**FEDERAL ENVIRONMENTAL, INDUSTRIAL AND NUCLEAR  
SUPERVISION SERVICE**

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|  | APPROVED  by order of Federal Environmental, Industrial and Nuclear Supervision Service No. 44 of February 16, 2022 |

**SAFETY GUIDE  
IN THE USE OF ATOMIC ENERGY  
“RECOMMENDATIONS ON THE ORGANIZATION AND CONDUCT OF CATEGORIZATION OF RADIONUCLIDE SOURCES BY RADIATION HAZARD”**

**(RB-011-22)**

Effective as of February 16, 2022

**Moscow, 2022**

**SAFETY GUIDE IN THE USE OF ATOMIC ENERGY “RECOMMENDATIONS ON THE ORGANIZATION AND CONDUCT OF CATEGORIZATION OF RADIONUCLIDE SOURCES BY RADIATION HAZARD” (RB-011-22)**

**Federal Environmental, Industrial and Nuclear Supervision Service, Moscow, 2022**

The Safety Guide in the Use of Atomic Energy “Recommendations on Organization and Conduct of Categorization of Radionuclide Sources by Radiation Hazard” RB-011-22 (hereinafter referred to as the Safety Guide) has been developed in accordance with Article 6 of Federal Law No. 170-FZ of November 21, 1995 “On the Use of Atomic Energy” to facilitate the compliance with the requirements of clause 10 of federal rules and regulations in the field of the use of atomic energy “Basic Rules for Accounting and Control of Radioactive Substances and Radioactive Waste in an Organization” (NP-067-16) approved by order of Federal Environmental, Industrial and Nuclear Supervision Service No. 503 of November 28, 2016 (registered by the Ministry of Justice of Russia on December 21, 2016, registration No. 44843).

This Safety Guide contains recommendations of Federal Environmental, Industrial and Nuclear Supervision Service on the organization and conduct of categorization of sealed radionuclide sources by radiation hazard.

This Safety Guide is intended for use by organizations handling sealed radionuclide sources in their activities.

Released for the first time.[[1]](#footnote-1)

1. **General**

1. The Safety Guide in the use of atomic energy “Recommendations on the organization and conduct of categorization of radionuclide sources by radiation hazard” (RB-011-22) (hereinafter referred to as the Safety Guide) has been developed in accordance with Article 6 of the Federal Law No. 170-FZ of November 21, 1995 “On the Use of Atomic Energy” in order to facilitate the compliance with the requirements of clause 10 of the federal rules and regulations in the field of the use of atomic energy “Basic Rules for Accounting and Control of Radioactive Substances and Radioactive Waste in an Organization” (NP-067-16) approved by order of Federal Environmental, Industrial and Nuclear Supervision Service No. 503 of November 28, 2016 (registered by the Ministry of Justice of Russia on December 21, 2016, registration No. 44843) (hereinafter referred to as NP-067-16).

2. The recommendations of this Safety Guide apply to organization and conduct of categorization of sealed radionuclide sources by radiation hazard (hereinafter referred to as SRS categorization).

3. This Safety Guide is intended for use by organizations handling radioactive sources in their activities (hereinafter referred to as the organization).

1. **General recommendations on categorization of sealed radionuclide sources**

4. Categorization of SRS should be carried out in order to comply with the principle of graded approach to ensuring safety, including that to determine the scope of measures and procedures for accounting and control of radioactive substances (hereinafter referred to as RS) in SRS.

5. The *D* value used in calculating the *A/D* ratio is the calculated radionuclide activity, which is a normalizing factor used to separate a wide range of activities of SRS with different radionuclide composition in order to rank SRS by assigning them to one of the hazard categories.

6. In the absence of registration data for SRS (for example, in the absence of a data sheet for SRS), accounting measurements should be done in order to establish the accounting data.

7. The procedure for establishing the category of SRS and entering information about the category of SRS in the data sheet (certificate) for SRS or in a separate document (for example, an annex to the data sheet (certificate), an insert to the data sheet (certificate)) (hereinafter referred to as the separate document), including that when dismantling a batch of SRS, should be established in the organizational and administrative documents of the organization. It should indicate:

the period for establishing the SRS category from the moment when an unidentified SRS category was found;

information about the organization (division) that will carry out accounting measurements;

the planned membership of the commission for SRS categorization and its powers;

the form of the report on SRS categorization;

the procedure for entering information about the established SRS category in the SRS data sheet or in a separate document.

1. **Recommended procedure for organization and conduct of categorization of sealed radionuclide sources**

8. When establishing accounting data by the SRS organization-owner is impossible, an organization that has the ability to perform accounting measurements and is accredited in the field of ensuring the uniformity of measurements in the national accreditation system should be involved to determine the activity and radionuclide composition of this SRS.

9. When the SRS activity determined as a result of accounting measurements was used in calculating the *A/D* ratio, and, taking into account the measurement error, the maximum and minimum values of the *A/D* ratio can correspond to different categories of radiation hazard, the category that should be established for it, when deciding on the establishment of the SRS category, should correspond to the greater radiation hazard of the SRS (that is, a category with a lower number, for example, 4 instead 5, or 2 instead of 3 should be chosen).

10. The chairman of the SRS categorization commission should be the head of the centralized service (designated structural subdivision) for accounting and control of RS and radioactive waste (hereinafter referred to as RW) or an official responsible for accounting and control of RS and RW in the SRS owner organization-owner.

11. Representatives of the RS and RW accounting and control service and persons responsible for RS and RW accounting and control in the subdivisions that manage RS and RW to be categorized should be members of the commission that will categorize SRS.

12. If it is necessary to establish accounting data during the categorization of SRS, the commission should include a measurement specialist for the purpose of accounting and control of RS and RW, including a specialist of the organization involved in performing accounting measurements.

13. The commission should comprise at least three persons.

14. SRS categorization should be done with regard for the following specifics of the fabrication and use of the SRS:

SRS is made on the basis of one radionuclide;

SRS is made on the basis of a mixture of radionuclides;

one SRS is used in a radiation source;

more than one SRS is used in a radiation source.

**IV. Categorizing a sealed radionuclide source made on the basis of one radionuclide**

15. When categorizing an SRS made on the basis of one radionuclide, the *A* activity of the SRS should be determined at the initial stage.

16. When the SRS activity and its radionuclide composition are unknown, accounting measurements should be carried out in accordance with the procedure established by the organization in order to establish accounting data, and when the SRS owner organization cannot establish accounting data, an organization should be involved in accordance with the recommendations of clause 8 of this Safety Guide.

17. At the next stage, the *A/D* ratio should be determined on the basis of *A* activity determined at the initial stage, and the *D* value for the radionuclide of this SRS in accordance with Table 2 of Appendix 2 to NP-067-16.

18. At the final stage, on the basis of the SRS categorization commission’s report, data on the SRS category should be entered in the SRS data sheet (certificate) or in a separate document determined in accordance with the established boundaries of the SRS hazard categories in Appendix No. 2 to NP-067-16. The number and date of the SRS categorization report should be also entered in in the SRS data sheet (certificate) or in a separate document.

19. When the amount of the *D* value indicated in Table 2 of Appendix 2 to NP-067-16 is “unlimited”, this SRS should be referred to hazard category 5.

20. Examples of categorizing SRS made on the basis of one radionuclide are given in Appendix 1 to this Safety Guide.

**V. Categorizing a sealed radionuclide source made on the basis of a mixture of radionuclides**

21. When categorizing an SRS made on the basis of a mixture of radionuclides, at the initial stage, the *Ai* activity (where *i* varies from 1 to *n*) of each of the *n* radionuclides included in the mixture should be determined and on the basis of the *Di* values for the *i*-th radionuclide taken from Table 2 of Appendix 2 to NP-067-16 should be determined, and the *Аi/Di* ratio for each of the *n* radionuclides included in the SRS should be calculated (similar to the calculation of the *A/D* ratio for the SRS made on the basis of one radionuclide).

22. When the SRS activity and its radionuclide composition are unknown, accounting measurements should be carried out in accordance with the procedure established by the organization in order to establish accounting data, and when the SRS owner organization cannot establish accounting data, an organization should be involved in accordance with the recommendations in clause 8 of this Safety Guide.

23. At the next stage, the aggregated *A/D* ratio for an SRS containing a mixture of radionuclides should be determined by summing the *Аi/Di* ratios (where *i* varies from 1 to *n*) for each of the *n* radionuclides included in the SRS by the formula:

aggregated *A*/*D* ratio = , (1)

where:

*Ai* is activity of the *i*th radionuclide in the SRS;

*Di* is amount of the *D* values for the *i*th radionuclide.

24. At the final stage, on the basis of the SRS categorization commission’s report, data on the category of the SRS containing a mixture of radionuclides should be entered in the SRS data sheet (certificate) or in a separate document determined in accordance with the established boundaries of the SRS hazard categories in Appendix 2 to NP-067-16. The number and date of the SRS categorization report should also be entered in the SRS data sheet (certificate) or in a separate document.

25. An example of SRS categorization on the basis of a mixture of radionuclides is given in Annex 2 to this Safety Guide.

**VI. Categorizing sealed radionuclide sources in a radiation source**

26. When categorizing a totality of SRS in a radiation source, at the initial stage, the activities of the *j*th radionuclide included in the *i*th SRS A*i,j* (where *i* varies from 1 to *m*, and *j* varies from 1 to *n*) should be determined.

27. When the activity of each SRS in the totality is unknown, accounting measurements should be carried out in accordance with the procedure established by the organization in order to establish accounting data, and when the SRS owner organization can establish accounting data, an organization should be involved in accordance with the recommendations in clause 12 of this Safety Guide.

28. At the next stage, based on the values of *Dj* taken from Table 2 of Appendix 2 to NP-067-16 for the *j*th radionuclide, the aggregated *A/D* ratio of the totality of several SRS should be calculated by the formula:

aggregated *A*/*D* ratio of the SRS totality = , (2)

where:

*Ai,j* is activity if the *j*th radionuclide in the в *i*th SRS (where *i* varies from 1 to *m*, and *j* varies from 1 to *n*);

*Dj* is the amount of the *D* value for the *j*th radionuclide.

29. The value of the category of the SRS totality determined in accordance with the above recommendations can be used when establishing the category of radiation hazard of a complex, installation or equipment (radiation source) which use more than one SRS, and in the event of an accident these SRS can have a combined effect.

30. An example of categorizing the SRS totality in a radiation source is given in Appendix 3 to this Safety Guide.

**VII. Recommendations for Documenting the Results of Categorizing Sealed Radionuclide Sources**

31. The results of the commission’s work should be formalized in a report. The recommended example of the report on establishing the category of radioactive sources, which is used to make changes to information about the radioactive sources in the system of state accounting and control of RS and RW is given in Appendix 4 to this Safety Guide.

32. On the basis of the report on establishing the SRS category, the person responsible for accounting and control of RS and RW in the subdivision in the SRS data sheet (certificate) (in the “Notes” section or similar, or in a free space on the title page), or in a separate document, should enter information about the SRS category by radiation hazard. The number and date of the SRS categorization report should be entered in the SRS data sheet (certificate) or in a separate document.

33. The recommendations for entering information about the SRS category in the SRS data sheet (certificate) are given in the safety guide on the use of atomic energy “Recommendations on the form of a data sheet and the composition of data on a radionuclide source necessary for the purposes of state accounting and control of radioactive substances and radioactive waste” (RB -109-16) approved by order of the Federal Environmental, Industrial and Nuclear Supervision Service No. 113 of March 24, 2016.

34. Based on the information obtained when categorizing SRS (the SRS category and, in the case of accounting measurements, the established accounting data), the person responsible for accounting and control of RS and RW in the subdivision should enter information about the SRS in the SRS register.

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APPENDIX 1

to Safety Guide in the Use of Atomic Energy “Recommendations on Organization and Conduct of Categorization of Radionuclide Sources by Radiation Hazard” approved by order of Federal Environmental, Industrial and Nuclear Supervision Service No. 44 of February 16, 2022

**Examples of categorizing a sealed radionuclide source made on the basis of one radionuclide**

Example 1.

An SRS, which is a source of neutron radiation, has the following characteristics in accordance with the data sheet:

|  |  |
| --- | --- |
| type | IBN-6; |
| Source No. | IBN6-768; |
| date of fabrication | 02.03.2021; |
| data sheet No. | 284313; |
| date of issue of the data sheet | 02.03.2021; |
| radionuclide on the basis of which the SRS is made | 239Pu; |
| value of SRS radionuclide activity as of the date of fabrication, Bq, not more than | 1.3 x 1010. |

In accordance with Table 2 of Appendix 2 to NP-067-16, the amount of the *D* value for the 239Pu radionuclide is *D* = 6 x 1010 Bq.

In accordance with the above information from the SRS data sheet, the activity of the 239Pu radionuclide, on the basis of which the SRS is made, as of the date of manufacture is *A* = 1.3 x 1010 Bq.

*A*/*D* = 0,217, which corresponds to category 4 – the hazard to humans is unlikely (0,01 base_1_209596_10 *A*/*D* < 1).

Example 2.

An SRS, which is a source of gamma radiation and used in gamma radiography, irradiation installations, radioisotope devices, has the following characteristics in accordance with the data sheet:

|  |  |
| --- | --- |
| type | IGI-Ts-8-1; |
| source No. | IGITs81-2944; |
| date of fabrication | 25.02.2021; |
| data sheet No. | 534212; |
| date of issue of the data sheet | 25.02.2021; |
| radionuclide on the basis of which the SRS is made | 137Cs; |
| value of SRS radionuclide activity as of the date of fabrication, Bq, not more than | 3.03 x 1013. |

In accordance with Table 2 of Appendix 2 to NP-067-16, the amount of the *D* value for the 137Cs radionuclide is *D* = 1011 Bq.

In accordance with the above information from the SRS data sheet, the activity of the 137Cs radionuclide, on the basis of which the SRS is made, as of the date of fabrication is *A* = 3.03 x 1013 Bq.

*A*/*D* = = 303, which corresponds to category 2 – very hazardous for humans (10 base_1_209596_10 *A*/*D* < 1 000).

Example 3.

An SRS, which is a source of gamma radiation and used in irradiation installations, has the following characteristics in accordance with the data sheet:

|  |  |
| --- | --- |
| type | GIK-A6; |
| source No. | GIK-986; |
| date of fabrication | 01.03.2021; |
| data sheet No. | 733684; |
| date of issue of the data sheet | 01.03.2021; |
| radionuclide on the basis of which the SRS is made | 60Co; |
| value of SRS radionuclide activity as of the date of fabrication, Bq, not more than | 3.59 x 1014. |

In accordance with Table 2 of Appendix 2 to NP-067-16, the amount of the *D* value for the 60Co radionuclide is *D* = 3 x 1010 Bq.

In accordance with the above information from the SRS data sheet, the activity of the 60Co radionuclide, on the basis of which the SRS is made, as of the date of fabrication is *A* = 3.59 x 1014 Bq.

*A*/*D* = 12 000, which corresponds to category 1 – extremely hazardous for humans (*A*/*D* base_1_209596_91 000).

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APPENDIX 2

to Safety Guide in the Use of Atomic Energy “Recommendations on Organization and Conduct of Categorization of Radionuclide Sources by Radiation Hazard” approved by order of Federal Environmental, Industrial and Nuclear Supervision Service No. 44 of February 16, 2022

**Examples of categorizing a sealed radionuclide source containing a mixture of radionuclides**

The SRS, which is a source of alpha radiation and used for the purpose of calibrating spectrometric equipment, has the following characteristics in accordance with the data sheet:

|  |  |
| --- | --- |
| type | OSAI U3P8P9; |
| source No. | U3P8P9-733; |
| date of fabrication | 05.02.2021; |
| data sheet No. | 2286; |
| date of issue of the data sheet | 05.02.2021; |
| radionuclide on the basis of which the SRS is made | 233U + 238Pu + 239Pu; |
| value of SRS radionuclide activity as of the date of fabrication, Bq, not more than: | 233U 1,1 x 104;  238Pu 1,13 x 104;  239Pu 1,0 x 104. |

In accordance with Table 2 of Appendix 2 to NP-067-16, the amount of the *D* value for the 233U radionuclide is *D*1 = 7 x 1010 Bq, the amount of the *D* value for the 238Pu radionuclide is D2 = 6 x 1010 Bq, the amount of the *D* value for radionuclide 239Pu is D3 = 6 x 1010 Bq.

In accordance with the above information from the SRS data sheet, the activity of the mixture of radionuclides 233U + 238Pu + 239Pu, on the basis of which the SRS is made, at the date of fabrication A1 = 1.1 x 104 Bq (for 233U), A2 = 1.13 x 104 Bq (for 238Pu) and A3 = 1.0 x 104 Bq (for 239Pu).

*Ai*/*Di* ratios:

*A*1/*D*1 = = 1.57 x 10–7 (for 233U);

*A*2/*D*2 = = 1.88 x 10–7 (for 238Pu);

*A*3/*D*3 = = 1.67 x 10–7 (for 239Pu).

In accordance with the formula from clause 23, the aggregated *A/D* ratio = =; in the case under consideration, the formula for the aggregated *A/D* ratio for an SRS containing a mixture of three radionuclides will take the form as follows:

aggregated *A*/*D* ratio = *A*1/*D*1 + *A*2/*D*2 + *A*3/*D*3.

Aggregated *A*/*D* ratio = (1.57 + 1.88 + 1.67) x 10–7 = 5.12 x 10–7, which corresponds to category 5 – the hazard for humans is very unlikely (*A*/*D* < 0,01).

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APPENDIX 3

to Safety Guide in the Use of Atomic Energy “Recommendations on Organization and Conduct of Categorization of Radionuclide Sources by Radiation Hazard” approved by order of Federal Environmental, Industrial and Nuclear Supervision Service No. 44 of February 16, 2022

**Examples of categorizing a totality of sealed radionuclide sources in a radiation source**

A certain irradiation facility contains 201 SRS, which are made on the basis of the 60Co radionuclide: 72 sources of the GIK-2-15 type with the activity as of the date of fabrication A1 = 2.89 x 1010 Bq, 67 sources of the GIK-5-1 type with the activity as of the date of fabrication A2 = 1.89 x 1012 Bq, and 62 sources of the GIK-7-3 type with the activity as of the date of fabrication A3 = 4.81 x 1013 Bq.

Due to the fact that all SRS contain only the 60Co radionuclide, the amount of the *D* value will be the same. In accordance with Table 2 of Appendix to NP-067-16, the amount of the *D* value for the 60Co radionuclide is *D* = 3 x 1010 Bq. The activity of all SRS takes only three specific values (A1, A2, and A3).

In accordance with the formula from clause 28, the aggregated *A/D* ratio of the SRS totality = , in the case under consideration, the formula for the aggregated *A/D* ratio of the totality of 201 SRS of three different activities A1, A2, and A3 will take the form: the aggregated A/D ratio of the SRS totality = = . The aggregated A/D ratio of the SRS totality = 103 697,0, which corresponds category 1 – extremely hazardous for humans (*A*/*D* base_1_209596_91 000).

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APPENDIX 4

to Safety Guide in the Use of Atomic Energy “Recommendations on Organization and Conduct of Categorization of Radionuclide Sources by Radiation Hazard” approved by order of Federal Environmental, Industrial and Nuclear Supervision Service No. 44 of February 16, 2022

(recommended example)

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

day month 20..

REPORT

No. \_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_

on establishing the category of SRS used to make changes to information about SRS in the system of state accounting and control of RS and RW

Based on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(date and number of the administrative document on SRS categorization by radiation hazard)

The commission with membership of

(positions, surnames and initials of the chairman and members of the commission)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

in relation to SRS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

(SRS type, name, designation)

with No. \_\_\_\_\_\_\_\_\_\_\_\_ and fabricated \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in accordance with   
 (SRS No.) (date of fabrication)  
with data sheet No. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ issued \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

(data sheet No.) (date of issue of data sheet)

using information from the SRS data sheet on the radionuclide(s) on the basis of which the SRS is made \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

(radionuclide(s), on the basis of which the SRS is made)

the value of activity(ies) of the radionuclide(s) as of the date of fabrication (issue))\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(value(s) of activity(ies) of the radionuclide(s) in the SRS as of the date of issue, Bq)

and the corresponding amount(s) of the *D* value for the corresponding radionuclide(s) in accordance with Table 2 of Appendix to NP-067-16

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(amount(s) of *D* value(s), Bq)

has determined the *A*/*D* ratio(s) of the radionuclide(s) in the SRS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

(*А*/*D* ratio(s))

and has determined the aggregated *A*/*D* ratio (when determining the category of SRS containing a mixture of radionuclides) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

(aggregated *А*/D ratio)

as a result

HAS ESTABLISHED

the category \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(category number and corresponding description of the hazard to humans in accordance with Appendix to NP-067-16)

on radiation hazard of the SRS made on the basis of one radionuclide/containing a mixture of radionuclides (underline as appropriate).

|  |  |  |
| --- | --- | --- |
| Commisison Chair:  (head of centralized service for accounting and control of RS and RW, or an official responsible for accounting and control of RS and RW in the organization) | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (signature) | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (initials, surname) |
| Commission members: | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (signature) | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (initials, surname) |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (signature) | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (initials, surname) |

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1. Developed by a team of authors consisting of: Gareyev M.D., Subbotin E.P., Kushnevsky L.N., Kirtayev A.E., Goncharova A.E. (SEC NRS), Bokov D.A., Shotskaya N.N., Novak I.A. (Rostechnadzor). [↑](#footnote-ref-1)