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

**ORDER No.104  
dated March 5, 2011**

**ON APPROVAL AND ENACTMENT  
OF FEDERAL NORMS AND REGULATIONS IN THE FIELD OF NUCLEAR  
POWER USE  
"GENERAL SAFETY PROVISIONS FOR  
RADIATION SOURCES"**

In accordance with [subparagraph 5.2.2.1](#) of the Provisions on the Federal Environmental, Industrial and Nuclear Supervision Service of Russia, approved by the Decree of the Government of the Russian Federation dated July 30, 2004 No.401 (Code of laws of the Russian Federation, 2004, No. 32, article 3348; 2006, No. 5, article 544; No. 23, article 2527; No. 52, article 5587; 2008, No. 22, article 2581; No. 46, article 5337; 2009, No. 6, article 738; No. 33, article 4081; No. 49, article 5976; 2010, No. 9, article 960; No. 26, article 3350; No. 38, article 4835), I, hereby, order:

Approve and enact starting from June 1, 2011 the attached [federal norms and regulations](#) in the field of atomic energy use "General Safety Provisions for Radiation Sources" (NP-038-11).

Head of the Service

Approved by:  
the order of Federal  
Environmental, Industrial  
and Nuclear Supervision Service  
dated March 5, 2011, No.104

**FEDERAL NORMS AND REGULATIONS  
IN THE FIELD OF NUCLEAR POWER USE "GENERAL SAFETY PROVISIONS  
FOR RADIATION SOURCES"  
NP-038-11**

1. Designation and scope of application

1.1. The present Federal norms and regulations in the field of atomic energy use "General Safety Provisions for Radiation Sources" (hereinafter - General provisions) were developed in accordance with Federal [Law](#) dated November 21, 1995 No.170-FZ "On the Use of Atomic Energy" (Code of laws of the Russian Federation, 1995 No. 48, article 4552; 1997, No. 7, article 808; 2001, No. 29, article 2949; 2002, No. 1, article 2; No. 13, article 1180; 2003, No. 46; 2004, No. 35, article 3607; 2006, No. 52, article 5498; 2007, No. 7, article 834; No. 49, article 6079; 2008, No. 29, article 3418; No. 30, article 3616; 2009, No. 1, article 17; No. 52, article 6450), Federal [Law](#) dated January 9, 1996 г. N 3-FZ "On Radiation Safety of Population" (Code of laws of the Russian Federation, 1996,

No. 3, article 141; 2004, No. 35, article 3607; 2008, No. 30, article 3616).

In addition, during the development consideration was given to recommendations of IAEA documents, domestic and foreign experience in safety assurance of stationary and mobile radiation sources.

1.2. List of abbreviations, as well as terms and definitions used in the present General provisions are presented in [Attachments 1 and 2](#). In the requirements pertaining to both stationary and mobile radiation sources abbreviation RS is used, otherwise it is indicated specifically: "stationary RS" or "mobile RS".

1.3. The present General provisions establish the goals, basic principles, criteria, and general requirements of safety assurance implemented during designing (engineering), siting, manufacturing (producing), commissioning, operation, and decommissioning of RS.

1.4. The requirements of the present General provisions apply to all types of activities in the field of atomic energy use that are based on the use of RnS and RA in the composition of RS.

Classification of RS, which fall under the requirements of the present General provisions, by their purpose is given in [Attachment 3](#).

1.5. The requirements of the present General provisions apply to RS that are used in the territory and in composition of nuclear installations (including nuclear power plant units, research nuclear installations and nuclear fuel cycle facilities), as well as to storage facilities in the scope or requirements that are not identified by other federal norms and regulations in the field of atomic energy use pertaining to these facilities.

1.6. The requirements of the present General provisions do not apply to RS that are used in the kinds of activities associated with the development, tests and utilization of nuclear weapons and nuclear installations of military purpose.

1.7. The requirements of the present General provisions do not apply to:

- transportation of RnS, RA and mobile RS beyond the territories of organizations;

- RA, contained in RW, discharges and releases;
- control and accounting of RS, RnS, RA and RW;
- RS design service life extension.

In the above-listed cases, the requirements of other federal norms and regulations in the field of atomic energy are used.

1.8. The requirements of the present General provisions do not apply to RS that do not contain RnS or RA, in which ionizing radiation is generated due to the change of velocity of charged particles, annihilation or nuclear reactions.

## 2. Goals, basic principles and criteria of assuring safety of radiation sources

2.1. The primary goal of assuring safety of radiation sources during normal operation, abnormal operation, including design basis accidents, consists in prevention of radiation impact on personnel, population and environment beyond the established limits.

2.2. The primary goal shall be accomplished by observation of basic principles of radiation safety assurance:

- staying within permissible limits of individual radiation doses for personnel and population (regulation principle);
- interdiction of commissioning and operation of RS, if the benefit for individuals and society does not exceed potential damage inflicted by radiation supplementing the natural radiation background (substantiation principle);
- keeping the individual doses and the number of irradiated individuals during commissioning, operation and decommissioning of RS, taking into account economical and social factors, as low as reasonably achievable (optimization principle).

2.3. All organizational and technical RS safety assurance measures planned and implemented during RS operation shall be commensurable with categories of RS potential

radiation hazard for individuals (hereinafter - RS hazard categories) established in accordance with the requirements of [items 3.5 - 3.7](#) of the present General provisions.

The sufficiency of these measures and commensurability thereof with the established RS hazard category shall be substantiated in the design and (or) in RS technical documentation and presented in the RS SAR.

2.4. RS satisfies safety criteria if its radiation impact on personnel, population and environment during normal operation and abnormal operation, including design basis accidents, does not lead to the excess of base limits of irradiation of personnel and population, rules for RA discharges and releases, and excess of RA content in the environment.

2.5. For normal operation of RS, permissible personnel exposure doses, permissible values of ionizing radiation impact on personnel and population, as well as permissible discharges and releases of RA into the environment are established in accordance with federal norms and regulations in the field of atomic energy use.

2.6. RS safety shall be provided by consistent implementation of defense-in-depth concept based on the use of a system of physical barriers on the path of propagation of ionizing radiation and RA into the environment, as well as by the system of organizational and technical measures for ensuring their integrity and effectiveness.

2.7. The system system of organizational and technical measures, in general case, is represented by five levels of defense-in-depth.

Level 1 (Conditions of RS location and prevention of deviations from normal operation):

- selection of the site (room) suitable for accommodation of stationary RS (for hazard category 1, 2 and 3 RS) and consideration of stationary RS siting conditions in the design;
- RS designing (engineering) on the basis of conservative approach and with due consideration of operation experience of similar RS;
- ensuring the required quality of RS systems and of performed works;

- use of RS only in accordance with their design purpose and the requirements of operational and (or) technical documentation, operating instructions;
- providing the diagnostics of equipment and systems important for RS safety, and maintaining their operable condition by timely detection of defects, taking preventive measures, replacement of systems with depleted resource, and arrangement of effectively operating system of documenting the results of performed works;
- selection of personnel for RS, ensuring the required qualification level for actions of the personnel during normal operation and deviations from normal operation, including accidents;
- forming and maintaining safety culture and safe preservation culture of RS personnel.

Level 2 (Management of deviations from normal operation and prevention of design basis accidents by normal operation systems):

- detection of deviations from normal operation and elimination of their causes;
- control of RS during operation with deviations from normal operation.

Level 3 (Management of design basis accidents and prevention of beyond design basis accidents by safety systems) for hazard category 1, 2 and 3 RS:

- prevention of initiating event development into design basis accidents;
- prevention of initiating event development into beyond design basis accidents with the use of safety systems;
- mitigation of the consequences of accidents that could not be prevented by localizing the generated RA.

Level 4 (Management of beyond design basis accidents) for hazard category 1 and 2 RS:

- prevention of development of beyond design basis accidents and mitigation of their consequences;
- protection of RS room against destruction during beyond design basis accidents

and maintaining its integrity;

- recovery of controllable state of RS whereby RA release is stopped and they are confined within the established boundaries.

Level 5 (Emergency preparedness and response):

- preparation of action plans for protection of personnel and population in the event of radiation accidents and elimination of their consequences, and ensuring the preparedness for implementing these plans (for hazard category 1 RS);
- preparation of action plans for protection of personnel in the event of radiation accidents and elimination of their consequences, and ensuring the preparedness for implementing these plans (for hazard categories 2 and 3 RS).

The number, composition and characteristics of physical barriers, as well as the number of defense-in-depth levels and completeness of their implementation for each specific RS are established and substantiated in RS design and (or) technical documentation in accordance with the hazard category specified for it.

2.8. The defense-in-depth concept shall be implemented at all stages of activities associated with RS safety assurance.

2.9. In normal operation conditions all RS physical barriers, envisaged in the design and (or) technical documentation, shall be operable. If inoperable condition of any of the envisaged physical barriers is detected, RS operation shall be terminated, and measures to bring it back to safe condition shall be taken.

2.10. Organizational and technical measures for prevention and mitigation of accident consequences during RS operation shall be commensurable with RS hazard category.

2.11. For newly designed (engineered) RS, reliability indicators systems important for RS safety, initiating events and anticipated accident consequences shall be defined in RS design and (or) technical (operational) documentation.

Initiating events and potential design basis accident sequences with assessment of their consequences and prediction of radiation situation shall be considered.

2.12. Technical decisions and organizational measures affecting RS safety shall be taken with due consideration of NTD requirements, the operation experience of the given RS prototypes (analogues), research and test results, as well as the specific features and peculiarities of RS during its future decommissioning.

Such an approach shall be implemented not only during RS designing (engineering), siting, construction, manufacturing of the equipment for the RS, but during reconstruction and modernization of the RS and (or) of the systems, important to RS safety, as well.

2.13. RS operating organization quality assurance activity shall ensure safe operation of the RS and reliability of the systems, important to RS safety, in accordance with the design documentation and the quality assurance program requirements for performing various kinds of works affecting RS safety during commissioning, operation and decommissioning of the RS.

2.14. The activity of organizations involved in RS siting, designing (engineering), construction (manufacturing), as well as of organizations that produce the systems important to RS safety or render other services in the field of atomic energy use for RS operating organization shall ensure the quality of works and services within the framework of pertinent quality assurance programs of these works and services.

2.15. All members of the staff of organizations involved in RS siting, designing (engineering), construction (manufacturing), operation and decommissioning of RS, designing (engineering), manufacturing of the systems important to RS safety shall possess safety culture and safe preservation culture, which is achieved by appropriate selection, instruction and training of the personnel for various kinds of activity affecting RS safety, establishment and strict observance of the discipline with clear distribution of personal responsibility of managers and personnel, development and strict observance of the requirements of current instructions for performing the works and periodical updating of these instructions taking into account the experience obtained.

The indicated persons must be aware of the character and the extent of the influence of their activity on RS safety and preservation of RnS in RS composition, and completely



understand what consequences may follow in the event of failure to observe or inadequately fulfill the requirements of federal norms and regulations in the field of atomic energy use and of RS operating documentation.

### 3. Classification of radiation sources, their systems and components

#### Classification of radiation sources

3.1. For the purposes of differentiated establishment and fulfillment of the requirements of the present General Safety Provisions for Radiation Sources, RS are classified by the following attributes:

- RS purpose;
- RS mobility;
- type of RnS used in RS composition;
- potential radiation hazard of RS.

3.2. By their purpose RS are subdivided into complexes, installations, apparatuses, equipment and products. RS are classified by this attribute in accordance with the definitions presented in [Attachment 2](#).

3.3. By their mobility RS are subdivided into stationary and mobile (movable and portable) RS in accordance with the definitions presented in [Attachment 2](#).

3.4. By the type of RnS used in RS composition, RS are subdivided into:

- RS composed of SRnS only;
- RS composed of URnS only;
- RS composed of SRnS and URnS.

3.5. Potential RS radiation hazard is stipulated by possible radiation impact on personnel and population during radiation accidents and is determined considering the categories of potential radiation hazard of RnS (hereinafter - RnS hazard category) that are

used in RS composition.

Five RnS hazard categories are established:

- Category 1 Extremely dangerous for man.
- Category 2 Very dangerous for man.
- Category 3 Dangerous for man.
- Category 4 Low probability of danger for man.
- Category 5 Very low probability of danger for man.

Brief description of SRnS hazard categories is given in [Attachment 4](#) to the present General provisions.

For radiopharmaceuticals hazard categories not higher than 4 are established.

3.6. RS hazard category is established considering the hazard category of RnS that are used in RS composition, and considering the requirements of [item 2.7](#).

Hazard category of stationary RS which contains only one RnS may not be higher than the maximum hazard category of that RnS, which is determined on the basis of the RnS certificate activity (for the date of its manufacturing).

Hazard category of stationary RS which contains several RnS shall be defined in the following way:

- if RS composition includes a group of RnS, which in the event of an accident may cause joint radiation impact on personnel or population, RS hazard category is defined by hazard category of this group of RnS;
- in other cases RS hazard category shall be defined by RnS attributed to the highest hazard category.

Hazard category of mobile RS must correspond to maximum hazard category of RnS that are authorized for use in its composition in accordance with technical documentation of specific mobile RS.

3.7. For newly designed stationary RS and engineered mobile RS, hazard category is established by the design organization and indicated in the design of stationary RS or in the technical documentation (certificate) of mobile RS.

For operational RS, hazard category is established by the operating organization and indicated in the RS operational documentation.

### Classification of systems (elements) of radiation sources

3.8. By their importance for safety RS systems are subdivided into:

- systems, important to RS safety;
- systems, not affecting RS safety.

3.9. Systems, important to RS safety, include:

- SRnS transfer and holding system (working position or storing position);
- ionizing radiation beam capping system;
- control system (panel);
- radiation hazard warning and alarm system;
- interlock system preventing unauthorized access to RnS and unplanned irradiation of personnel;
- stationary RS RnSU fastening system;
- electric power supply system;
- special ventilation system.

3.10. RS system elements are subdivided into three safety classes.

Safety class 1 comprises hazard category 1, 2 and 3 RnS, as well as the elements of systems, important to RS safety, the failures or damages of which are initiating events for accidents leading to overriding of the basic radiation dose limits for personnel and (or) population or discharge (release) of RA into the stationary RS rooms and (or) the environment.

Safety class 2 comprises hazard category 4 and 5 RnS, as well as the elements of systems, important to RS safety, not attributed to safety class 1.

Safety class 3 comprises RS system elements not affecting RS safety.

3.11. Safety classes of RS system elements are established during RS designing

(engineering).

3.12. Quality requirements to RS system elements attributed to safety classes 1 and 2 are established in the RS design and (or) technical documentation. Higher safety class shall imply more strict requirements to manufacturing quality assurance in accordance with the requirements of NTD.

Manufacturing quality of system elements attributed to safety class 3 are general industrial requirements.

#### Requirements for conducting categorization of radionuclide sources by potential radiation hazard

3.13. RnS manufacturing enterprises shall conduct categorization thereof by potential radiation hazard and indicate established RnS hazard categories in the certificates and if produced RnS are available in the catalogs.

3.14. Categorization of earlier manufactured and operating RnS by potential radiation hazard shall be conducted by RS operating organization. Established RnS hazard categories shall be indicated in RnS certificates.

3.15. In cases, when simultaneous radiation impact of RnS group is possible, hazard categories shall be established for each RnS and for the entire RnS group. Integration of several RnS into a group is performed in each specific case by RnS operating organization.

3.16. Procedure for categorization by potential radiation hazard and periodicity of revision of established RnS hazard categories are established by RS operating organization depending on RnS radionuclide half-decay period.

Mandatory revision of hazard categories shall be conducted only for SRnS containing radionuclides having half-decay period that is shorter than SRnS designated service life during scheduled inventory taking.

#### 4. Safety assurance requirements implemented

during siting, designing (engineering)  
and construction (manufacturing) of radiation sources

### General Requirements

4.1. The siting, designing (engineering), construction (manufacturing) of radiation sources and their systems shall be performed in accordance with the present General provisions and other federal norms and regulations in the field of atomic energy use.

4.2. During RS designing (engineering) preference shall be given to systems that are based on passive action principle.

4.3. The systems important for RS safety shall be designed, manufactured, installed and maintained in such a way that envisaged safety functions are performed in the scope determined by the RS design and (or) technical documentation, considering established in the design mechanical, thermal, chemical and other loads caused by external natural and man-induced impacts, and internal loads occurring during RS operation.

4.4. During the designing of RS electrical and electronic equipment operating in ionizing radiation fields, operability of systems, important to RS safety, shall be provided throughout the RS design operational life period.

4.5. The following shall be defined and substantiated in the RS design and (or) technical documentation:

- RS purpose, type of RnS used in RS composition, RS hazard category, as well as the established class of works for RS that incorporate URnS and (or) RA (in accordance with the requirements of health protection standards);
- list of systems, important for RS safety;
- safety classes of RS system elements, incorporated in its composition, established in accordance with item 3.10 of the present General provisions;
- list of anticipated operational occurrences and design basis accidents;
- organizational and technical measures for preventing violations of the limits

and (or) conditions of RS safe operation, as well as for prevention of accidents and mitigation of their consequences in the event of any initiating event considered in the design;

- organizational and technical measures for preventing personnel erroneous or unauthorized actions that may lead to violations of the limits and (or) conditions of RS safe operation;
- engineered features and organizational measures for providing the types of radiation monitoring envisaged for specific RS in the necessary scope;
- communication means for providing control of stationary RS in normal operation conditions and during deviations from normal operation including accidents;
- safety assurance measures during RS decommissioning in accordance with the requirements of [Section 6](#) of the present General provisions.

#### Consideration of siting conditions, designing and construction of stationary radiation sources

4.6. For hazard categories 1, 2 and 3 RS, design bases and lists of design basis and beyond design basis accidents shall be defined taking into account probable extreme effects on natural and man-induced origin in the their location (site) in accordance with the requirements of federal norms and regulations in the field of atomic energy use.

4.7. When designing and engineering physical barriers (for instance, biological shielding, labyrinth, safety door) of hazard category 1 and 2 stationary RS, a possibility of safe entrance to RS working compartment shall be envisaged. The design of safety door shall provide the possibility of opening it from the inside.

4.8. The physical barriers, envisaged in the stationary RS design, shall ensure the reduction of the levels of radiation impact on personnel and population to permissible values.

4.9. Availability of ducts and apertures for handling, process and other systems in biological shielding of hazard category 1, 2, 3 and 4 stationary RS shall not reduce its efficiency, and their design must exclude unauthorized access of people into the working compartment during RS operation.

4.10. The working compartment of hazard category 1, 2 and 3 stationary RS and adjacent rooms shall be equipped with audio and light alarms with information input to control panel and (or) workstations, which warn the personnel of an accident or deviations from RS normal operation.

4.11. Stationary RS design, when URnS and (or) RA are used, taking into account radionuclide attribution to one of radiation hazard groups and the established class of works, shall envisage zoning of RS working compartments with allocation of unattended, periodically attended, and constantly attended rooms.

4.12. Stationary RS working compartments shall be equipped with combined extract and input ventilation or exhaust ventilation, the operating modes and technical characteristics of which must be substantiated in the stationary RS design.

In the hazard category 1, 2, 3 and 4 RS rooms, where works are conducted with URnS and (or) RA, which may lead to release of radioactive gases, vapors or aerosols, the ventilation systems shall be equipped with cleaning filters.

4.13. Stationary RS design shall implement the principle of separate ventilation of unattended rooms with RnS, periodically attended rooms with RnS, and constantly attended rooms with RnS.

4.14. Stationary RS devices and structures intended for RnS storage (for instance, bays, wells, safes) shall be designed in such a way, where, during loading or withdrawal of individual RnS, the personnel would receive minimum dose from other RnS.

4.15. The design of hazard category 1, 2 and 3 stationary RS shall envisage interlock systems that exclude:

- unauthorized opening of RS working compartment safety door in the event of loss of electric power supply if SRnS is in operating position (ionizing

radiation beam is open);

- SRnS transfer to operating position or opening of ionizing radiation beam when the safety door (mounting hatch) is open or radiation monitoring system is out of operation.

4.16. The design of hazard category 1, 2 and 3 stationary RS shall envisage the possibility of forced transition of SRnS to storing position in the event of interlock system malfunction, loss of electric power supply, fire, as well as other initiating events considered in the RS design.

4.17. The design of hazard category 1, 2 and 3 stationary RS shall envisage provision of the control panel with the following information:

- RS mode of operation;
- SRnS position ("operating", "storage") or position of ionizing radiation beam capping device ("open", "closed");
- ventilation system operation mode (if unsealed RnS are used);
- dose rate value in the working compartment and adjacent rooms;
- dose rate reference level excess at workplaces;
- initiation of fire;
- interlock system failure;
- water level in RS pool with water and combined protection types, and its change.

4.18. Stationary RS control panel shall envisage SRnS transition to operating position (opening of ionizing radiation beam) only with the aid of special technical means (for instance, the key). When control panel is turned off, SRnS shall be automatically transferred to storing position.

4.19. The room where hazard category 1, 2 and 3 stationary RS control panel is located shall be equipped with telephone or other communication means with RS operating organization emergency services.

4.20. The working compartment of hazard category 1, 2 and 3 stationary RS and (or)



in the room, where RS control panel is located, shall be provided with emergency electric power supply sources that are automatically turned on, if the primary electric power supply source is disconnected.

4.21. The design of hazard category 1, 2 and 3 stationary RS shall envisage light signalization indicating SRnS position (availability or absence of ionizing radiation in the working compartment), with display of the information above the entrance to the working compartment and (or) in the RS control panel.

4.22. Stationary RS design shall envisage minimization of radioactive contamination of irradiated objects (or samples) as well as the possibility for its elimination.

4.23. The composition of stationary RS, wherein works with URnS and RA are conducted, shall include a compartment (or a place) for storing URnS and RA.

4.24. The design of stationary RS, the operation of which may lead to RW generation, shall envisage RW storage locations (or storage facility), the design shall also take into account the requirements of the federal norms and regulations in the field of atomic energy use pertaining to safety assurance during RW treatment (collection, sorting, processing, temporary storage and radiation monitoring).

4.25. The design of hazard category 1, 2 and 3 stationary RS with URnS and SRnS that may lose sealing during the work with them shall envisage technical decisions facilitating RS decommissioning upon expiration of the design service life, including the following:

- use of smooth and non-absorbing surfaces of working compartments and floor coatings in the locations of most probable contamination by RA;
- providing access to equipment for decontamination and dismantling;
- providing conditions for direct conducting of decontamination, e.g., of pipelines, cable tunnels, tanks and minimization of hard-to-reach places in terms of decontamination;
- providing access for conducting works with decontaminated and dismantled equipment;

- availability of reliable ventilation and drainage systems for preventing and monitoring RA propagation in the process of RS operation and decommissioning;
- availability of systems for treatment of solid and liquid RW that are generated during RS decommissioning activities, and of places for temporary storage thereof.

4.26. The requirements of items 4.27 - 4.32 pertaining to design and manufacturing also apply to stationary RS.

#### Design and manufacturing of mobile radiation sources

4.27. Hazard category 1, 2 and 3 mobile RS containing SRnS shall be equipped with the devices for reliable fixing SRnS position or of the device (gate valve, latch) capping ionizing radiation beam. The design of fixing devices shall exclude the possibility of spontaneous or unauthorized transfer of SRnS into operating position (opening of ionizing radiation beam) in all operating conditions, as well as under all external and internal impacts established in the design bases.

4.28. Hazard category 1, 2 and 3 mobile RS shall be equipped with manual actuator for compulsory mechanical transfer of SRnS into storing position and (or) ionizing radiation beam capping. In the event of electric power supply interruption or unauthorized shutdown of control system, SRnS shall be automatically transferred into storing position and remain in it until SRnS control system is turned on again from the control panel.

4.29. Mobile RS shall have ionizing radiation beam RnSU exit indication system (for instance, "open", "closed") independent of SRnS position switching control system ("operating", "storage") or position of the device (gate valve, latch) capping ionizing radiation beam.

4.30. Mechanical indication system output devices shall be placed on RnSU, those of

the electrical and radiometric systems - on the control panel. For mobile RS operating under preset program, it is allowed to place the indication system output devices on RnSU.

4.31. The design of RnSU, incorporated in mobile RS, shall provide the reduction of dose rate on RnSU surface and at specified distance from it in two basic positions of SRnS ("operating", "storage") or positions of ionizing radiation beam capping device ("open", "closed") down to the values established in NTD for the given type of mobile RS.

4.32. Technical means and appliances for installation and replacement (loading and reloading) of SRnS in RnSU shall be designed and manufactured so as to assure safety of these works (either at the workplace or in special chambers) on condition that radiation impact levels specified by federal norms and regulations in the field of atomic energy use are not exceeded.

#### Design and manufacturing of sealed radionuclide sources

4.33. When designing SRnS intended for use in various purpose RS, it is necessary that their leak tightness and strength characteristics be maintained within the limits of norms established in NTD for specific SRnS type throughout the entire specified service life and taking into account external man-induced and natural effects.

4.34. For SRnS, conditions and methods of checking thereof for external impacts shall be defined in accordance with the requirements of NTD for specific SRnS types.

4.35. SRnS shall have marking allowing identification of their type, serial number, year of manufacturing, SRnS manufacturer.

The marking shall be made on SRnS external surface by any method (e.g., engraving, etching, indelible paint, bar code) ensuring its legibility throughout the entire specified service life of SRnS.

Specific marking methods, its content, location and quality shall be established in NTD for specific SRnS types.

SRnS that do not have sufficient surface or those, the design features and (or) the material of which makes marking technically inadmissible, are not marked.

4.36. In any case, the information on SRnS mentioned in [item 4.35](#) shall be entered in SRnS certificate with an indication of hazard category. The requirements to additional information on SRnS characteristics included in the certificate are established by other federal norms and regulations.

## 5. Safety assurance during commissioning and operation of radiation sources

### Commissioning of radiation sources

5.1. For hazard category 1, 2 and 3 stationary RS commissioning program that includes a list, sequence, and description of pre-commissioning activities shall be developed.

For hazard category 4 and 5 RS the development of commissioning program is not required.

5.2. By the moment of stationary RS commissioning, radiation monitoring system shall be in operation. Besides, radiation safety service shall be created, or an officer responsible for monitoring of radiation safety assurance shall be assigned, taking into account the number and hazard categories of RnS used in the RS.

5.3. During commissioning of hazard category 1, 2 and 3 stationary RS, compliance of construction, installation of its equipment and systems with the design documentation shall be verified.

During commissioning of mobile RS, compliance of its complete set and operability with the design documentation shall be verified.

5.4. During implementation of RS commissioning program, characteristics of the systems important to RS safety shall be defined and documented, RS performance

characteristics shall be specified more exactly. List of characteristics and parameters subject to documenting is defined in the RS design and (or) technical documentation.

5.5. Pre-commissioning activities, checks and tests of the systems, important to RS safety, shall be performed by RS operating personnel, appropriately qualified and authorized for conducting such activities in accordance with the established procedure, or with the involvement of the personnel of specialized organizations holding the permits (licenses) for conducting corresponding works.

5.6. During pre-commissioning activities, the systems important to RS safety shall undergo direct and complete check for compliance with design parameters. If direct and complete check is impossible (which must be substantiated in the design), then indirect or partial checks shall be conducted. Possibility for diagnostics (check) of condition of systems, important to RS safety, and for representative tests thereof shall be envisaged.

5.7. During pre-commissioning activities within the framework of RS commissioning program at the stage of tests of the systems, important to RS safety, the design mode of work shall envisage measures for safe transportation and loading of SRnS into RnSU.

5.8. Pre-commissioning activities shall confirm that the RS on the whole, as well as the systems, important to RS safety, function in accordance with the design and (or) RS technical documentation and safety requirements.

5.9. Deficiencies of operation of systems, important to RS safety, revealed in the process of pre-commissioning activities, shall be eliminated, appropriate records made in the design and (or) technical documentation and reflected in RS SAR.

5.10. Following the works accomplished in the framework of stationary RS commissioning program, RS commissioning report, confirming the compliance of RS and its systems characteristics with the design and (or) technical documentation, shall be drawn up.

5.11. Prior to commencement of operation in the design mode, hazard category 1, 2 and 3 stationary RS are accepted by a commission assigned by the RS operating organization.

## Safety assurance during operation of radiation sources

5.12. During RS operation, personnel and population radiation safety shall be assured by observation of requirements of the present General provisions, requirements of other norms and regulations in the field atomic energy use and of RS operating instructions.

5.13. RS operating organization shall ensure production supervision over RS radiation safety and over radiation safety of RS personnel including third-party personnel involved in RS maintenance or repair, as well as support the development and implementation of measures for reducing radiation impact on personnel to reasonably achievable level.

For hazard category 1, 2 and 3 stationary RS, radiation situation monitoring shall be performed on the basis of stationary radiation monitoring means.

In other cases, including those when mobile RS are used (e.g., in the field or in production environment), employment of portable radiation monitoring means is allowed.

5.14. On the basis of design and (or) technical documentation, RS operating organization shall develop necessary instructions for personnel actions for normal operation conditions, operation with deviations from normal operation, and in the event of accidents.

RS operating instructions shall envisage measures (with the indication of their periodicity) for monitoring the integrity and effectiveness of physical barriers aimed at prevention of deviations leading to violation of established limits of RS safe operation.

5.15. During operation of stationary RS that use URnS and (or) RA, periodical radioactive contamination monitoring of room surfaces and equipment at workplaces shall be performed.

5.16. For RS of all hazard categories, RS operating organization shall ensure accounting and control of RnS (operative, with expired specified service life, not used, damaged) and RA.

5.17. RnS and RA that are not temporarily used during RS operation shall be placed in specially equipped storage locations that ensure their safe custody and exclude unauthorized access to them. Gross activity of RnS and (or) RA in storage locations shall be substantiated.

5.18. The systems, important to RS safety, and technical systems of safe RnS, RA and RW storage shall perform their functions in accordance with operation documentation, and monitoring and alarm systems shall be maintained in constant readiness for warning of RS abnormal operation including accidents.

5.19. RS operational documentation shall envisage measures for preventing accidents during RnSU loading (reloading). Therewith, SRnS loading in RnSU with the activity exceeding the activity specified in the RS design or technical documentation.

5.20. RS operating organization shall ensure RS physical protection and safe preservation of RnS and RA, including the conditions of receiving, storing and using RnS and RA in accordance with federal norms and regulations in the field of atomic energy use.

5.21. In stationary RS rooms, where works with RnS are conducted, it is forbidden to perform other works, not indicated in the RS design and (or) technical documentation, and not associated with RS operation.

5.22. All process operations with URnS and RA, carried out during RS operation, shall be represented in the RS design and (or) technical documentation and set out in operating instructions that are developed and approved by RS operating organization.

5.23. During RS operation, it is forbidden to perform actions and operations not envisaged by operating instructions and (or) other documents approved, in accordance with the established procedure, by RS operating organization, unless they are aimed at taking urgent measures for preventing accidents and other circumstances threatening health and life of personnel and population or fraught with environmental contamination.

5.24. The following shall be performed for maintaining operability of the systems important to RS safety and prevention of failures: regular technical maintenance, checks,

repair and testing. The indicated works shall be conducted in accordance with approved instructions, programs and schedules, developed by RS operating organization on the basis of its design and (or) technical documentation.

When conducting these works, organizational and technical measures shall be envisaged that exclude the possibility of unauthorized changes in the circuits, equipment and operation algorithms of the system important to RS safety.

5.25. After maintenance and repair, the system important to RS safety shall be checked for operability and compliance with design characteristics, and the results of checks and tests shall be documented.

RS design and technical documentation and all the changes introduced in it shall be kept throughout the entire service life of the RS. Test, check reports and maintenance and repair documentation on RS and its systems shall be kept till the next repair or test.

5.26. Hazard category 1, 2 and 3 RS operating organization shall perform analysis and assessment of RS radiation safety condition and development of action plans for RS safe operation assurance, as well as timely (in accordance with license validity conditions) according to the rules established, submit the information on RS radiation safety condition to Rostekhnadzor territorial bodies in the Report on RS radiation safety condition.

5.27. Hazard category 1, 2 and 3 RS operating organization shall ensure collection, processing and storage of the information on failures of the systems, important to RS safety, and erroneous personnel actions, as well as its handover to the RS developers and manufacturers.

5.28. RS shall be operated only in accordance with its design purpose. Introducing changes into RS design documentation is permitted only on condition of availability of appropriate safety case.

5.29. RS shall be operated only during design service life (specified service life). Extension of RS design service life is permitted, provided the requirements of appropriate federal norms and regulations in the field of atomic energy use are fulfilled.



## Handling of unused and spent sealed radionuclide sources

5.30. Use of SRnS in RS composition is permitted only for the duration of specified service life, established (recommended by SRnS manufacturer and indicated in SRnS certificate). Upon expiration of the specified service life, SRnS must be, in accordance with the established procedure and on time, handed over to specialized organization for burial.

Extension of SRnS service life is permitted in accordance with federal norms and regulations in the field of atomic energy use are fulfilled.

5.31. During temporary storage, SRnS with expired specified service life (hereinafter - spent SRnS) are subject to accounting and control.

5.32. In the RS operating organization, spent SRnS shall be temporarily stored in separate containers (packages, protective safe cells).

Joint storage (e.g., in one storage facility, room, safe) of spent and operating SRnS is permitted on condition that leak tightness of spent SRnS is confirmed by appropriate measurements.

Protective containers with spent SRnS shall have corresponding marking (inscription, label).

5.33. Temporary storage of spent SRnS in the RS operating organization is permitted for no longer than one year after expiration of the specified service life.

## Selection and training of personnel for operating radiation sources

5.34. Prior to commencement of commissioning activities, the RS must be completely staffed with personnel having the required qualification and authorized in accordance with the established procedure for unattended work.

Prior to authorization for unattended work, the personnel shall undergo:

- instruction in radiation safety and probation period in specific workplace;
- examination of the knowledge of occupational instructions (by specialty) and of radiation safety instructions.

Prior to authorization for unattended work, as well as periodically, RS personnel shall, according to the rules established in the organization, undergo medical examination to confirm the absence of contraindications for work with RnS and RA.

5.35. The system of recruiting and training of personnel shall be aimed at achievement, control and maintenance of their qualification, which are required for safe RS operation in all modes, and for activities aimed at prevention of accidents and mitigation of their consequences.

An integral element of training shall consist in forming and maintaining safety culture and safe preservation culture of RS personnel.

5.36. RS operating organization shall have documented procedure for training, instruction, examination of knowledge of regulations for safe operations, current instructions, as well as for rules of authorizing RS personnel for unattended work.

#### Assurance of emergency preparedness and response

5.37. Action plans for protection of personnel and population in the event of radiation accidents in the RS are developed by RS operating organization with due consideration of established RS hazard category.

For hazard category 1 and 2 RS, the accident, which may lead to radiation impact, action plans for personnel and public protection in the event of radiation accident shall be developed, agreed upon and approved as per the established procedure.

For hazard category 3 RS, only action plans for personnel protection in the event of radiation accident shall be developed, agreed upon and approved as per the established procedure.

For hazard category 4 and 5 RS action plans for personnel protection are not

developed. The personnel shall follow RS operating instructions.

5.38. Prior to commissioning, hazard category 1 RS shall be equipped with not less than two independent communication means with the higher organization and those organizations that, in accordance with the envisaged plans, are charged with accomplishment of measures for personnel and public protection in the event of radiation accident in the RS.

5.39. Plans for personnel protection in the event of radiation accident in hazard category 1 RS shall define who (appointed officer) gives a warning of the accident, by what communication channels, in what time, and to what organizations.

5.40. Hazard category 1 and 2 RS operating organization shall provide and maintain in constant readiness an emergency stock of the necessary radiation monitoring devices, communication means, medical supplies and individual protection means for accomplishment of action plans for personnel protection in the event of radiation accident in the RS. The emergency stock shall be periodically checked and renewed as shelf life (effective life) of its components expires.

5.41. For RS of all hazard categories, instructions for personnel actions in emergency situations shall be developed.

5.42. Hazard category 1, 2 and 3 RS personnel shall be trained for actions during radiation accidents and elimination of their consequences. For this purpose, RS operating organization shall provide the development of the program for preparing and conducting personnel emergency training drills for working through the actions in radiation accident environment in the RS and arrangement of conducting the drills. The frequency of conducting emergency training drills is established by RS operating organization, and the results of the drills shall be registered and documented.

## 6. Safety assurance during decommissioning of radiation sources

## General requirements for decommissioning of radiation sources

6.1. Planning of decommissioning of RS represented as complexes, installations, apparatuses, equipment and hazard category 1, 2 and 3 products shall be performed at all RS life cycle stages, including designing (engineering), siting, construction (manufacturing), operation, as well as during modernization, maintenance and repair.

6.2. The decision on RS decommissioning is made by RS operating organization. The basis for making a decision on RS decommissioning shall be the impossibility or inexpediency of its further operation by its purpose or of repair (modernization).

6.3. Prior to expiration of RS design service life, RS operating organization shall ensure the development of RS decommissioning plan, which defines:

- basic organizational and technical arrangements for RS decommissioning, including scheduled dates of their accomplishment during preparation for RS decommissioning and its decommissioning;
- possible strategies (variants) of RS decommissioning, as well as brief characteristic of planned final states of the RS after completion of decommissioning activities;
- the sequence and approximate schedule of accomplishment of decommissioning stages.

6.4. RS decommissioning plan or RS SAR shall include the substantiation of safe accomplishment of all scheduled works.

6.5. RS decommissioning plan shall take into account RS radiological hazard (RS hazard category and type of RnS used in its composition) and its technical complexity (e.g., complexity of the design, systems and components, location in separate engineering structure).

6.6. RS decommissioning plan shall be submitted for review to Rostekhnadzor no later than one year prior to expiration of hazard category 1, 2 and 3 RS design service life,

and no later than 6 months prior to expiration of hazard category 3 and 4 RS design service life. For any hazard category 5 RS, decommissioning plan is not developed.

6.7. When developing RS decommissioning plan, RS operating organization shall select and substantiate the selection of one of the three RS decommissioning strategies (variants) or a combination thereof:

1) immediate RS decommissioning - removal of all RnS, RA and operational RW and handover thereof to specialized organization for storage or burial;

2) delayed RS decommissioning - keeping RS under observation until complete natural decay of radionuclides (during this period controlled access to the RS may be allowed);

3) stage-by-stage RS decommissioning - stage-by-stage accomplishment of decommissioning activities, so that the intervals between the stages could be used for:

- creation of conditions necessary for treatment of generated RW;
- solution of organizational and technical issues;
- redistribution of the necessary resources (e.g., finances, personnel).

6.8. RS decommissioning activities shall be carried out by RS operating organization personnel or by personnel of specialized organizations holding licenses (permits) for conducting corresponding works, and must be provided with all kinds of radiation monitoring envisaged for the specific RS.

6.9. Upon completion of RS decommissioning activities, RS operating organization shall submit to Rostekhnadzor the necessary documents for excluding the RS from the number of supervised nuclear facilities.

### Decommissioning of stationary radiation sources

6.10. Prior to decommissioning of hazard category 1 and 2 complex stationary RS represented as facilities, instruments installations, including buildings, engineering structures, additional equipment, the operating organization shall conduct radiation and (if

delayed or stage-by-stage decommissioning variants are considered) engineering survey of the RS. Based on its results, it is necessary that RS decommissioning strategy (variant) and RS final state after accomplishment of all RS decommissioning activities be selected and substantiated.

For hazard category 3, 4 and 5 RS whereat URnS and (or) RA were used or accidents accompanied with radioactive contamination of equipment, premises, territory occurred in the process of operation, radiation survey shall be conducted.

6.11. RS operating organization shall develop a report on the results of RS radiation and engineering survey.

The results of radiation and engineering survey shall be used as the basis for developing detailed RS decommissioning plan or for updating the existing plan (if available).

6.12. Stationary RS decommissioning plan shall define and substantiate the kinds of works and technique for performing them, arrangements and technical means for assuring their safety, accomplishment sequence, required human, financial, and material and technical resources; this applies to each stage, if stage-by-stage decommissioning is selected.

6.13. Stationary RS decommissioning plan shall imply that dismantling of physical barrier system, ventilation system, fire extinguishing system, and radiation monitoring system shall be performed at the final decommissioning stages as those systems become no longer required.

6.14. Prior to hazard category 1 and 2 stationary RS decommissioning activities, RS operating organization shall revise current (or developed new) action plans for protection of personnel and population in case of radiation accidents for taking into account the specific character of works envisaged by RS decommissioning plan.

6.15. During stationary RS decommissioning, accounting and control of generated RW and RA temporarily stored in RS compartments shall be conducted.

6.16. At all stages of stationary RS decommissioning, control of personnel access to

work sites, physical protection and preservation of RS, RnS, RA, dismantled contaminated equipment and generated RW shall be assured.

6.17. Dismantling of hazard category 1, 2 and 3 stationary RS is documented in the form of report. The report is signed by the persons, who accomplished the dismantling, and approved by RS operating organization manager.

Decommissioning of mobile radiation  
sources and radiation sources based on off-the-shelf  
radioisotope devices

6.18. Mobile RS (e.g., flaw detectors, mobile irradiation installations) decommissioning plan shall include measures for implementing immediate decommissioning variant (strategy) as well as for substantiation of safety of works, including those associated with treatment of RW generated as a result of equipment decontamination and dismantling (collection, temporary storage, handover for burial).

6.19. Decommissioning plan for relatively simple RS represented by production-type RID (e.g., density meters, level meters, moisture meters, layer thickness meters) shall envisage implementation of immediate decommissioning strategy (variant) and contain organizational and technical arrangements, list and sequence of performing basic decommissioning activities.

6.20. Decommissioning plan for RS represented by production-type RID shall be based on RS technical and operational documentation with planning and technical support of the works associated with safe unloading of all SRnS and removal (handover) thereof for storage (burial) to specialized organization for RW treatment and subsequent decontamination of the remaining equipment and premises.

## Decommissioning of radioisotopic thermoelectrical generators

6.21. RITEG with expired specified or extended service life, as well as faulty RITEG are subject to decommissioning and handover either to the manufacturing enterprise or to specialized organization for RW treatment for temporary storage or burial.

6.22. During RITEG decommissioning, engineering and radiation survey is conducted for determining the possibility of dismantling and transportation.

6.23. Based on the results of engineering and radiation survey, RITEG operating organization shall develop RITEG decommissioning plan containing a list, sequence and time schedule of organizational measures and dismantling works.

The works associated with RITEG engineering and radiation survey, dismantling may be combined in one stage.

6.24. RITEG dismantling shall be performed by specially trained personnel using instructions developed by the organization, responsible for dismantling, and in accordance with the requirements of technical documentation for specific item.

6.25. Dismantling of each RITEG is documented in the form of report. The report is signed by the persons, who accomplished the dismantling, and approved by organization manager.

The report shall include the following data: item type, year of manufacturing, item serial number, SRnS certificate number, commissioning date, place of operation, brief characteristic of the item technical condition prior to dismantling, time of dismantling beginning and termination.

In case of absence of certain data on the item (e.g., due to loss of documentation), this fact shall be mentioned in the report.

6.26. RITEG is excluded from the balance of the organizations after receiving the report on putting the item on the balance of manufacturer of the report on handover of the item to specialized organization for temporary storage or burial.



Attachment 1  
to General Safety  
Provisions for  
Radiation Sources  
Approved by the order of  
Federal  
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Industrial  
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dated 05.03.2011, No.104

## LIST OF ABBREVIATIONS

NTD	- normative technical documentation
RA	- radioactive agent
RID	- radioisotopic device
RITEG	- radioisotopic thermoelectrical generator
RnS	- radionuclide source
RnSU	- radionuclide source unit
RRSC	- Report on radiation safety condition of radiation source
RS	

RS - radiation source

RS SAR - Radiation Source Safety Analysis Report

RW - radioactive waste

SRnS - sealed radionuclide source

URnS - unsealed radionuclide source

Attachment 2  
to General Safety  
Provisions for  
Radiation Sources  
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## TERMS AND DEFINITIONS

1. RS radiation accident - loss of control of RS caused by equipment malfunction, erroneous personnel actions, natural disasters or other reasons that led to irradiation of people and (or) radioactive contamination of the environment above the limits established by radiation safety standards.

2. RS safety - a property of RS during normal operation, deviations from normal operation and design basis accidents to constrain radiation impact on personnel, population and environment to appropriate limits.

3. Radionuclide source unit - structural element of an instrument, installation, product designed for accommodating SRnS and ensuring safe operation of RS owing to availability of physical barriers and devices for transferring SRnS from storing to operating position and vice versa, and (or) ionizing radiation beam capping devices.

4. RS commissioning - a process during which the functioning of RS systems and (or) the RS on the whole is verified to be in accordance with the design and (or) technical

documentation.

5. RS decommissioning - activity, carried out after termination of RS operation, that excludes its further use and is directed at assurance of personnel, population and the environment safety up till complete exemption of RS from supervision of state regulatory authorities for atomic energy safety.

6. Beyond design basis accident - an accident caused by initiating events that are not accounted for deviations from normal operation and design basis accidents.

7. Sealed radionuclide source - radiation source, the design of which excludes the release of radionuclides contained in it into the environment in the conditions of application and wear for which it is designed.

8. Unsealed radionuclide source - radiation source, the use of which may lead to the release of radionuclides contained in it into the environment.

9. Initiating event - single failure in RS systems, external event or personnel error. An initiating event includes all dependent failures being its consequence.

10. Safety culture - as applied to organizations and individuals is an assembly of characteristics and attitudes which establish that protection and safety issues receive the attention corresponding to their significance.

11. Preservation culture - as applied to organizations and individuals is an assembly of characteristics and attitudes which establish that safe preservation issues receive the attention corresponding to their significance.

12. RS abnormal operation - violation in RS operation involving violation of established operational limits and conditions. Simultaneously, other limits and conditions, established by the design, including safe operation limits, may be also violated.

13. RS normal operation - RS operation within operational limits and conditions defined by the design.

14. Accident consequences - radiation situation resulting from an accident.

15. RS safe operation limits - the values of parameters and characteristics established by RS design for normal operation, abnormal operation and design basis accidents.

16. Design basis accident - an accident for which the design establishes initiating events and final states and envisages technical means and organizational measures ensuring constraining of its consequences to the limits established for such accidents (50 mSv - for RS personnel and 5 mSv - for the population).

17. Radiation sources - complexes, installations, apparatuses, equipment and products not attributed to nuclear installations and containing RA or generating ionizing radiation.

Complex - a set of technical devices (installations, instruments, equipment, products) of interconnected purposes, containing RnS, operated within the framework of joint process.

Installation - technical device, containing one or several RnS, intended for implementation of radiation technologies, research in the area of ionizing radiation effect on substances, metrological certification of instruments and RnS.

Apparatus - technical device, containing one or several RnS, intended for the use of ionizing radiation properties for various purposes.

Equipment - technical devices accommodating RnS- or RA-containing products for performing a certain part of the process, as well as process accessories required for conducting the works with RnS or RA.

Product - technical device containing RnS or RA, and not attributed to complexes, installations, apparatuses or equipment.

In the framework of the present General provisions, RS also comprise complexes, installations, apparatuses, equipment and products containing nuclear materials in quantities and/or concentrations established in federal norms and regulations in the field of atomic energy for accounting and control of RA.

18. Stationary radiation source - physically isolated, i.e., located in a separate building (compartment), or technically independent nuclear facility, which, by its purpose and design, is intended for operation at a constant location throughout the entire design service life, and which incorporates one or several complexes, installations, apparatuses and products, as well as the personnel, equipment for conducting works, physical protection

means.

Stationary RS may incorporate storage facilities (locations) for mobile RS, RnS, RA and RW envisaged in its design.

Stationary RS, for instance, include:

- research and development or educational laboratory, where works with the use of RnS or RA are conducted;
- radiological department of a medical institution;
- stationary industrial irradiation installation;
- industrial shop or production division, where stationary RS are installed or activities involving the use of RnS and (or) RA are conducted.

19. Mobile radiation source - movable or portable complex, installation, apparatus, equipment or product.

Movable RS - RS, mounted and used (operated) as intended on vehicles (self-propelled or specially adapted for transportation).

Portable RS - RS, that, owing to the design and mass of their integral blocks (parts), may be carried (or, if necessary, transported in disassembled or assembled form) and used (operated) as intended directly at the place of works in the rooms (without room reconstruction or enhancement of protection) or in the field conditions.

Mobile RS, for instance, include:

- portable RID (for example: radioisotopic density meters, moisture meters, level meters):
- portable and movable radionuclide flaw detectors;
- radioisotopic icing indicators mounted in aircraft.

20. System - an assemblage of elements intended for performing prescribed functions.

21. Systems, important to RS safety - systems, the failures of which violate normal operation of the RS or obstruct elimination of deviations from normal operation and may lead to accidents.

22. RS construction - activities associated with erection of buildings, engineering

structures and structural units of stationary RS that includes construction, transportation, assembly and other activities.

23. RnS safe preservation - measures aimed at preventing unauthorized access to RnS or inflicting damage on them, as well as their loss, theft or unauthorized handover.

24. RS maintenance - a series of operations aimed at maintaining availability and proper operable condition of RS and its systems during their use (operation) as intended by the design and during storage.

25. RS conditions of safe operation - minimum conditions for quantity, characteristics, operability state and maintenance of systems important to RS safety required for RS safety assurance, established by RS design or technical documentation.

26. Physical barrier - an engineering structure, facility or part of RS structure confining ionizing radiation and (or) RA propagation into the environment, in particular, RA matrix, SRnS capsule, radiation protective container, RnSU, screen, labyrinth, canyon, walls.

27. Safety function - actions that assure the achievement of specific particular goal aimed at preventing an accident or limiting its consequences.

28. Element - structural unit assuring the accomplishment of specified functions independently or within the system composition and considered in RS design or RS technical documentation when analyzing reliability and safety.

29. RS operational limits - the values of RS system condition parameters and characteristics specified by RS design (or technical documentation) for normal operation.

30. RS operational environment - conditions for quantity, characteristics, operability state and maintenance of systems required for operation without violation of operational limits, established by RS design.

Attachment 3  
to General Safety  
Provisions for  
Radiation Sources  
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## CLASSIFICATION OF RADIATION SOURCES BY THEIR PURPOSE

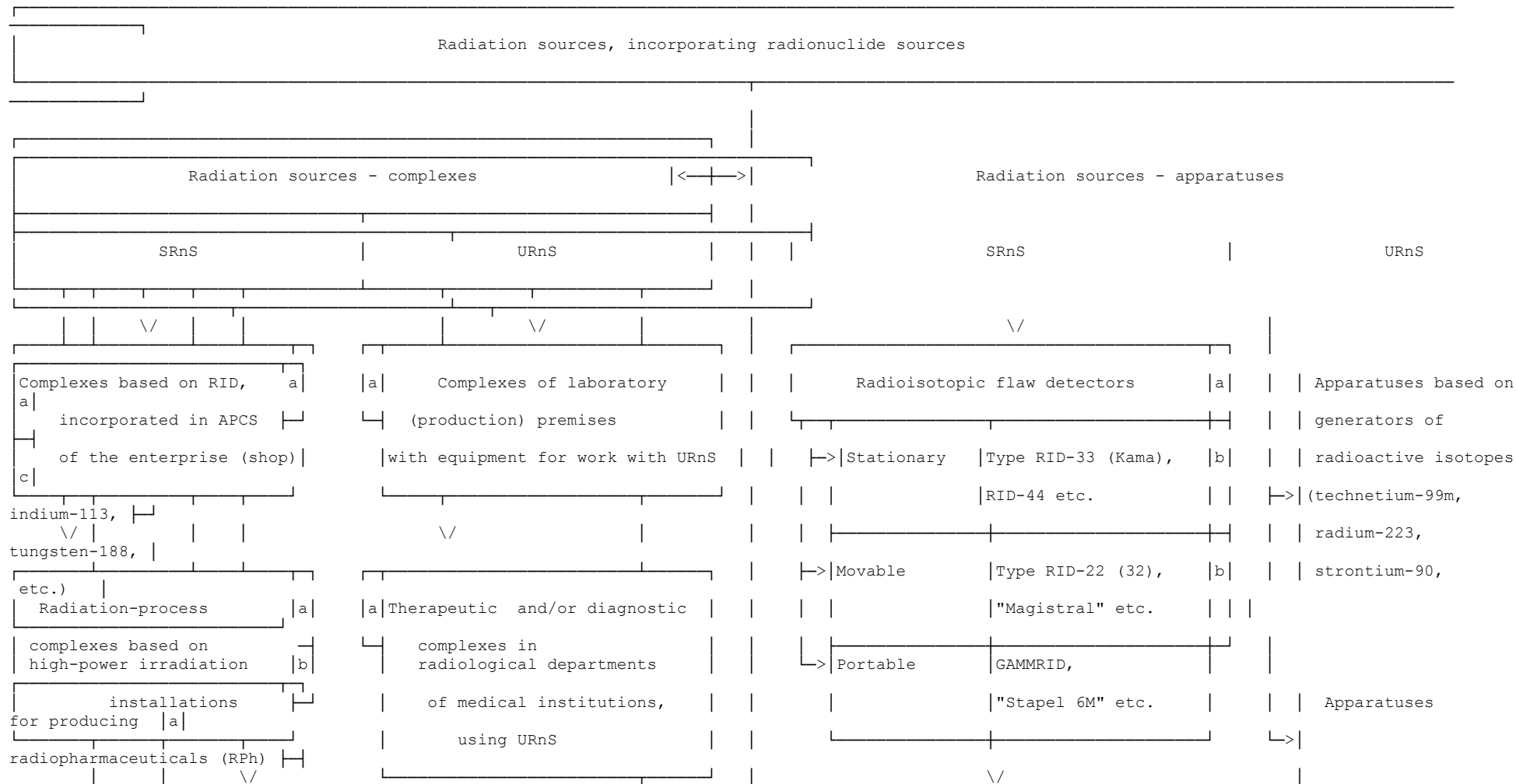
This Attachment contains schematic representation of classification by purpose of those RS that fall under the requirements of the present General provisions (see the scheme). This scheme explains the definitions of terms 17, 18 and 19 presented in [Attachment 2](#).

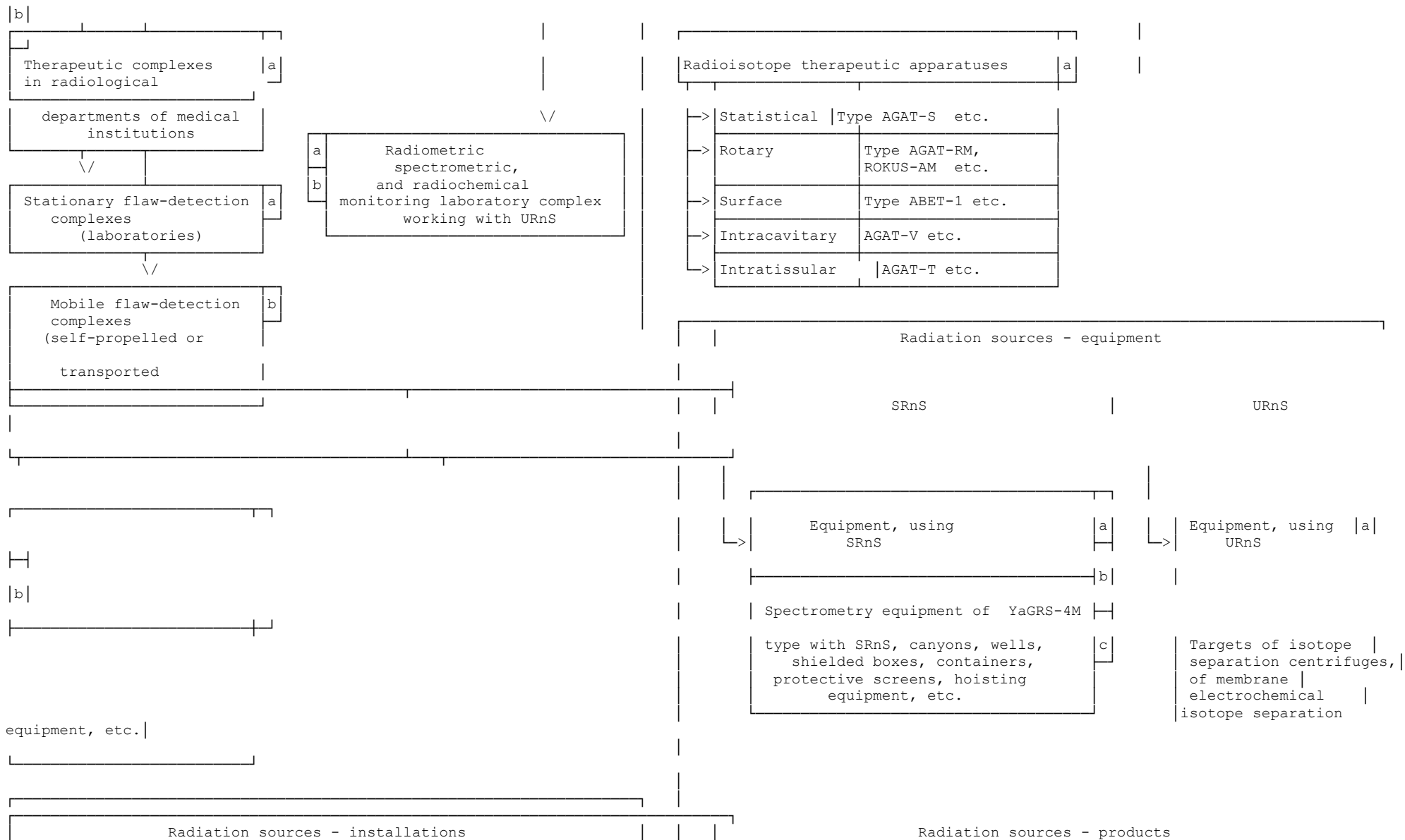


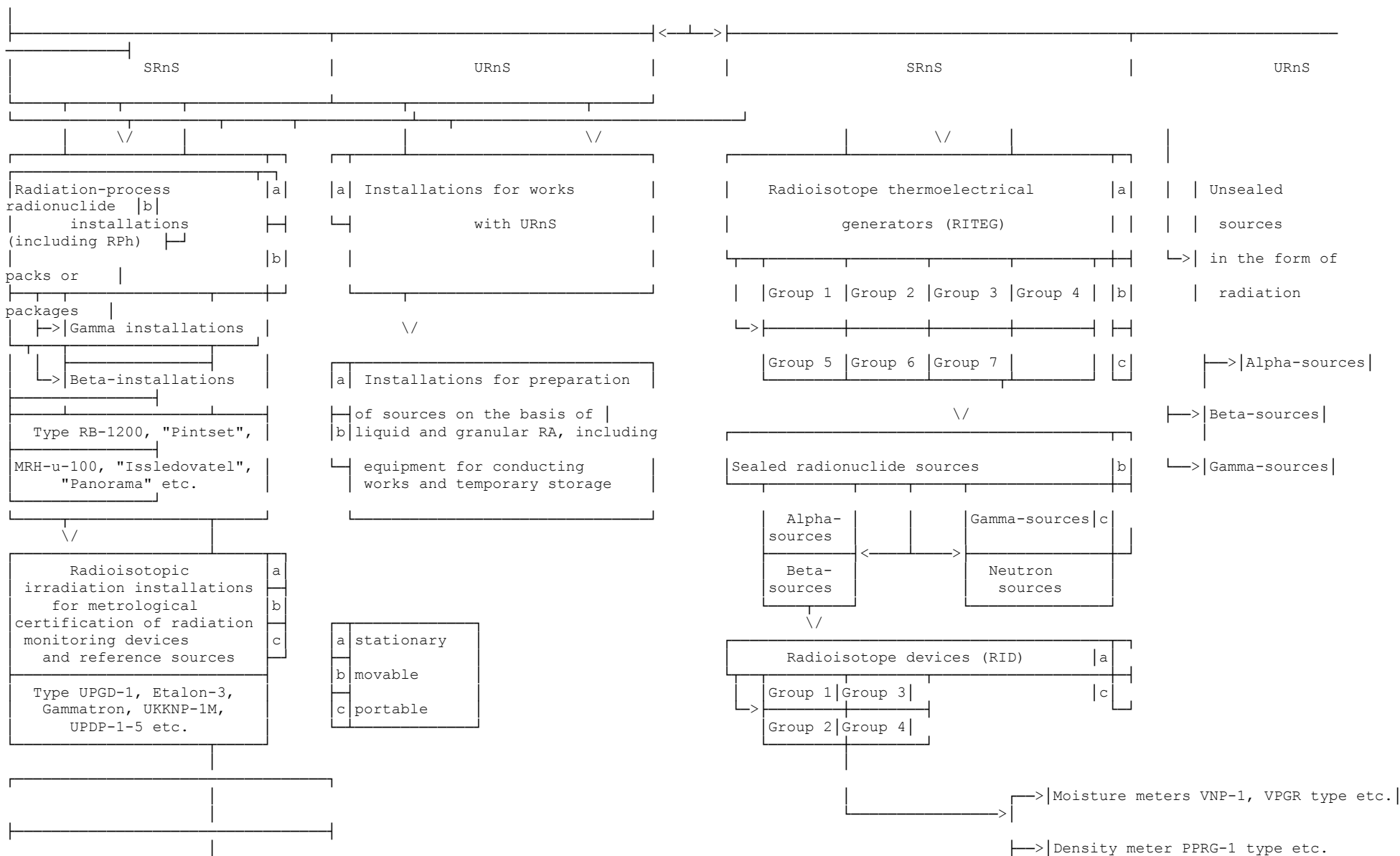
The examples of particular types of RS (complexes, installations, apparatuses, equipment and products) are given exclusively for illustration.

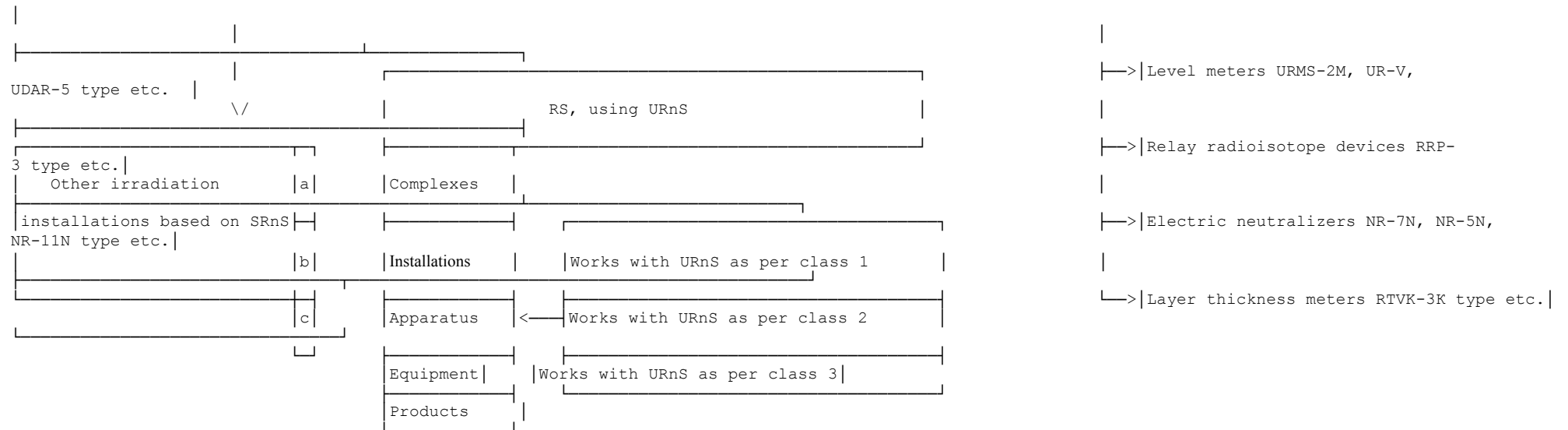
**Consultant Plus: Note.**

A part of the text in the scheme is not presented since it is illegible. The text will be refined after official publication of the document.









Attachment 4  
to General Safety  
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BRIEF DESCRIPTION OF HAZARD  
CATEGORIES OF SEALED RADIONUCLIDE SOURCES

Source hazard category	Danger of irradiation near separate source	Danger of irradiation in case of dispersion of the source RA in the event of fire, explosion and other impacts
1.	<p>Extremely dangerous for man</p> <p>Such a source, once its safe application and preservation are not assured, may become a cause of irreparable damage to an individual who held it in his/her hands or in any other way had contact with it for several minutes.</p> <p>Fatal outcome is possible, if an individual had been staying near such unshielded source for a time period from several minutes to 1 hr.</p>	<p>Such quantity of RA, if it is dispersed, may, although it is unlikely, inflict irreparable damage or pose threat to the life of people in the immediate vicinity of it.</p> <p>Beyond the radius of several hundred meters the threat of direct effects on human health is insignificant or does not exist, however contaminated territory must be decontaminated. For high-activity sources the area of the territory, subject to decontamination, may be on the order of 1 km<sup>2</sup> and more.</p>
2.	<p>Very dangerous for man</p> <p>Such a source, once its safe application and preservation are not assured, may become a cause of irreparable damage to an individual who held it in his/her hands or in any other way had contact with it for a short period of time (from several minutes to several hours). Fatal outcome is possible, if an individual had been staying near such unshielded source for a period of time from several hours to several days.</p>	<p>Such quantity of RA, if it is dispersed, may, although it is very unlikely, inflict irreparable damage or pose threat to the life people in the immediate vicinity of it.</p> <p>Beyond the radius of 100 m (or about 100 m) the threat of direct effects on human health is low or does not exist, however contaminated territory must be decontaminated. The area of the territory, subject to decontamination, will not exceed 1 km<sup>2</sup>.</p>
3.	<p>Dangerous for man</p> <p>Such a source, once its safe application and preservation are not assured, may become a cause of irreparable damage to an individual who held it in his/her hands or in any other way had contact with it for several hours. Fatal outcome, although unlikely, is possible, if the individual had been staying near such unshielded source for a period of time from several days to several weeks.</p>	<p>Such quantity of RA, if it is dispersed, may, although it is highly unlikely, inflict irreparable damage or pose threat to the life of people in the direct vicinity of it.</p> <p>Beyond the radius of several meters the threat of direct effects on human health is low or does not exist, however contaminated territory must be decontaminated. The area of territory, subject to decontamination, will not exceed a small fraction of 1 km<sup>2</sup>.</p>
4.	<p>Low probability of danger for man</p> <p>It is unlikely that irreparable damage will be inflicted on anybody by this source. However, such unshielded source, once its safe application and preservation are not assured, may, although it is unlikely, inflict temporary damage on an individual, who held it in his/her hands or in any other way had contact with it for many hours or had been staying near the source for many weeks</p>	<p>Such quantity of RA cannot inflict irreparable damage on people, if dispersed.</p>

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Source hazard category	Danger of irradiation near separate source	Danger of irradiation in case of dispersion of the source RA in the event of fire, explosion and other impacts
5.	Very low probability of danger for man Such a source cannot inflict irreparable damage on anybody.	Such quantity of RA cannot inflict irreparable damage, if dispersed.

Notes.

1. If RA of hazard category 1, 2 or 3 sources are dispersed, the area of territory, subject to decontamination, will depend on many factors (for instance, radionuclide activity and type, dispersal mode, meteorological conditions).

2. Some potential direct effects of impact on health (temporary skin redness and irritation or temporary change of blood composition as well as delayed effects (such as irradiation-induced cancer) were not taken into account.