of a radiation accident;

5) the organization of an information system on radiation situation.

12. When developing measures to reduce radiation doses to personnel and the population, the following main provisions are used:

1) maintaining of individual radiation doses and the number of exposed persons when using any radiation source at a low and achievable level, taking into account economic and social factors;

2) measures for the collective protection of people are carried out in relation to radiation sources, where it is possible to achieve the greatest reduction in the collective radiation dose at minimal cost;

3) reduction of doses from each radiation source is achieved by reducing the exposure of critical groups for this radiation source.

13. Radiation monitoring is part of production control and should cover all the main types of human exposure to ionizing radiation.

14. The purpose of radiation monitoring is to obtain information on individual and collective radiation doses to personnel, patients and the population in all conditions of human life, as well as information on all regulated values, characterizing the radiation situation.

15. The results of radiation monitoring are used to assess the radiation situation, establish control levels, develop measures to reduce radiation doses and evaluate their effectiveness.

16. The objects of radiation monitoring are:

1) the personnel of groups “A” and “B” when exposed to ionizing radiation in a production environment;

2) patients when medical radiological procedures are performed;

3) the population when exposed to natural and man-made sources of radiation;

4) the human environment.

17. The radiation monitoring program at a radiation facility where it is planned to handle radiation sources is being developed at the design stage. In the design of the radiation facility, the types, volume and procedure for control, a list of technical equipment and the staff of workers necessary for its implementation should be determined.

18. The administration of the radiation facility develops and approves the radiation monitoring program taking into account the features and conditions of the work performed.

The types and volume of radiation monitoring are specified depending on the specific radiation situation at the radiation facility and in the surrounding area.

19. Radiation monitoring of a radiation facility involves the monitoring and accounting of individual doses of exposure of workers (personnel).

20. Depending on the scope and nature of the work, radiation monitoring is carried out by the radiation safety service or by the person responsible for radiation monitoring who has undergone special training.

21. The administration of the radiation facility fulfills the following requirements:

1) obtaining a positive sanitary and epidemiological conclusion;

2) ensuring the development of control levels of radiation factors at the radiation facility and sanitary protection zone established for operational radiation monitoring, in order to consolidate the achieved level of radiation safety, to further reduce the levels of exposure of personnel and the population, to reduce radioactive contamination of the environment;

3) ensuring the development of radiation safety instructions when working with radiation sources, in accordance with the procedure for maintaining radiation safety instructions when working with radiation sources, specified in appendix 6 of these Sanitary rules;

4) determination of the list of persons related to the personnel of groups “A” and “B”;

5) creation of conditions for working with radiation sources that meet the requirements of these Sanitary rules;

6) planning and implementation of measures to ensure and improve radiation safety at a radiation facility;

7) ensuring systematic monitoring of the radiation situation at workplaces, in premises, on the territory of the organization, in the sanitary protection zone and in the surveillance zone, as well as over the release and discharge of radioactive substances;

8) ensuring control and accounting of individual radiation doses of personnel;

9) regular informing of personnel about the levels of ionizing radiation at their workplaces and about the amount of individual radiation doses received by them;

10) the conduct of preliminary (upon admission to work) and periodic mandatory medical examinations of personnel;

11) annual provision of the radiation-hygienic passport of the radiation facility on time.

22. The personnel of the radiation facility comply with the following requirements:

1) knowledge and compliance with the requirements for radiation safety established by these Sanitary rules, radiation safety instructions and job descriptions;

2) the use of personal dosimetric control equipment and personal protective equipment;

3) compliance with measures to protect personnel and the population from a radiation accident and its consequences;

4) immediate notification of the head of the workshop, section, laboratory and relevant officials and the person authorized to monitor radiation safety, about all detected malfunctions in the operation of units, devices and apparatuses that are sources of radiation;

5) implementation of the instructions of the radiation safety service (or the person responsible) regarding the provision of radiation safety during the performance of work;

6) at the end of the shift, leaving their workplaces, if further stay there is not caused by production needs.

Paragraph 1. Requirements for classification of radiation facilities by potential radiation hazard

23. The potential danger of a radiation facility is determined by its possible radiation exposure to the population and personnel in a radiation accident.

Potentially more dangerous are the radiation facilities, whose activities in case of accident may result in irradiation of not only the facility's employees, but also the population. The least hazardous radiation facilities are those where the possibility of exposure to non-personnel is excluded.

Four categories of facilities are identified for potential radiation hazard:

1) category I includes radiation objects in the event of an accident in which their radiation exposure to the population is possible and measures for its radiation protection will be required;

2) category II includes facilities whose radiation exposure in an accident is limited by the territory of the sanitary protection zone;

3) category III includes objects whose radiation exposure during an accident is limited by the territory of the object;

4) category IV includes objects whose radiation exposure during an accident is limited by rooms where work with radiation sources is carried out.

24. The category of radiation objects is established at the stage of their design. For existing radiation facilities, the categories are established by the administration of the radiation facility and agreed with the authorized body in the field of atomic energy use, except for the facilities where luggage and baggage screening equipment and medical devices and units that generate ionizing radiation are used. Criteria for determining the categories of potential radiation hazard of radiation facilities during design and operation are given in appendix 7 to these Sanitary rules.

Paragraph 2. Requirements for selection of land plot, design, construction and reconstruction of radiation facilities

25. When considering the possibility of placing a radiation facility, the category of the facility and its potential radiation and chemical hazard to the population and the environment are taken into account.

26. When considering the possibility of placing radiation objects of categories I and II on a land plot, meteorological, hydrological, geological and seismic factors are assessed during normal operation and during possible accidents.

27. Radiation facilities of categories I and II are located on land plots:

1) located in sparsely populated non-flooded territories;

2) having a stable wind regime;

3) restricting the possibility of the spread of radioactive substances outside the industrial site of the facility, due to its topographic and hydrogeological conditions.

28. Radiation facilities of category I and II are located taking into account the wind rose mainly from the leeward side in relation to the residential area, medical and preventive and children's organizations, as well as to recreation and sports facilities.

29. The master plan of a radiation facility is developed taking into account the development of production, a forecast of the radiation situation at and around the facility and the risk of radiation accidents.

30. It is not allowed to place an object carrying out work with radiation sources in a residential and public building, except for X-ray machines with digital image processing used in dental practice.

31. A sanitary protection zone is established around radiation facilities of categories I and II, and a surveillance zone is also established around radiation facilities of category I. The sanitary protection zone for radiation facilities of category III is limited by the territory of the facility, for radiation facilities of category IV the zoning is not provided.

32. The dimensions of the sanitary protection zone and the observation zone around the radiation facility are established taking into account the levels of external exposure, as well as the values and areas of the possible spread of radioactive emissions and discharges.

33. When located on the same site of the complex of radiation facilities, the sanitary protection zone and the surveillance zone are established taking into account the total impact of the facilities.

The inner border of the surveillance zone coincides with the outer border of the sanitary protection zone.

34. The radiation impact on the population living in the surveillance zone of a radiation facility of category I during its normal operation is limited by the size of the quota for that facility.

35. The dimensions of the sanitary protection zone (right-of-way) along the pipeline route for transporting radioactive substances and removal of liquid radioactive waste are established depending on the activity of the latter, the terrain, the nature of the soil, the depth of the pipeline, and the pressure level in it and must be at least 20 meters to each side of the pipeline .

36. The boundaries of the sanitary protection zone and the surveillance zone of a radiation facility are established at the design stage. The validity of the size of the sanitary protection zone is confirmed by calculations of dispersion of emissions into atmosphere for all pollutants and the spread of radiation factors, the sanitary protection zone of the facilities is developed sequentially: calculated (preliminary), performed on the basis of the project with calculations of dispersion of atmospheric air pollution and physical impact; established (final) - based on the results of the annual cycle of field studies and measurements to confirm the calculated parameters.

37. Permanent or temporary residence, placement of children’s organizations, hospitals, sanatoriums and other health-improving organizations, as well as industrial and utility facilities not related to this object, are not allowed in the sanitary-protective zone of radiation facilities. On the territory of the sanitary protection zone, improvement and landscaping is carried out in accordance with the design decision.

38. In the surveillance zone in the event of an accidental release of radioactive substances, the administration of a radiation facility carries out a set of protective measures in accordance with Hygienic standards and these Sanitary rules.

39. In the sanitary protection zone and the surveillance zone, the radiation safety service of the facility must conduct radiation monitoring.

40. The design documentation for radiation facilities contains a justification of safety measures during the design, construction, overhaul, reconstruction, operation, decommissioning, and also in case of an accident.

The design documentation of the radiation facility must undergo a sanitary and epidemiological examination in accordance with the Rules for sanitary and epidemiological examination approved by the order of the Minister of National Economy of the Republic of Kazakhstan dated February 27, 2015 No. 150 (registered in the Register of state registration of regulatory legal acts under No. 10970) (hereinafter – the Order No. 150).

41. In the design documentation of the radiation facility for each room (site, territory) the following is indicated:

1) when working with open sources of radiation: radionuclide, compound, state of aggregation, activity at the workplace, annual consumption, type and nature of the planned work, class of work;

2) when working with closed sources of radiation: radionuclide, its type, activity, permissible number of sources at the workplace and their total activity, the nature of the planned work;

3) when working with devices that generate ionizing radiation: type of device, type, energy and intensity of the generated radiation and (or) anode voltage, current strength, power , the maximum allowable number of simultaneously working devices located in one room (on a site, territory) ;

4) during the operation of a nuclear reactor, a radionuclide generator, with radioactive waste and other radiation sources with a complex radiation characteristic: the type of radiation source and its radiation characteristics (radionuclide composition, activity, energy and radiation intensity). For all works, their nature and restrictive conditions are indicated.

42. The design of protection against external exposure of personnel and the population is carried out taking into account the safety coefficient for an annual effective dose equal to two and the availability of other radiation sources and a prospective increase in their power.

43. The design of protection against external ionizing radiation is carried out taking into account the purpose of the premises, categories of exposed persons and the duration of exposure:

1) when calculating protection with a safety coefficient equal to two, the design power of the equivalent radiation dose (hereinafter - H) on the protection surface is determined by the formula:

$$H = 500 \times \frac{D}{t}, \text{ мкЗв/ч},$$

where: D – is the dose limit for personnel or the population, mSv per year;

t - is the duration of exposure, hours per year;

2) the equivalent dose rate used in the design of protection against external ionizing radiation is given in appendix 8 to these Sanitary rules;

3) for X-ray machines and accelerators, the calculation is carried out taking into account the radiation output and the working load of the device according to the methods approved in the established manner.

44. Calculation of permissible emissions and discharges of radiation facilities is based on the requirement that the effective dose for the population over 70 years of life, due to annual emissions and discharges, does not exceed the established value of the dose limit quota.

45. When designing radiation facilities and choosing technological schemes of work, the following is provided:

1) minimal exposure of personnel;

2) maximum automation and mechanization of operations;

3) automated and visual monitoring of the technological process;

4) the use of the least toxic and harmful substances;

5) minimum levels of noise, vibration and other harmful factors;

6) minimum emissions and discharges of radioactive substances;

7) minimum amount of radioactive waste with simple, reliable methods for their temporary storage and processing;

8) sound and (or) light signaling about violations of the technological process;

9) blocking.

46. Technological equipment for working with radioactive substances must meet the following requirements:

1) the structure is reliable and easy to use, has the necessary tightness, provides the ability to use remote control methods and to control the operation of the equipment;

2) is made of corrosion-resistant and radiation-resistant materials that can be decontaminated;

3) the external and internal surfaces of the equipment are made available for decontamination.

47. The project of a radiation facility provides for a set of measures to ensure radiation safety of personnel and the population during the repair work.

Paragraph 3. Requirements for organization of work with radiation sources

48. Work with radiation sources is allowed only in the premises and territories indicated in the sanitary-epidemiological conclusion.

Its purpose, class of work performed with open radiation sources and a sign of radiation hazard are indicated on the doors of each room.

49. Equipment, containers, packaging, apparatus, mobile units, vehicles containing radiation sources must have a radiation hazard sign.

50. It is allowed not to put a radiation hazard sign on equipment in a room where work with radiation sources is constantly carried out and which has a radiation hazard sign.

51. The security conditions for radiation sources are ensured by the administration of a legal entity or an individual.

52. For the planned removal of radiation sources, for work with it outside the agreed place of work, a positive sanitary and epidemiological conclusion allows its use in non-stationary conditions, at that it is necessary to notify (in writing) the territorial subdivisions that issued the sanitary and epidemiological conclusion, and territorial subdivisions at the place of the planned work.

53. At the time of starting work with radiation sources, an individual or legal entity approves the list of persons allowed to work with it, ensures their necessary training, appoints persons responsible for ensuring radiation safety, accounting and storage of radiation sources, for organizing collection, storage and delivery of radioactive waste, radiation monitoring.

54. Upon termination of work with radiation sources, individual and legal entities inform the territorial subdivisions about this within 15 calendar days.

55. Depending on the volume and nature of work with radiation sources, radiation facilities create a radiation safety service or appoint a person responsible for radiation safety (control). Regulations on the radiation safety service (job description of the person responsible for radiation safety (control)) are approved by the head of the radiation facility or a person authorized by him and determines the headcount, rights and obligations of the service (person responsible for radiation safety (control)).

The headcount of the service is set in such a way as to ensure radiation control during all radiation hazardous works.

56. The personnel of the radiation safety service and the person responsible for radiation safety (control) are appointed by the order of the head from among the employees who have passed special training in organizations licensed to carry out special training for the personnel responsible for ensuring nuclear and radiation safety.

57. Prior to the start of work with radiation sources, the administration of the radiation facility creates an organizational structure for the accounting and control of radiation sources to fulfill the requirements of paragraph 193 of the Technical Regulation “Nuclear and radiation safety”, approved by the order of the Minister of Energy of the Republic of Kazakhstan dated February 20, 2017 No. 58 (registered in the Register of state registration of regulatory legal acts under No. 15005).

58. The assignment of personnel by posts to one or another category of exposed persons is determined by the administration of the radiation facility, taking into account the achieved level of protection and radiation doses to personnel.

59. The requirements for personnel allowed for work of at least 2 people with radiation sources are determined by the nature of the production process, the type of equipment used and these Sanitary rules.

60. The following persons are allowed to work with radiation sources, not younger than 18 years of age, without medical contraindications, assigned by the order of the head of the radiation facility to the category of personnel of group "A", who passed training on radiation safety in organizations, licensed to carry out special training for personnel responsible for nuclear and radiation safety and were instructed on radiation safety. When changing the nature of work with radiation sources, an extraordinary training is carried out.

61. When working with radiation sources, operations that are not provided for by the operating and radiation safety instructions are not allowed if these actions are not aimed at taking urgent measures to prevent accidents and other circumstances that threaten the health of workers.

62. Protective technological equipment (chambers, boxes, fume hoods), as well as safes, containers for radioactive waste, vehicles, transport packaging, containers designed for storing and transporting radioactive substances, filters for dust and gas cleaning systems, personal protective equipment have documents from the manufacturer, indicating the technical operating conditions, are used before the expiration of the warranty period, if there is an act of technical service issued by the service organization.

63. The release of devices, apparatuses, units and other products, the operation of which is based on the use of ionizing radiation, radionuclide radiation sources, devices, apparatus and units, during which the ionizing radiation is generated, as well as reference radiation sources, is allowed only according to the design documentation that passed the sanitary - epidemiological examination in accordance with the Order No. 150.

Section 4. Requirements for supply, accounting, storage and transportation of radiation sources

64. The transfer of radiation sources and products with characteristics exceeding the values set forth in paragraph 5 of these Sanitary rules from one individual or legal entity to another individual or legal entity is made with the notification (in writing) of the territorial subdivision and authorized body in the field of atomic energy use within 15 calendar days at the location of both the transmitter and receiver of radiation sources of individual or legal entity.

When transferring radiation sources for temporary storage or use, an acceptance certificate is drawn up. Copies of passports (certificates and other supporting documents) to

the radiation sources are submitted to the person, responsible for accounting and storage, of the receiving organization.

65. Individual or legal entities ensure the safety of radiation sources and such conditions for the receipt, storage, use, deregistration of all radiation sources in which the possibility of their loss or uncontrolled use is excluded.

66. A person responsible for accounting and storage of radiation sources regulates their reception and submission in accordance with the established forms specified in appendixes 9 and 10 to these Sanitary rules.

67. All radiation sources received at a radiation facility are recorded in the issue and receipt register of ionizing radiation sources in accordance with appendix 10 to these Sanitary rules. Separate pages are filled out for each type of radiation source. The accounting of devices, apparatuses and units equipped with radionuclide radiation sources is carried out from the accounting of radioactive substances in a separate logbook. The logbook should be maintained regularly.

68. Radionuclide radiation sources are registered by the radionuclide, the name of the preparation, packaging and activity according to the supporting documents. Devices, apparatuses and units that use radionuclide radiation sources are taken into account by names and serial numbers indicating the activity and number of each radiation source included in the kit.

Generators of short-lived radionuclides are registered by their names and serial numbers indicating the nominal activity of the parent nuclide.

Devices that generate ionizing radiation are registered by names, serial number and year of manufacture.

Radionuclides obtained in the organization with the help of generators, accelerators, and nuclear reactors are registered by packing, preparations and activities in the issue and receipt register of radiation sources.

69. The administration of a radiation facility ensures the safety of supporting documents for radionuclide radiation sources throughout the entire life cycle. In case of loss of supporting documents, measures are taken to restore them. If it is impossible to restore the supporting documents, the operation of radionuclide radiation sources is not allowed.

70. Sources of radiation are issued from storage facilities by the responsible person with the written permission of the head of the radiation facility or a person authorized by him, in accordance with the requirements for the issuance of radioactive substances in the form in accordance with appendix 9 to these Sanitary rules.

In the event of dismissal (transfer) of persons admitted to work with radiation sources, the administration of the radiation facility accepts all the radiation sources assigned to them by the act.

71. The expenditure of radionuclides used in open form is documented by internal acts drawn up by contractors with the participation of persons responsible for accounting and

storage of radiation sources and radiation control. Acts on the expenditure and write-off of radionuclide sources of radiation from a radiation facility are approved by the administration of the radiation facility in the form in accordance with appendix 11 to these Sanitary rules.

72. Individual and legal entities must conduct an inventory of radiation sources within 15 calendar days from the receipt of radiation sources and then annually from December 1 to 30.

In case of detection of theft or loss of radiation sources, the territorial subdivision and the authorized body in the field of atomic energy use should be immediately informed (in writing).

73. Storage and transportation of radiation sources must be done according to the principle of homogeneity of substances and materials.

74. Sources of radiation that are not in work are stored in specially designated places or in equipped storages that ensure their safety and exclude access of unauthorized persons to them . The activity of radionuclides in the storage should not exceed the values indicated in the sanitary-epidemiological conclusion.

75. When creating temporary storages of radiation sources outside the territory of a radiation facility, including for gamma-ray radiographic apparatuses used in the field, the dose rate on the outer surface of such a storage or its enclosure, excluding access for unauthorized persons, should not exceed 1.0 μSv / h.

76. Specially equipped storage facilities are located at the level of the lower elevations of the building (non-flooded basement, ground floor).

77. Compliance of the finishing and equipment of the premises for storing open sources of radiation with the requirements for premises for work of the corresponding class, but not lower than class II, is ensured.

78. Devices for storing radionuclide radiation sources (niches, wells, safes) are designed so that when laying or removing individual radiation sources, personnel are not exposed to radiation from other radiation sources. The doors of the sections and packaging with radioactive substances (containers) should be easy to open and clearly marked with the name of the radionuclide and its activity. Glass containers containing radioactive liquids are placed in metal or plastic packaging.

A schematic map of the location of radiation sources in the storage facility, as well as at the locations of radioisotope devices and on the territory of the facility, is compiled by the person responsible for accounting and storage of radiation sources and approved by the head of the radiation facility.

Radionuclides, during storage of which it is possible to release radioactive gases, vapors or aerosols, are stored in closed vessels made of non-combustible materials, with the removal of the resulting gases in fume hoods, boxes, chambers, with treatment filters on ventilation systems. The storage is equipped with round-the-clock working exhaust ventilation.

When storing radioactive substances with high activity, a cooling system is provided. When storing fissile materials, radiation and nuclear safety measures are provided.

79. Radionuclide radiation sources unsuitable for further use (or with an expired service life) are timely written off and delivered for processing, long-term storage and (or) disposal.

Radionuclide radiation sources and radioisotope devices unsuitable for further use (or expired) may be stored at the facility for no more than 6 months.

80. The transportation of radionuclide sources of radiation indoors and on the territory of a radiation facility is carried out in containers and packages on special vehicles, taking into account the physical condition of the radiation sources, their activity, type of radiation, dimensions and weight of the package, subject to safety conditions.

81. Vehicles intended for the transportation of radiation sources are equipped with the signs of radiation hazard of the cargo, as well as signal colors in accordance with the Rules for transportation of radioactive substances and radioactive waste, approved by the orders of the Minister of Energy of the Republic of Kazakhstan dated February 22, 2016 No. 75 (registered in the Register of state registration of regulatory legal acts under No. 13586).

82. Vehicles are provided with radiation protection shielding devices, devices for attaching packages of carbon dioxide fire extinguishers, a set of tools for emergency repairs, sorbing materials and other means of eliminating the consequences of the accident, remote signs ("Emergency stop", "Radiation hazard" "No movement" with wheel blocks), personal protective equipment and special clothing, a first-aid kit, means of external and internal communication and warning, as well as equipment, instruments and devices for emergency work.

83. Sources of radiation may be transported on vehicles having a separate compartment (cabin) and cargo compartment. Finishing of the inner surface of the cargo compartment has a moisture-resistant and chemically resistant coating, with a device for draining a decontamination solution from it.

84. Transshipping of radiation sources carried out by carriers is permitted on a hard-surface site located no closer than 1000 meters from residential buildings, from entertainment, cultural and educational, preschool, medical and health-improving institutions. Transshipping of radioactive sources within the boundaries of settlements is not allowed.

Transshipping is carried out by persons assigned to the personnel of group “A”, unauthorized persons are not allowed to be on the site.

In order to avoid depressurization of the packaging of the radiation source, all transshipping processes are mechanized as much as possible and carried out directly from one vehicle to another.

Not less than three days before the transshipping the radiation source, the carrier informs (in writing) the territorial subdivision indicating the place of transshipping.

85. Permissible levels of radioactive contamination of the surface of vehicles are given in appendix 12 of these Sanitary rules.

Paragraph 5. Requirements for working conditions with closed radiation sources and devices that generate ionizing radiation

86. The operation of closed radiation sources and devices that generate ionizing radiation is carried out in accordance with the requirements of these Sanitary rules.

87. Five hazard categories for closed radiation sources are identified:

1) category I includes closed sources of radiation, the radiation exposure of which can be fatal when in contact with them for a period of time from several minutes to one hour (A / Doc> 1000);

2) category II includes closed sources of radiation, the radiation exposure of which can be fatal when in contact with them for a period of time from several hours to several days (1000 ≥ A / Doc> 10);

3) category III includes closed sources of radiation, the radiation exposure of which can be fatal, although it is unlikely, when in contact with them for a period of time from several days to several weeks (10 ≥ A / Doc> 1);

4) category IV includes closed sources of radiation, the radiation exposure of which can, although it is unlikely, cause temporary damage to health when in contact with them for many weeks (1 ≥ A / Doc> 0.01);

5) category V includes closed sources of radiation, the radiation exposure of which is not dangerous and cannot cause significant harm to health (0.01 ≥ A / Doc> MSA).

The boundaries of the hazard categories of closed radionuclide sources are determined by the introduction of the dimensionless normalized ratio A / Doc, where: A is the current activity of the closed radionuclide, Doc - is the threshold activity. The threshold activity values for determining the hazard category for closed sources are given in the Hygienic standards.

If several radionuclide sources with the same radionuclides are in the same radioisotope device (irradiation unit), their total activity is considered as the activity of one source. The category of this radionuclide source is determined by the ratio A / D – the value in accordance with Hygienic standards.

In cases where radionuclide sources with different radionuclides are in the same radioisotope device or a single irradiation unit, it is necessary to calculate the sum of the A / D ratios – the value in accordance with the formula:

total	$A/D_{oc} = \sum_n \frac{\sum_i A_{i,n}}{D_n},$

where: Ai,n - is the activity of the individual i- source of radionuclide n, Dn - is the value for the radionuclide n, shown in Table 2. The hazard category is determined by the total A / Doc ratio in accordance with Hygienic standards.

88. The use of closed radiation sources is not allowed in case of break of airtightness, as well as after the expiration of the specified period of operation without a document on the extension of its service life.

89. When inoperative, the closed radiation sources are in protective devices, and the units that generate ionizing radiation must be de-energized. A protective device in which a closed source of radiation is placed must be resistant to mechanical, chemical, temperature and other impacts and have a sign of radiation hazard.

90. To remove the closed source of radiation from the container, the remote tools or special devices are used. When working with a radiation source of category IV removed from a protective container, the protective shields and manipulators are used, and when working with a radiation source of category I-III or creating a dose rate of more than 2 mSv / h at a distance of one meter - special protective devices (boxes, cabinets and others) with remote control are used.

91. The power of the equivalent dose of radiation from portable, mobile, stationary radiographic, therapeutic devices and other units, the operation of which is based on the use of radionuclide radiation sources, should not exceed 20 mSv / h at a distance of one meter from the surface of the protective unit with the radiation source.

For radioisotope devices intended for use in a production environment, the equivalent dose rate at the surface of a unit with a radiation source should not exceed 100 mSv / h, and at a distance of one meter - 3 mSv / h.

The power of the equivalent dose of radiation from devices, during operation of which there is a concomitant unused x-ray radiation, should not exceed 1.0 mSv / h at a distance of 0.1 meters from any surface.

92. When using units (devices), the radiation dose rate from which in the working position and during storage of radiation sources does not exceed 1.0 mSv / h at a distance of one meter from accessible parts of the unit’s surface, special requirements are not imposed on the premises.

93. The working part of stationary apparatuses and units with a beam of radiation unlimited in direction is located in a separate room (mainly in a separate building or a separate wing of the building); the material and thickness of the walls, floor, and ceiling of this room at any positions of the radiation source and beam direction ensure attenuation of the primary and scattered radiation in adjacent rooms and on the territory of the radiation facility to acceptable values.

The control panel of such an apparatus (unit) is located in a separate room from the radiation source. The entrance door to the room where the apparatus is located is blocked with

a mechanism for moving the radiation source or with the turn-on of high (accelerating) voltage so as to exclude the possibility of accidental exposure of personnel.

94. The premises where work is carried out on stationary units with closed radiation sources are equipped with interlocking and signaling systems about the position of the source (source block) and provide a device for the forced remote movement of the radiation source to the storage position in the event of a power outage in the unit or in case of any other emergency situation.

95. For underwater storage of closed radiation sources, the systems are provided to automatically maintain the water level in the pool, to signal about a change in the water level and about the increase of the dose rate in the working room.

96. When working with closed radiation sources, special requirements for the finishing of premises are not imposed. The premises in which recharging and repair of radiation units are carried out are equipped in accordance with the requirements for work with open radiation sources of class III.

97. When using powerful radiation units and storing the closed radiation sources in quantities that lead to the accumulation of excess concentrations of toxic substances in the air of working rooms, the inflow exhaust ventilation is provided to ensure that the permissible concentration of toxic substances in the air of the working zone is not exceeded.

98. When using devices with closed radiation sources and devices that generate ionizing radiation, outdoors or in common production facilities, access for unauthorized persons to radiation sources must be excluded and their safety must be ensured.

In order to ensure radiation safety of personnel and the population, one should:

1) direct the ionizing radiation towards the earth or to places where there are no people;

2) remove radiation sources from maintenance personnel and other persons as far as possible;

3) limit the time of people’s stay near radiation sources;

4) hang out a radiation hazard sign and warning posters that should be clearly visible from a distance of at least 3 m.

99. Before starting work with radiation sources, personnel conduct a functional check of the equipment. In case of malfunctions, it is necessary to suspend work, inform the administration of the radiation facility and call the representative of the organization engaged in maintenance and repair of equipment.

Paragraph 6. Requirements for working conditions with open radiation sources (radioactive substances)

100. Radionuclides as potential sources of internal exposure are divided according to the degree of radiation hazard into four groups depending on the MSA:

1) group A - radionuclides with MSA 103 Bq;

2) group B - radionuclides with MSA 104 and 105 Bq;

3) group C - radionuclides with MSA 106 and 107 Bq;

4) group D - radionuclides with MSA 108 Bq or more.

The affiliation of the radionuclide to the radiation hazard group is established in accordance with its MSA given in the Hygienic standards. Short-lived radionuclides with a half-life of less than 24 hours not listed in this appendix belong to group D.

101. All works with the use of open radiation sources are divided into three classes. The class of work with open radiation sources is established in accordance with appendix 13 to these Sanitary rules, depending on the radiation hazard group of the radionuclide and its activity at the workplace, provided that the specific activity of the radionuclide exceeds its MSA. In simple operations with liquids (without evaporation, distillation, bubbling, etc.), an increase in the activity of radionuclides at the workplace by 10 times is allowed. In simple operations for the production (elution) and packaging of generators of short-lived medical radionuclides, an increase of the activity of radionuclides at the workplace by 20 times is allowed. The class of work is determined by the maximum simultaneously washed out (eluted) activity of the daughter radionuclide.

For enterprises processing uranium and its compounds, the class of work is determined depending on the nature of production and is regulated by special rules. When storing open radiation sources, an increase in the activity of radionuclides by 100 times is allowed.

102. If at the workplace there are radionuclides of different groups of radiation hazard, their activity is reduced to group A of radiation hazard according to the formula:

$$C_э = C_A + МЗА_A \sum \left(\frac{C_i}{МЗА_i} \right),$$

where: Cэ is the total activity reduced to the activity of group A, Bq;

CA - total activity of radionuclides of group A, Bq;

MSAA - the minimum significant activity for group A, Bq;

Ci - activity of individual radionuclides not belonging to group A;

MSAi - the minimum significant activity of individual radionuclides given in the Hygienic standards.

103. The class of work defines the requirements for the placement and equipment of the premises in which work with open sources of radiation is carried out.

104. When working with open radiation sources, protection of personnel from internal and external radiation, limitation of air pollution and surfaces of working rooms, skin and clothing of personnel, as well as environmental objects (air, soil, vegetation) are ensured both during normal operation, and in carrying out work to eliminate the consequences of a radiation accident.

105. The restriction of the entry of radionuclides into workrooms and the environment is ensured by the use of a system of static (equipment, walls and floors of rooms) and dynamic (ventilation and gas cleaning) barriers.

106. At the radiation facilities where work with open sources of radiation is carried out, the premises for each class of work are concentrated in one place. In those cases when work is underway on radiation facilities in all three classes, the rooms are divided in accordance with the class of work carried out in them.

107. Work with open radiation sources with activity below the MSA is allowed to be carried out in industrial premises, to which additional requirements for radiation safety are not imposed.

108. Works of class III are carried out in separate rooms that meet the requirements for chemical laboratories. The structure of these rooms provides for the inflow exhaust ventilation and shower. Work associated with the possibility of radioactive air pollution (operations with powders, evaporation of solutions, work with emanating and volatile substances) should be carried out in fume hoods. The surfaces of the premises should be smooth, without damage and allow wet cleaning and decontamination.
109. Works of class II are carried out in rooms located in a separate part of the building in isolation from other rooms. When carrying out works of the II and III classes connected with a single technology in one organization, it is allowed to allocate a common block of premises equipped in accordance with the requirements for works of class II.

When planning, rooms for permanent and temporary stay of staff are allocated.

As part of these premises, a sanitary checkpoint or sanitary lock is provided. Class II workrooms are equipped with fume hoods or boxes.

110. Works of class I are carried out in a separate building or in an isolated part of the building with a separate entrance through a sanitary checkpoint. Workrooms are equipped with boxes, cameras, canyons or other pressurized equipment. The premises are divided into three zones:

1) the first zone - unmanned premises, where technological equipment and communications are located, which are the main sources of radiation and radioactive contamination. Stay of personnel in unmanned premises with operating technological equipment is not allowed;

2) the second zone - periodically serviced premises intended for equipment repair and other works related to opening of technological equipment, placing of stations for loading and unloading of radioactive materials, temporary storage of raw materials, finished products and radioactive waste;

3) the third zone - premises for the permanent stay of personnel throughout the entire shift (operator rooms, control panels).

To prevent the spread of radioactive contamination between zones, sanitary locks are equipped.

During works of class I, depending on the purpose of the radiation facility and the effectiveness of the barriers used, a two-zone layout of the working rooms is allowed, which includes the following areas: unmanned rooms and premises for permanent stay of personnel.

111. In the premises for works of I and II classes, the management of common heating, gas supply, compressed air, water supply systems and group electrical panels is conducted in the working rooms.

112. Automation and remote control systems, shielding of radiation sources and reduction of the time of work operations are used to reduce external exposure levels of personnel from open radiation sources.

113. At radiation facilities where all kinds of radioactive substances are handled at the workplace, including radiation monitoring (hereinafter referred to as radioactive substances), a set of measures to decontaminate production facilities and equipment is provided.

114. The floors and walls of rooms for work of the II class and the 3rd zone of the I class, as well as the ceilings in the 1st and 2nd zones of the I class, are coated with smooth slightly sorbing material resistant to detergents. Rooms belonging to different zones and classes are painted in different colors.

115. Doors, windows, equipment and work furniture should be made of materials and have a structure to ensure the effective removal of radioactive contaminants. The edges of the floor coverings are raised and built in close flush with the walls. If there are ramps, the floor should have slopes.

116. For works of classes I and II, the area of the premises per worker should be at least 10 square meters.

117. Equipment and work furniture have a smooth surface, simple construction and weakly sorbing coatings that facilitate the removal of radioactive contaminants.

118. Equipment, tools and furniture are assigned to the premises of each class (zones) and are accordingly marked. Their transfer from the premises of one class (zone) to others is not allowed.

119. Production operations with radioactive substances in chambers and boxes are carried out by remote means or using gloves hermetically mounted in the front wall. Loading and unloading of processed products, equipment, replacement of chamber gloves, manipulators is carried out without depressurization of chambers or boxes.

120. The amount of radioactive substances in the workplace is kept to the minimum necessary for work. If it is possible to select radioactive substances, substances of a smaller group of radiation hazard, solutions, rather than powders, solutions with the lowest specific activity are used.

The number of operations in which radioactive contamination of premises and the environment is possible (pouring powders, sublimation) should be minimized. In manual operations with radioactive solutions, the automatic pipettes or pipettes with syringes are used

.

121. The organization of work with open sources is aimed at minimizing the radioactive waste generated during technological processes (operations).

122. To limit the contamination of work surfaces, equipment and premises, when working with radioactive substances in the laboratory, the trays and pallets made of weakly sorbing materials, plastic films, filter paper and other disposable materials are used.

123. When working with open radiation sources, ventilation and air-cleaning devices provide protection against radioactive contamination of the air of working rooms and atmospheric air. Workrooms, fume hoods, boxes, canyons and other technological equipment are arranged so that the air flow is directed from less polluted spaces to more polluted ones.

124. The design of ventilation and air conditioning in industrial buildings and structures of a radiation facility, as well as emissions of ventilation air into the atmosphere and its purification before discharge, is carried out in accordance with the requirements of these Sanitary rules. For radiation facilities whose emissions of radioactive substances into the atmosphere create a dose in a critical group of the population of more than 10 mSv / year, the maximum allowable emissions are established on the basis of the sanitary and epidemiological conclusion.

125. Contaminated air removed from shelters, as well as from boxes, chambers, cabinets and other equipment, is cleaned before being emitted into the atmosphere. It is not allowed to dilute this air before cleaning it.

At radiation facilities where works of classes I and II are being carried out, the exhaust pipes are provided whose height ensures a decrease in the volumetric activity of radioactive substances in the atmospheric air at the site of the torch landing to values that ensure the non-exceeding of the established dose limit quota for the population.

126. It is allowed to remove air into the environment without purification, if its total emission per year does not exceed the allowable emission value established for the radiation facility. Moreover, the levels of external and internal exposure of the population should not exceed the established quotas.

127. In buildings where only part of the total area is allocated for work with open radiation sources, separate ventilation systems must be provided.

128. When using an air recirculation system, radioactive and toxic substances are cleared and rooms for works of classes I and II are aerated.

129. In airtight chambers and boxes with closed openings, an exhaustion of at least 20 millimeters (hereinafter - mm) of the water column is provided, chambers and boxes are equipped with devices for controlling the degree of exhaustion. The estimated air velocity in the working openings of fume hoods and shelters is assumed to be 1.5 meters per second (hereinafter - m / s).

A short-term decrease in exhaustion to 10 mm of water column and a decrease in air velocity in openings up to 0.5 m / s are allowed.

130. Ventilators, serving fume hoods, boxes and chambers, are located in special separate rooms. In rooms for work of class I, an exhaust chamber is part of the premises of the second zone; ventilation systems serving premises for work of class I must have backup units with a capacity of at least 1/3 of the full design.

Motor starters have a light alarm; they are placed in rooms of the 3rd zone.

131. For work with emanating and volatile radioactive substances, a permanent exhaust ventilation system for storage facilities, workrooms and boxes is provided. The system is equipped with a backup exhaust unit with a capacity of at least 1/3 of the full design.

132. The main requirements for the selection and arrangement of systems and units for dust and gas cleaning when working with radioactive substances of classes I and II are:

1) the minimum number of units of dust and gas cleaning equipment;

2) mechanization and automation of the processes of maintenance, repair and replacement of dust and gas cleaning equipment, if necessary, remote performance of these works;

3) the presence of monitoring systems and alarms for the effectiveness of the treatment apparatus and filters; in case of a multi-stage dust and gas cleaning system, an automated monitoring and alarm are provided, both for the operation of the entire system and its individual parts (steps);

4) reliable isolation of dust and gas cleaning equipment as a radiation source, ensuring the safety of personnel during maintenance.

133. Filters and devices are installed directly at the boxes, chambers, cabinets, shelters in order to minimize pollution of the main air drawoff systems.

134. When placing dust and gas cleaning equipment in separate rooms (parts of buildings, separate buildings), they are subject to the same requirements as the main production facilities . In the case of placing dust and gas cleaning equipment in the roof space, it is equipped as a technical floor.

135. The premises of dust and gas cleaning equipment must be isolated and not communicated by air with the main production facilities and areas. Entrance and exit to the premises of dust and gas cleaning equipment is carried out through a sanitary gateway.

136. The complex of premises for dust and gas cleaning equipment provides for isolated rooms or pressurized ventilated areas for repair, disassembly, temporary storage of filters, apparatus and their elements, as well as for storage of cleaning and decontamination facilities.

137. With the centralized placement of dust and gas cleaning equipment in areas for works of class I, the zoning principle is used as the basis for planning the dust and gas cleaning complex.

138. In rooms for works of class I and individual works of class II in the zone placement of equipment, it is necessary to provide air supply to individual hose insulating personal protective equipment (pneumosuits, air helmets, hose gas masks), as well as the possibility of connecting mobile exhaust units to exhaust ventilation systems.

To supply air to the hose protection means, it is allowed to install a separate pneumatic line or separate ventilators that provide the necessary pressure and air flow. Hose connections are supplied with ball or spring automatic valves.

139. Heating of premises for work with the use of open radiation sources is provided by water or electricity.

140. Radiation facilities where work is carried out with open sources of radiation of all classes should have cold and hot water supply and sewage. An exception is allowed for field laboratories conducting works of class III and located outside settlements or in settlements that do not have central water supply.

141. In rooms for works of classes I and II, taps for water supplied to the sinks must have mixers and open with a pedal, elbow or non-contact device. Flushing the toilet is carried out by pedal flushing.

Electric hand dryers are provided.

142. The special sewage system provides for the decontamination of wastewater and the possibility of their reuse for technological purposes. Wastewater treatment plants are located in a special room or on an enclosed area of the organization. The sewage system is equipped with the means of monitoring the quantity and activity of wastewater. Receivers for draining radioactive solutions (sinks, drains) in a special sewage system are made of corrosion-resistant materials or have easily deactivated corrosion-resistant coatings of internal and external surfaces. The design of the receivers eliminates the possibility of spraying solutions.

143. Laying of air ducts, water pipes, sewers and other communications in walls and ceilings should not lead to weakening of protection against ionizing radiation.

Paragraph 7. Requirements for decommissioning or extension of life of radiation facilities and radiation sources

144. The decision to extend the life or decommissioning of a radiation facility, as well as the selection of its option, is taken after a comprehensive examination of the radiation and technical condition of technological systems and equipment, building structures and the surrounding area.

145. At the radiation facilities of category I no later than five years before the appointed term for termination of operation, a detailed project is being developed for decommissioning the entire facility or a separate part thereof. For facilities of category II, a decommissioning project is developed no later than three years before the end of the operational life, and for facilities of category III - one year.

146. The project for decommissioning a radiation facility includes measures to ensure safety at various stages of its decommissioning: shutdown, conservation, dismantling, re-profiling, liquidation or disposal, as well as during repair works.

147. The project for decommissioning a radiation facility should contain:

1) preparation of the necessary equipment for dismantling;

2) methods and means of decontamination of dismantled equipment;

3) the procedure for the disposal of radioactive waste;

4) a list and description of radiation protection measures that will be used during the decommissioning of the facility;

5) rehabilitation of the released areas and territories.

148. In the project of decommissioning a radiation facility, the expected individual and collective radiation doses to personnel and the population should be assessed.

149. Works on the decommissioning of radiation facilities is carried out by specially trained personnel of the radiation facility or personnel of other organizations holding an appropriate license in the field of atomic energy use. When necessary, the training of personnel is carried out on mock-ups and simulators with imitation of the basic operations of the upcoming work.

150. The issue of a possible extension of the operation life of radiation sources is considered if the extension of the operation life is not prohibited by the technical documentation for the radiation source, and should be decided by a commission composed of representatives of the individual or legal entity using the radiation source, and, if necessary, representatives of the manufacturer.

The decision to extend the operation life or decommissioning of a closed radiation source is made in accordance with the results of a technical survey of a closed radiation source. Technical inspection is carried out by a specialized organization licensed in the field of atomic energy use for the manufacture of radioactive substances, devices and units, containing radioactive substances. The conclusion of the commission determines the possibility, conditions and term for further use of the radiation source.

151. After the decommissioning of devices generating radiation sources, they must be brought into a state that excludes the possibility of using them as radiation sources.

After the decommissioning of radionuclide radiation sources, they should be transferred to specialized organizations for long-term storage and (or) disposal.

Paragraph 8. Requirements for sanitary checkpoints and sanitary locks

152. A sanitary checkpoint is located in a building where work with open radiation sources is carried out or in a separate part of the building connected to the production building (laboratory) by a closed gallery.

The sanitary checkpoint includes: showers, a dressing room for home clothes, a dressing room for special clothing, rooms for storing personal protective equipment, a radiometric control point for skin and clothing, a store room for dirty clothing, a store room for clean special clothing, and toilet rooms.

In the sanitary checkpoint a drinking regime must be provided.

Sanitary checkpoint is a complex of premises and equipment intended for changing clothes, shoes, personnel sanitizing, monitoring radioactive contamination of the skin, personal protective equipment, special and personal clothing of personnel.

153. The layout of the sanitary checkpoint should exclude the possibility of crossing the flows of personnel in personal and special clothing. The possibility of passage from the premises of the free access zone to the premises of the controlled access zone, bypassing the sanitary checkpoint, should be excluded.

154. The fixed sanitary locks are located between the second and third zones of the workrooms. Depending on the volume and nature of the work carried out in sanitary locks, the following are provided:

1) places for changing clothes, storage and preliminary decontamination of additional personal protective equipment;

2) washbasins;

3) radiation monitoring point.

In addition to the fixed sanitary locks, it is allowed to use portable sanitary locks installed directly at the entrance to the room where repairs are carried out.

Sanitary lock is a room between the zones of a radiation facility, designed for preliminary decontamination and change of additional personal protective equipment.

155. The floor, walls and ceiling of the sanitary facilities, as well as the surfaces of the cabinets, have moisture resistant coatings that weakly absorb radioactive substances and allow easy cleaning and decontamination.

156. The number of places for storing home and work clothes in the dressing room corresponds to the maximum number of people permanently and temporarily working in a shift.

157. Placement of a store room for dirty special clothes provides for a closed transportation of clothes that are sent to the laundry, with access to the street, bypassing clean rooms. The store room is located near radiometric control points and a dressing room of contaminated special clothing.

Sorting of special clothing should be made according to its type and degree of radioactive contamination. The contaminated special clothes from the dressing room are transferred to the store room in a packaged form for subsequent delivery to specialized laundries.

158. Rooms for the storage and distribution of personal protective equipment (aprons, glasses, respirators, extra shoes) are located in a clean area, between the dressing room of clean special clothes and work rooms.

Storage of cleaning equipment intended for cleaning the “clean” and “dirty” zones of sanitary checkpoints should be carried out separately in special rooms (store rooms) or in special cabinets.

159. A radiometric skin monitoring station is located between the shower room and dressing room of home clothes.

Paragraph 9. Requirements for handling of materials and products contaminated or containing radionuclides

160. Materials and products with low levels of radionuclide content may be used in work. The criterion for decision making on the possible use of raw materials, materials, items and products containing radionuclides is the expected individual annual effective dose of radiation , which should not exceed 10 mSv for the intended use, the annual collective effective dose should not exceed 1 man-Sv.

161. It is not allowed to use materials, items and products (metal, wood and others) that have unfixed (removable) radioactive contamination of the surface.

162. No restrictions are imposed on the use of any materials, raw materials, items and products (except food raw materials, food products, drinking water and animal feed) with a specific activity of manmade radionuclides in them less than the values given in the Hygienic standards, except for their use, leading to the concentration of radionuclides to the levels requiring special handling.

163. Raw materials, materials, items, and products with a specific activity of manmade radionuclides from the values given in the Hygienic standards to the values of MSSA are used to a limited extent (if there are several manmade radionuclides, the sum of the ratios of the specific activities of all manmade radionuclides contained in the material to the values of MSSA for them should be less than one) and subject to the requirements of paragraph 160 of these Sanitary rules. In the future, products made of these raw materials, materials or items are subject to radiation monitoring.

164. When using building materials and fertilizers containing radioactive substances of natural origin, compliance with the requirements of Hygienic standards is ensured.

165. Materials, items and products intended for further use contaminated with radioactive substances above the levels specified in paragraph 160 of these Sanitary rules are subject to decontamination to the levels specified in the Hygiene standards. Decontamination should be carried out in the cases where the level of contamination in raw materials, materials, items and products can be reduced to acceptable levels that ensure their further use.

166. A document on the content of radionuclides and the absence of removable radioactive contamination in raw materials, materials, items and products intended for removal from a radiation facility is issued by the radiation safety service (or person in charge) of that facility.

167. The contaminated metal raw material intended for shipment to processing facilities after its decontamination is subject to preliminary re-melting or other processing at radiation

facilities, which excludes the formation of secondary radioactive waste in any options of further use of the remelted metal.

168. The decontamination, re-melting or other processing of materials containing radionuclides is permitted if there is a positive sanitary and epidemiological conclusion on the facility. The technology for processing of raw material and its further use is developed and approved by the head of this facility.

169. Numerical values of the permissible specific activity of the main long-lived radionuclides for unlimited use of metals after preliminary remelting or other processing and products based on these metals are given in appendix 14 to these Sanitary rules. If there is a mixture of radionuclides in the metal, the values of specific activities of individual radionuclides Qi must meet the ratio:

$$\sum \frac{Q_i}{ДУА_i} < 1,$$

where:

Q_i

is the specific activity of the radionuclide i in the metal; PSAi – permissible specific activity of the radionuclide i.

170. In case of impossibility or inappropriateness of using raw materials, materials, items and products assigned to the category of limited use, in accordance with these Sanitary rules, they are sent to specially designated areas in places of disposal of industrial waste. The presence of removable radioactive contamination on these wastes is not allowed. The procedure, conditions and methods for the disposal of such raw materials, materials, items and products are determined by organizations responsible for these objects or specialized organizations.

171. In case of impossibility or inappropriateness of further use of materials, items and raw materials containing radionuclides with a specific activity greater than the MSSA, they must be treated as radioactive waste.

Paragraph 10. Requirements for handling the radioactive waste

172. The criteria for classifying wastes as radioactive, their categorization, as well as requirements for handling the radioactive waste are established in accordance with the Sanitary rules “Sanitary and epidemiological requirements for radiation hazardous facilities”, approved by the orders of the Acting Minister of National Economy of the Republic of Kazakhstan dated March 27, 2015 No. 260 (registered in the Register of state registration of regulatory legal acts under No. 11204) (hereinafter – the Order No. 260).

173. Radioactive waste in accordance with the state of aggregation is divided into liquid and solid. The liquid and solid radioactive waste management system includes its collection, decontamination, processing, storage and (or) disposal, as well as transportation of radioactive waste.

174. The transfer of radioactive waste from the facility for processing, long-term storage and (or) disposal in a specialized organization should be carried out in special packaging (containers).

The levels of radioactive contamination on the surfaces of the package (container) must not exceed the values given in appendix 12 of these Sanitary rules.

175. The transportation of radioactive waste should be carried out by specialized organizations in specially equipped vehicles.

176. Selection of radioactive waste disposal sites should be based on hydrogeological, geomorphological, tectonic and seismic conditions. At that, radiation safety of the population and the environment should be ensured over the entire period of waste isolation, taking into account the long-term forecast.

177. Individual or legal entities, whose activity includes radioactive waste management, for planning and implementing measures to ensure radiation safety, must have a radioactive waste management scheme, which is approved by the head of this facility.

The following basic issues should be reflected in radioactive waste management schemes:

1) the organization of collection of liquid and solid wastes directly in the places of their f o r m a t i o n ;

2) waste accounting and requirements for their temporary storage;

3) waste transportation routes inside the facility;

4) decontamination of containers belonging to organization, used for the temporary storage of radioactive waste;

5) the storage and disposal of radioactive waste containing short-lived radionuclides;

6) the exact storage location, equivalent dose rate and residual activity of spent sources, as well as the date (beginning and end) of the preparation of the waste for transfer to disposal is indicated;

7) organization of radiation control when working with radioactive waste;

8) organization of work in the event of an accident or incident;

9) conditions and terms for temporary storage of very short-lived radioactive waste;

10) volumes, terms and conditions of temporary storage of radioactive waste.

178. The effective dose of exposure of the population due to radioactive waste at all stages of its handling should not exceed 10 μSv / year.

179. The responsible person conducts systematic control and accounting of the collection, temporary storage and preparation for disposal of radioactive waste generated during the work. The specified information is entered in the register log of solid and liquid radioactive waste in the form 1 and 2 specified in appendix 40 of the Order No. 260.

180. At least once a year, a commission appointed by the administration of a radiation facility verifies the correctness of keeping records of the amount of radioactive waste that has been transferred to a specialized organization for disposal and also located at a radiation facility.

After issuing passports for a batch of radioactive waste, in accordance with the form specified in appendix 38 of the Order No. 260 delivered for disposal (storage), the individual or legal entities submit a copy of passports to territorial subdivisions within 15 calendar days.

Paragraph 11. Requirements for radiation control when working with manmade radiation sources

181. Radiation monitoring when working with manmade radiation sources should be carried out for all the main radiation indicators that determine the exposure levels of personnel and the population. At each radiation facility, the radiation monitoring system provides a specific list of types of control, types of radiometric and dosimetric equipment, measurement points and frequency of control.

Radiation monitoring should include individual dosimetric monitoring of personnel and radiation situation monitoring.

The contribution of natural radiation sources to personnel exposure under production conditions is monitored and taken into account when assessing doses in cases when it exceeds 1 mSv per year.

182. Individual dosimetric monitoring is carried out in order to determine annual doses of personnel and is mandatory for the personnel of group “A”. Individual dosimetric monitoring of personnel exposure, depending on the nature of the work, includes:

1) radiometric monitoring of contamination of the skin and personal protective equipment ;

2) control of the nature, dynamics and levels of the intake of radioactive substances into the body using direct and (or) indirect radiometry methods;

3) control of doses of external beta, gamma and X-rays, as well as neutrons with the use of individual dosimeters or by calculation. Based on the results of radiation monitoring, the effective dose values for personnel are calculated, and if necessary, the values and equivalent doses of exposure of individual organs are determined.

183. Monitoring of the radiation situation, depending on the nature of the work carried out , includes:

1) measurement of the dose rate of x-ray, gamma and neutron radiation, the density of the fluxes of particles of ionizing radiation at workplaces, in adjacent rooms, on the territory of radiation facilities, in the sanitary protection zone and the observation zone;

2) measurement of levels of radioactive contamination of work surfaces, equipment, vehicles, personal protective equipment, skin and clothing of personnel;

3) determination of the volumetric activity of gases and aerosols in the air of working rooms;

4) measurement or assessment of the activity of releases and discharges of radioactive substances;

5) determination of the levels of radioactive contamination of environmental objects in the sanitary protection zone and the observation zone.

184. The radiation monitoring system of facilities of category I and II should use the following technical means:

1) continuous monitoring based on stationary automated technical means;

2) operational control based on wearable and mobile technical means;

3) laboratory analysis based on stationary laboratory equipment, sampling and preparation of samples for analysis.

Automated systems provide control, registration, display, collection, processing, storage and delivery of information.

185. In rooms where fissionable materials are being handled in quantities in which a spontaneous fission chain reaction may occur, as well as in nuclear reactors and critical assemblies and in other works of class I, where the radiation situation may change significantly during the work, the radiation monitoring devices with sound and light signaling devices are installed, and personnel are provided with emergency dosimeters.

186. The results of the individual control of radiation doses to personnel are stored for 50 years. During individual control, the annual effective and equivalent doses, the effective dose for five consecutive years, as well as the total accumulated dose for the entire period of professional work are kept. The data on individual doses to personnel are compiled in the form No. 1-DOZ “Information on the doses of exposure of persons from among the personnel during normal operation of manmade sources of ionizing radiation” and form No. 2-DOZ “ Information on the doses of exposure of persons from among the personnel during a radiation accident or planned increased exposure, as well as persons from among the population exposed to emergency exposure,” and are submitted to the territorial subdivisions in accordance with the procedure for maintaining and filling out the form No. 1-DOZ and the form No. 2-DOZ specified in the appendixes 15 to these Sanitary rules.

187. An account card for individual doses of external exposure to persons working with radiation sources (hereinafter referred to as an individual personnel card) must be established by the employer for all personnel under individual dosimetric control. The form of an individual personnel card is given in appendix 16 to these Sanitary rules.

An individual dose of radiation is recorded in the logbook with the subsequent entry in an individual personnel card, as well as in a machine medium for creating a database on radiation facilities.

A copy of the employee’s individual card in the event of his transfer to another organization where work with radiation sources is carried out is transferred to a new place of

work; in the event of termination of employment - it is handed over to the employee; the original is stored at the previous place of work.

188. Persons seconded to work with radiation sources are issued a completed copy of an individual card on the radiation doses received. Exposure data of the seconded persons are included in their individual cards.

189. At radiation facilities carrying out work with manmade radiation sources, the administration sets control levels.

The list and numerical values of control levels are determined in accordance with the working conditions.

190. When establishing control levels, one should proceed from the optimization principle , taking into account:

1) non-uniformity of radiation exposure over time;

2) the advisability of maintaining the already achieved level of radiation exposure at this facility below acceptable;

3) the effectiveness of measures to improve the radiation situation.

When changing the nature of the work, the list and numerical values of control levels are subject to adjustment. When establishing control levels of volumetric and specific activity of radionuclides in atmospheric air and in the water of reservoirs, one should take into account their possible supply through food chains and the external radiation of radionuclides accumulated on the ground.

191. The results of radiation monitoring are compared with the values of dose limits and control levels. If control levels are exceeded, the administration of the radiation facility carries out an analysis. The administration of the radiation facility informs (in writing) the territorial subdivision about the cases of exceeding the dose limits for personnel established in the Hygienic standards or exposure quotas for the population.

Section 12. Requirements for the use of personal protective equipment and personal hygiene

192. All those working with radiation sources or visiting areas where such work is carried out must be provided with personal protective equipment in accordance with the type and class of work.

193. When working with radioactive substances in the open form of class I and in certain works of class II, personnel are provided with a set of basic personal protective equipment, as well as additional protective equipment, depending on the level and nature of the possible radioactive contamination.

The basic set of personal protective equipment includes: special underwear and shoes, socks, a jumpsuit or suit (jacket, trousers), a hat or helmet, gloves, towels and disposable handkerchiefs, respiratory protection means (depending on air pollution).

During the works of class II and in individual works of class III, personnel are provided with bathrobes, hats, gloves, light footwear and, if necessary, respiratory protection means.

194. Personal protective equipment for working with radioactive substances is made of well-decontaminated materials, or disposable.

195. Those working with radioactive solutions and powders, as well as personnel cleaning rooms where radioactive substances are being handled, in addition to a set of basic personal protective equipment, have additional clothing made of film materials or materials with a polymer coating: aprons, arm ruffles, jackets, trousers, rubber or plastic special shoes.

196. Personnel performing welding or cutting works on metal contaminated with radionuclides are provided with special personal protective equipment made of sparkproof, well-decontaminated materials.

197. Respiratory protection means (filtering or insulating) are used when working in conditions of possible aerosol pollution of room air with radioactive substances (work with powders, evaporation of radioactive solutions).

198. During the works, when it is possible to contaminate the room air with radioactive gases or vapors (liquidation of accidents, repair work), or when the use of filtering devices does not ensure radiation safety, the insulating protective equipment (pneumosuits, air helmets, and in some cases - autonomous insulating devices) are used.

199. At radiation facilities where there is a possibility of radioactive contamination of the skin, detergents are used as decontamination agents.

200. During the transition from premises for work of a higher class to the premises for work of a lower class, the levels of radioactive contamination of personal protective equipment are monitored. Upon transition from the second to the third zone, additional personal protective equipment is removed.

201. Work clothes and underclothing contaminated above acceptable levels are sent for decontamination to a special laundry room. The change of basic work clothes and underclothing is carried out by personnel at least once every seven days.

Additional personal protective equipment (film, rubber, with a polymer coating) after each use is subject to preliminary decontamination in the sanitary lock or in another specially designated place. If after decontamination their residual contamination exceeds the permissible level, additional personal protective equipment is sent for decontamination to a special laundry.

202. In the event that contamination is detected, personal clothing and shoes are subject to decontamination under the control of the radiation safety service, and if it is not possible to clean it – to disposal.

203. In the premises for working with radioactive substances in open form it is not allowed:

1) the stay of employees without the necessary personal protective equipment;

2) eating, smoking, use of cosmetic accessories, jewelry;

3) storage of food products, tobacco products, home clothes, cosmetic accessories and other items not related to work.

204. For eating, a special room is provided, equipped with a wash basin for washing hands with hot water, isolated from the premises where work is carried out with the use of radioactive substances in open form.

In the premises for eating, people are not allowed to be in special working clothes.

205. When leaving the premises where work with radioactive substances was carried out, the radioactive contamination of protective clothing and other personal protective equipment is monitored; when radioactive contamination is detected, protective clothing and personal protective equipment are sent for decontamination.

Chapter 3. Sanitary and epidemiological requirements for radiation safety during medical exposure

206. Radiation safety of patients and the population is ensured for all types of exposure (preventive, diagnostic, therapeutic and research) of patients as a result of medical examination or treatment (hereinafter referred to as medical exposure) by maximizing the benefits of radiological procedures and minimizing radiation damage.

207. Medical exposure of patients in order to obtain diagnostic information or therapeutic effect is carried out as prescribed by the doctor and with the consent of the patient. The final decision on the appropriate procedure is made by the radiotherapist or radiologist.

208. Medical diagnostic irradiation is carried out according to medical indications in those cases when other alternative diagnostic methods are absent or impossible to use, or not sufficiently informative.

209. The methods of radiation diagnostics and therapy are approved by the authorized body in the healthcare sector and reflect the optimal modes of procedures and acceptable levels of patient exposure.

210. The regulations ensure the absence of determined radiation effects during all types of radiological diagnostic studies.

211. Irradiation of people in order to obtain scientific medical information is carried out with the written consent of the subjects after providing them with information about the possible consequences of exposure.

212. When conducting radiation therapy, the location of the pathological focus is taken into account in order to reduce the risk of radiation complications.
213. For X-ray medical research and radiation therapy, equipment is used that is included in the state register of medicines, medical devices and medical equipment.

214. Departments (subdivisions) of radiation therapy and diagnostics use mobile and individual means of radiation protection of the patient and staff when performing diagnostic procedures.

215. Medical personnel involved in radiological diagnostics and therapy protect patients by keeping radiation doses as low as possible.

216. The patient's radiation doses from each X-ray examination and radiation therapy procedures are entered in the personal sheet of medical radiation dose accounting, which is an appendix to his outpatient card, and if there are medical information systems, the radiation dose is generated in electronic format.

217. Upon reaching the patient's cumulative dose of medical diagnostic exposure to 0.5 Sv, measures are taken to further limit his exposure unless radiation procedures are lifesaving.

218. At the request of the patient, he is provided with information about the expected or received dose of radiation and the possible consequences of radiological procedures.

219. Medical personnel are not allowed to increase patient exposure in order to reduce their own exposure in the process of working with manmade radiation sources (hereinafter - professional exposure).

220. When a radiopharmaceutical medicine is administered to a patient for therapeutic purposes, the doctor recommends that he temporarily abstains from reproduction.

221. The introduction of radiopharmaceuticals for the purpose of diagnosis and therapy for pregnant women is not permitted.

222. When nursing mothers receive radiopharmaceuticals for the purpose of diagnosis or therapy, breastfeeding is temporarily suspended.

Chapter 4. Sanitary and epidemiological requirements for radiation safety when exposed to natural radiation sources

223. Requirements for radiation safety when exposed to natural radiation sources under industrial conditions are imposed on any facilities in which workers are exposed to radiation exceeding 1 mSv / year (facilities operating in underground conditions, mining and processing mineral and organic raw materials with a high content of natural radionuclides and others).

The design documentation for non-uranium mines and other underground structures reflects radiation safety issues.

224. Objects mining and processing ores with the aim of extracting natural radionuclides (uranium, radium, thorium) from them, as well as objects using these radionuclides, are related to the objects that work with manmade sources.

225. For construction of buildings of industrial purpose, the areas of the territory on which the gamma-ray background does not exceed 0.6 mSv / h, where the density of radon flux from the soil surface does not exceed 250 mBq per square meter per second (hereinafter mBq / (m2 *s) are selected. When designing the construction of a building on a site with a radon flux density from the soil surface of more than 250 mBq / (m2*s), a radon protection system is provided for in the building design.

226. At the facilities where work is not being carried out with manmade radiation sources, the levels of natural exposure of workers under production conditions should not exceed the values, given in the Hygienic standards. When changing the duration of work, violating the radioactive balance of natural radionuclides in industrial dust, which determine the level of radiation exposure, the administration of the facility establishes control levels of radiation exposure.

227. To compile a list of existing facilities, workshops or individual workplaces in which the radiation situation caused by natural radiation sources will be monitored, their initial examination is carried out.

228. If, as a result of an examination at the facility, no cases of exceeding the radiation dose to workers of more than 1 mSv / year were detected, further radiation monitoring in it is not mandatory. However, with a significant change in production technology, which will lead to an increase in exposure of workers, a re-examination is carried out.

229. At the facility where a dose excess of 1 mSv / year is established, but there is no dose excess of 2 mSv / year, selective radiation monitoring of workplaces with the highest exposure levels for workers is carried out.

230. At the facility in which the radiation doses to workers exceed 2 mSv / year, the radiation doses are constantly monitored and measures are taken to reduce them.

231. In case of detection of an excess, established in the Hygiene standards (5 mSv / year) , the administration of the radiation facility takes measures to reduce the exposure of workers. If it is impossible to comply with the specified Hygienic standards at the facility, it is allowed to equate the relevant workers in terms of working conditions with personnel working with manmade radiation sources. The administration of the facility informs (in writing) the territorial subdivisions about the decision taken. Persons equated in terms of working conditions with personnel working with manmade radiation sources are subject to all radiation safety requirements established for the personnel of group “A”.

232. At the facilities in which according to the criteria specified in paragraph 10 of chapter 2 “Requirements for management of radioactive waste” of these Sanitary rules the production wastes are classified as radioactive, their collection, temporary storage and disposal are organized.

233. The requirements for radiation safety of the population apply to regulated natural sources of radiation: radon isotopes and products of their degradation in indoor air, gamma radiation of natural radionuclides contained in construction products, natural radionuclides in drinking water, fertilizers and minerals.

234. The following values of effective doses from natural radiation sources characterize the relative degree of radiation safety of the population: less than 2 mSv / year — irradiation does not exceed average doses for the country's population from natural radiation sources; from 2 to 5 mSv / year – an increased exposure; more than 5 mSv / year - high exposure. Measures to reduce high levels of exposure are carried out as a matter of priority.

235. When choosing land plots for construction of residential buildings and social buildings, land plots with a gamma background not exceeding 0.3 mSv / h and a radon flux density from the soil surface of not more than 80 mBq / (m2*s) are allocated. When designing a building on a site with an equivalent dose rate of gamma radiation above 0.3 mSv / h and a radon flux density of more than 80 mBq / (m2*s), a building protection system against the increased levels of gamma radiation and radon must be provided.

236. Radiation monitoring is carried out at all stages of the construction, reconstruction, overhaul and operation of residential buildings and social buildings. In cases of detection of excess of standard values, an analysis of the causes associated with this should be carried out and protective measures aimed at reducing the dose rate of gamma radiation and (or) the content of radon in indoor air should be carried out. The dose rate of gamma radiation and the volumetric activity of radon in the air of the premises of a building under construction, under reconstruction or overhaul must correspond to standard values.

237. Radiation monitoring of residential and social buildings is carried out by individual and legal entities that have an appropriate license in the field of atomic energy use.

238. The manufacturer controls the content of natural radionuclides in building materials and products. The specific activity values of natural radionuclides and the hazard class are indicated in the accompanying documentation for each batch of materials and products.

239. The specific activity values of natural radionuclides in phosphate fertilizers and ameliorants are indicated by suppliers in the accompanying document.

Chapter 5. Sanitary and epidemiological requirements for radiation safety in radiation accidents

240. The radiation safety system for personnel and the population in a radiation accident ensures that the negative consequences of the accident are minimized, the occurrence of determined effects is prevented, and the likelihood of stochastic effects is minimized. Upon detection of a radiation accident, urgent measures are taken to stop the development of the accident, to restore control over the radiation source and to minimize radiation doses and the number of exposed persons from among personnel and the population, radioactive contamination of production facilities and the environment, economic and social losses caused by the accident.

241. The design documentation of each radiation facility defines the possible accidents, caused by equipment malfunctions, improper personnel actions, natural disasters, or other reasons that lead to loss of control over radiation sources and human exposure and (or) radioactive contamination of the environment.

242. The following sections are reflected in the design documentation of radiation facilities of I-II categories:

1) “Engineering and technical measures of civil defense. Measures for prevention of emergency situations”, including the emergency response plan, the availability of a specialized emergency brigade, nomenclature, volume and place of storage of personal protective equipment, medicines, emergency stock of radiometric and dosimetric devices, decontamination and sanitation means, tools and equipment necessary for urgent liquidation of the consequences of a radiation accident;

2) "Action plan to protect personnel and the population from a radiation accident and its consequences."

243. The administration of radiation facilities of categories I and II and nuclear units develops and approves an action plan for protection of personnel and the population from a radiation accident and its consequences.

The action plans for protection of personnel and the population from a radiation accident and its consequences should contain the following main sections:

1) the forecast of possible accidents at a radiation facility, taking into account the probable reasons, types and scenarios of the development of the accident, as well as the projected radiation situation in accidents of various types;

2) measures to protect the population and the environment and the criteria for making decisions on the implementation of protective measures;

3) a list of organizations with which interaction is carried out during the liquidation of the accident and its consequences;

4) organization of emergency radiation monitoring;

5) assessment of the nature and size of the radiation accident;

6) the procedure for putting the emergency plan into effect;

7) the procedure for notification and information;

8) personnel behavior during an accident;

9) duties of officials during emergency operations;

10) personnel protection measures during emergency operations;

11) providing medical assistance to victims;

12) measures for localization and elimination of foci (sites) of radioactive contamination;

13) preparation and training of personnel for actions in case of an accident.

244. Personnel should be prepared for actions in case of radiation accidents and for actions to eliminate the consequences of such accidents. All radiation facilities should have instructions on personnel actions during radiation accidents.

245. At production sites, in the sanitary checkpoint and at the medical station of the radiation facility, there are first-aid kits with a set of necessary first-aid equipment for the victims of the accident, and at facilities where radioactive substances are handled in open form, there is a replenished supply of sanitizing means for persons exposed to contamination.

246. At each facility in which a radiation accident is possible, an emergency alert system should be provided on the occurrence of an accident, after the signals of which the personnel

must act in accordance with the action plan to protect personnel and the population from a radiation accident and its consequences and job descriptions.

247. When a fact of a radiation accident is established, the administration of the radiation facility immediately informs (in writing) the authorized state bodies in the field of radiation safety.

248. State bodies in the field of radiation safety, in accordance with the "Action plan to protect personnel and the population from a radiation accident and its consequences," inform the specialized emergency brigades about the need for measures to eliminate the radiation accident, as well as inform the population about the fact of a radiation accident, the recommended methods and means of protection.

249. Members of specialized emergency brigades are involved primarily in the liquidation of the accident and its consequences. If necessary, people of over thirty years of age who have no medical contraindications are involved in these works, if they voluntarily agree in writing after informing them about possible radiation doses and health risks. Women are allowed to participate in emergency work only in exceptional cases.

250. Before starting work on the liquidation of the consequences of the accident, personnel are briefed on radiation safety issues with an explanation of the nature and sequence of work. If necessary, preliminary testing of upcoming operations should be carried out.

251. Work on liquidation of the consequences of the accident and other activities related to the possible re-irradiation of personnel is carried out under radiation control by special permission (admission), which defines the maximum duration of work, additional protective equipment, the names of the participants and the person responsible for the work.

252. The regulation of the planned increased exposure of personnel during the liquidation of an accident is determined by the Hygienic standards. The planned increased exposure is allowed for the personnel of the radiation facility involved in the emergency recovery work, and specialists of emergency rescue services and units.

253. The procedure for radiation monitoring is determined taking into account the scale and characteristics of the accident, the nature and conditions of the work performed.

254. People with traumatic injuries, chemical poisoning, or exposed to radiation at a dose of more than 0.2 Sv should be sent to medical examination. In case of radioactive contamination, people are sanitized and the decontaminated clothes are decontaminated.

255. In a radiation accident with the release of radionuclides into the environment, which entailed radioactive contamination of vast territories, the protection of the population is carried out in accordance with the criteria for decision-making, specified in the Hygienic standards.

256. The liquidation of the consequences of the accident and the investigation of its causes, if necessary, is carried out at the regional, territorial and object levels in the manner prescribed by the legislation of the Republic of Kazakhstan.

257. Territorial subdivisions take part in the investigation and liquidation of the consequences of a radiation accident in accordance with the Decree of the Government of the Republic of Kazakhstan dated August 19, 2016 No. 467 “On approval of the National response plan for nuclear and radiation accidents”.

258. In the territories exposed to radioactive contamination as a result of a radiation accident, the following should be carried out:

1) radiation monitoring with an assessment of the doses of exposure to the population due to radioactive contamination of the territory, if this dose can exceed 10 mSv / year;

2) radiation monitoring of other main types of exposure of the population;

3) an optimized dose reduction for all major types of exposure if the dose of exposure of the population due to radioactive contamination of the territory exceeds 1.0 mSv / year;

4) the optimized protective measures that do not violate the normal life of the population, the economic and social functioning of the territory, if the dose of exposure due to radioactive contamination of the territory exceeds 0.1 mSv / year, but not more than 1.0 mSv / year.

259. The administration of a radiation facility carrying out business activities in a territory exposed to radioactive contamination provides working conditions under which the exposure of workers due to radioactive contamination does not exceed 5 mSv / year. At radiation facilities, where the exposure of workers due to accidental contamination exceeds 1 mSv / year, a radiation safety service is being created, which carries out radiation monitoring and takes measures to reduce radiation doses to workers in accordance with the optimization principle.

260. The medical organization, serving the organization where work with radiation sources is carried out, in case of exposure from a nuclear or radiation accident (hereinafter referred to as emergency radiation), is equipped with:

1) radiation monitoring devices;

2) means of decontamination of the skin, burns and wounds (when working with radioactive substances in open form);

3) means of accelerating the elimination of radionuclides from the body;

4) radioprotectors.

261. A periodic medical examination of persons from the personnel of group “A” after they stop working with radiation sources is carried out in the same medical organization as during the specified work, or in another medical organization of the department in which he worked with radiation sources.

262. A medical examination of people from among the population exposed during a year to an effective dose of more than 200 mSv or a cumulative dose of more than 500 mSv from one of the main sources of radiation, or 1000 mSv from all sources of radiation, is organized

by the local public health authorities of the regions, the city of republican significance and the capital.

Appendix 1
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Weighting coefficients for individual types of radiation when calculating the equivalent dose (WR)

Table 1

№	Weighting coefficients for individual types of radiation	Absorbed dose coefficients taking into account the relative effectiveness of different types of radiation
1	2	3
1	Photons of any energy	1
2	Electrons and muons of any energy	1
3	Neutrons with an energy of less than 10 kiloelectron-volts (hereinafter - keV)	5
4	Neutrons with energies from 10 keV to 100 keV	10
5	Neutrons with energies from 100 keV to 2 megaelectron-volts (hereinafter - MeV)	20
6	Neutrons with energies from 2 MeV to 20 MeV	10
7	Neutrons with energies above 20 MeV	5
8	Protons with an energy of more than 2 MeV, except for recoil protons	5
9	Alpha particles, fission fragments, heavy nuclei	20

Note: All values refer to radiation falling on the body, and in the case of internal radiation – radiating during nuclear transformation.

Weighting coefficients for tissues and organs to calculate effective dose (WT)

Table 2

№	Weighting coefficients for tissues and organs to calculate effective dose	Equivalent dose coefficients in organs and tissues
1	2	3
1	Genital gland	0,08
2	Bone marrow (red)	0,12
3	Colon	0,12
4	Lungs	0,12
5	Stomach	0,12
6	Urinary bladder	0,05
7	Breast	0,12

8	Liver	0,05
9	Esophagus	0,05
10	Thyroid	0,05
11	Skin	0,01
12	Bone surface cells	0,01
13	The rest (adrenal glands, brain, extra-thoracic respiratory organs, small intestine, kidneys, muscle tissue, pancreas, spleen, thymus and uterus)	0,12

Note: In cases where one of the listed organs or tissues receives an equivalent dose exceeding the highest dose received by any of the twelve organs or tissues for which the weighting coefficients are determined, a weighting coefficient of 0.025 should be assigned to this organ or tissue and the total coefficient equal to 0.025 – to the remaining organs or tissues from the “Other” column.

Appendix 2
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Instructions for filling out the sanitary and epidemiological conclusion

1. In paragraph 1 of the sanitary and epidemiological conclusion, the full name of the radiation facility, legal entity is indicated in accordance with the certificate of state registration and the grounds for the conduct of a sanitary and epidemiological examination (at the petition, order, resolution, in a special order and others (date, number).

2. In paragraph 2 of the sanitary and epidemiological conclusion, the full name of the business entity (affiliation) and legal address (location of the facility) are indicated in accordance with the certificate of state registration, telephone number, last name, first name, patronymic (if any) of the head.

3. In paragraph 3 of the sanitary and epidemiological conclusion, the scope, type of activity, location and address of the radiation facility are indicated.

4. Paragraph 4 of the sanitary and epidemiological conclusion is filled out if necessary.

5. In paragraph 5 of the sanitary and epidemiological conclusion, the submitted documents are indicated, specified in paragraph 9 of appendix 2 of the order of the acting Minister of Health of the Republic of Kazakhstan dated April 28, 2017 No. 217 “On approval of standards of public services in the field of sanitary and epidemiological welfare of the population” (registered in the Register of state registration of regulatory legal acts under No. 15217).

6. Paragraph 6 of the sanitary and epidemiological conclusion is filled out if necessary.

7. Paragraph 7 of the sanitary and epidemiological conclusion is filled out if necessary.

8. In paragraph 8 of the sanitary and epidemiological conclusion, the full sanitary and hygienic characteristics and assessment of the object of expertise (services, processes,

conditions, technologies, production, products) are indicated in accordance with the requirements of regulatory legal acts in the field of sanitary and epidemiological welfare of the population and hygienic standards.

9. Paragraph 9 of the sanitary and epidemiological conclusion is filled out if necessary.

10. In paragraph 10 of the sanitary-epidemiological conclusion, the protocols of laboratory and laboratory-instrumental studies and tests are indicated, as well as a fragment from the master plans, drawings, photos, if available.

11. The table of paragraph 11 of the sanitary and epidemiological conclusion indicates each radiation source (type of radiation sources with the same radiation characteristics) with the assignment of a serial number. For each radiation source (type of radiation source with the same radiation characteristics), columns 2-4 are filled out.

The radiation hygiene doctor indicates the following information:

1) Lines of column 1 “Type and characteristics of the radiation source” are filled with the following information:

line 1 “Works with open radiation sources”: radionuclide, substance, its state of aggregation, the maximum permissible one-time activity at the workplace, annual consumption;

line 2 “Works with closed radiation sources”: nuclide, type of source (for units, apparatus, devices - type, brand, year of manufacture; serial or factory number of the radiation source), maximum activity of the radiation source, maximum allowable one-time number of radiation sources at the workplace and their total activity at the workplace, annual consumption (for short-lived nuclides);

line 3 “Works with devices that generate radiation”: type of source (for units, apparatuses, devices - the same information as in line 2), type, energy and intensity of radiation (and (or) accelerating voltage, current, power and other), the maximum allowable number of simultaneously working radiation sources, the number of radiation sources located in one place;

line 4 “Other works with radiation sources”: works that cannot be attributed to the work specified in lines 1-3, including works with radionuclide generators, nuclear reactors, radioactive waste, works in the evacuation (alienation) zone and others types of works with radiation sources. Depending on the type and nature of the radiation source, the same information is indicated as in lines 1 - 3. For radionuclide generators - data on the parent nuclide and performance for daughter products, as well as storage conditions for the radiation sources; for works for transportation of radioisotope sources and radioactive waste by special automobile transport - type, brand and number of the car;

2) column 2 “Type and nature of work” is filled in with the following information: type and nature of work (stationary, non-stationary, research, productive and the like);

3) column 3 “Place of work” clearly indicates the place of works: a building, a floor, workshop, section, room, section of territory (in the organization or outside it);

4) in the lines of column 4 “Restrictive conditions” the following information is provided:

in lines 1 and 4, when working with open sources of radiation, - the class of work permitted to be carried out in these rooms;

in lines 2 - 4, the necessary restrictive conditions - permission or prohibition to carry out other works in this place that are not related to the use of radiation sources (by personnel or other employees), the exclusion or reduction of harmful non-radiation factors and the like.

Appendix 3
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Practical implementation of the basic principles of radiation safety

Section 1. Justification principle

1. In the simplest situations, verification of the justification principle is carried out by comparing the benefits and harms:

$$X - (У_1 + У_2) \geq 0 \text{ , (1)}$$

where X is the benefit of using a radiation source or radiation conditions, minus all the costs of creating and operating a radiation source or radiation conditions, except for radiation protection costs;

У1– costs of all protection measures;

У2– harm to human health and the environment from exposure not eliminated by protective measures.

2. The difference between benefit (X) and the amount of harm (У1 + У2) should be greater than zero, and if there are alternative ways to achieve benefit (X), this difference should also be maximum. In the case when it is impossible to achieve the excess of benefits over harm, a decision is made on the unacceptability of using this type of radiation source.

The aspects of technical and environmental safety are taken into account.

3. Verification of compliance with the justification principle associated with weighing the benefits and harms of the radiation source, when most often the benefits and harms are measured through various indicators, is not limited to radiological criteria, but includes social, economic, psychological and other factors.

4. For various sources of radiation and irradiation conditions, specific values of benefit have their own characteristics (produced energy from a nuclear power plant (NPP), diagnostic and other information, extracted natural resources, housing provision). They should be reduced to a generalized expression of benefits for comparison with the possible damage from exposure for the same time periods in the form of a reduction in the number of man-years of

life. Moreover, it is assumed that irradiation in a collective effective dose of one man-Sv leads to the loss of one man-year of life.

5. Priority is given to health indicators compared to economic benefits. The medical and social justification of the benefit-harm ratio can be made on the basis of quantitative and qualitative indicators of the benefits and harm to health from activities related to radiation.

6. To quantify, use the inequality:

$$У\,0 > У\,2\ ,(2)$$

where У2 has the same meaning as in formula (1),

У0 - harm to health as a result of abandonment of this type of activity related to radiation.

Qualitative assessment can be performed using the formula:

$$\sum\left(\frac{Z}{D_Z}-\frac{Z_0}{D_{Z0}}\right)<0\ ,(3)$$

where Z is the intensity of exposure to harmful factors as a result of activities associated with exposure;

Z0 – harmful factors affecting personnel or the population in case of abandonment of activities related to exposure;

DZ and DZ0 – allowable intensity of exposure to factors Z and Z0.

Section 2. Optimization principle

7. The implementation of the optimization principle is carried out every time when protective measures are planned. Those responsible for the implementation of this principle are the service or persons responsible for the organization of radiation safety at facilities or territories where there is a need for radiation protection.

8. Under conditions of normal operation of the radiation source or radiation conditions, the optimization (improvement of protection) should be carried out at irradiation levels in the range from the appropriate dose limits to the attainment of a negligible level of 10 mSv per year of individual dose.

9. The implementation of the optimization principle, as well as the justification principle, should be carried out according to special guidelines approved by the agency of the state body in the field of sanitary and epidemiological welfare of the population, and before their publication – through the conduct of radiation-hygienic examination of supporting documents . At the same time, according to the Hygienic standard, the minimum expenditure on improving protection that reduces the effective dose per man-Sv is considered to be

expenditure equal to one annual per capita national income (alpha value adopted in international recommendations).

Appendix 4
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Instructions for establishing quotas for exposure of population from individual man-made radiation sources

1. The purpose of establishing quotas is to prevent exceeding the dose limit for manmade exposure of the population (1 mSv / year) established in the Hygienic standards for the population exposed to radiation from several radiation facilities, and to reduce the exposure of the population from manmade sources in accordance with the optimization principle.

2. In the design documentation of radiation facilities of category I, quotas for exposure of the population during normal operation of the facility are determined.

3. Quotas are set for the values of the average individual effective dose to critical groups of the population residing in the area of observation of the object.

4. Quotas are set for all radiation factors (air emissions, water discharges), from which the exposure of a critical group of the population outside the sanitary protection zone of a radiation facility during its normal operation can exceed a minimum significant value of 10 m Sv / year.

5. The quota size should characterize the upper limit of the possible level of exposure of critical groups of the population due to the normal operation of radiation sources at a radiation facility, taking into account the achieved level of radiation safety of the population.

6. The amount of quotas from various sources of radiation should not exceed the dose limit of the exposure of the population given in the Hygienic standards. The difference between the dose limit for the population and the amount of quotas should be considered as a reserve, the value of which characterizes the degree of radiation safety of the population from manmade radiation sources.

7. The values of quotas are used to calculate the permissible levels of individual radiation factors (radiation dose rate at the border of the sanitary protection zone, emission and discharge power, and radionuclide content in environmental objects).

Appendix 5
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"
Form

APPROVE _____
(head of a radiation facility, using a radiation source) _____ _____
(signature) (last name, first name, patronymic (if any))

S t a m p h e r e

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

(date)

Radiation-hygienic passport of a radiation facility

_____

_____

(name of the radiation facility using a radiation source)

for _____ year

1. Name of the radiation facility using a radiation source, its departmental subordination, address, telephone, fax

_____

__

_____

__

2. Surname, name, patronymic (if any), initials and contact numbers of:

2.1. the head of a radiation facility using a radiation source

_____

__

2.2. an official authorized by the head of a radiation facility using a radiation source to monitor radiation safety

_____ _____

_

2.3. a person, responsible for radiation safety of the structural subdivision of the radiation facility using a radiation source _____

3. The list of permits regulating the operation of facilities using a radiation source (licenses, sanitary and epidemiological conclusions and others):

№	Full title of the document	Name of organization issuing the document	Commencement of document	Expiration of document
1	2	3	4	5

4. The list of works carried out with radiation sources and the place of their performance:

№	The name of the structural subdivision of objects using a radiation source	The list of works (class of works with open radionuclide sources)
1	2	3

5. Information on the use of the allotted land plot and documents certifying the right to use, the right of inherited lifetime possession of the land plot, and the right to private ownership of the land plot:

№	Appointment of allotted land plot	Name and details of documents	Dimensions or area
1	2	3	
1	Objects and constructions where work with radiation sources is carried out		
2	Sanitary protection zone		
3	Surveillance zone		

6. The number of employees (staff):

№	The name of the structural subdivision of objects using radiation sources	Number of people (total)	Number of women under the age of 45
1	2	3	4

7. Probability of radiation accidents and their estimated scale _____

_____

—

8. List of radiation sources:

8.1. ionizing radiation sources:

№	Type and name of source	Number of sources
1	2	3

8.2. radionuclide sources: 8.2.1. open radionuclide sources:

№	Received, including earlier		Submitted	
	radionuclides	activity, Bq	radionuclides	activity, Bq
1	2	3	4	5

8.2.2. closed radionuclide sources:

№	Received, including earlier		Submitted	
	radionuclides	activity, Bq	radionuclides	activity, Bq
1	2	3	4	5

8.3. information on radioactive waste: 8.3.1. stored (disposed) at objects using radiation sources:

№	The origin and type of waste according to their classification	Radionuclide composition	Activity as of December 31 of the compilation of a radiation hygiene passport
1	2	3	4

8.3.2. air-conditioned when handling radioactive waste:

№	Type of radioactive waste before reprocessing	Type of radioactive waste after processing	Name of equipment for processing, its productivity	Data for the year	
				activity, Bq	volume, cubic meter
1	2	3	4	5	6

8.3.3. transferred from a radiation facility using radiation sources during the year for disposal:

№	Type of waste according to its classification	Radionuclide composition	Activity on day of transfer
1	2	3	4

9. The number of excesses of radiation doses (past year / previous year): 9.1. basic dose limits:

№	Standard value	Critical human organ	Number of persons	
			per year	per 5 years
1	2	3	4	5
1	Effective dose	whole body		
2	Equivalent dose	lens of the eye		
3	Equivalent dose	skin		
4	Equivalent dose	hands and feet		

9.2. radiation doses for additional restrictions for women under the age of 45

_____

_____

9.3. doses with planned increased exposure _____

9.4. doses of exposure to natural radiation sources

_____

9.5. control levels _____

10. Radiation monitoring results:

№	Type of radiation control, place frequency	Radiation monitoring data	Control level	Information about radiation monitoring instruments			Who conducts radiation monitoring
				name	quantity	date of inspection	
1	2	3	4	5	6	7	8

11. Discharge (release) of radioactive substances into the environment:

№	Year (last 5 years or from the day of discharge)	Physical state, origin of discharges of radioactive substances	Activity, Bq		Environment of release of radioactive substances
			maximum, one-time	Total for the year	
1	2	3	4	5	6

12. Characterization of areas of radioactive contamination of the territory of objects using radiation sources:

№	Year of observation	Type of radioactive control	Place and type of sampling	Radioactive monitoring data	Dose rate, mSv / h		Surface activity, Bq / sq . m	
					averaged over the year	maximum for a year	averaged over the year	maximum for a year
1	2	3	4	5	6	7	8	9

13. The number of employees (personnel) who have become ill from ionizing radiation, the measures taken to increase the effectiveness of radiation safety

_____

_____

14. Measures taken in excess of the established control levels of a radiation facility using radiation source _____

_____

15. The degree of preparedness for elimination of a radiation accident and its consequences

_____

16. Information on non-compliance with the requirements of regulatory legal acts and technical regulatory legal acts in the field of radiation safety _____

_____

_____

17. A note about implementation of the work plan to ensure the effectiveness of technical and radiation safety of the facility using radiation source and recommendations of regulatory and supervisory authorities _____

_____

_____

_____

(position, surname, name, patronymic (if any) of the person authorized by the head using the radiation source to monitor radiation safety) _____ _____

(signature)

_____

(date)

Procedure for maintaining and using a radiation-hygienic passport of a radiation facility

1. This procedure defines the requirements for filling out and using a radiation-hygienic passport of a radiation facility (hereinafter – a passport).

2. A passport is mandatory for all objects using radiation sources.

3. A passport certifies the radiation safety status of objects using radiation sources when handling radiation sources.

4. A passport is filled in by the radiation facility annually as of December 31.

5. A passport contains the results of the assessment of the radiation safety status of facilities using radiation sources in accordance with paragraphs 7 and 8 of Chapter 2 of these Sanitary rules.

6. A passport is filled out sequentially by points.

7. Entering of information in all paragraphs of the passport is mandatory.

8. For a more efficient and complete assessment of the radiation safety status, it is allowed to include additional information in the form of annexes to the passport.

9. A completed passport is signed by an official authorized by the head of the radiation facility to monitor radiation safety, is approved by the head of the radiation facility.

10. A passport must contain the actual information on the day of its filling in about all available radiation sources and be stored at the objects using radiation sources.

11. A passport is presented by objects using a radiation source at the request of state bodies of supervision and control in the field of radiation safety, in the manner prescribed by law.

12. Objects using a radiation source submit a passport to their territorial subdivisions annually no later than December 31 of the current year.

Appendix 6
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Procedure for maintaining radiation safety instruction when working with radiation sources

1. The Instruction on radiation safety when working with radiation sources (hereinafter referred to as the Instruction) is mandatory for all objects using radiation sources.

2. The Instruction includes the following sections:

1. introduction;

2) general provisions;

3) organizational activities;

4) safety requirements for personnel when handling radiation sources. 3. In the “ Introduction” section, a list of applicable regulatory legal acts on the basis of which the Instruction was developed is indicated.

4. The "General provisions" section provides a brief description of the work performed and the possible radiation risks for personnel associated with the performance of the relevant work.

5. The section "Organizational activities" describes the procedure for appointing a person responsible for radiation safety, the procedure for registration of personnel access to work with radiation sources.

6. The section “Safety requirements for personnel when handling radiation sources” describes methods and techniques for the safe performance of work, the procedure for using personal protective equipment, radiation monitoring, and the procedure for collecting and disposing of radioactive waste.

This section consists of the following subsections:

1) The procedure for the actions of personnel before starting the work with radiation sources;

2) The procedure for the action of personnel during the work with radiation sources;

3) The procedure for the action of personnel after the work with radiation sources.

Appendix 7
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Criterion for determining the category of potential radiation hazard of radiation facilities during design and operation

1. In the case when outside the established sanitary protection zone of radiation facilities in a maximum radiation accident, it is possible for the population to receive an effective dose of radiation that may occur as a result of a radiation accident (hereinafter - potential exposure) of more than 1.0 mSv, the unit is assigned to category I.

2. In the case when radiation objects do not belong to category I, but in its sanitary protection zone, which does not coincide with the site of location of radiation objects, in a maximum radiation accident, it is possible to obtain an effective dose of potential exposure above the limits specified in appendix 2 of the Hygienic standards, at least for one of the categories of exposed persons, the presence in which is allowed in the visit regime established at radiation facilities, the unit is assigned to category II.

3. In the case when radiation facilities are not classified in either category I or category II and on the outdoor site of its location, where nuclear materials and (or) radiation sources are directly handled, in a maximum radiation accident, at least one of categories of exposed persons, the presence of which in the unit is allowed by the established visiting regime, can receive an effective dose of potential exposure, above the limits specified in appendix 2 of the Hygienic standards, the unit is assigned to category III.

4. In all other cases, radiation objects are assigned to category IV of potential radiation hazard.

Criterion for categories of potential radiation hazard of radiation facilities during design and operation

№	Criterion	Category of potential radiation hazard of radiation facilities			
		I	II	III	IV
1	2	3	4	5	6
1	Selection of a site for location of a radiation facility	In accordance with the law		No requirements	No requirements
2	Availability of SPZ	To be agreed with the territorial subdivisions, may be limited to the limits of the site of the radiation facility		Limited to the site of radiation facilities	SPZ is not provided
3	Availability of surveillance zone (SZ)	SZ is needed. To be agreed with territorial subdivisions		SZ is not needed	Not provided
4	Impact on the population during normal operation of radiation facilities	Limited by exposure quota	No impact	No impact	Not provided
5	Availability of a unit decommissioning plan	Preliminary plan at the design stage	Preliminary plan at the design stage	Preliminary plan at the design stage	Not provided
6	Availability of an action plan to protect the population in the event of a radiation accident	Is required	Is required	Is not required	Is not required
7	Availability of the section for protection against external influences in the project	Is required	Is required	Is not required	Is not required
8	The use of stationary automated means for continuous monitoring of the radiation situation	Is required	Is required	Is not required	Is not required
9	Classification of systems and equipment	Is required	Is required	Is required	Is not required
10	Availability of technological operating procedures	Is required	Is required	User manual	User manual
11	Availability of a report on the analysis of safety of radiation facilities	Is required	Is required	Project section on radiation safety	Radiation safety instruction

Appendix 8
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Equivalent dose rate used in designing protection against external ionizing radiation

№	Category of exposed persons		Appointment of premises and territories	Duration of irradiation, h / year	Design equivalent dose rate, mSv / h
1	2		3	4	5
1	Staff	Group A	Premises for permanent stay of staff	1700	6,0
			Premises for temporary stay of staff	850	12
		Group B	Premises of the organization and the territory of the sanitary protection zone where the personnel of group B are located	2000	1,2
2	Population		Any other premises and territories	8800	0,03

Appendix 9
to the Sanitary rules
"Sanitary-epidemiological requirements for
radiation security"
Form
I allow _____
(signature of the head of the
radiation facility)
"___"_____ ____

Requirement for the issue of radioactive substances (compiled in duplicate)

Please issue for _____
(indicate for which specific work)
the following radioactive substances: _____
_

№	Required			Actually issued			
	Name of substance and type of compounds	Quantity (volume or number of sources)	Total activity	Quantity (volume or number of sources)	Activity		Passport number and date, source number (batch number)
					by passport	per hour of issue of the substance	
1	2	3	4	5	6	7	8
1							
2							

Requested the employee
Issued the person responsible for storage of radioactive substances
_____ _____
___
(name, surname, patronymic (name, surname, patronymic
(if any)) (if any)) _____ _____
__
(name of laboratory or workshop) (name of organization)

"____" _____ _____ _____

_

(signature)

Received _____

(signature)

Hours _____ (for short-lived) "_____"_____ 20 ___

Appendix 10
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Issue and receipt register of accounting for sources of ionizing radiation

№	Receipt								
	Supplier name	№ and date of receipt	Name of source, device, apparatus, unit	Device, apparatus, unit		Source			
				manufacturing number	№ and date of technical passport	№ and date of issue of the technical passport	Quantity (pieces) No. of sources	Activity b y passport	Source life
1	2	3	4	5	6	7	8	9	10
1									
2									

Continuation

Receipt				The remainder		Note
To whom issued or delivered, the date of issue	№ and date of invoice or requirements	Quantity of sources and numbers	Activity on the day of issue	Quantity	Activity	A note on the return, write-off and disposal, indicating supporting documents
11	12	13	14	15	16	17

Appendix 11
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"
Form
I approve

_____

(signature of the head of the
radiation facility)

"___" _____ 20 __

Act on expenditure and write-off of radionuclide radiation sources of a radiation facility

_____

_____

(name of organization)

This act is compiled by employees _____

_

(surname, name, patronymic (if any))

The Head of works _____

___

(surname, name, patronymic (if any))

that the radioactive substance received on demand on "___"_____ 20 ___

_____

__

_____

__

(name, source number or batch number, passport number and date)

in the amount of _____ with specific activity and total activity

_____

_

_____

__

by measurements at _____ hours _____ minutes (initial cost _____ tenge)

"___" _____ 20 ____ was used for

_____

__

(indicate the nature of the work)

Work was carried out _____

__

(surname, name and patronymic (if any) of the employee)

During the work _____

__

(a brief description of what happened to the original nuclide)

Waste in the form of _____

__

submitted for disposal under the document № _____

on "____"_____ 20 ___

Substance residue _____ in the amount of _____ total activity

_____

__

(returned to storage or absent)

"____"_____ 20 ___

The head of works _____

__

(signature)

Employee _____

__

(signature)

Person responsible for storage of nuclides _____

___

(surname, name and patronymic (if any))

_____ "___" _____ 20 ____

(signature)

Appendix 12
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Permissible levels of radioactive contamination of the surface of vehicles, in particles per square centimeter per minute (hereinafter - part / (cm2 * min)

№	Object of contamination	Type of pollution			
		Removable (non-fixed)		Not removable (fixed)	
		Alpha active radionuclides	Beta active radionuclides	Alpha active radionuclides	Beta active radionuclides
1	2	3	4	5	6
1	The outer surface of the container's protective packaging	Not allowed	Not allowed	Not regulated	200
2	The outer surface of the container car	Not allowed	Not allowed	Not regulated	200
3	The inner surface of the protective packaging of container	1,0	100	Not regulated	2000
4	The outer surface of the transport container	1,0	100	Not regulated	2000

Appendix 13
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Class of works with open sources of radiation

№	Class of works	Total activity at workplace reduced to group A, Bq
1	2	3
1	class I	over 108
2	class II	from 105 to 108
3	class III	from 103 to 105

Appendix 14
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Permissible specific activities of the basic long-lived radionuclides for unlimited use of metals after preliminary remelting or other processing and products based on these metals

№	Radionuclide	Half life	Permissible specific activity of radionuclide (PSA), kBq / kg
1	2	3	4
1	1	2	3
2	54Mn	312 days	1,0
3	60Co	5,3 yr	0,3
4	65Zn	244 days	1,0
5	94Nb	2,0×104 yr	0,4
6	106Ru+106mRh	368 days	4,0
7	110mAg	250 days	0,3
8	125Sb+125mTe	2,8 yr	1,6
9	134Cs	2,1 yr	0,5
10	137Cs+137mBa	30,2 yr	1,0
11	152Eu	13,3 yr	0,5
12	154Eu	8,8 yr	0,5
13	90Sr+ 90Y	29,1 yr	10,0
14	226Ra	11,6×103 yrs	0,4
15	232Th	1×1010 yrs	0,3
	U-natural		0,3
16	233U *	1,58×105 yrs	4,0
17	234U *	2,44×105 yrs	4,0
18	235U *	7,04×108 yrs	1,0
19	238U *	4,47×109 yrs	4,0

Note: * Data for these uranium radioisotopes are given under conditions of their balance with daughter radionuclides:

for 238U with 234Th and 234mPa;

for 235U with 231Th;

for natural uranium with 234Th, 234mPa, 234U, 230Th, 226Ra, 222Rn, 218Po, 214Pb, 214Bi, 214Po, 210Pb, 210Bi, 210Po.

Appendix 15
to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"
Form № 1-DOZ
Responsible for
radiation safety (control)

_____
(position)

_____
(surname, name, patronymic (if any))

_____
(signature)
"___" _____20___

Information on radiation doses to persons from among personnel under normal operation of manmade radiation sources for 20 ___

Name of reporting organization _____
Mailing address _____
Reporting organization code _____
Code of type of activity of the reporting organization _____
Code of territory where the reporting organization carries out its activity
_____

Table 1

№	Staff Information				
	Surname, name, patronymic (if any)	Individual identification number	Date of Birth	Gender (male, female)	Status
1	2	3	4	5	6

Continuation of table 1

Exposure Information				
Effective dose, mSv			Equivalent dose, mSv	
Type of ionizing radiation	Dose from external exposure	Dose from internal exposure	Organ or tissue code	Dose
7	8	9	10	11

Table 2

№	Code of region	Code of district	Code of organization	Code of type of activity	Number of personnel working with open radiation sources		Number of personnel working with closed radiation sources	
					Male	Female	Male	Female

1	2	3	4	5	6	7	8	9

Continuation of table 2

Number of personnel working with generating radiation sources		Effective dose received by staff at the age of, mSv.					
Male	Female	18-25 years	26-35 years	36-45 years	46-55 years	56-65 years	66-75 years
10	11	12	13	14	15	16	17

Note: in the table 2 sent to the territorial subdivisions, the lines in columns 3 and 4 are not filled out.

Form № 2-DOZ

Responsible for
radiation safety (control)

_____
(position)

_____
(surname, name, patronymic (if any))

_____
(signature)
"___" _____20___

Information on the doses to persons from among personnel in the conditions of a radiation accident or planned increased exposure, as well as to people from the population exposed to emergency radiation for 20 ___

Name of reporting organization _____
Mailing address _____
Reporting organization code _____
Code of type of activity of the reporting organization _____
Code of territory where the reporting organization carries out its activity
_____

Table 1

№	Staff information				
	Surname, name, patronymic (if any)	Individual identification number	Date of Birth	Gender (male, female)	Status
1	2	3	4	5	6

Continuation of table 1

Exposure Information	

Effective dose, mSv			Equivalent dose, mSv		Code, twice exposed to the planned increased exposure
Type of ionizing radiation	Dose from external exposure	Dose from internal exposure	Organ or tissue code	Dose	
7	8	9	10	11	12

Table 2

№	Code of region	Code of district	Code of organization	Code of type of activity	Number of personnel working with open radiation sources		Number of personnel working with closed radiation sources	
					Male	Female	Male	Female
1	2	3	4	5	6	7	8	9

Continuation of table 2

Number of personnel working with generating radiation sources		Effective dose received by staff at the age of, mSv.					
Male	Female	18-25 years	26-35 years	36-45 years	46-55 years	56-65 years	66-75 years
10	11	12	13	14	15	16	17

Note: in the table 2 sent to the territorial subdivisions, the lines in columns 3 and 4 are not filled out.

Procedure for maintaining and filling out the form No. 1-DOZ “Information on radiation doses to persons from among personnel in conditions of normal operation of man-made sources of ionizing radiation” and the form No. 2-DOZ “Information on radiation doses to persons from among personnel in conditions of a radiation accident or planned increased exposure, and also persons from the population exposed to emergency exposure"

Section 1. General provisions

1. Individual or legal entities working with radiation sources and having personnel under individual dosimetric control annually fill out the form No. 1-DOZ “Information on radiation doses to persons from among personnel in conditions of normal operation of man-made sources of ionizing radiation” (hereinafter – the form No. 1-DOZ).

2. Individual or legal entities that have had cases of planned increased exposure to personnel or exposure as a result of radiation accidents in the reporting year, fill out the form

No. 2-DOZ “Information on radiation doses to persons from among personnel in conditions of a radiation accident or planned increased exposure, and also persons from the population exposed to emergency exposure” (hereinafter – the form No. 2-DOZ).

Individual doses associated with the planned increased exposure and exposure as a result of radiation accidents are entered in the form.

3. Form No. 1-DOZ should not include doses associated with the planned increased and emergency exposure, which are included in form No. 2-DOZ, as well as the doses of persons from the personnel of group “B” received by the calculation method.

4. Individual or legal entities carrying out individual dosimetric control of personnel must have an appropriate license in the field of atomic energy use.

5. Control and accounting of individual doses of personnel is carried out in order to:

1) obtain the objective information about the individual doses of radiation of personnel received when working with radiation sources, conducting medical radiological procedures, as well as due to the radiation background;

2) account the persons exposed to radiation above established limits;

3) provide the possibility of obtaining objective and reliable information about radiation doses to the organization’s personnel;

4) assess the impact of the radiation factor on personnel;

5) take measures to reduce exposure levels of personnel.

6. Individual or legal entities, annually fill out the forms No. 1-DOZ, No. 2-DOZ and submit it to the territorial subdivisions no later than December 31, which, in turn, summarize the data received and submit it to the Branch of the “Scientific and Practical Center for Sanitary and Epidemiological expertise and monitoring” RSE on the basis of the right of economic management “National Public Healthcare Center” of the Ministry of Health of the Republic of Kazakhstan (hereinafter referred to as the Branch) by January 15, where a national database of individual doses of radiation is formed. The Branch analyzes the data obtained and submits it to the departments of the state body in the field of sanitary and epidemiological welfare of the population by January 30.

7. Forms No. 1-DOZ and No. 2-DOZ are provided on A4 sheets of white paper and in the form of electronic copies. Both documents (original and electronic copy) are to be completely identical.

Section 2. Procedure for filling out the form No. 1-DOZ

8. Form No. 1-DOZ is filled out annually according to the results of measurements of individual radiation doses for personnel of groups “A” and “B”.

9. For the personnel of group “A”, in the absence of IDC data, it is allowed to enter the doses received by the calculation method in the appropriate columns of the form. For the

personnel of group “B”, in the absence of instrumental measurement data, the form is not completed.

10. Individual or legal entities filling out the form No. 1-DOZ also include temporarily seconded persons from the personnel of group “A” in the reports.

11. The line “Name of organization” indicates the full name of the organization, the full mailing address with a postal code without any abbreviations. After the full name of the organization, its official abbreviated name, if any, is indicated in brackets.

12. The line "Mailing address" indicates the postal code, address of the reporting organization.

13. In the corresponding lines of the form, the organization codes by classifiers are sequentially entered (the territorial subdivisions make up the constant coding of organizations).

14. The line “Code of territory where the reporting organization carries out its activity” is indicated in accordance with table 1 of this appendix of the Sanitary rules;

15. The line “Code of the type of activity of the reporting organization” is indicated in accordance with table 2 of this appendix of the Sanitary rules.

16. Table 1 contains two sections: staff information (columns 2–6) and exposure information (columns 7–11).

17. Column 1 of table 1 indicates the serial number of the personnel.

18. Column 2 of table 1 indicates full surname, name and patronymic (if any) of the employee. Entering of the employee’s initials in columns is not allowed.

19. Column 3 indicates the individual identification number.

20. Column 4 indicates the date of birth of the employee. It is filled with numbers corresponding to the date, month and year of birth, which are separated by dots. In this case, the date and month are put down in two digits (for numbers less than 10, zero is added on the left), and the year is indicated in full four-digit number (for example: 12.05.1984).

21. Column 5 indicates the gender of the employee: “Male”, “Female”.

22. Column 6 indicates the codes according to table 3 of this appendix of the Sanitary rules, in accordance with the status of the employee.

23. Column 7 indicates the codes according to table 4 of this appendix of the Sanitary rules in accordance with the type of ionizing radiation. At that, with a serial number from 1 to 6, they refer to external exposure by various types of ionizing radiation, and the seventh - to internal exposure due to the intake of radionuclides into the body of employees.

24. Column 8 is filled out according to the official data of the IDC of the employee's external exposure in the reporting year (mSv). In the absence of individual dosimetry data, it is allowed to enter in the column the values of doses obtained by the calculation method for estimating the annual dose.

25. Column 9 is filled in according to the official data of the individual dosimetry of the internal exposure of the employee in the reporting year (mSv). The annual effective dose of

internal exposure of personnel is taken into account when working with radioactive substances in open form and is determined by measuring the volumetric activity of radionuclides in the air of the working area of industrial premises or in the breathing zone using individual samplers, direct measurement of the content of radionuclides in the body using human radiation counters and (or) analysis of biosubstrates of excretions.

26. Column 10 indicates the codes according to table 5 of this appendix of the Sanitary rules in accordance with the type of organ or tissue exposed to radiation by radiation sources. At the same time, data are recorded only for those organs (tissues) for which dose limits are determined in the Hygienic standards.

27. Column 11 contains the values of the equivalent dose (mSv) in the lens of the eye, skin, hands and feet, lower abdomen (for women under the age of 45) of the personnel, obtained following the results of individual dosimetry of these organs. These data are entered only in cases where the control of equivalent doses in the above bodies is necessary and carried out.

28. If, as a result of measurements of an individual dose of external or internal exposure, or a dose in an organ (tissue), the measured value is less than the minimum measured value, metrologically established for the measuring instrument used, then in the corresponding column (8, 9, 11) the value “0” is entered. At the same time, in column 10 a dash “-” is put down.

29. If the fact of one of the above types of exposure was recorded, but the numerical value of the corresponding dose is unknown, then in the corresponding column (8, 9, 11), instead of the dose, the code “-1” is entered.

30. In the corresponding cells of table 2 the following is entered:

1) column 1 indicates the serial number of the personnel;

2) column 2 indicates the codes of regions according to table 1 of this appendix of the Sanitary rules;

3) column 3 indicates the districts, the located organizations using radiation sources (the decoding is indicated in the note);

4) column 4 indicates the code of the organization using the radiation sources (the decoding is indicated in the note);

5) column 5 indicates the code of the type of activity of the organization according to table 2 of this appendix 12 of the Sanitary rules;

6) columns 6-7 indicate the total number of personnel working with open radiation sources;

7) columns 8–9 indicate the total number of personnel working with closed radiation sources;

8) columns 10-11 indicate the total number of personnel working with generating radiation sources;

9) columns 12-17 indicate the received effective dose of personnel by age, in the range from the lowest to the highest radiation doses, in mSv.

Section 3. Procedure for filling out the form No. 2-DOZ

31. The individual doses associated with the planned increased exposure and exposure as a result of radiation accidents are entered in the form No. 2-DOZ.

32. In case of exceeding the permissible effective dose of personnel (20 mSv per year), it is necessary to indicate in the note the reason, the period, who (last name, first name, middle name (if any), age, place of residence) and in what conditions received the increased dose, full name of the organization (mailing address), type of exposure to ionizing radiation, measures taken and recommendations for investigation.

33. The form is filled out annually based on the results of measurements or calculation of individual doses of the planned increased exposure of personnel and exposure in the event of a radiation accident, as well as the persons from among the population, exposed to emergency exposure in the reporting year.

34. Doses of emergency exposure to the population are recorded only in the form relating to the first year after this radiation accident. In subsequent years, radiation doses to the population due to past radiation accidents are not recorded in the form.

35. Individual or legal entities filling out the form also include temporarily seconded persons in the reports.

36. Identification of persons from among the population exposed to emergency radiation, and the assessment of individual radiation doses to the personnel of the organization where the radiation accident occurred, is carried out by the territorial subdivisions, and (or) the appropriate commission investigating the causes of the accident. Depending on the extent of the accident, institutions (enterprises) of the relevant ministries and departments involved in the liquidation of the consequences of the accident may also participate in this work.

37. The line “Name of the reporting organization” indicates the full name of the organization without any abbreviations. After the full name of the organization, its official abbreviated name, if any, is indicated in brackets.

38. The line “Mailing address” indicates the postal code and full postal address of the reporting organization.

39. In the line “Code of the reporting organization”, the permanent coding of the organization is made up by the territorial subdivisions (the decoding is indicated in the note).

40. The line "Code of the territory where the reporting organization carries out its activity " is indicated in accordance with table 1 of this appendix of the Sanitary rules.

41. The line "Code of the type of activity of the reporting organization" is indicated in accordance with table 2 of this appendix of the Sanitary rules.

42. Column 1 indicates the serial number of the personnel and the population.

43. Column 2 indicates in full the surname, name, patronymic (if any) of the employee. Filling in the column with the initials of the employee is not allowed.

44. Column 3 indicates the individual identification number.

45. Column 4 indicates the date of birth of the employee. It is filled with numbers corresponding to the date, month and year of birth, which are separated by dots. In this case, the date and month are put down in two digits (for numbers less than 10, zero is added on the left), and the year is indicated in full four-digit number (for example: 12.05.1984).

46. Column 5 indicates the gender of the employee: “Male”, “Female”.47. Column 6 indicates the codes according to table 3 of this appendix of the Sanitary rules, in accordance with the status of the employee.

48. Column 7 indicates the codes according to table 4 of this appendix of the Sanitary rules, in accordance with the type of ionizing radiation. In this case, with serial number 1-6 they refer to external exposure by various types of ionizing radiation, and 7 - to internal exposure due to the entry of radionuclides into the body of employees.

49. Column 8 indicates the official data of the IDC of the external exposure of the employee in the reporting year (mSv). In the absence of individual dosimetry data, it is allowed to enter in the column the values of doses obtained by the calculation method for estimating the annual dose.

50. Column 9 indicates the results of the assessment of the effective dose of the employee's internal exposure in the reporting year (mSv). The annual effective internal dose of personnel is taken into account when working with radioactive substances in open form and is determined following the results of measuring the volumetric activity of radionuclides in the air of the working area of industrial premises or in the breathing zone using individual samplers, direct measurement of the content of radionuclides in the body using human radiation counters and (or) analysis of bioprobes of excretions.

51. Column 10 indicates the codes according to table 5 of this appendix of the Sanitary rules, in accordance with the type of organ or tissue exposed to radiation by radiation sources. At the same time, data are recorded only for those organs (tissues) for which dose limits are determined in the Hygienic standards.

52. Column 11 indicates the values of the equivalent dose (mSv) in the lens of the eye, skin, hands and feet, lower abdomen (for women under the age of 45) of the personnel, obtained following the results of individual dosimetry of these organs.

These data are entered only in cases where the control of equivalent doses in the above bodies is necessary and carried out.

Equivalent doses are determined only for those organs (tissues) for which their determination is carried out in accordance with special methodological documents in force on the territory of the Republic of Kazakhstan.

53. Column 12 indicates a code that consists of three entries in table 6 of this appendix of the Sanitary rules.

54. The value of the annual individual dose for a person belonging to the personnel of group “A” is entered in the form, who underwent the planned increased exposure twice in the reporting year. For him, in column 12 the code “1P2” is entered.

55. In the corresponding cells of table 2 of the form No. 2-DOS, the following is entered:

1) column 1 indicates the serial number;

2) column 2 indicates the codes of regions according to table 1 of this appendix of the Sanitary rules;

3) column 3 indicates the districts, the located organizations using radiation sources (the decoding is indicated in the note);

4) column 4 indicates the code of the organization using the radiation sources (the decoding is indicated in the note);

5) column 5 indicates the code of the type of activity of the organization according to table 2 of this appendix 12 of the Sanitary rules;

6) columns 6-7 indicate the total number of personnel working with open radiation sources;

7) columns 8–9 indicate the total number of personnel working with closed radiation sources;

8) columns 10-11 indicate the total number of personnel working with generating radiation sources;

9) columns 12-17 indicate the received effective dose of personnel by age, in the range from the lowest to the highest radiation doses, in mSv.

Codes of regions of the Republic of Kazakhstan covered by individual dosimetric control

Table 1

№	Names of regions	Code
1	2	3
1	Nur-Sultan	Z 01
2	Almaty	A 02
3	Akmola region	C 03
4	Aktobe region	D 04
5	Almaty region	B 05
6	Atyrau region	E 06
7	West-Kazakhstan region	L 07
8	Zhambyl region	H 08
9	Karaganda region	M 09
10	Kostanay region	P 10
11	Kyzylorda region	N 11
12	Mangistau region	R 12

13	Turkestan region	X 13
14	Pavlodar region	S 14
15	North Kazakhstan region	T 15
16	East-Kazakhstan region	F 16
17	Shymkent	Y 17

Codes of the type of activity of the organization working with manmade radiation sources and having personnel of group A

Table 2

№	Name of organization	Code
1	2	3
1	Medical facilities, including medical research institutes	M 01
2	Industrial enterprises, including organizations performing repair, set up, calibration of equipment using a radiation source	P 02
3	Research institutes, including higher education institutions, except for a medical profile	S 03
4	Other organizations	Y 04

Code of status of employee with radiation sources

Table 3

№	Status of employee	Code
1	2	3
1	Worked all reporting year	001
2	Seconded in the reporting year *	002
3	Quit the job in the reporting year **	003
4	Retired in the reporting year	004
5	Died in the reporting year	005

Note: * for an employee with the indicated status, the doses are indicated for the whole time of the secondment;

** for an employee with the indicated status, the doses are indicated from the beginning of the year until dismissal.

Codes of radiation sources used by organizations in their activities

Table 4

№	Type of affecting ionizing radiation	Code
1	2	3
1	X-ray	R 101
2	Alpha	A 102
3	Beta	B 103

4	Gamma	G 104
5	Neutron	N 105
6	Radionuclide	I 106
7	Others	X 107

Codes of organs and tissues exposed to a radiation source

Table 5

№	Type of organ or tissue exposed to ionizing radiation	Code
1	2	3
1	Gonads	01
2	Red bone marrow	02
3	Colon	03
4	Lungs	04
5	Stomach	05
6	Urine bladder	06
7	Breast	07
8	Liver	08
9	Esophagus	09
10	Thyroid	010
11	Lens of eye	011
12	Skin	012
13	Hands and feet	013
14	Bone surface	014
15	Other	015
16	Lower abdomen*	016

Note: * - determined only for women under the age of 45

Codes of persons exposed to a radiation source

Table 6

№ of position of code	Code	Meaning
1	2	3
1	1	Group A staff
	2	Group B staff
	3	Workers not assigned to personnel
	4	The rest of the population exposed to emergency exposure
2	A	Emergency exposure
	P	Planned increased exposure
3	Numbers starting from 1.	Number of cases of planned increased or emergency exposure of the person in the reporting year.

Appendix 16

to the Sanitary rules
"Sanitary-epidemiological
requirements for radiation
security"

Card for recording individual doses of external exposure to persons working with radiation sources

1. Name of organization _____

_

(name, address, telephone)

2. Surname, name, patronymic (if any) _____

3. Year of birth _____

4. Gender _____

_

5. Place of work _____

(workshop, department, section, laboratory and others)

6. Position _____

7. Work experience with radiation sources:

7.1. in this organization _____

_

(the beginning of work in the institution)

7.2. total work experience _____

_

(before working in this institution and the total dose received)

8. Working conditions _____

__

_____

_

(type and nature of work, radionuclide, open and closed sources of radiation, class of work, state of aggregation of the radioactive substance, maximum permissible one-time activity at the workplace)

9. Dose data:

№	Year	Dosimeter location	Quarterly radiation doses, mSv				Total annual dose, mSv	Signatures	
			I	II	III	IV		Responsible for radiation monitoring	Personnel
1	2	3	4	5	6	7	8	9	10
1	20___								
2	20___								
3	20___								

4	20___								
5	20___								
6	20___								
7	20___								
8	20___								