

**RESOLUTION OF THE MINISTRY OF HEALTH
OF THE REPUBLIC OF BELARUS
of December 31, 2013 No. 137**

**“ON APPROVAL OF SANITARY NORMS AND RULES
“REQUIREMENTS TO ASSURANCE OF RADIATION SAFETY OF
PERSONNEL AND POPULATION IN THE USE OF NUCLEAR
ENERGY FACILITIES AND SOURCES OF IONIZING RADIATION”
AND MAKING AN ADDITION TO THE RESOLUTION OF THE
MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS OF
DECEMBER 28, 2012 NO. 213**

On the basis of Article 13 of the Law of the Republic of Belarus of January 7, 2012 “On Sanitary and Epidemiological Well-Being of Population”, the second paragraph of Sub-Clause 8.32 of Clause 8 of the Regulation on the Ministry of Health of the Republic of Belarus, approved by the Resolution of the Council of Ministers of the Republic of Belarus of October 28, 2011 No. 1446 "On certain issues of the Ministry of Health and measures, concerning implementation of the Decree of the President of the Republic of Belarus as of August 11, 2011 No. 360", the Ministry of Health of the Republic of Belarus RESOLVES:

1. To approve the attached Sanitary Norms and Rules “Requirements to Assurance of Radiation Safety of Personnel and Population in the Use of Nuclear Energy Facilities and Sources of Ionizing Radiation”

2. To supplement Clause 1 of the Sanitary Norms and Rules “Radiation Safety Requirements”, approved by the Resolution of the Ministry of Health of the Republic of Belarus of December 28, 2012 No. 213 “On Approval of Sanitary Norms and Rules “Radiation Safety Requirements” and the Hygienic Standard “Criteria for Radiation Impact Assessment” (the National Legal Internet Portal of the Republic of Belarus, 25.05.2013, 8/26850), with the part of the following content:

"Additional requirements can be set by the technical normative legal acts of the Republic of Belarus to:

radiation safety of personnel and population in the use of nuclear energy facilities and sources of ionizing radiation;

radiation safety of personnel and population in the course of radioactive waste management;

radiation safety of personnel and population in the course of carrying out

of other types of practice".

3. The present Resolution shall enter into force from the 1st of March, 2014.

Minister

Zharko V.I.

APPROVED
by the Resolution
of the Ministry of Health
of the Republic of Belarus
31.12.2013 No. 137

**SANITARY NORMS AND RULES “REQUIREMENTS TO
ASSURANCE OF RADIATION SAFETY OF PERSONNEL AND
POPULATION IN THE USE OF NUCLEAR ENERGY FACILITIES
AND SOURCES OF IONIZING RADIATION”**

**CHAPTER 1
GENERAL PROVISIONS**

1. The present Sanitary Norms and Rules set out requirements to assurance of radiation safety of personnel and population in the use of nuclear energy facilities and sources of ionizing radiation.

2. The present Sanitary Norms and Rules shall be obligatory to the state bodies, other organizations and private individuals, including individual entrepreneurs.

The Sanitary Norms and Rules apply to all users of ionizing radiation sources (hereinafter - the IRS) (including nuclear facilities) in the process of design, construction, operation, reconstruction, including modernization, capital repairs, in the course of which capacity extension or increase is carried out, as well as changing the target purpose of objects of social, industrial, transport and engineering infrastructures takes place; in the process of decommissioning of radiation facilities, as well as storage of IRS, except for users of IRS, the design, construction and reconstruction of which began before entering into force of the present Sanitary Norms and Rules (in terms of design, reconstruction and construction).

3. State sanitary supervision of compliance with the present Sanitary Norms and Rules is conducted in accordance with the legislation of the Republic of Belarus.

4. For violation of the present Sanitary Norms and Rules guilty persons shall bear responsibility in accordance with the legislative acts of the Republic of Belarus.

5. For the purposes of the present Sanitary norms and rules the basic terms and their definitions are used in the meanings, established by the Law of the Republic of Belarus of January 5, 1998, “On Radiation Safety of Population” (Records of the National Assembly of the Republic of Belarus, 1998, No. 5, p. 25), the Law of the Republic of Belarus of July 30, 2008 “On the Use of Atomic Energy” (the National Register of Legal Acts of the Republic of Belarus, 2008, No. 187, 2/1523), Sanitary Norms and Rules “Radiation Safety Requirements” and the Hygienic standard “Criteria for Radiation Impact Assessment”, approved by the Resolution of the Ministry of Health of the Republic of Belarus of December 28, 2012 No. 213 (the National Legal Internet Portal of the Republic of Belarus, 25.05.2013, 8/26850), as well as the following terms and their definitions are used:

food restrictions planning zone - an area around a nuclear facility for which arrangements have been made to take countermeasures (for example, an agricultural countermeasure), which prevent intake of radionuclides from water and food of local production, as well as longer term protective actions in order to prevent large collective radiation doses to the practicable extent;

urgent protective action planning zone - an area around a nuclear facility for which arrangements have been made to take urgent protective actions in the event of a nuclear or radiological emergency to avert stochastic effects to the practicable extent;

precautionary action zone - an area around a facility for which arrangements have been made to take urgent protective actions in the event of a nuclear or radiological emergency to reduce the risk of severe deterministic effects off the site;

authorized order – a task for safe performance of work, which is drawn up on a due specific form and determines the content, place of work, the time of its beginning and end, the conditions for its safe performance, the necessary security measures (including radiation and fire safety measures, as well as security measures on polluted workplaces), composition of the brigade, as well as the workers, responsible for safe execution of the work;

radiation monitoring - obtaining of information on radiation situation in the organization, in the environment and on human exposure levels (includes dosimetric and radiometric monitoring);

personnel access lock entrance (hereinafter - the airlock) – a set of premises and equipment, intended for changing of clothes, shoes, sanitary treatment of personnel, monitoring of radioactive contamination of skin coverings, individual protection means, special and personal clothes of personnel;

sanitary barrier (hereinafter - the sanitary barrier) - a premise intended for pre-decontamination and change of additional means of individual protection;

individual protection means (hereinafter - the IPM) - means of protection of personnel against external exposure, intake of radioactive substances into the body and radioactive contamination of skin coverings.

6. IRS are subject to mandatory registration in the Unified State System of Accounting and Control of IRS in the manner, prescribed by the Resolution of the Council of Ministers of April 30, 2009 No. 562 “On Approval of Regulation on the Procedure for State Registration of Sources of Ionizing Radiation and Unified State System of Accounting and Control of Sources of Ionizing Radiation” (the National Register of Legal Acts of the Republic of Belarus, 2009, No. 109, 5/29694).

7. A user of IRS has the right to work with IRS, produce, use, store, transport and dispose radioactive waste and other IRS, subject to presence of a sanitary passport for the right to work with IRS (hereinafter - the sanitary passport), which is issued in compliance with Appendix 1 to the present Sanitary Norms and Rules in accordance with the requirements, set out in Appendix 2 to the present Sanitary Norms and Rules, as well as a special permit (license), issued in accordance with the legislation. Presence of a conclusion of the state sanitary supervision bodies on compliance of work with radioactive substances and other IRS with the Sanitary Rules and Norms, hygienic standards and other normative legal acts is a mandatory condition for coordination of work.

The user of IRS must obtain the sanitary passport before starting work with IRS, as well as after suspension of operation of the facility by the bodies, exercising the state sanitary supervision, carrying out of measures on elimination of violations of sanitary rules and norms and hygienic standards, other normative legal acts and after addressing the issue on the continuation of work with IRS.

8. Validity of the sanitary passport is determined by the State sanitary supervision organization, but it should not exceed 3 years.

9. Receipt of the sanitary passport is not required in cases if:

9.1. devices, substances and products, which are not subject to mandatory registration in the Unified State System of Accounting and Control of IRS are used in accordance with the Resolution of the Council of Ministers of the Republic of Belarus of April 30, 2009 No. 562;

9.2. at a workplace:

specific activity of unsealed radionuclide sources is less than minimum significant specific activity (hereinafter - MSSA) and unsealed radionuclide source activity is less than minimum significant activity (hereinafter - MSA), listed in Appendix 13 to the Hygienic standard “Criteria for Radiation Impact

Assessment”, approved by the Resolution of the Ministry of Health of the Republic of Belarus as December 28, 2012 No. 213 (hereinafter - the Hygienic standard “Criteria for Radiation Impact Assessment”), while the sum of ratios of activity of individual radionuclides to the tabulated values is less than 1;

9.3. in an organization:

total activity of unsealed radionuclide sources of radiation does not exceed more than 10 times the amount of the MSA or the sum of ratios of activity of different radionuclides to their tabulated values, given in Appendix 13 to the Hygienic standard “Criteria for Radiation Impact Assessment”, is less than 1;

9.4. a dose rate measured at any point 0.1 m away from the surface of sealed radionuclide source of radiation, doesn't exceed 1.0 mcSv/h over the background, and its reliable hermetization is ensured.

10. In case of planned transportation of IRS for carrying out of work with it out of the agreed place of works, which is subject to the applicable sanitary passport, it is necessary to notify (in writing) the authority, issuing the sanitary passport, as well as the institution, carrying out the state sanitary supervision at the place of the planned works. Drawing-up of a new sanitary passport at the place of the planned work is not required if organization of temporary storage of IRS is not required.

CHAPTER 2

FUNDAMENTAL RADIATION SAFETY PRINCIPLES

11. Radiation safety of personnel and population is considered to be ensured if the fundamental principles of radiation safety (rationing, justification, optimization) and the requirements, established by the Law of the Republic of Belarus “On Radiation Safety of Population”, are observed.

12. The principle of justification is applied in design of new sources of radiation and radiation facilities, in the course of issuance of licenses and approval and (or) adjustment of technical normative legal acts for use of sources of radiation, as well as in case of a change of conditions of their operation. Practical implementation of the fundamental principles of radiation safety is carried out in accordance with the approaches, set out in Appendix 3 to the present Sanitary Norms and Rules.

In case of a radiation accident the principle of justification is applied not to IRS and exposure conditions, but to a protective arrangement. The priority protective arrangement is restoration of control over IRS.

The principle of optimization is applied under normal operating conditions of IRS and in accordance with Appendix 3 to the present Sanitary Norms and Rules.

In case of a radiation accident, when, instead of dose limits, the general criteria for response are applied, the optimization principle should be applied to a protective arrangement taking into account a projected dose, which can be prevented or reduced by means of preventive urgent protective actions, and detriment, associated with carrying out of protective actions.

The principle of rationing is applied for the purpose of non-exceedance of the basic dose limits of exposure of population and personnel (staff) (hereinafter - personnel), established by the Law of the Republic of Belarus “On Radiation Safety of Population” on the territory of the Republic of Belarus.

13. In order to monitor effective and equivalent doses of exposure the system of monitored parameters is administered, which are standards, derived from the dose constraints, established on the basis of non-exceedance of dose limits.

Since the derived standards during technogenic exposure are calculated for a one-factor effect, and each of them runs out of the full dose limit, their use should be based on the condition of non-exceedance of the value, which is equal to one sum of ratios of all controlled variables to their acceptable values.

14. For the purpose of radiation safety of population and compliance to the exposure dose limit, established for population, the State sanitary supervision bodies should establish quotas (dose constraints) for types of practice.

Establishment of quotas for public exposure from individual technogenic IRS is carried out taking into account the principles, set out in Appendix 4 to the present Sanitary Norms and Rules.

CHAPTER 3

EVALUATION OF RADIATION SAFETY PERFORMANCE

15. Evaluation of radiation safety performance is based on key indicators, stipulated in Article 11 of the Law of the Republic of Belarus “On Radiation Safety of Population”.

16. A radiation and hygienic passport of a user of IRS reflects the level of radiation safety assurance in the organization. A form of the radiation and hygienic passport of the user of ionizing radiation sources is approved by the Resolution of the Council of Ministers of the Republic of Belarus of June 24, 2006 No. 797 “On Radiation and Hygienic Passport of a User of Sources of Ionizing Radiation, its Keeping Procedure and Applications and Annulment of Resolution of the Council of Ministers of the Republic of Belarus of March 23, 1999 No. 391” (the National Register of Legal Acts of the Republic of Belarus, 2006, No. 104, 5/22495) (hereinafter - the radiation and

hygienic passport).

17. In order to assess IRS radiation safety performance the radiation risk indicator is used in accordance with Chapter 1 of the Sanitary Norms and Rules “Radiation Safety Requirements”. The significance of each and all IRS should be assessed according to their contribution to the total effective dose, which to the maximum extent characterizes a radiation risk.

CHAPTER 4

MEANS OF RADIATION SAFETY ASSURANCE

18. Radiation safety on a radiation facility, as well as on an adjacent territory is provided by:

- compliance with the requirements of the normative legal acts and technical normative legal acts in the process of preparation of a design documentation of the radiation facility, which includes justification of a choice of an area and site of location of the radiation facility, a level of physical protection of IRS, zoning of an area around and inside facilities of I and II category, established in accordance with Clause 38 of the present Sanitary Norms and Rules;

- compliance with the conditions of operation of technological systems;

- use of products and technologies, which have passed the state sanitary and hygienic examination of a radiation factor, which is carried out in the manner, prescribed by the Regulation on the procedure and conditions for execution of the state sanitary and hygienic examination, approved by the Resolution of the Ministry of Health of the Republic of Belarus of January 3, 2013 No. 1 (the National Legal Internet Portal of the Republic of Belarus, 02.02.2013, 8/26857);

- arrangement and carrying out of a radiation control;

- planning and carrying out of arrangements for assurance of radiation safety of personnel and population during normal operation of the radiation facility, its reconstruction and decommissioning;

- preparedness to respond to emergencies;

- provision of information and training to personnel and population in the field of radiation safety assurance;

- compliance with the safety culture.

19. Radiation safety of personnel is provided by:

- restriction of access of personnel to work with IRS by age, sex, a health status, a level of a previous exposure;

- good knowledge of and compliance with the rules of work with IRS;

- creation of working conditions, which meet the requirements of the normative legal, as well as technical normative legal acts;

- compliance with the standards: the basic limits of radiation doses, dose

constraints and reference levels;

use of means of protection against ionizing radiation, as well as use of distance protection and limitation of time of work with IRS;

arrangement and carrying out of a radiation control;

provision of information on a radiation situation;

carrying out of measures for protection of personnel when planning of increased exposure in the case of a threat and occurrence of an accident;

presence of an appropriate qualification.

20. Radiation safety of population is provided by:

creation of conditions for people vital activity, which meet the requirements, established by the technical normative legal acts in the field of radiation safety;

establishment of quotas for exposure from different IRS;

arrangement of a radiation monitoring;

effective planning and carrying out of radiation protection arrangements under normal conditions and in case of a radiation accident;

arrangement of a system of information on a radiation situation.

21. Radiation safety of personnel and population from sources of potential exposure is provided by application of technical measures for decreasing a probability of events, due to which overall boundary risk values, set out in Clause 24 of the Sanitary Norms and Rules "Radiation Safety Requirements" may be exceeded, as well as by application of measures for minimization of radiation accident consequences.

22. Radiation safety of population in areas, where due to previous economic activity or radiation accidents residual contamination or sources of potential exposure present, is provided by protection measures in accordance with the principle of optimization, aimed at localization of a source, restriction of an access and (or) provision of information to population about factors of a radiological emergency.

23. In the process of development of arrangements for decline of radiation doses of personnel and population the following key provisions shall applied:

individual doses must be primarily declined, where they exceed a permissible exposure level;

arrangements for collective protection of persons must be carried out first of all for those IRS, where it is possible to achieve a maximum decline of a collective radiation dose at the lowest cost;

decline of doses from each IRS should primarily be achieved by means of decline of exposure of the representative person for this IRS.

CHAPTER 5

CONTROL OF RADIATION SAFETY ASSURANCE

24. The user of IRS is obliged to exercise control of radiation safety assurance on the radiation facility in accordance with Article 12 of the Law of the Republic of Belarus "On Radiation Safety of Population".

Prior to work and taking into account peculiarities and conditions of carried out works the user of IRS is obliged to assign a person, who is authorized to exercise control of radiation safety assurance, as well as assign persons, who are responsible for radiation control, registration, storage and delivery of IRS, arrangement of collection, storage and delivery of radioactive substances. The procedure for exercising control of radiation safety assurance is developed by the user of IRS and is confirmed by the state supervision bodies in the field of nuclear and radiation safety assurance and by the competent bodies of the state sanitary supervision.

25. Control of radiation safety assurance should be executed in the organization, where dose of exposure of workers by natural sources of radiation is more than 1 mSv/y.

CHAPTER 6

GENERAL REQUIREMENTS FOR RADIATION CONTROL

26. Radiation control should cover all types of effects of ionizing radiation on a person: occupational exposure, public exposure, medical exposure.

27. The objective of radiation control is to obtain information on individual and collective doses of exposure of personnel, patients and population in all conditions of life activity of a person, as well as information on all regulated values, which characterize a radiation environment.

28. Results of radiation control are used for estimation of the radiation environment, establishment of dose constraints and development of measures for decline of radiation doses, as well as assessment of their effectiveness.

29. Objects of a radiation control are:

personnel, who are exposed to ionizing radiation in working conditions;
patients, who perform a medical X-ray radiometric treatment;
population on exposure to natural and technogenic IRS;
living environment.

30. In order to ensure radiation safety of population the user of IRS develops and approves a radiation control system taking into account particularities and conditions of work.

The radiation control system during IRS management must be developed before commissioning of the facility. Types, scope and procedure for control

execution, a list of necessary equipment, accessories, location of stationary units and points of permanent and periodic control are specified in the Section "Radiation control" of the design documentation of the radiation facility.

After commissioning of the radiation facility the radiation control system could be revised taking into account a specific radiation environment on the radiation facility, on the adjacent territory.

31. Radiation control involves control and accounting of individual doses of exposure of personnel and population. Registration of doses of exposure of personnel and population should be carried out in accordance with the Regulation on the unified state system of accounting and control of individual doses of exposure, approved by the Resolution of the Council of Ministers of the Republic of Belarus of June 17, 1999 N 929 (the National Register of Legal Acts of the Republic of Belarus, 1999 N 49, 5/1114).

32. Reconstruction of individual doses from other types of exposure should be carried out for personnel, who have the accumulated dose from one type (category) of exposure in different exposure situations, which exceeds 0.5 Sv.

33. Measuring instruments must be applied for their intended purpose and undergo periodic verification, calibration and checking in the manner, established by the legislation of the Republic of Belarus.

CHAPTER 7

REQUIREMENTS TO IRS USERS AND PERSONNEL FOR RADIATION SAFETY ASSURANCE

34. The users of IRS must fulfill the following requirements:

to comply with the requirements of the Law of the Republic of Belarus "On Radiation Safety of Population" and the other normative legal acts and technical normative legal acts of the Republic of Belarus, containing binding requirements in the field of radiation safety;

to obtain from bodies and institutions that perform the state sanitary supervision a permit for work with IRS, production, use, storage, transportation and disposal of radioactive waste and other IRS, which is issued in the form of a sanitary passport;

to ensure non-exceedance of the established dose constraints on the radiation facility, in the sanitary and protection area (hereinafter - SPA) and in the supervised area (hereinafter - SA);

to ensure elaboration of controlled parameters of radiation factor effects on the radiation facility and in SA, which are established for operational radiation control with the aim of preservation of the achieved level of radiation safety, provision of further decline in exposure of personnel and

population, as well as decline in radioactive pollution of the environment;

- to determine a list of persons, belonging to personnel and provide them with necessary training and instructions;
- to assign a person, who is authorized to exercise control of radiation safety;
- to assign persons, who are responsible for exercising of radiation control, recording, storage and delivery of IRS, arrangement of collection, storage and delivery of radioactive waste;
- to create a commission for verification of knowledge of personnel in the field of radiation safety;
- to assign a person, who is responsible for technical state of IRS;
- to ensure creation of conditions for work with IRS, which meet the requirements of the present Sanitary Norms and Rules, the rules for labor protection, safety, the requirements of other normative legal and technical normative legal acts of the Republic of Belarus in this field.

35. When working with IRS the user of IRS is obliged to elaborate and agree with the bodies of the state sanitary supervision the instructions on radiation safety, which contain the procedure for conduction of work, control, registration, storage and delivery of IRS, collection and disposal of radioactive waste, maintenance of premises, individual protective measures, radiation safety measures during pre-commissioning work with IRS.

36. The personnel must fulfill the following requirements:

- to know and comply with the radiation safety requirements, established by the present Sanitary Norms and Rules, radiation safety instructions and job instructions;

- to use means of individual dosimetric control and means of individual protection;

- to comply with measures for protection of the personnel and the population against a radiation accident and its consequences;

- to inform immediately the head of the department, section, laboratory and the relevant officials and the person, authorized to exercise control over radiation safety assurance, about all detected faults or failures in operation of facilities, devices and apparatus, which are IRS;

- to ensure radiological protection of patients during medical exposure;

- to leave their workspaces after the end of a shift, if their further stay is not due to operational needs.

CHAPTER 8

HAZARD CATEGORIES OF RADIATION FACILITIES

37. A potential hazard of a radiation facility is defined by its possible radiation effect to population during a radiation accident.

Potentially more dangerous radiation facilities are those facilities, as a result of activities of which in the event of an accident the exposure of not only facility employees, but also population is possible. The least dangerous radiation facilities are those, which exclude a possibility of exposure of persons, not belonging to personnel.

38. According to a potential radiation hazard the radiation facilities are divided into four categories of radiation facilities:

Category I - radiation facilities, in the event of an accident on which a radiation effect on population is possible and administration of measures for radiation protection of it is required;

Category II - radiation facilities, in the event of an accident on which a radiation effect is limited to the area of SPA;

Category III - radiation facilities, in the event of an accident on which a radiation effect is limited to the area of the facility;

Category IV - radiation facilities, in the event of an accident on which a radiation effect is limited to the premises, where works with IRS are carried out.

39. A potential hazard of a radiation facility is determined before its commissioning. The procedure for designation of a category to the radiation facility is defined by the separate normative legal and technical normative legal acts of the Republic of Belarus.

CHAPTER 9

REQUIREMENTS FOR LOCATION OF RADIATION FACILITIES, ZONING OF AREAS

40. When considering a possibility of location of a radiation facility it is necessary to take into account the category of the facility, its potential radiological, chemical and fire hazard to population and environment.

41. When considering a possibility of location of radiation facilities of I and II categories on a plot additionally it is necessary to take into account meteorological, hydrological, geological and seismic factors both during normal operation and in case of possible accidents.

It is preferable to place radiation facilities of I and II categories on the plots, which:

- are located in scarcely populated flood-free areas;

- have a steady wind conditions;

- limit a possibility of spread of radioactive substances outside the facility due to its topographical and hydrogeological conditions.

Radiation facilities of I and II categories must be located taking into account the wind rose mainly on the leeward side in relation to a residential area, health care organizations and educational institutions, special

educational and training institutions, medical and educational institutions, as well as places of recreation and sports facilities.

42. The general plan of a radiation facility should be developed taking into account development of production, forecast of a radiation situation at the facility and around it, and a possibility of radiation accidents. The plan of the radiation facility location should be agreed with the bodies of the state sanitary supervision in the course of execution of examination of projects in accordance with Clause 3.23, Sub-Clause 10.24.3 of Clause 10.24 of the Single list of administrative procedures, carried out by the state bodies and other organizations in relation to legal entities and individual entrepreneurs, approved by the Resolution of the Council of Ministers of the Republic of Belarus of February 17, 2012 No, 156 "On Approval of the Single List of Administrative Procedures, Carried out by the State Bodies and Other Organizations in Relation to Legal Entities and Individual Entrepreneurs, Introduction of Amendments to the Resolution of the Council of Ministers of the Republic of Belarus of February 14, 2009 No. 193 and Annulment of some Resolutions of the Council of Ministers of the Republic of Belarus" (the National Register of Legal Acts of the Republic of Belarus, 2012, No. 35, 5/35330) (hereinafter - the Single List of Administrative Procedures).

43. It is not allowed to locate a radiation facility in a residential building, an establishment of education, a special educational and training institution, a medical and educational institution. In agreement with the state sanitary supervision bodies in some cases it is allowed to use IRS in residential buildings.

44. SPA and SA are established around radiation facilities of I and II categories.

45. The size of SPA and SA around the radiation facility is established taking into account possible levels of external exposure, as well as a degree and areas of possible spread of radioactive emissions and discharges.

In a mode of normal operation of the radiation facility the dose of public exposure on the boundary of SPA should not exceed the quota for public exposure from this radiation facility, which is established by the authorized state bodies and institutions, which execute the state sanitary supervision.

The radiation control maximum informativeness area, which is provided by the necessary completeness, accuracy and reliability of definable parameters, is determined in detection of the size of SA.

The internal boundary of SA always coincides with the external boundary of SPA.

46. SPA and SA are established taking into account their cumulative effects in case of location of a complex of radiation facilities at the same site.

47. Dimensions of SPA (exclusion zones) along a pipeline route for removal of liquid radioactive waste are established according to activity of

the latest, a land topography, nature of soil, a depth of the pipeline, a level of pressure in it and must be at least 20 m on each side from the pipeline.

48. The projects of SPA and SA are subject to agreement with the bodies of the state sanitary supervision. The condition for agreement of projects of SPA and SA is execution of the state sanitary and hygienic examination.

49. In SPA of radiation facilities a permanent or temporary residence, arrangement of recreation areas and leisure parks, educational institutions, health care organizations, health resorts and recuperation organizations, as well as industrial and auxiliary facilities, which are not related to the facility, are forbidden. Areas of SPA must be landscaped.

50. Changes in dimension of SPA and SA of existing, reconstructed and designed facilities must be accompanied by elaboration of a relevant project of SPA and SA with provision of a justification of these changes.

51. Transfer of lands of SPA to the category of agricultural lands is possible only by the decision of local executive committees in the presence of a positive sanitary and epidemiological conclusion. In this case, all manufactured products are subject to a sanitary and hygienic examination and radiation control.

52. In SPA and SA a user of IRS or a radiation facility must exercise radiation control and monitoring.

53. In SA in case of accidental releases of radioactive substances the administration of areas should provide a complex of protective measures, which ensure non-exceedance of levels of radiation impact in accordance with the requirements of Appendixes 19 - 21 of the Hygienic standard "Criteria for Radiation Impact Assessment".

54. In order to limit and (or) reduce consequences of a radiation accident on a radiation facility of I and II categories for public health the authorized state bodies and bodies of the state sanitary supervision may impose restrictions on economic activity in SA.

CHAPTER 10

REQUIREMENTS FOR RADIATION SAFETY IN THE DESIGN OF RADIATION FACILITIES

55. Design documentation on radiation facilities must contain a justification of safety measures during construction, capital repairs, modernization, reconstruction, operation, decommissioning, as well as in case of a radiation accident.

The design documentation is subject to the state sanitary and hygienic examination in accordance with the Regulation on the procedure and conditions for execution of the state sanitary and hygienic examination, approved by the Resolution of the Ministry of Health of the Republic of

Belarus of January 3, 2013 N 1.

56. The following shall be indicated in design documentation of a radiation facility for each premise (plot, area):

when working with unsealed IRS: a radionuclide, compound, aggregate state, activity at the workplace, annual consumption, type and nature of planned works, class of works;

when working with sealed IRS: a radionuclide, its type, activity, an allowable number of sources at the workplace and their total activity, nature of planned works;

when working with devices, which generate ionizing radiation: a type of the device, a category, energy and intensity of generated radiation and (or) an anode voltage, a current intensity and maximum number of simultaneously working devices, placed in one premise (on the plot, area);

when working with nuclear reactors, radionuclide generators, radioactive waste and other IRS with a complicated radiation characteristic: type of IRS and its radiation characteristics (a radionuclide composition, activity, energy and radiation intensity).

Nature and restrictive conditions are indicated for all works.

57. Design of protection against external ionizing radiation should be carried out taking into account the purpose of premises, categories of exposed persons, as well as duration of exposure. Design of protection against external exposure of personnel and population should be carried out with the safety factor of 2 according to the equivalent dose rate in the premises of permanent and temporary stay of personnel in accordance with the requirements, set out in Appendix 15 to the Hygienic standard "Criteria for Radiation Impact Assessment". It is necessary to take into account availability of other IRS and a prospective increase in their rate.

58. When calculating protection with the safety factor of 2, the design rate of an equivalent radiation dose (H) on the surface of protection is determined by the formula

$$H = 500 \times \frac{D}{t}, \text{ } \mu\text{c Sv/h},$$

where D – is a dose limit for personnel and population (mcSv/y);

t - is exposure time (hours per year).

Values of the equivalent dose rate, used in design of protection against external ionizing radiation are given in Appendix 15 to the Hygienic standard "Criteria for Radiation Impact Assessment". For X-ray apparatus and accelerators the calculation should be carried out taking into account a radiation output and workload of the apparatus.

59. Calculation of acceptable emissions and discharges of radiological facilities should be conducted on the basis of the requirement that the effective dose for the population during 70 years of life, caused by the annual emission and discharge, does not exceed the values of a quota of a dose limit.

60. When designing radiological facilities and choosing technological schemes of works it is necessary to ensure:

minimum exposure of personnel;

maximum automation and mechanization of operations;

automated and visual control of a technological process;

use of the least toxic and harmful substances;

minimum levels of noise, vibration and other harmful factors;

minimum emissions and discharges of radioactive substances;

minimum amount of radioactive waste with simple, reliable means of temporary storage and treatment;

sound and (or) light alarm, warning on violations of the technological process;

locks.

61. Technological equipment for works with radioactive substances must satisfy the following requirements:

a structure must be reliable and easy-to-use, possess necessary hermiticity, ensure a possibility of use of distance methods of management and control of an equipment operation process;

it must be made of strong corrosion-resistant and radiation-resistant materials, which are easy to decontaminate;

external and internal surfaces of equipment should be decontaminable.

62. A project of a radiation facility should envisage a complex of organizational, technical measures, as well as measures for assurance of radiation safety of personnel and population during repairs.

CHAPTER 11

REQUIREMENTS FOR ARRANGEMENT OF WORKS WITH IRS

63. A radiation facility or IRS at the end of construction, repair, modernization and technical re-equipment, as well as reconstruction is subject to commissioning by an acceptance committee, in accordance with the Regulation on the procedure for commissioning of construction facilities, approved by the Resolution of the Council of Ministers of the Republic of Belarus of June 6, 2011 No. 716 (the National Register of Legal Acts of the Republic of Belarus, 2011, No. 66, 5/33914).

64. Work with IRS is allowed only in premises, specified in the sanitary passport.

On doors of these premises it is necessary to indicate their purpose, class

of works, carried out with unsealed IRS, as well as apply a radiation precaution sign.

65. In premises of permanent and temporary stay of personnel the equivalent dose rate should not exceed the design rate by more than 2 times in accordance with the requirements of Appendix 15 for the Hygienic standard "Criteria for Radiation Impact Assessment".

66. Equipment, containers, packages, apparatus, mobile installations, vehicles, containing IRS, should have a radiation precaution sign.

67. In case of violation of requirements of the present Sanitary Norms and Rules the bodies and institutions, which execute the state sanitary supervision, are entitled in accordance with the procedure, established by the legislation, to suspend work with IRS fully or partially, withdraw the sanitary passport prior to expiration of its validity, to pose before the body, which has issued the special permit (license) for carrying out of work with IRS, a question of its suspension or termination.

68. Upon termination of works with IRS the administration of the organization is obliged within 15 days to notify of it the bodies of the state sanitary supervision.

The user of IRS makes a decision on the future use of the premises, in which previously works with radioactive substances were carried out, on the basis of an expert conclusion of the bodies and institutions, which exercise the state sanitary supervision.

69. When working with IRS it is not allowed to perform operations, which are not covered by operating manuals and radiation safety manuals, if these actions are not aimed at adoption of urgent measures to prevent accidents and other circumstances, endangering life and health of workers.

70. Technical conditions for protective technological equipment (chambers, boxes, fume cupboards) as well as safes, containers for storage and transportation of radioactive waste, vehicles, transport packaging, containers for storage and transportation of radioactive substances, filters of the system of gas and dust cleaning, IPM and radiation control means must be agreed with the bodies and institutions, which carry out the state sanitary supervision.

71. Production of devices, apparatus, installations and other products, whose operation is based on use of ionizing radiation, radionuclide radiation sources, devices, apparatus and installations, during operation of which ionizing radiation is generated, as well as production of reference radiation sources is allowed only according to technical documentation, which corresponds to the requirements of technical normative legal acts and agreed with the bodies and institutions that are engaged in the state sanitary supervision.

CHAPTER 12

REQUIREMENTS FOR DELIVERY, ACCOUNTING, STORAGE AND TRANSPORTATION OF IRS

72. Delivery to organizations of IRS and products containing them is carried out under call-off orders. A form of a call-off order for delivery of IRS is given in Appendix 5 to the present Sanitary Norms and Rules. Delivery of IRS, which are designed for calibration and verification of measuring instruments, is carried out without preparation of a call-off order, if their characteristics meet the requirements of Clause 9 of the present Sanitary Norms and Rules.

73. Call-off orders for receipt, delivery of IRS and products, containing them, must be agreed with the bodies of the state sanitary supervision and the Ministry for Emergency Situations of the Republic of Belarus.

74. Transfer of IRS and the indicated products with characteristics, which exceed the values, set out in Clause 9 of the present Sanitary Norms and Rules, from one organization to another is performed with an obligatory notification within 15 days of the state sanitary supervision bodies at the place of location of both the IRS transferring and receiving organizations.

75. The user, who has received IRS, is obliged to notify the territorial bodies of the state sanitary supervision within 15 days.

The user of IRS is not obliged to notify the territorial bodies of the state sanitary supervision upon receipt of radiopharmaceuticals for medical purposes with a half-life period of less than 10 days, if he has a permit (license) for this type of activity.

76. The user of IRS provides safety and physical protection of IRS, as well as such conditions of receipt, storage, use and writing-off from accounting of all IRS, for which is excluded the possibility of their loss or uncontrolled use.

77. A person, who is responsible for accounting, storage and delivery of IRS, exercises control over receipt and (or) transfer of IRS in the manner, prescribed by the user of IRS.

78. All radionuclide IRS, received by the organization, as well as generators of short-lived radionuclides, devices generating ionizing radiation, should be accounted in accordance with the requirements for accounting of material assets in the form of receipts and expenses registry of IRS, specified in Appendix 6 to the present Sanitary Norms and Rules. Individual pages are filled for each type of IRS. Accounting of devices, apparatus and installations, completed with radionuclide IRS, is conducted in the registry separately from accounting of radioactive substances. The registry should be

kept permanently.

79. Radionuclide IRS are accounted by a radionuclide, name of the preparation, package and activity, indicated in accompanying documents. Devices, apparatus and installations, in which radionuclide IRS are used, are recorded by names and serial numbers indicating activity and a number of each IRS, included in packaging.

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

Devices, which generate ionizing radiation, are accounted by a name, serial number and year of release.

Radionuclides, obtained in the organization with the help of generators, accelerators, nuclear reactors and other similar facilities, are accounted in the receipts and expenses registry of IRS by package, preparations and activities.

80. Radioactive substances and IRS are issued by a responsible person in accordance with the procedure, set by the user of IRS with a written permission of the head of the organization or a person, authorized by him, on the basis of a request for issuance of radioactive substances and IRS according to the form, specified in Appendix 7 to the present Sanitary Norms and Rules.

81. Expenditure of radioactive substances, used in an unsealed form, is accounted in accordance with the requirements of the specific normative legal acts and technical normative legal acts.

82. In case of unauthorized actions with respect to IRS or a system of a physical protection of IRS, as well as detection of a theft and loss of IRS the user of IRS is obliged to act in accordance with the scheme of notification in case of unauthorized actions with respect to IRS or the IRS physical protection system, as well as in case of detection of a theft and loss of IRS, which is contained in the plan of arrangements for protection of personnel and population from radiation accidents and their consequences.

83. IRS that are not in use, should be stored in specially designated areas or in equipped storages, which provide their safety and physical protection and exclude access for unauthorized persons. Activity of radionuclides, which are stored in storage, must not exceed the values, specified in the sanitary passport.

84. When creating a temporary storage for IRS outside the organization, including for gamma flaw-detective apparatus, used in field conditions, a prior agreement with the territorial bodies of the state sanitary supervision is required. The dose rate on an external surface of such storage or its fencing, which prevents access of unauthorized persons, shall not exceed 1.0 mcG / h.

Temporary storage of packages, containing radioactive substances in open storages and general storages of transport organizations, is permitted in the presence of a permit of the state sanitary supervision bodies.

85. Finishing and equipment of a premise for storage of unsealed IRS must meet the requirements, specified for premises for works of certain class, but not lower than class II, set out in Clause 114 of the present sanitary norms and rules.

86. Devices for storage of radionuclide IRS (niches, wells, safes) shall be designed so that when laying or removing separate IRS, personnel are not exposed to radiation from other IRS. Doors of sections and packages with radionuclides (containers, etc.) should be easy to open and have a clear marking with an indication of a name of a nuclide and its activity. Glass containers, containing radioactive liquid, should be placed in metal or plastic containers, which are sufficient for placement of all stored liquid in case if integrity of the container is crippled.

Schematic map of location of IRS in the storage is made by a person, who is responsible for accounting and storage of IRS, and approved in the manner, prescribed by the user of IRS.

Radioactive substances in the process of storage of which radioactive gases, vapors or aerosols can be released, should be stored in fume cupboards, boxes, chambers with cleaning filters on ventilation systems, in closed containers, made of fireproof materials, with a tap of gases. The storage should be equipped with twenty-four-hour exhaust ventilation. The requirements of this clause shall not apply to radon and isotope laboratories.

87. When storing radioactive substances with high activity a system of their cooling must be provided. When storing nuclear materials (uranium-233, uranium-235, plutonium-239, plutonium-241 or any combination of these radionuclides) nuclear safety measures must be provided. When storing flammable or explosive materials measures, ensuring explosion and fire safety of them must be provided.

88. Radionuclide IRS, which are unsuitable for further use, should be written off in due time and delivered for treatment, a long-term storage and (or) disposed.

89. Transportation of radioactive substances and nuclear materials inside the premises, as well as on the area of the organization must be carried out in containers and packages, taking into account a physical state of IRS, their activity, radiation type, size and weight of a package, in compliance with conditions of safety and in transport, intended for transportation of radioactive substances and nuclear materials.

90. Transport vehicles, which are intended for transportation of radioactive substances and nuclear materials outside the organization, must have a sanitary passport for the specialized transport for regular transportation of radioactive substances and materials, devices and installations with IRS and radioactive waste according to the form in conformity with Appendix 8 to the present Sanitary Norms and Rules.

Safety requirements for transportation of radionuclide IRS outside the organization are regulated by the separate sanitary norms and rules and other technical normative legal acts of the Republic of Belarus.

91. Levels of radioactive contamination of a surface of vehicles must not exceed the values, given in Appendix 14 to the Hygienic standard “Criteria for Radiation Impact Assessment”.

CHAPTER 13

REQUIREMENTS FOR DECOMMISSIONING OR EXTENSION OF SERVICE LIFE OF RADIATION FACILITIES AND IRS

92. Issuance of a radiation and hygienic passport for a new term, or a decision on decommissioning of a radiation facility, IRS is made by the commission after a comprehensive examination of a radiation and technical state of technological systems and equipment, building constructions and adjacent territories of the facility.

93. The question of possible extension of a term of operation of a radiation facility should be decided by the commission, which consists of representatives of the user of IRS, state bodies and organizations in the field of radiation safety assurance, and if necessary, representatives of the producer.

At expiration of a service life of a radiation facility, IRS, in order to extend the service life it is necessary to have a positive conclusion of the state sanitary supervision bodies on compliance of the radiation facility and (or) IRS with the requirements of the sanitary rules and norms, hygienic standards and the protocol of measurement of technical and radiological parameters of a radiation facility, IRS, made by a dedicated (accredited) institution, with a conclusion of correspondence of the radiation facility, IRS to the technical normative legal acts and passport data. In the conclusion, the commission indicates a possibility, conditions and terms of further use of the radiation facility, IRS.

94. On radiation facilities of category I, not later than 5 years before the assigned term of completion of operation, should be developed a detailed project on decommissioning of the whole facility or its separate parts, which is agreed with the state sanitary supervision bodies and the Ministry for Emergency Situations of the Republic of Belarus. For facilities of category II the project on decommissioning should be developed not later than 3 years before the term of termination of operation, and for facilities of category III - not later than 1 year.

95. In the project on decommissioning of a radiation facility the safety measures at all stages of its decommissioning must be provided: in case of a stop, conservation, dismantling, conversion, liquidation or disposal, as well

as during repairs.

96. The project on decommissioning of a radiation facility, aimed at ensuring safety of personnel, population and protection of the environment, must include:

preparation of equipment, which is necessary for carrying out of dismantling;

methods and means of decontamination of dismantled equipment;

procedure for disposal of radioactive waste;

a list and description of radiation protection measures to be applied in the process of decommissioning;

rehabilitation of the released areas and territories.

97. In the project on decommissioning of a radiation facility the committed individual and collective doses of exposure of personnel and population should be determined.

98. Decommissioning of radiation facilities must be performed by trained and qualified personnel of the radiation facility or by personnel of other organizations.

99. After decommissioning of devices, generating ionizing radiation, they must be brought to a state, which excludes the possibility of their use as IRS.

After decommissioning of radionuclide IRS, they must be transferred to specialized institutions for long-term storage and (or) disposal.

CHAPTER 14

REQUIREMENTS FOR WORK WITH SEALED IRS AND GENERATING IONIZING RADIATION DEVICES

100. Sealed IRS are non-renewable industrial products, which spend their resource continuously and cannot be repaired. Use of IRS or its storage should be stopped after the end of its operating life, or in case of violation of operating conditions. Depending on peculiarities of conditions of its operation and a technical state it may be decided to extend IRS operating lifetime. The decision on extension of the operating lifetime is made in accordance with the procedure, established by the legislation.

101. Control of hermiticity of sealed IRS should be carried out in the manner and within the terms, established in the relevant standards and technical documentation. It is not allowed to use sealed IRS in case of violation of their hermiticity.

102. In a non-operating position sealed IRS must be in protective devices and installations, generating ionizing radiation, should be de-energized. A protective device, in which the sealed IRS is placed, must be resistant to mechanical, chemical, thermal and other influences, as well as must has a

radiation precaution sign.

103. A remote tool or special devices should be used in order to remove a closed IRS from its protective container. When working with IRS without a protective container the protective barriers, manipulators must be used, and when working with IRS, creating the equivalent dose rate of more than 2 mSv / h at the distance of 1 m the special protective devices (boxes, cupboards and other) with remote control must be used.

104. A rate of an equivalent dose of radiation from portable, moving, stationary flaw-detection, therapeutic apparatus and other installations, whose operation is based on use of sealed radionuclide IRS, must not exceed 20 mSv / h at a distance of 1 m from the surface of a protective block with IRS.

For radioisotope devices, which are designed for use under industrial conditions, the equivalent dose rate at the surface of the block with IRS must not exceed 100 mSv / h and at a distance of 1 m from it the equivalent dose rate must not exceed 3 mSv / h.

The rate of the dose of radiation from devices, during operation of which concomitant unused X-ray radiation occurs, must not exceed 1.0 mSv / h at the distance of 0.1 m from any surface.

105. Requirements for radiation protection of personnel and patients against X-ray radiation of X-ray photofluorographic, X-ray diagnostic, X-ray therapeutic apparatus are regulated by the separate sanitary norms and rules, other technical normative legal acts of the Republic of Belarus.

106. The special requirements for premises are not imposed when using installations (apparatus), the dose rate of radiation from which in the operating position and during storage of IRS does not exceed 1.0 mSv / h at a distance of 1 m from accessible parts of the surface of the installation.

107. The working part of stationary apparatus and installations with an unlimited in directions beam of radiation must be placed in a separate premise (preferably in a separate building or a separate wing of the building); material and thickness of walls, a floor, a ceiling of this premises at any positions of IRS and direction of the beam must provide attenuation of primary and scattered radiation in adjacent premises and on the area of the organization to acceptable values.

The operation panel of such apparatus (installation), except for dental X-ray apparatus and mobile installations, should be placed in the premise, which is separated from IRS. The front door of the premise, where the apparatus is located, must be locked with a mechanism for moving of IRS or with turning-on of high (accelerating) voltage so as to prevent accidental exposure of the personnel.

108. The premises, where works with sealed IRS are carried out on stationary installations, shall be equipped with interlock systems and alarm systems, which inform about a position of IRS (IRS block). Furthermore, the

device should be provided for forced distance movement of IRS in a storage position in case of a power failure or in the event of any other accident.

109. In case of underwater storage of radionuclide IRS it is necessary to provide systems of automatic maintenance of the level of water in the basin, as well as alarm systems, which inform about the change of water level and about increase of the dose rate in the operating premise.

110. When working with sealed IRS the special requirements for interior finishing of premises are not imposed. Exceptions are premises, in which recharge, repair and temporary storage of dismantled equipment and installations are carried out, which should be equipped in accordance with the requirements for works with unsealed IRS of class III.

111. In case of use of powerful isotope gamma installations (installations with the source activity of more than $18,5 \times 10^3$ GBq) and storage of sealed IRS in amounts, which may lead to accumulation of excessive concentration of toxic substances in the air of working premises, it is necessary to provide a supply and exhaust ventilation, which ensures non-exceedance of a permissible concentration of toxic substances in the air of working area, established by the sanitary norms and rules, hygienic standards.

112. When using devices with sealed IRS and devices, generating ionizing radiation, outside premises or in common industrial premises an access of unauthorized persons to IRS shall be excluded and their safety shall be ensured.

In order to ensure radiation safety of personnel and population it is necessary to:

- direct radiation towards the ground or in a direction, where there is no people;

- remove IRS from population at the largest possible distance;

- limit the time of stay of personnel and population close to IRS;

- hang a radiation precaution sign and warning signs, which should be clearly visible from the distance of at least 3 m.

113. Prior to work with IRS personnel must carry out examination of equipment integrity. Upon detection of faults it is necessary to suspend work, inform the administration and call the representative of the organization, who carries out maintenance and repair of the equipment.

CHAPTER 15

REQUIREMENTS FOR WORK WITH UNSEALED IRS

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

- group A - radionuclides with MSA less than 10^3 Bq ;
- group B - radionuclides with MSA 10^4 and 10^5 Bq;
- group C - radionuclides with MSA 10^6 and 10^7 Bq;
- group D - radionuclides with MSA 10^8 and more.

Affiliation of a radionuclide to the radiation hazard group is determined in accordance with the requirements of Clauses 19, 20 of the Hygienic standard "Criteria for Radiation Impact Assessment". Short-lived radionuclides with a half-life period of less than 24 hours, not listed in Appendix 17, belong to the group D.

115. All works with unsealed IRS are divided into class I, class II and class III. Types of classes of works with unsealed radionuclide IRS are given in Appendix 16 to the Hygienic standard "Criteria for Radiation Impact Assessment". During simple operations with liquids (without vaporization, distillation, barbotage and others) increase of activity of radionuclides at the workplace is admitted by 10 times. During simple operations on derivation (elution) and packaging of generators of short-lived radionuclides for medical purposes the increase of activity of radionuclides at the workplace is allowed by 20 times. Class of works is determined by maximum simultaneously leachable (eluted) activity of a daughter radionuclide. For enterprises, which process uranium and its compounds, the class of works is determined according to the nature of production and regulated by special rules. When storing unsealed IRS it is allowed to increase activity of radionuclides by 100 times.

116. In case of presence at the workplace of radionuclides of various groups of radiation hazard their activity is reduced to group A of radiation hazard according to the formula

$$C_e = C_A + MSA_A \sum \left(\frac{C_i}{MSA_i} \right),$$

where C_e - is total activity, reduced to the activity of group A (Bq); C_A - is activity of radionuclides of group A, which present at the workplace (Bq); MSA - minimum significant activity for group A (Bq); C_i - is activity of the radionuclide i , which is not related to group A (Bq); MSA_i - is minimum significant activity of the radionuclide i (Bq).

117. A set of arrangements for radiation safety during work with unsealed IRS must ensure protection of persons against internal and external exposure, limit pollution of air and surfaces of work premises, skin coverings and clothes of personnel, as well as environmental objects (air, soil, plants, etc.) both in normal operation and during the works on liquidation of consequences of a radiation accident.

118. Limit of intake of radionuclides in working premises and the environment should be ensured by use of a system of static (equipment, walls and floors of premises) and dynamic (ventilation and gas cleaning) barriers.

119. In the organization the premises for each class of works should be situated in one place. In those cases, when the organization performs works of all three classes, the premises should be divided in accordance with the class of carried out works.

In case of performance in the same organization of works of II and III classes, connected by a single technology, it is possible to allocate a common block of premises, equipped in compliance with the safety requirements for works of this class.

120. Premises for permanent and temporary stay of personnel are allocated in the course of planning. An airlock or a sanitary barrier as well as a radiation control point must be in the exit from these premises.

121. Works with unsealed IRS with activity below MSA (below the values, given in Appendix 13 to the Hygienic standard "Criteria for Radiation Impact Assessment") are allowed to perform in premises, for which radiation safety requirements are not imposed.

122. Works of class III must be carried out in separate premises, in the process of finishing and equipment of which chemically resistant, corrosion-resistant and easily decontaminated materials should be used. These premises must be equipped with a general exchange and local supply and exhaust ventilation, a shower and washbasin. Works, connected with the possibility of radioactive air pollution (operations with powders, evaporation of solutions, work with emanating and volatile substances, etc.), must be conducted in fume hoods.

123. Works of Class I must be conducted in a separate building or in an isolated part of the building with a separate entrance only through an air lock. Working premises must be equipped with boxes, chambers, canyons or other sealed apparatus. The premises, where works of class I are conducted, are divided into three areas:

1st area – is non-occupied premises, where technological equipment and communications, which are major source of ionizing radiation and radioactive contamination, are located. It is not allowed for personnel to stay in non-occupied premises while technological equipment is operating;

2nd area - is periodically occupied premises (premises for temporary stay of personnel), intended for repair of equipment, other works, connected with opening of technological equipment, placement of items of load and discharge of radioactive materials, temporary storage of raw, finished goods and radioactive waste;

3rd area - is premises for permanent stay of personnel during an entire shift (control rooms, operation panels and other).

Sanitary barriers are installed in order to exclude spread of radioactive contamination between areas.

When performing works of class I depending on the purpose of the radiation facility and efficiency of applied barriers it is allowed to use two-area planning of working premises, including the following areas: non-occupied premises and premises for permanent stay of personnel.

124. In premises for works of I and II class the management of general systems of heating, gas supply, compressed air, water supply, as well as circuit-breaker panels must be removed from these working premises.

125. Automation and remote control systems, shielding of IRS and reduction of time of working operations should be applied in order to reduce levels of external exposure of personnel from unsealed IRS.

126. In the organization, where works with radioactive substances are performed, a set of arrangements for decontamination of industrial premises and equipment must be provided.

127. Floors and walls of premises for works of class II and 3rd area of class I, as well as ceilings in the 1st and 2nd areas of class I must be covered with sorbing materials, which are resistant to decontamination, and not have coverage defects. The premises, belonging to different areas and classes, should be painted in different colors.

128. For works of I and II classes a space of a premise per a worker must be not less than 10 sq. m. Height of premises for work with radioactive substances and space per a worker are determined by requirements of the technical normative legal acts.

129. Doors, windows, equipment and working furniture should be made of materials and have a construction, which provides effective removal of radioactive contaminants. The edges of floor coverings should be raised and sealed flush with walls. In the presence of traps the floors should have biases.

130. Equipment, tools and furniture must be assigned to premises of each class (areas) and labeled accordingly. Their transfer from premises of one class (area) to the other is prohibited, in exceptional cases it can be allowed only after exercising of radiation control with a mandatory replacement of marking.

131. Manufacturing operations with radioactive substances in chambers and boxes, except for introduction of a radiopharmaceutical preparation into vessels, or cavities, or tissues of a body of a patient, must be performed by remote means, or by using gloves, which are hermetically mounted in a façade wall. Loading and unloading of processed products, equipment, replacement of chamber gloves, manipulators and other equipment must be carried out without depressurization of chambers or boxes.

132. It is prohibited to store radioactive substances at the workplace. In agreement with the administration radioactive substances can be issued to

personnel for a work shift in the amount, which is necessary for performance of operations or works on the task, which is issued to the personnel. The amount of radioactive substances at the workplace must not exceed the necessary amounts. Given the chance of choice of radioactive substance it is necessary to use substances with smaller group of radiation hazard, solutions, rather than powders, solutions with lower specific activity.

Number of operations in the process of which losses of radioactive substances are possible (powders interspersing, distillation), should be reduced to a minimum. In hand operations with radioactive solutions it is necessary to use auto-pipets or pipettes with pears.

Arrangement of works with radioactive substances should be aimed at minimization of radioactive waste, resulting from technological processes (operations).

133. In order to limit contamination of working surfaces, equipment and premises, when working with radioactive substances in laboratory conditions, it is necessary to use trays and pallets, made of sorbing materials, plastic coatings, filter paper and other ancillary single-use materials.

134. In premises for works with radioactive substances in an unsealed form the following is prohibited:

stay of personnel without necessary IPM;

eating, smoking, use of cosmetic products;

storage of food products, tobacco, home clothes, cosmetic products and other items, which are not related to work.

135. For eating it is necessary to provide a special premise, which is equipped with a sink for washing of hands with a hot water and isolated from the premises, where works with the use of radioactive substances in an unsealed form are performed.

CHAPTER 16

REQUIREMENTS FOR SANITARY AND TECHNICAL SYSTEMS OF PROVISION OF WORKS WITH UNSEALED IRS

136. With the aim of non-exceedance of quotas of public exposure, established for a radiation facility, acceptable values of emissions and discharges are established on the basis of the sanitary and hygienic conclusion of the state sanitary supervision bodies.

137. Acceptable emissions are established for radiation facilities, from which emissions of radioactive substances into the atmosphere could create a dose of exposure of a representative person of more than 10 mSv / year.

138. A total emission per a year from a radiation facility shall not exceed the acceptable value of annual emission, established by bodies and institutions, exercising the state sanitary supervision.

139. In buildings, where for works with radioactive substances only part of the total area is assigned, it is necessary to provide separate ventilation systems for premises, where works with radioactive substances are performed, and for premises, not involving the use of radioactive substances.

140. When working with unsealed IRS ventilation and air pollution control equipment should provide protection against radioactive contamination of air of working premises and atmospheric air. Working premises, fume cupboards, boxes, canyons and other technological equipment should be arranged so, that the air flow is directed from less polluted spaces to the more polluted.

141. When working with unsealed IRS the contaminated air, removed from hiding spots, as well as from boxes, chambers, cupboards and other equipment, before being discharged into the atmosphere must be purified to acceptable emission levels. Dilution of this air should be excluded prior to its purification.

142. In organizations, where works of class I and if necessary works of class II are carried out, vent-pipes, the height of which must ensure reduction of volume activity of radioactive substances in atmospheric air at the site of landing of the torch to acceptable emission levels, are provided.

143. In premises, where works of I and II classes are carried out, and air recirculation systems are used, it is necessary to provide cleaning and aeration of premises to acceptable levels of radioactive and toxic substances at the workplace.

144. In sealed chambers and boxes with closed aisles a rarefaction of at least 20 mm of water column should be provided. Chambers and boxes must be equipped with controlling the degree of vacuum devices. The design speed of air flow in the working aisles of fume hoods and shelters shall be taken as 1.5 m/s.

A short-term decline in rarefaction is permitted to 10 mm of the water column and decline in air speed in opened aisles is permitted to 0.5 m/s.

145. Ventilators of an exhaust ventilation system (cupboards, boxes and chambers) should be placed in special separate premises.

For premises for works of class I ventilation systems must have auxiliary machinery with a capacity of not less than 1/3 of the total design capacity.

In premises for works of class I an exhaust chamber must be part of premises of 2nd area.

Starters of engines must have a light alarm and be placed in premises of 3rd area.

146. For works with emanating and volatile radioactive substances a permanently functioning system of exhaust ventilation of storages, working premises and boxes must be provided. The system should have a reserve extraction aggregate with a capacity of not less than 1/3 of the total

design capacity.

147. The main requirements in the process of selection and composition of systems and facilities of gas and dust cleaning when working with radioactive substances of classes I and II are:

- a minimum number of gas and dust cleaning equipment;

- mechanization and automation of processes of service, repair and replacement of gas and dust cleaning equipment, and if necessary - remote performance of these works;

- presence of systems of alarm and control over efficiency of operation of cleaning units and filters; in case of a multi-stage gas and dust cleaning system it is necessary to implement alarm and automated control both over operation of the whole system and its separate parts (stages);

- reliable isolation of gas and dust cleaning equipment as a radiation source, assurance of safety of personnel during its examination and maintenance.

148. Filters and apparatus should be installed, if possible, directly near boxes, chambers, cupboards, shelters, in order to minimize contamination of systems of trunk air ducts. The operating lifetime of apparatus and filters should be determined by reduction of the air capacity or by the level of radiation hazard, arising from accumulation of radioactive substances.

149. When placing gas and dust cleaning equipment in separate premises (parts of buildings, separate buildings), these premises must meet the same requirements as production facilities. In case of placement of gas and dust cleaning equipment in a garret, the latter must be equipped with a technical floor.

150. The premises of gas and dust cleaning equipment must be isolated and must not be in air communication with production facilities, in which works with IRS and areas are performed. An entry and exit to the premises of gas and dust cleaning equipment should be made through a sanitary barrier.

151. In a set of premises for gas and dust cleaning equipment it is necessary to have isolated premises or hermetic ventilated areas for repair, disassembly, temporary storage of filters, apparatus and their components, as well as for storage of cleaning and decontamination facilities.

152. In case of a centralized placement of gas and dust cleaning equipment in areas for works of class I the zoning principle must be taken as a basis for planning of a gas and dust cleaning set.

153. In premises for works of class I and certain works of class II it is necessary to provide supply of air to hose isolating IPM of personnel (pneumatic suits, pneumatic helmets, hose gas-mask), as well as the ability to connect moving exhaust installations with exhaust ventilation systems.

For supply of air to hose IPM it is necessary to install a separate pneumatic line or separate ventilators, which provide necessary pressure and

consumption of air. Places of connection of hoses must be equipped with ball or spring automatic valves.

154. Heating of premises for works with the use of radioactive substances should be water or air.

155. In organizations, where formation of a significant amount of liquid radioactive waste is possible (more than 200 liters per day), a special sewage system must be provided by the project. Non-radioactive effluents must not fall in the special sewage.

156. Organizations, where works with radioactive substances of all classes are carried out in an open type, must have cold and hot water supply and sewerage. Exceptions are field laboratories, which carry out works of class III and are located outside populated areas or in populated areas without central water supply.

157. In the premises for works of class I and II cranes for water, supplied to sinks, must have faucets and must be opened with the help of a foot, an elbow or a non-contact device. Flushing of toilets must be carried out by pedal descent of water. Washbasins must be equipped with electric hand driers.

158. The special sewage system (hereinafter - the special sewage) should include decontamination of waste water and the possibility of their reuse for technological purposes. Cleaning facilities should be placed in a special premise on the area of the radiation facility. The special sewage system shall be provided with means of control over the amount and activity of waste water.

Receivers for discharging of radioactive solutions (sinks, traps) in the special sewage system must be made of corrosion-resistant materials or have easily decontaminated corrosion-resistant coatings of internal and external surfaces. Receiver design must exclude the possibility of splashing of solutions.

159. Installation of air ducts, water pipes, sewage and other utilities in walls and ceilings must not lead to weakening of ionizing radiation protection.

CHAPTER 17

REQUIREMENTS FOR AIRLOCKS AND SANITARY BARRIERS

160. An airlock should be placed in the building, in which works with unsealed IRS are carried out, or in a separate part of the building, connected with the manufacturing building (laboratory) by a closed gallery.

The airlock includes: shower rooms, a dressing room for personal clothes, a dressing room for working clothes (hereinafter - working clothes), facilities for storage of IPM, a point of radiometric control over skin

coverings and working clothes, a thermal chamber, a store room for contaminated working clothes, a store for clean working clothes, a room for feminine hygiene, toilet rooms.

A drinking fountain with a pedal or non-contacting control should be in the airlock.

161. Plan of the airlock must exclude the possibility of crossing of flows of personnel in personal and working clothes. The ability to pass from the premises of a free access zone to the premises of a controlled access zone, bypassing the airlock, should be excluded.

162. Stationary sanitary barriers are located between the 2nd and 3rd areas of working premises. Depending on the size and nature of conducted works sanitary barriers include:

- rooms for changing, storage and pre-decontamination of additional IPM;
- a point of radiation control;
- sinks.

Apart from stationary sanitary barriers it is possible to use portable sanitary barriers, installed directly at the entrance to the premise where repairs are made.

163. A floor, walls and ceilings of sanitary facilities of an air lock, as well as surfaces of cupboards must have water-resistant coatings, sorbing radioactive substances, and allow easy cleaning and decontamination.

164. Number of places for storage of personal and working clothes in a dressing room must comply with the maximum number of personnel, working in a shift.

165. Placement of a store room for contaminated working clothes should provide closed transportation of working clothes, directed to a laundry with an exit to a street, bypassing clean rooms. The store room should be located close to radiometric control points and a dressing room for contaminated clothing.

Sorting of working clothes must be carried out according to its appearance and degree of contamination. Contaminated working clothes from a dressing room is transferred to a store room in a packaged form for subsequent delivery to specialized laundries (hereinafter - a specialized laundry).

166. Premises for storage and issuing of IPM (aprons, glasses, respirators, extra shoes, etc.) should be located in a clean area, between a dressing room for working clothes and working premises.

167. Point of radiometric control over the skin coverings should be placed between a shower room and a dressing room for personal clothes.

CHAPTER 18

REQUIREMENTS FOR HANDLING OF MATERIALS AND PRODUCTS, CONTAMINATED WITH OR CONTAINING RADIONUCLIDES

168. Raw, materials, articles and products with low levels of radionuclides may be used in economic activities.

Raw, materials, articles and products, containing radionuclides, may be used in economic activities, if in the process of a proposed use their committed individual annual effective dose of exposure does not exceed 10 mSv and the annual collective effective dose is not more than 1 man Sv.

169. It is not allowed to use in economic activity materials, articles and products (metal, wood, etc.), with a non-fixed (removable) radioactive contamination of the surface.

170. There are no restrictions on use in economic activities of any materials, raw, articles and products (except food raw materials, food products, drinking water and animal feeding) in case when specific activity of radionuclides in them is less than the values, given in Appendix 4 to the Hygienic standard "Criteria for Radiation Impact Assessment", except for their use, which leads to concentration of radionuclides at levels, which requires special treatment.

Upon agreement with the state sanitary supervision bodies for certain beta-emitting radionuclides in justified cases, it can be set higher values of specific activity of raw and products, suitable for unrestricted use.

171. In order to determine the possibility of use of raw, materials, articles and products the state sanitary supervision bodies carry out a sanitary and hygienic examination for determination of conformity of specific activity of radionuclides in the raw, materials, articles and products with the requirements, given in Appendix 4 to the Hygienic standard "Criteria for Radiation Impact Assessment" In a sanitary and epidemiological conclusion one of the following cases of use must be specified: possible, limited or impossible.

Unlimited use of raw, materials, articles and products is possible when specific activity of radionuclides in them does not exceed the values, given in Appendix 4 to the Hygienic standard "Criteria for Radiation Impact Assessment".

Raw, materials, articles and products, which have specific activity of technogenic radionuclides from the values, given in Appendix 4 to the Hygienic standard "Criteria for Radiation Impact Assessment", to MSSA values $\langle * \rangle$, can be used limitedly as well as subject to compliance with the requirements of Clause 168 of the present Sanitary Norms and Rules. Further the products, manufactured from this raw, materials or articles, are subject to

mandatory radiation control.

<*> When there are several technogenic radionuclides the sum of ratios of specific activities of all technogenic radionuclides, contained in the material, to MSSA values for them must be less than one.

172. Designed for further use materials, articles, and products, contaminated with radioactive substances above the levels, set out in Clause 171 of the present Sanitary Norms and Rules, are subject to decontamination to the levels, specified in Appendix 12 to the Hygienic standard “Criteria for Radiation Impact Assessment”.

Deactivation should be performed in those cases when a level of contamination of raw, materials, articles and products can be reduced to acceptable levels, ensuring their further use.

173. A document on content of radionuclides and absence of removable radioactive contamination in raw, materials, articles and products, intended for exportation from the radiation facility, is issued by the radiation safety service or by a responsible person, appointed by the user of IRS. A sanitary and hygienic conclusion on the possibility of their further use is issued by the state sanitary supervision bodies.

174. Designed for sending to reprocessing enterprises contaminated metallic raw after its decontamination is subject to preliminary re-melting or other reprocessing on radiation facilities in order to avoid formation of secondary radioactive waste at its further use.

175. Organizations, in which decontamination, re-melting or other reprocessing of metals, contaminated with radionuclides is carried out, must have a special permit (license) for these types of works.

Acceptable specific activities of basic long-lived radionuclides for unlimited use of metals after preliminary re-melting or other reprocessing are given in Appendix 18 to the Hygienic standard “Criteria for Radiation Impact Assessment”. At presence in metal a mixture of radionuclides the values of specific activities of individual radionuclides must satisfy the correlation:

$$\sum \frac{Q_i}{ASA_i} < 1,$$

where Q_i - is a specific activity of the radionuclide i in metal; ASA – is an acceptable specific activity of the radionuclide i .

176. It is necessary to treat with materials, articles, raw and products as with radioactive wastes, if their use is impossible in connection with non-compliance with the requirements, listed in Clause 171 of the present Sanitary norms and rules.

Raw, materials, products and articles, the use of which is impossible, are transferred to specially designated areas in industrial waste disposal sites. Procedure, conditions and methods of disposal of such raw, materials, products and articles are determined by organizations, which are responsible for these facilities, in agreement with the state sanitary supervision bodies. In such cases, and in the absence of removable contamination, the state sanitary supervision bodies should indicate in a sanitary and hygienic conclusion the recommendations for disposal of such raw, materials, products and articles.

177. Use of radioactive substances by their introduction into generated products, regardless of physical state of products, is permitted subject to compliance with requirements of certain technical normative legal acts, adopted in accordance with the legislation.

CHAPTER 19

REQUIREMENTS FOR RADIOACTIVE WASTE MANAGEMENT

178. Discharge of technogenic radionuclides into the atmospheric air is carried out in accordance with the permissible discharge standards and approval documents, established in accordance with the environment protection legislation and atmosphere air protection legislation.

The gaseous radioactive wastes are subject to ageing and (or) cleanup in filters in order to reduce their activity to the levels, which are designated by the permissible discharge, and after that they can be disposed in the atmosphere.

179. The criteria for classification of wastes as radioactive wastes, their categorization, as well as the requirements for radioactive waste management are established by the separate normative and legal acts and technical normative and legal acts.

180. According to aggregate state radioactive waste are divided into liquid, solid and gaseous. The system of management with liquid and solid radioactive waste includes their collection, immobilization, processing, storage and (or) disposal, as well as transportation of radioactive waste.

181. Transfer of radioactive wastes from the organization for processing, long-term storage and (or) disposal to a specialized organization shall be executed in the manner, determined by the normative legal acts and technical normative legal acts of the Republic of Belarus.

Levels of radioactive contamination on surfaces of a package (container) must not exceed the values, given in Appendix 14 to the Hygienic standard "Criteria for Radiation Impact Assessment".

182. Transportation of radioactive waste must be carried out by specialized enterprises on a specially equipped vehicles in accordance with the applicable rules on safe transportation of radioactive substances and at

presence of an accompanying certificate for radioactive waste transportation, executed in accordance with the Resolution of the Ministry for Emergency Situations of the Republic of Belarus of April 30, 2009 No. 20 “On Approval of the Form of Accompanying Certificate for Radioactive Waste Transportation and Instruction on Execution of Accompanying Certificate for Radioactive Waste Transportation” (the National Register of Legal Acts of the Republic of Belarus, 2009, No. 145, 8/20999).

183. Selection of radioactive wastes disposal sites must be based on hydrological, geomorphological, tectonic and seismic conditions. At the same time radiation safety of population and the environment must be ensured during the whole period of isolation of waste, taking into account the long-term forecast.

184. The organization and (or) the user of IRS, in the process of activities of which radioactive waste management is carried out, for planning and implementation of measures for radiation safety assurance should have a scheme of radioactive wastes management.

185. The effective dose of public exposure, caused by radioactive waste at all stages of their management, should not exceed 10 mSv / year.

CHAPTER 20

REQUIREMENTS FOR RADIATION CONTROL WHEN WORKING WITH TECHNOGENIC IRS

186. Radiating control when working with technogenic IRS should be carried out by a service or a person, who is responsible for radiation control, as well as for all main indicators of radiation, which determine the level exposure of personnel and population.

In design documentation the following are established and justified: facilities and types of radiation control, controlled parameters, acceptable levels of controlled parameters, points of radiation control, frequency of radiation control, technical means and methodical provision of radiation control, composition of necessary premises and a staff of workers, engaged in radiation control.

Radiating control should include individual dosimetric control of personnel, as well as radiation environment control.

187. Contribution of natural sources of radiation into exposure of personnel in production conditions should be monitored and taken into account in those cases, when it exceeds the dose of 1 mSv / year.

188. Individual dosimetric control is mandatory for personnel. Individual control over personnel exposure, depending on the nature of work includes:
radiometric control of contamination of skin coverings and IPM;
control of nature, dynamics and levels of intake of radioactive substances

into the body using methods of direct and (or) indirect radiometry;

control of doses of external beta radiation, gamma-radiation and X-ray radiation, as well as neutrons by using of individual dosimeters or by calculation.

Based on results of radiation control the person or the radiation control service must calculate values of effective doses for personnel, and if necessary determine values of equivalent doses of exposure of certain organs.

189. Control over radiation environment, depending on the nature of conducted works includes:

measurement of the dose rate of X-ray, gamma and neutron radiation, flux density of particles of ionizing radiation at workplaces, in adjacent premises, on the territory of the organization, in SPA and SA;

measurement of levels of radioactive contamination of work surfaces, equipment, vehicles, IPM, skin coverings and clothes of personnel;

determination of volume activity of gases and aerosols in the air of working premises;

measurement and assessment of discharges of radioactive substances;

determination of levels of radioactive contamination of objects of the environment in SPA and SA.

190. The system of radiation control of facilities of categories I and II must use the following technical means:

continuous control on the basis of stationary automated technical means;

operational control based on portable and mobile technical means;

laboratory analysis on the basis of stationary laboratory equipment, means of selection and preparation of samples for analysis.

Automated radiation control systems (ARCS) should provide control, registration, displaying, collection, processing, storage and delivery of information.

191. In premises, where works with fissile materials are carried out in quantities, which may cause spontaneous fission chain reactions, as well as on nuclear reactors and critical assemblies and in the process of other works of class I, where the radiation situation during the work can change significantly, it is necessary to install radiation control equipment with sound and light signaling devices, and provide personnel with emergency dosimeters.

192. Results of individual dosimetric control of personnel must be kept for 50 years. When conducting individual control it is necessary to keep accounts of annual effective and, if necessary, annual equivalent doses, an effective dose for 5 consecutive years, as well as a total cumulative dose for the whole period of professional activity of personnel.

193. An individual external radiation dose status card of persons, working with IRS (hereinafter – an individual card of the personnel) should

be made by the employer for each employee, belonging to the category of personnel. The form of the individual card of personnel is given in Appendix 9 to the present Sanitary Norms and Rules.

Individual radiation dose should be registered in the registry of individual doses of external exposure of persons, working with IRS, with subsequent entering in an individual card of personnel.

A copy of an individual card of personnel in the event of his transfer to another organization, where work with IRS is carried out, should be transferred to a new workplace, in case of termination of labor relations it is issued to the employee.

An original of an individual card of personnel should be kept by the employer, which has issued it. Individual cards of personnel must be kept in a paper form and in a form of an electronic database.

194. Processing and transmission of information on individual doses of exposure of personnel and population is carried out in accordance with the Resolution of the Council of Ministers of June 17, 1999 No. 929 "On United State System of Accounting for and Control of Individual Exposure Doses".

195. To the persons, seconded for works with IRS, the sending organization should give a copy of the individual card on received radiation doses. Data on doses of exposure of seconded persons should be included by the receiving organization in copies of the individual cards and returned to the sending organization.

196. The user of technogenic IRS sets values of controlled parameters for assurance of non-exceedance of exposure dose constraints, established by the state sanitary supervision bodies for this practice.

197. When establishing dose constraints one should proceed from the principle of optimization taking into account:

unevenness of radiation effects in time;

appropriateness of maintaining of already achieved level of radiation effects at the facility below the acceptable level;

effectiveness of arrangements for improvement of the radiation situation.

In case of change of working conditions the list and numerical values of dose constraints, as well as their derivatives are subject to change.

When determining the controlled parameters it is necessary to consider a possible intake of radionuclides through food chains, as well as the external radiation of radionuclides, accumulated on the location.

198. The radiation control service should compare results of radiation control with the values of dose limits for personnel and population and dose constraints, and if they are exceeded it shall inform the administration and the state sanitary supervision bodies.

CHAPTER 21

REQUIREMENTS FOR METHODS AND MEANS OF INDIVIDUAL PROTECTION AND PERSONAL HYGIENE

199. The user of IRS must provide IPM for personnel and all persons, who visit premises or an area, where works with IRS are carried out. When choosing IPM the specifics of production, the nature and conditions of work must be taken into account.

200. When working with radioactive substances of class I in an open form and during some works of class II the employer must provide personnel with the basic and additional set of IPM, which provide protection that meets the level and nature of possible radioactive contamination during performance of works.

When performing works of class II and some works of class III the personnel must be provided with an additional set of IPM.

201. IPM for works with radioactive substances shall be made of well decontaminated materials or be single-use.

202. Personnel, working with radioactive solutions and powders, as well as personnel, carrying out cleanup of premises, in which works with radioactive substances are carried out, apart from a set of basic IPM additionally must have working clothes, made of film materials or materials with polymeric coating: aprons, arm ruffles, splash coats, rubber and plastic safety shoes.

203. Personnel, performing works on welding or cutting of metal, contaminated with radionuclides, shall be provided with IPM from nonsparking decontaminated materials.

204. IPM of respiratory organs of a filtering or isolation type should be used when working in conditions of possible aerosol contamination of air of premises with radioactive substances (for example, in the course of work with powders, evaporation of radioactive solutions).

205. During works, when contamination of air of premises with radioactive gases or vapors (elimination of accidents, repair works) is possible or when use of filtration means does not provide radiation safety it is necessary to use isolating protective equipment (pneumatic suits, pneumatic helmets, and in some cases - autonomous isolating devices).

206. When passing from premises for works of higher class to premises for works of lower class it is necessary to control levels of radioactive contamination of IPM, and when passing from the 2nd to the 3rd area it is necessary to remove additional IPM.

207. Working clothes and linen, contaminated above acceptable levels, should be decontaminated in specialized laundries. The procedure and frequency of change of working clothes and linen, their decontamination is

established by the separate technical normative and legal acts.

Additional IPM (filmy, rubber, with polymer coating) after each use should be subject to pre-decontamination in a sanitary barrier or in other special place. If after decontamination of them the residual contamination exceeds the acceptable level, the additional IPM should be decontaminated in a special laundry.

208. Upon exiting the premises, where works with radioactive substances are carried out, it is necessary to check cleanliness of working clothes and other IPM, to take off them and in case of detection of radioactive contamination to send them for decontamination, and the worker should take a shower.

209. Radioactive contamination of personal clothes and shoes should be excluded. In case of detection of such contamination the clothes and shoes are subject to decontamination under control of the radiation safety assurance service, and if cleanup is impossible it is subject to disposal.

210. On radiation facilities, where cases of radioactive contamination of skin coverings may occur, means of decontamination (detergents), which effectively remove contamination and do not increase intake of radionuclides through the skin into the body should be used.

CHAPTER 22

REQUIREMENTS FOR RADIATION SAFETY DURING MEDICAL EXPOSURE

211. Radiation safety must be ensured in all types of medical exposure (preventive, diagnostic, therapeutic, study) by achieving a maximum benefit from X-ray radiological procedures (the principle of justification) and comprehensive minimization of radiation detriment with absolute superiority of benefits for exposed individuals over detriment (the principle of optimization).

212. Medical exposure of patients with the purpose of obtaining of diagnostic information or therapeutic effect is carried out only by prescription of a specialist doctor and with a written consent of the patient (or his legal representative). The final decision on carrying out of the appropriate procedure is made by the specialist doctor, performing the procedure.

213. Medical diagnostic exposure is carried out according to medical indications, in cases when there are no, or cannot be applied, or when there are no sufficient information on alternative diagnostic methods.

214. X-ray diagnostic survey with the use of unsealed IRS should not be performed for pregnant women and nursing mothers, except for cases when these procedures should be performed for health reasons.

215. When assigning medical diagnostic survey with the use of IRS for

female patients of childbearing age it is necessary to take into account phases of a menstrual cycle.

216. It is necessary to seek to reduce exposure of patients both by eliminating unjustified prescriptions of X-ray radiological procedures and their unjustified repetitions.

Methods for carrying out of all kinds of X-ray radiological diagnostic surveys should guarantee absence of radial deterministic effects in patients. Methods for carrying out of medical X-ray radiological procedures are developed and approved by the Ministry of Health of the Republic of Belarus.

217. In order to prevent radiation complications in patients during radiation therapy all possible measures should be taken.

218. Radiation therapy departments, X-ray departments and rooms should have and use means of radiation protection of a patient and personnel when performing therapeutic or diagnostic procedures. List of means of radiation protection of a patient and personnel in various departments and rooms of radiation therapy and diagnostics is determined by the separate technical normative legal acts of the Republic of Belarus.

219. Medical workers, involved in X-ray radiological diagnostics and therapy, are obliged to protect a patient, by means of keeping of his individual dose of exposure at the lowest possible level.

220. Doses of exposure of a patient from each X-ray radiological survey are recorded in forms of accounting medical documentation, approved by the Ministry of Health. Data on patient radiation doses are sent to the state dosimetric register in the prescribed manner.

221. Personnel has no right to influence on increase of exposure of a patient directly or indirectly in order to reduce their own occupational exposure.

CHAPTER 23

REQUIREMENTS FOR RADIATION SAFETY DURING EFFECTS OF NATURAL RADIATION SOURCES

222. Requirements for radiation safety assurance on exposure to natural IRS in production environment are imposed on any organizations, in which exposure of workers from natural radionuclides exceeds 1 mSv / year. These include, in particular, organizations, carrying out works in underground conditions (non-uranium mills, mines, etc.), as well as organizations, mining and processing mineral and organic raw materials with a high content of natural radionuclides. Measures for radiation safety assurance must be foreseen in these organizations on a design stage.

223. Organizations, mining and processing ores with the purpose of

extraction from them natural radionuclides (uranium, radium, thorium, and other), as well as organizations, which use these radionuclides, belong to organizations, conducting works with technogenic sources of radiation. They are subject to requirements for radiation safety assurance during works with technogenic sources of radiation.

224. For construction of industrial buildings it is necessary to select areas of territories, where the radon flux density from the surface of the ground does not exceed 250 MBq / (sq.m. x s). When designing the construction of a building on the area with a radon flux density from the surface of the ground is more than 250 MBq / (sq.m. x s) in the building project should be presented the system of protection against radon.

225. In organizations, where works with technogenic sources of IRS are not carried out, levels of natural exposure of workers in working environment should not exceed the values, given in Clauses 39, 40 of the Sanitary Norms and Rules "Radiation Safety Requirements". In case of a change in duration of work, a violation of radioactive equilibrium of natural radionuclides in occupational dust, which determine the level of radiation exposure, the administration of the organization with the agreement of the state sanitary supervision bodies sets other values of derived standards for limitation of personnel exposure.

226. According to results of examination of the facility, its separate queues or technical lines, sections or individual workplaces, where natural sources of radiation present, the state sanitary supervision institutions reflect in a sanitary and hygienic conclusion the need for radiation control in implementation of an administrative procedure under Sub-clause 10.24.3 Clause 10.24 and Clause 10.32 of the Unified list of administrative procedures.

If as a result of a survey the cases of increase in doses of exposure of workers of 1 mSv/year are not detected, the further radiation control is not obligatory. Nevertheless in case of changes in technologies of production, which may lead to increase in exposure of workers, it is necessary to carry out a repeated survey.

In organizations, in which exceedance of a dose in 1 mSv/year is indicated, but there is no exceedance of a dose in 2 mSv/year, it is necessary to carry out selective radiation control of workplaces with the largest levels of exposure of workers.

In organizations, in which doses of exposure of workers exceed 2 mSv/year, a permanent radiation control of doses of exposure should be carried out and actions, directed to reduction of them should be performed.

227. In case of excess of radiation dose of workers in the amount of 5 mSv / year the administration of the organization is obliged to take measures to reduce exposure of workers. If it is impossible to comply with the

specified standard in the organizations, listed in Clause 222 of the present Sanitary Norms and Rules, the correspondent workers are equaled in accordance with working conditions to the personnel, working with technogenic IRS, and are subject to all requirements for radiation safety assurance, established for personnel. The administration informs the state sanitary supervision bodies on this decision.

228. The decision on use of minerals, containing natural radionuclides above the prescribed limits, in economic activity is taken subject to approval of the state sanitary supervision institutions.

229. In organizations, in which as a result of practice radioactive waste are generated, their collection, temporary storage and (or) disposal must be arranged.

230. Requirements for assurance of radiation safety of population are applied to controlled natural IRS: radon isotopes and their decay products in the air of premises, gamma radiation of natural radionuclides, contained in building products, natural radionuclides in drinking water, fertilizers and minerals.

231. The relative degree of radiation safety of population is characterized by the following values of effective doses from natural sources of radiation:

less than 2 mSv / year - exposure does not exceed the average values of doses of exposure of the population from natural sources of radiation;

from 2 to 5 mSv / year - increased exposure;

more than 5 mSv / year - high exposure.

The user of IRS must carry out measures for reduction of high levels of radiation on a priority basis.

232. The areas with the level of the dose rate of gamma radiation, which does not exceed 0.3 mSv/h, and with the radon flux density from the surface of the ground, which is not exceed 80 MBq / (sq.m x s), are preferred in case of planning of housing construction and social facilities.

In case of planning of construction of a building on the area, where the radon flux density exceeds 80 MBq / (sq.m x s), in the design project must be provided a system of protection against radon (monolithic concrete pad, improved insulation of the basement of the underground accommodation, and others). The necessity for radon protection measures, if the radon flux density from the surface of the ground is less than 80 MBq / (sq.m x s), should be determined at the design stage.

233. Radiation control should be carried out by the user of IRS at all stages of construction, reconstruction, capital repairs and maintenance of houses and buildings of social and domestic purposes. Radiation control is carried out by the user of IRS in order to verify compliance with the requirements, set out in Clauses 107 and 108 of the Sanitary Norms and Rules "Radiation Safety Requirements". In case of detection of exceedance

of the standard values it is necessary to analyze the causes, connected with it and implement the required protective measures, aimed at reduction of the dose rate of gamma radiation and (or) reduction of content of radon in the air of premises. The dose rate of gamma radiation and radon volumetric activity in the air of premises of the building, which is under construction, reconstruction or capital repairs, should conform to standard values.

234. The State sanitary supervision over compliance with radiation safety requirements in residential houses and buildings of social and domestic purposes during their construction, reconstruction, commissioning and operation is carried out by the territorial bodies of the state sanitary supervision bodies.

235. Territorial bodies of the State sanitary supervision carry out supervision of the content of radionuclides in water sources and, if necessary, make assessment of internal exposure doses of population and areas, as well as assessment of doses of representative persons, who are in a greater degree exposed to radiation due to consumption of water from sources with high concentration of radionuclides.

236. Control of content of radionuclides in drinking water is implemented by the organization, which provides water supply to the population. The volume and frequency of control are agreed in the prescribed manner with the state sanitary supervision bodies.

237. New sources of water supply are introduced into service, provided that the specific activity of a radionuclide in the water does not exceed the accepted reference levels, set out Appendix 9 in to the Hygienic standard "Criteria for assessing radiation effects".

238. When the content of radionuclides in the water of existing sources of water supply exceeds the reference levels, set out in Appendix 9 to the Hygienic standard "Criteria for Radiation Impact Assessment", and when other sources of water supply are available, it is necessary to change the source of water supply to the source, the water of which corresponds to the radiation safety requirements.

239. All batches of building materials and products that contain natural radionuclides, mineral fertilizers and meliorants, containing phosphates, must be accompanied by the relevant documents, confirming safety. Organization-manufacturer and a supplier in the prescribed manner provide storage of these documents.

240. If necessary, the materials and products, which contain natural radionuclides, and for which standards are not set in the Sanitary Norms and Rules "Radiation Safety Requirements" and the Hygienic standard "Criteria for Radiation Impact Assessment", can be subject to the sanitary and hygienic examination in order to establish the possibility of their use in accordance with the legislation of the Republic of Belarus.

CHAPTER 24

RADIATION SAFETY REQUIREMENTS DURING RADIATION ACCIDENTS

241. The system of radiation safety of personnel and population in case of a radiation accident shall provide minimization of negative consequences of an accident, prevention of occurrence of deterministic effects and minimization of probability of stochastic effects. Upon detection of a radiation accident the emergency measures must be taken in order to stop its development, regain control over the radiation source, as well as to minimize radiation doses and the number of exposed individuals from personnel and population, as well as contamination of production facilities and the environment, economic and social losses, caused by radiation accidents.

242. At the stage of designing of a radiation facility it is necessary to determine possible accidents, arising from equipment failure, incorrect actions of personnel, natural disasters or other causes, which can lead to loss of control over radiation sources and exposure of people and (or) radioactive contamination of the environment. The list of possible accidents, specified in the design documentation, is agreed with the state sanitary supervision bodies.

243. Before start of the emergency response planning it is required to determine types of practice, which are subject to planning. Emergency planning depends on a type of practice and can be simplified by grouping types of practical activity according to hazard categories. A category of hazard of practice for the purposes of emergency response planning is established in compliance with the normative legal and technical normative legal acts of the Republic of Belarus.

244. For practice on operation of installations, radiation accidents on which could potentially lead to deterministic health effects off the site, as well as to doses of exposure of people, which require urgent protective measures, and to excess of the general criteria for response, indicated in the Appendix 19 to Hygienic standard “Criteria for Radiation Impact Assessment”, the emergency response areas should be identified and justified on the stage of design of the radiation facility:

- precautionary action zone;
- urgent protective action planning zone;
- food restrictions planning zone.

Dimensions and boundaries of these zones are determined by a possible release of radioactive substances in the course of beyond design basis accidents.

Dimensions of zones must be identified as areas of approximately

circular shape around a radiating facility with boundaries, determined by local landmarks (for example roads or rivers), in order to ensure easy identification of zones in the process of response. These zones should not be interrupted at national borders.

Protective measures on-site should be taken before or shortly after a release of radioactive material or exposure taking into account the situation that arose at the radiation facility.

Protective measures on-site must be performed on the basis of data of radiation monitoring of the environment taking into account the situation that arose in the radiation facility.

Protective measures on-site must be performed on the basis of data of radiation control of samples of the environment and food.

In the course of respond to radiation accidents, in a particular emergency situation the protective measures may be required both in a small part of zones and outside the proposed zones.

245. In accordance with Article 17 of the Law of the Republic of Belarus “On Radiation Safety of Population” for protection of population and personnel from a radiation accident the user of IRS must have:

- a list of potential radiation accidents with a forecast of their consequences, as well as radiation environment forecast;

- criteria for making a decision in the event of a radiation accident;

- an emergency plan for protection of workers (personnel) and population from a radiation accident and its consequences, which is agreed with the Ministry for Emergency Situations of the Republic of Belarus, competent authorities and institutions of the state sanitary supervision, relevant national bodies of the state administration and other state organizations, subordinated to the Government of the Republic of Belarus, local executive and regulatory bodies;

- means for warning the public and workers (personnel), as well as means of ensuring liquidation of a radiation accident;

- medical means of prevention of radiation injuries and means of medical assistance to victims of a radiation accident;

- supernumerary rescue services, created from the number of workers (personnel).

246. An emergency plan for protection of workers and population against a radiation accident and its consequences should be agreed by the Ministry for Emergency Situations of the Republic of Belarus with authorized state authorities and institutions, engaged in the state sanitary supervision, relevant national bodies of the state administration and other state organizations, subordinated to the Government of the Republic of Belarus, local executive and administrative bodies.

247. Requirements for design and content of an emergency plan for

protection of workers and population from a radiation accident and its consequences are subject to the specific normative legal acts and the normative technical acts of the Republic of Belarus.

For nuclear facilities the conditions and procedures for development of emergency plans are determined by the Resolution of the Council of Ministers of August 27, 2010 N 1242 "On Approval of Regulation on Terms and Procedure for Emergency Plans Development" (the National Register of Legal Acts of the Republic of Belarus, 2010, No. 211, 5/32390).

248. Personnel must be ready for actions in case of radiation accidents and actions on elimination of consequences of such accidents. Instructions on actions of personnel in case of radiation accidents must be in all radiation facilities.

249. Universal first aid kits, completed in accordance with the Resolution of the Ministry of Health of the Republic of Belarus of January 15, 2007 No. 4 "On approval of lists of enclosures, included in the first aid kits, as well as the procedure of their complement" (the National Register of Legal Acts of the Republic of Belarus, 2007, No. 68, 8/15904), should be on production sites and in an airlock of a radiation facility.

On facilities, where works with radioactive substances are carried out in an open form, it is necessary to have a replenish store of means of sanitization of contaminated persons.

250. A system for emergency notification of an occurred accident should be in every organization, in which radiation accident is possible.

251. The user of IRS in accordance with the emergency plan on elimination of a radiation accident develops instructions for personnel actions in case of a radiation accident, which must be kept at the workplace of personnel.

252. In case of establishment of a fact of a radiation accident the administration of the organization is obliged to inform immediately the state bodies, engaged in management, supervision and control in the field of radiation safety assurance, as well as bodies of local government and autonomous bodies, the population of the areas, in which increasing exposure is possible, superior body or agency.

253. Local executive and administrative bodies in accordance with the emergency plan for protection of personnel and population in the event of a radiation accident ensure rapid supply of information on a radiation accident to specialists in the field of radiation protection, as well as their participation in informing of population on a radiation accident, recommended methods and means of protection.

254. First of all members of specialized emergency teams must be involved in carrying out of works on liquidation of an accident and its consequences. If necessary, for performing these works the persons,

preferably from personnel over 30 years old, who do not have medical contraindications, may be involved with their voluntary written consent after being informed about the possible radiation doses, as well as health risks.

255. Before starting works on elimination of consequences of an accident it is necessary to carry out instruction of personnel on radiation safety, which clarify the nature and sequence of works. If needed, a pre-testing of upcoming operations should be conducted.

256. Works on elimination of consequences of an accident and performance of other activities, related to the possible overexposure of personnel, should be carried out under radiation control according to an authorized order, which sets a limit duration of works, additional means of protection, surnames of participants and the person, who is responsible for execution of works. The form of an authorized order for production of works of increased radiation hazard is given in Appendix 10 to present Sanitary Norms and Rules.

257. Regulation of planned increased exposure of personnel during elimination of an accident is determined in accordance with the requirements, specified in Appendix 21 to Hygienic standard "Criteria for Radiation Impact Assessment". Designed heightened exposure is permitted for personnel of a radiation facility, which is involved in performance of emergency and recovery operations, and specialists of emergency and recovery services and units.

258. People with traumatic injuries, chemical poisoning or exposed to radiation at a dose of more than 0.2 Sv should be sent for medical survey and treatment. In case of a radioactive contamination sanitary treatment of people and decontamination of clothing should be carried out.

259. In case of a radiation accident with a discharge of radionuclides into the environment, which caused contamination of vast areas, protection of population is carried out in accordance with the criteria for decision-making, given in Annexes 19, 20 to Hygienic standard "Criteria for Radiation Impact Assessment".

260. Elimination of consequences of an accident and investigation of its causes are carried out in accordance with the legislation of the Republic of Belarus.

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

radiation control of main types of public exposure;

optimized dose reduction for all main types of exposure, if the dose of public exposure due to radioactive contamination of the area exceeds 1.0 mSv / year;

optimized protective measures, which do not violate normal activity of population, economic and social functioning of the area, if the radiation dose

due to radioactive contamination of the area exceeds 0.1 mSv / year, but doesn't exceed 1.0 mSv / year.

262. In organizations, performing economic activity on areas, affected by radioactive contamination, exposure of workers of more than 5 mSv / year due to radioactive contamination is not allowed.

In organizations, where exposure of workers due to accidental pollution exceeds 1 mSv / year, it is necessary to establish a radiating safety service, which carries out radiation control and activities on reduction of workers exposure. Procedure for radiation control is agreed with the state sanitary supervision bodies.

CHAPTER 25

REQUIREMENTS FOR MEDICAL ASSURANCE OF RADIATION SAFETY

263. Medical assurance of radiation safety of personnel and population, who have been exposed to radiation, includes a medical examination, disease prevention and, if necessary, treatment and rehabilitation of persons with detected deviations in health status.

264. All personnel must undergo preliminary and periodic medical examinations in the manner, determined by the Ministry Health of the Republic Belarus.

265. The personnel, who have not undergone a medical examination, are prohibited from performing work.

266. Persons, residing in settlements, for which a status of a radioactive contamination zone is established, undergo a medical examination in accordance with the legislation of the Republic of Belarus.

267. In cases, when personnel may be affected by other harmful factors (physical, chemical, biological and others), medical protection measures must be taken with due consideration of a combined effect of all harmful factors.

268. After conduction of a periodic preventive medical examination it is expedient to allocate dispensary groups in accordance with a set of influencing adverse factors.

269. In a public health care organization, which is intended for delivering specialized medical care for victims of accidental exposure, must present:

- radiation detection and monitoring equipment;
- means for decontamination of skin coverings, burns and wounds (when working with unsealed radioactive substances);
- means for decorporation of radionuclides.

270. Medical examination of members of the public, who have been exposed to radiation for a year at the effective dose of more than 200 mSv, or

who has the accumulated dose of more than 500 mSv from one of the main sources of exposure, or 1,000 mSv from all sources of exposure, is made in a territorial public health care organization.

271. The state dosimetric register operates on the basis of the Ministry of Health of the Republic of Belarus for assessment of ionizing radiation impact on health of personnel and population. The procedure for control and accounting of doses of exposure of population and personnel is determined by the Resolution of the Council of Ministers of the Republic of Belarus of June 17, 1999 No. 929 "On United State System of Accounting for and Control of Individual Exposure Doses".

272. Cause-and-effect links of illnesses, disability or death with professional occupation or emergency exposure are determined in accordance with the procedure, established by the Ministry of Health of the Republic of Belarus.

Appendix 1
to Sanitary Norms and Rules
“Requirements to Assurance
of Radiation Safety
of Personnel and Population
in the Use of Nuclear Energy Facilities
and Sources of Ionizing Radiation”
31.12.2013 No. 137

Form

_____ (full name of the state sanitary supervision body, address, phone number)

Copy No. _____

**SANITARY PASSPORT No. _____
for the right to work with ionizing radiation sources (IRS)**

1. Organization _____
(full and abbreviated name,
legal address, phone number)

2. Ministry, department _____
(full and abbreviated name, address)

3. Overhead (directly above the organization) organization _____
(full
and abbreviated name, address, phone number)

4. Subdivision of the organization (facility), obtaining the passport _____
(name,

subordination in the organization structure, location address, phone number)

5. Officer, responsible for radiation safety on the facility _____
(position, number, date of order of the organization

_____ on assignment of responsibility, phone number

6. Works with the following IRS are permitted:

Type and characteristics of IRS	Type and nature of works	Place of works	Restrictive conditions
1	2	3	4
1. Works with unsealed IRS			
2. Works with sealed IRS			
3. Works with devices that generate radiation			
4. Other works with IRS			

7. Sanitary passport is issued on the basis of _____
(sanitary and hygienic

conclusions, acceptance acts, surveys and other documents
with indication of numbers and dates)

8. Passport is valid from _____ till _____
Chief state medical officer (region, district, city)

Stamp here

(Full name, signature)

Date of issue of the sanitary passport _____

Executor _____
(surname, first name, patronymic, phone number)

Executed in _____ copies.

Handed over:

Copy number	Organization	Date	Entry of handing (signature)

**LIST OF REQUIREMENTS FOR COMPLETION OF A FORM OF A
SANITARY PASSPORT FOR THE RIGHT TO WORK WITH
IONIZING RADIATION SOURCES (IRS)**

1. In Clause 1 of the sanitary passport for the right to work with ionizing radiation sources (IRS), which is Appendix 1 to the present Sanitary Norms and Rules (hereinafter - the sanitary passport), the full and abbreviated name of the legal entity, the recipient of the sanitary passport for the right to work with IRS, as well as legal address is indicated in accordance with the certificate on state registration.

2. Clauses 2, 3 of the sanitary passport are filled subject to existence of subordination to a ministry or department, an overhead organization.

3. In Clause 4 of the sanitary passport a structural subdivision or a subdivision of the organization, which obtain the sanitary passport, are specified.

4. In Clause 5 of the sanitary passport the officer, who is responsible for radiation safety on the facility, is specified: a head of the radiating safety service or a radiation safety officer.

5. In the table in Clause 6 of the sanitary passport each IRS (a type of IRS with identical radiation characteristics) is specified with assignment of a sequence number. Columns 2 - 4 are filled for each IRS (a type of IRS with identical radiation characteristics).

Radiation Hygiene hygienist specifies the following information:

5.1. Lines of column 1 "Type and characteristics of IRS" are filled with the following data:

line 1 "Works with unsealed IRS": a radionuclide, substance, its aggregate state, maximum allowable single activity at the workplace, annual consumption;

line 2 "Works with sealed IRS": a nuclide, type of the source (for facilities, apparatus, devices - a type, mark, year of manufacture, serial or manufacturing number of IRS), IRS maximum activity, maximum single amount of IRS at the workplace and their total activity at the workplace, annual consumption (for short-lived nuclides);

line 3 "Works with devices that generate radiation": a type of the source (for facilities, apparatus, devices - the same data that in line 2), type, energy and intensity of radiation (and (or) accelerating voltage, current intensity, rate and others), maximum allowable number of simultaneously operating IRS, number of IRS, located in one place;

line 4 "Other works with IRS": works, which cannot be attributed to the works, mentioned in lines 1 - 3, including works with radionuclide generators, nuclear reactors, radioactive waste, execution of works on an area of an evacuation zone (alienation zone) and other types of works with IRS. Depending on the type and nature of radiation sources the same data as in lines 1 - 3 are specified. For radionuclide generators data on a parent nuclide and subsidiary products capacity, as well as storage conditions of IRS are specified; for works on transportation of radioisotope sources and radioactive waste by means of special vehicles the type, mark and number of the vehicle is indicated;

5.2. column 2 "Type and nature of works" is filled with the following data: a type and nature of works (stationary, non-stationary, research, productive and the like);

5.3. in column 3 "Place of works" a place of works must be clearly identified: a building, floor, section, plot, room, area plot (in the organization or outside it);

5.4. lines of column 4 "Restrictive conditions" must contain the following data:

in line 1 and 4, when working with unsealed IRS, a class of works, allowed to perform in given premises, must be indicated;

in lines 2 - 4 necessary restrictive conditions must be specified: authorization or prohibition on performance in a given place of other works, which do not involve use of IRS (by personnel or other workers), elimination or reduction of effect of harmful non-radiation factors, and the like.

6. In Clause 7 of the sanitary passport it is necessary to specify documents, which were the basis for issuance of the sanitary passport (for example, an act of acceptance into operation of a constructed (modernized or reconstructed) facility or an act of the state sanitary and hygienic examination of works and services, which may pose a potential threat to public health, etc.), with numbers and dates.

7. In Clause 8 of the sanitary passport the validity of the passport for the right to work with IRS is specified.

PRACTICAL IMPLEMENTATION OF RADIATION SAFETY FUNDAMENTAL PRINCIPLES

1. In the simplest cases verification of compliance with the principle of justification is performed by comparison of a benefit and harm:

$$X - (Y_1 + Y_2) \geq 0,$$

where X – is benefit from use of IRS or exposure conditions after deduction of all costs for production and operation of IRS and irradiation conditions, except for radiation protection costs; Y_1 - costs for all protective actions; Y_2 - is harm, which is caused to human health and the environment from exposure, which is not eliminated by protective actions.

The difference between benefit (X) and a sum of harm (+) must be greater than zero, and at presence of alternative means of achieving benefit (X), this difference must also be maximized. In case when it is impossible to achieve excess of benefit over harm, the decision on inadmissibility of use of this type of IRS is made.

Aspects of technical and ecological safety should be taken into account.

Verification of compliance with the principle of justification, which is associated with weighing of benefit and harm from IRS, when more often benefit and harm are measured through various indicators, is not only limited by radiological criteria, but also includes social, economic, psychological and other factors.

For different IRS and irradiation conditions specific values of benefit have their own peculiarities (energy, produced from nuclear power plants, diagnostic and other information, extracted natural resources, housing, etc.). They should, where possible, be reduced to generalized expression of benefit for comparison with possible radiation detriment for equal time periods in the form of reduction of number of person years of life. It is assumed that exposure at the collective effective dose of 1 man Sv leads to loss of 1 person

years of life.

Priority is given to health indicators in comparison with the economic benefits.

Medical and social justification of the benefit and harm ratio can be formed on the basis of quantitative and qualitative indicators of benefit and harm to health from activities, related to exposure.

For a quantitative estimation it is necessary to use the following inequality:

$$Y_0 > Y_2,$$

where Y_2 has the same value as in the formula (1);

Y_0 - is harm to health as a result of a refusal from the activity, associated with the exposure.

A qualitative estimation can be performed by means of the formula

$$\Sigma\left(\frac{Z}{D_z} - \frac{Z_0}{D_{z0}}\right) < 0,$$

where Z – is intensity of impact of harmful factors in the result of activities, associated with exposure; Z_0 - is harmful factors, affecting personnel or population at refusal from activities, associated with exposure; D_z and D_{z0} – is acceptable intensity of impact of factors Z and Z_0

2. Implementation of the principle of optimization should be carried out whenever protective actions are planned. Responsibility for implementation of this principle is placed on services or persons, who are responsible for organization of radiation safety on the facilities or areas, where there is a need for radiation protection.

In normal operation of a radiation source or under irradiation conditions the optimization (improvement of protection) must be carried out at the levels of exposure in the range from relevant dose limits to achievement of a negligible level of individual dose - 10 mSv per year.

Implementation of the principle of optimization, as well as the principle of justification, must be carried out according to the documents, approved by the national bodies of state supervision over radiation safety, and prior to their publications the implementation of these principles must be performed by conducting radiation and hygienic examination of substantiating documents. However, according to the Sanitary Norms and Rules “Radiation Safety Requirements” the minimum expense for improvement of protection, reducing the effective dose by 1 man Sv, is the expense, which is equal to one annual national income per capita (the alpha value, which is accepted in international recommendations).

**LIST OF REQUIREMENTS FOR ESTABLISHING QUOTAS FOR
PUBLIC EXPOSURE FROM CERTAIN TECHNOGENIC SOURCES
OF IONIZING RADIATION (IRS)**

1. The aim of establishing quotas is prevention of exceedance of the dose limit of technogenic public exposure, which is equal to 1 mSv / year and is established by the Sanitary Norms and Rules “Radiation Safety Requirements” and the Hygienic standard “Criteria for Radiation Impact Assessment” for population, exposed to radiation from several radiation facilities, as well as reduction of public exposure from technogenic IRS in accordance with the principle of optimization.

2. In a design documentation of radiation facility of category I quotas for public exposure during normal operation of an facility must be specified. Numeric values of quotas are subject to an agreement with the republican bodies of the state sanitary supervision.

3. Quotas are set for the quantity of the individual effective dose of exposure of a representative person, living in supervised area of a facility.

4. Quotas are established for all radiation factors (air emissions, water discharges and others), in consequence of which exposure of a critical group of population outside a sanitary protection zone of a radiation facility in its normal operation may exceed the minimum significant value - 10 mSv / year (1% of the dose limit), set in Clause 8 of the Sanitary Norms and Rules “Radiation Safety Requirements”.

5. Size of a quota should characterize an upper limit of possible levels of exposure of critical groups of population under normal operation of IRS on a radiation facility, taking into account an achieved level of radiation safety of population.

6. Sum of quotas from various IRS must not exceed the dose limit of public exposure, established in Clause 3 of the Hygienic standard “Criteria for Radiation Impact Assessment”. The difference between the dose limits for population and the sum of quotas should be considered as a reserve, the quantity of which characterizes the degree of public radiation safety from technogenic IRS.

7. Values of quotas are used for calculation of acceptable levels of certain factors of radiation (radiation dose rate at a boundary of a sanitary protection area, capacity of emissions and discharges, content of radionuclides in environmental objects, etc.).

Appendix 5
to Sanitary Norms and Rules
“Requirements to Assurance
of Radiation Safety
of Personnel and Population
in the Use of Nuclear Energy Facilities
and Sources of Ionizing Radiation”
31.12.2013 No. 137

Form

Registration number of the organization _____

**Call-off order
for supply of ionizing radiation sources in _____**

1. Name and postal address of the supplier _____

2. Name and postal address of the customer _____

3. Name and postal address of the organization, for which the order is made _____

4. Subject of the order _____

4.1. Radionuclide sources

Source name	Unit of measurement	Activity of the unit	Number of units per a year	Including by month												Total amount per a year (activity)		
				I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII			

4.2 Generating ionizing radiation device _____
(name,
_____ amount)

Source name	Unit of measurement	Activity of the unit	Number of units per a year	Including by month												Total amount per a year (activity)		
				I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII			

Total _____

Notes _____

5. Security of payment _____
_____ 20__

Head of the organization-customer

(signature)

(Initials and Surname)

Head of the organization,
for which the order is made _____

(signature)

(Initials and Surname)

6. Acquisition of the ordered sources is permitted.

Head of
Gosatomnadzor

(signature)

(Initials and Surname)

____ 20__

Chief
State
Sanitary Doctor
(region,
district, city)

(signature)

(Initials and Surname)

____ 20__

7. Accounting marks on call-off order implementation (for a single delivery)

8. Date of dispatch
of the sources to the customer

Date of receipt
of the sources by the customer

____ 20__

____ 20__

Executed in 5 copies:

copies No.1, 2 - for the supplier;

copy No. 3 - for the Center of Hygiene and Epidemiology;

copy No. 4 - for Gosatomnadzor;

copy No. 5 - for the customer.

Requested by the employee

(surname, first name, patronymic)

(name of the laboratory or section)
_____ 20____

Выдал ответственный за хранение
радиоактивных веществ и (или) ИИИ

(surname, first name, patronymic)

(name of the organization)

(signature)

Received _____
(signature)

Hours _____ 20____
(for short-lived radioactive substances)

The request is drawn up in two copies and kept by the person, who is responsible for safekeeping of documents, and who has received the radioactive substance and (or) IRS.

Appendix 8
to Sanitary Norms and Rules
“Requirements to Assurance
of Radiation Safety
of Personnel and Population
in the Use of Nuclear Energy Facilities
and Sources of Ionizing Radiation”
31.12.2013 No. 137

Form

SANITARY PASSPORT
for specialized vehicles for regular transportation
of radioactive substances and materials, devices and facilities
with radiation sources and radioactive waste

1. Name of the organization _____

2. Type of the vehicle (motor vehicle, trailer, railway wagon) _____
No. _____

3. Vehicle equipment _____

4. Presence of an emergency set _____

5. On the basis of the sanitary inspection and results of dosimetric measurements transportation is allowed for:

a) packages, containing radioactive substances, facilities and devices with radioactive sources _____
(specify the number of packages, category and total activity)

b) radioactive waste (liquid, solid) _____
(underline)

(specify the type of wastes and their activity)

Date of issue _____ 20____

Valid from _____ 20____ till _____ 20____

Chief State Sanitary doctor (region, district, city) _____
(Initials and Surname)
Stamp here

_____ 20____

Appendix 9
to Sanitary Norms and Rules
“Requirements to Assurance
of Radiation Safety
of Personnel and Population
in the Use of Nuclear Energy Facilities
and Sources of Ionizing Radiation”
31.12.2013 No. 137

Form

CARD
**of accounting of individual doses of external exposure of persons, working
with ionizing radiation sources (IRS)**

1. Name of the organization _____
(name, address, phone number)
2. Full name _____
3. Year of birth _____
4. Sex _____
5. Place of work _____
(section, division, plot, laboratory, etc.).
6. Position _____
7. Experience of work with IRS:
 - 7.1. in the organization _____
(start of work in the institution)
 - 7.2. Total work experience _____
(prior to work in the institution and
the received total dose)
8. Home address, phone number _____
9. Working conditions _____
(type and nature of work, radionuclide, open and
closed IRS, class of work, aggregate state of the radioactive substance,
maximum permissible single activity at the workplace)
10. Dosimeter type _____
11. Data on radiation doses: _____

Month, quarter, exposure time	Place of dosimeter location	Dose, mSv				
		20__	20__	20__	20__	20__
I II III						
I quarter						
IV V VI						
II quarter						
VII VIII IX						
III quarter						
X XI XII						
IV quarter						
Per year						
Total dose of exposure as of 01.01.20__						
Head of the organization (full name, signature)						
Person, responsible for radiation control (full name, signature)						

Appendix 10
to Sanitary Norms and Rules
“Requirements to Assurance
of Radiation Safety
of Personnel and Population
in the Use of Nuclear Energy Facilities
and Sources of Ionizing Radiation”
31.12.2013 No. 137

Form

APPROVED BY
Chief engineer _____
(signature, initials and surname)
_____ 20__

**AUTHORIZED ORDER No. _____
for performance of works of increased radiation hazard**

(name of the enterprise)

I. ORDER

1. For the responsible executor of works _____
composed of _____ persons to perform the following works _____
(name of works,

work location)

2. For performance of works the following is necessary:
materials _____
tools _____
protective means, radiation control devices _____

3. During preparation and performance of works to ensure the following
radiation safety measures: _____
(main arrangements and means

for work radiation safety assurance are enumerated, rules of procedure of
work performance and radiation control volume are specified)

4. Special conditions _____

5. Beginning of work at ____ hour ____ minute ____ 20__
End of work at ____ hour ____ minute ____ 20__

6. Responsible work manager is _____
(position)

(signature)

(Initials and Surname)

7. Responsible for radiation control is _____
(position)

(Initials and Surname)

8. Authorized order was issued by _____
(position)

(signature)

(Initials and Surname)

9. Authorized order was accepted by
 the responsible work manager _____
 (position)

 (signature) (Initials and Surname)

10. Arrangements for radiation safety assurance and procedure for
 production of works are agreed with _____
 (position of the responsible person of the organization,

 full name, signature)

II. AUTHORISATION

11. Instructing on the radiation safety measures at the workplace in
 accordance with the instructions _____
 (numbers and names of instructions)

was conducted by:
 the responsible work manager _____
 (date, signature)

responsible person of the organization _____
 (date, signature)

12. The following persons were instructed:

Item No.	Surname, first name, patronymic	Profession, category	Date of carrying out of instructing	Numbers of instructions, technological chart	Signature of the instructed person

13. Workplace and working conditions are checked. Radiation safety measures, specified in authorization order, are provided.

I authorize to start the work. _____
 (position of the responsible person of the organization)

 (signature, surname, name, patronymic, date)
 Responsible work manager _____
 (date, signature)

Responsible for radiation control assurance _____
 (date, signature)

Responsible executor of work _____
 (date, signature)

14. Work started at ____ hour ____ minute ____ 20__
 Responsible work manager _____
 (date, signature)

Responsible for radiation control assurance _____
 (date, signature)

15. Daily work authorization form:

Date and time	Workplace and radiation safety measures were checked. Work is authorized		
	Signature of the responsible work manager	Signature of the person, responsible for radiation control assurance	Signature of the responsible executor of work

16. Works were completed, workplaces were checked, materials, tools, appliances were removed, people were evacuated.

Authorized order was closed at ____ hour ____ minute ____ 20__

Responsible executor of work _____
(date, signature)

Responsible for radiation control assurance _____
(date, signature)

Responsible person of the operating enterprise _____
(date, signature)
