

Federal Service for Ecological, Technological and Nuclear Supervision

**FEDERAL RULES AND REGULATIONS
ON THE USE OF NUCLEAR ENERGY**

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**REQUIREMENTS
TO PHYSICAL PROTECTION SYSTEMS
OF NUCLEAR MATERIALS, NUCLEAR FACILITIES AND NUCLEAR
MATERIAL STORAGE FACILITIES**

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**Requirements to physical protection systems for nuclear materials, nuclear facilities and nuclear material storage facilities
NP-083-07**

**Federal Service for Ecological, Technological and Nuclear Supervision
Moscow, 2007**

The present Federal rules and regulations establish requirements to physical protection systems for nuclear materials, nuclear facilities and nuclear material storage facilities.

Issued for the first time*.

This regulatory document was drawn up in accordance with Federal Law “Use of Nuclear Energy”, “Regulations on Physical Protection of Nuclear Materials, Nuclear Facilities and Nuclear Material Storage Facilities”, and the recommendations contained in the IAEA document INFCIRC/225/Rev.4 “Physical Protection of Nuclear Material and Nuclear Facilities”.

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The comments and proposals of the Federal Atomic Energy Agency, the Federal Customs Service, the Federal Industry Agency, the concern Rosenergoatom, and other interested organizations were considered and taken into account.

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LIST OF ABBREVIATIONS

PPETF	– physical protection engineering & technical facilities
LCU	– local control unit
AMCS	– access monitoring and control system
RCWS	– rapid communication and warning system
OESS	– optoelectronic surveillance system
TCS	– telecommunications system
ACS	– alarm-call signaling
PPTF	– physical protection technical facilities
CCU	– central control unit

1. PURPOSE AND SCOPE

1.1. The present Federal rules and regulations establish requirements to physical protection system for nuclear materials, nuclear facilities and nuclear material storage facilities (hereinafter referred to as “storage facilities”), which are binding for all legal entities engaged in the production, use, storage and processing of nuclear materials, design, construction, commissioning, operation and decommissioning of nuclear installations and storage facilities for peaceful purposes regardless of ownership, source of financing and departmental affiliation, in accordance with Federal Law No. 170-FZ “Use of Nuclear Energy” dated November 21, 1995 (Code of Laws of the of the Russian Federation No. 48, dated November 7, 1995 Art. 4552) and “Regulations on Physical Protection of Nuclear Materials, Nuclear Facilities and Nuclear Material Storage Facilities”, approved by Resolution No. 456 dated July 19, 2007 of the Government of the Russian Federation (Code of Laws of the of the Russian Federation No. 31, dated July 30, 2007 Art. 4081).

1.2. The present Federal rules and regulations apply to the physical protection of nuclear materials, nuclear facilities (except nuclear materials and nuclear facilities on ships and other floating facilities, space facilities and aircrafts during sailing and flight) and storage facilities at all stages of their life cycle: during design, construction, commissioning, operation and decommissioning of nuclear installations and storage facilities, production, use, processing and storage of nuclear materials..

2. GENERAL PROVISIONS

2.1. A physical protection system consisting of the physical protection personnel, organizational and technical measures and actions carried out by it, and complex of the physical protection engineering & technical facilities, should perform the following tasks:

- a) prevention of unauthorized actions;
- b) prompt detection of unauthorized actions;
- c) hindering (slowing down) the intrusion (advancement) of offenders;
- d) responding to unauthorized actions of offenders and neutralization of such in order to prevent the unauthorized actions.

2.2. The physical protection system is part of the system of organizational and technical measures carried out at nuclear facilities to provide the safety of nuclear energy use.

2.3. Any legal entity or individual that breaches the present Federal rules and regulations shall be brought to justice in accordance with the laws of the Russian Federation.

3. CATEGORIZATION OF PHYSICAL PROTECTION ITEMS, ROOMS, BUILDINGS, STRUCTURES, INDUSTRIAL SITES AND NUCLEAR FACILITIES

3.1. To perform physical protection tasks at each nuclear facility, the following should be categorized:

- physical protection items;
- rooms where physical protection items are placed, as well as buildings, structures, separate territories of a nuclear facility, where nuclear material is used or stored, or where nuclear installation or storage facility (hereinafter referred to as “industrial sites”) is located and (or) operated;
- nuclear facility.

3.2. Categorization of physical protection items, rooms (if necessary buildings, structures, industrial sites) and nuclear facilities is used to develop requirements on a physical protection system and for providing its adequacy to the threats and models of offenders.

3.3. The factors of categorization of physical protection items should incorporate the following:

- category of nuclear material;
- degree of secrecy of physical protection items;
- category of consequences of unauthorized actions against physical protection items;
- presence of significant quantities of direct-use nuclear material.

3.4. Category of nuclear materials should be determined by types, isotope content, degree of exposure and the mass of nuclear materials in accordance with Appendix No. 1 to the Regulations on Physical Protection of Nuclear Materials, Nuclear Facilities and Nuclear Material Storage Facilities.

Categories of consequences of unauthorized actions against physical protection items should be determined in accordance with Appendix No. 2 to the Regulations on Physical Protection of Nuclear Materials, Nuclear Facilities and Nuclear Material Storage Facilities.

3.5. Categorization of physical protection items, rooms, buildings, structures, industrial sites and nuclear facilities should result in attributing those to one of the categories.

The requirements for placement of physical protection items in the relevant protected areas and areas of restricted access should be determined in accordance

with Appendix No. 3 to the Regulations on Physical Protection of Nuclear Materials, Nuclear Facilities and Nuclear Material Storage Facilities.

3.6. At a nuclear facility, there should be categorization of rooms in which physical protection items are placed (if necessary, categorization of buildings, structures, and industrial sites). The category of rooms, buildings, structures, and industrial sites should be determined based on the maximum category of separate nuclear materials located in those spaces, nuclear materials that make up the nuclear facilities, taking into account the degree of their secrecy and the consequences of unauthorized actions against physical protection items.

3.7. The results of categorization of physical protection items, rooms, buildings, structures, and industrial sites and their attribution to protected areas should be drawn-up as a separate document.

3.8. The following categories of nuclear facilities are established taking into account the category of physical protection items:

- I Category – nuclear facilities, which contain physical protection items of Category A;
- II Category – nuclear facilities not attributed to Category I, and which contain physical protection items of Category B;
- III Category – nuclear facilities not attributed to Categories I and II, and which contain physical protection items of Category B or D;
- IV Category – nuclear facilities not attributed to Categories I, II and III, and which contain physical protection items of Category D.

4. PROCEDURE FOR CREATION, IMPROVEMENT AND OPERATION OF A PHYSICAL PROTECTION SYSTEM

4.1. In creating (improving) a physical protection system, it is necessary to:

- a) take into account the features of the nuclear facility and the existing nuclear, radiological, environmental, fire, safety, and information security measures, and other types of safety measures;
- b) limit the number of persons having access to the physical protection items, to elements and systems important for the safety of the nuclear facility or its physical protection system, and to the information about the arrangement, composition and functioning of the physical protection system;
- c) provide that the physical protection system meets the requirements established for the nuclear facility;
- d) establish requirements for organizational and technical measures on providing physical protection, depending on the category of the physical protection items.

4.2. In order to provide physical protection, measures on protection of information about the arrangement and functioning of the physical protection system, determined in accordance with Federal and departmental regulations should be taken.

The hardware and software of the physical protection systems used in the processing of information that constitutes state or official secrets should be liable to mandatory certification for compliance with information security requirements, while

the created and reconstructed physical protection systems should be liable to attestation on information security requirements.

4.3. Stages and specific work on creation (improvement) of physical protection system should be established in the technical specifications for the creation (improvement) of the physical protection system (in individual technical specifications).

4.4. Conceptual design stage.

4.4.1. Creation (improvement) of a physical protection system should be based on the results of analysis of the vulnerability of the nuclear facility and the assessment of the effectiveness of the physical protection system.

4.4.2. In creating (improving) the physical protection system, the category of physical protection items, rooms, buildings, structures, and industrial sites, and the features of location and operation of nuclear installations and storage facilities should be taken into account.

4.4.3. At the conceptual design stage of physical protection system, the materials of vulnerability analysis and categorization of rooms, buildings, structures and industrial sites should be used as input data.

Pre-design survey of nuclear facilities and physical protection systems, development and selection of an option for construction of the physical protection system based on assessments of the effectiveness and costs of various options for the physical protection system are carried out at this stage.

4.4.4. The technical specifications for the creation (improvement) of a physical protection system should be developed in order to form and detail the requirements for the physical protection system based on the conceptual design results, as well as to determine the composition, content and procedure of work on the commissioning of the physical protection system.

4.4.5. The technical specifications for the preparation of project documentation should be based on the input data and results of the conceptual design stage of creation (improvement) of a physical protection system and should contain the requirements for development of an investment feasibility study and project documentation for the physical protection system in the construction, reconstruction, technical re-equipment of the nuclear facility, as well as for development of an investment feasibility study and project documentation for reconstruction and technical re-equipment of the physical protection system at an existing nuclear facility.

4.4.6. The design technical specifications and PPETF complex projects are liable to coordination with parent organizations of security guard units in respect of the engineering & technical facilities used for protecting of nuclear facilities.

4.5. Design stage.

4.5.1. Design activities on the creation of a physical protection system are implemented during the construction of new nuclear installations and storage facilities, while improvement (reconstruction, modernization) of a physical protection system is carried out on existing nuclear installations and storage facilities.

4.5.2. During construction of new nuclear installations and storage facilities, a design project documentation for the physical protection system should be developed

and included in form of a separate section in the project documentation for their construction.

4.5.3. During reconstruction and technical re-equipment of a physical protection system only, a feasibility study (draft) on the physical protection system, or a working draft (approved part and working documentation), or working documentation should be developed.

4.5.4. Design, technical and organizational solutions on the physical protection system of nuclear installations and storage facilities should be developed based on requirements, rules and regulations, as well as with the use of standard design solutions.

4.6. Commissioning stage of a physical protection system.

4.6.1. The commissioning stage of a physical protection system should include:

- organizational activities, including preparation of a nuclear facility and the physical protection personnel for the commissioning of the physical protection system, organization of complex of regime, engineering, technical measures and other activities carried out by the security guard units, and with the direct participation of the management body of nuclear facilities, and other cooperating agencies in order to prevent unauthorized access of offenders to a nuclear facility and their neutralization (hereinafter referred to as “protection”), development of physical protection site-documents, organization of control;

- equipping a nuclear facility with a set of engineering & technical facilities designed to provide physical protection (hereinafter referred to as “PPETF”), including kitting, construction, installation and commissioning activities;

- testing and commissioning of PPETF complex;

- attestation on informational security requirements and acceptance of the physical protection system by the acceptance committee.

4.6.2. During improvement of individual elements of the existing physical protection system, it is allowed not to carry out acceptance of the physical protection system.

4.7. Evaluation of the effectiveness of a physical protection system.

4.7.1. The quality of creation and operation of a physical protection system should be confirmed by the evaluation of its effectiveness.

4.7.2. The effectiveness of a physical protection system should be evaluated experimentally (in exercises), analytically or by modeling at various stages and phases of creation of the physical protection system, as well as during its operation. The evaluation of the effectiveness of a physical protection system should be used to identify ways of improving the system.

4.7.3. A minimum permissible value of the effectiveness factor of a physical protection system should be set for each nuclear facility.

4.7.4. The effectiveness of a physical protection system at a nuclear facility should be evaluated periodically.

4.7.5. With a change in threats and models of offenders, and change in the process of use and storage of nuclear materials, the effectiveness of the physical protection system should be evaluated.

5. REQUIREMENTS TO PHYSICAL PROTECTION SYSTEM AT A NUCLEAR FACILITY

5.1. General Requirements to physical protection system

5.1.1. The physical protection system should be functioning at the time of supply of nuclear materials at a nuclear facility.

5.1.2. During decommissioning of a nuclear facility and storage facility, the physical protection system should be functioning until withdrawal of nuclear materials from the nuclear facility and storage facility.

5.1.3. The physical protection system should perform tasks under normal circumstances and in states of a nuclear facility in which normal conditions were breached due to unauthorized action on it, causing possible injury to personnel (population), giving rise to threat to the life of personnel (population), and also possible damage to the environment (hereinafter referred to as “emergency situations”).

5.1.4. In the physical protection system, there should be information protection, including privacy (confidentiality) of information about the arrangement, composition and functioning of the physical protection system, its integrity and authorized access to it, of which if breached, may reduce the effectiveness of the physical protection system as a whole or of its individual elements.

5.1.5. At a nuclear facility, there should be protection not related to nuclear installation or storage facilities, a nuclear facility communications and elements, for which in the course of vulnerability analysis, the need to prevent unauthorized actions was identified.

5.1.6. In exceptional cases when it is impossible to fully implement the requirements for the physical protection system at a nuclear facility established by the present Federal rules and regulations, compensatory organizational and technical measures should be adopted. The sufficiency of measures taken should be confirmed by an assessment of the effectiveness of the physical protection system.

5.2. Requirements to components of a physical protection system

5.2.1. Requirements for organizational measures for a physical protection system.

5.2.1.1. The organizational measures for a physical protection system should include a set of measures at all stages of the creation (improvement) and functioning of the physical protection system and regulatory documents on issues of arrangement and functioning of the physical protection system, which regulate these measures.

5.2.1.2. A set of measures carried out at the stages of creation (improvement) of a physical protection system is outlined in section 4 of the present Federal rules and regulations.

The set of measures on providing the functioning of the physical protection system should include:

- administration of the physical protection system, including work planning, organization of interaction, site-monitoring of the state of the physical protection system;
- organization of security clearance and access of persons to nuclear materials, nuclear installations, storage facilities and information on the functioning of the physical protection system;
- organization of security clearance and internal security policy;
- protection of information circulating in the physical protection system;
- carrying out analytical work, including analysis of the vulnerability of a nuclear facility, evaluation of the effectiveness of physical protection system and preparation of proposals for its improvement.

The procedure for operation of PPETF is established in section 6 of the present Federal rules and regulations.

5.2.1.3. At a nuclear facility, organizational measures should be designed and physical protection regulations issued.

5.2.1.4. Protection of nuclear facilities should be based on Acts of inter-departmental (departmental, domestic) committees in charge of organization of their protection.

5.2.1.5. In categorized buildings, structures and rooms, where activities with nuclear materials are being conducted, a set of organizational and technical activities should be carried out during working time by the employees (personnel) located at the nuclear facility in order to provide prompt notification of the duty services and security guard units of any intrusion into their territory by persons who have no right to do so, or in breach of the established order and provision of safety of nuclear materials (hereinafter referred to as “self-protection”):

- the procedure for organization of self-protection should be determined according to the self-protection instructions;
- in categorized buildings, structures and rooms under self-protection, there should be duty personnel and a register of visitors should be kept;
- the actions of the personnel in buildings, structures and rooms under self-protection should be aimed at providing protection of nuclear materials, nuclear installations and storage facilities against unauthorized actions (detection of unauthorized actions and prompt notification about them to duty services and security guard units).

5.2.1.6. In selection and training of physical protection personnel, the following requirements should be met:

- qualifications and medical requirements for the physical protection personnel should be determined by Federal and departmental regulations;
- there should be professional training involving a basic training, advanced training and retraining of the physical protection personnel.

Basic training should be conducted with the candidates selected for appointment to vacant positions and meeting the relevant eligibility requirements for specific categories of physical security personnel, as defined in the document establishing requirements for the personnel in charge of physical protection of nuclear materials.

Advanced training and retraining of physical protection personnel should consist of a system of measures for in-depth training of managerial personnel and experts in the field of physical protection in order to enhance their professional knowledge and skills.

5.2.2. Requirements for the PPETF complex.

5.2.2.1. The PPETF complex should consist of PPTF and engineering systems.

5.2.2.2. The PPETF complex should perform the following tasks:

- providing prompt, sustained and continuous control of the physical protection system;
- providing the established regime of access of personnel to nuclear materials, nuclear installation, and to storage facility;
- issuing of signals at the control stations of the physical protection system about intrusion into protected areas, buildings, structures, rooms or into the cargo compartments of vehicles transporting nuclear materials and nuclear installations by persons who have no right to do so, or in breach of the established order (hereinafter referred to as “unauthorized intrusion”);
- determining the time and place of unauthorized intrusion at the perimeter (boundaries) of guarded areas, while at the perimeter (boundary) of protected area – the movement direction of offenders;
- hindering (slowing down) the intrusion (advancement) of offenders;
- creation of conditions for the security guard units favorable for performance of their duties and enabling actions on detention of offenders;
- surveillance of guarded areas, guarded buildings, structures, rooms in order to assess the situation;
- recording (documentation) of signals from PPETF, orders and instructions given by command centers of a physical protection system and reports of operators of command stations of the physical protection system.

5.2.2.3. The project of creation (improvement) of the PPETF complex should take into account the operating conditions of PPETF.

The operating conditions of PPETF for specific nuclear installations and storage facilities should be installed by the customer in technical specifications for creation (improvement) of the PPETF complex.

5.2.2.4. There should be PPETF operational documentation developed.

5.2.2.5. The PPTF complex should perform the following tasks:

- collection, processing, analysis and control of all information received;
- providing the possibility of evaluating an alarm situation in real time;
- generation and transmission of messages (prescribed signals) to the guard and response units, and to command centers of the physical protection system;
- providing information exchange between CCU and LCU;
- development of control actions on the managed physical barriers and means on providing the operations of the physical protection system;
- monitoring the status and operational capability of PPETF;
- controlling the actions and location of personnel when they are working with nuclear materials, at nuclear installations, and at storage facilities;

- storing and issuing information on the functioning of the physical protection system, attempts to overcome it, and unauthorized actions against protected facilities and at the PPETF.

The need and procedure of information interaction of the PPETF complex with systems of nuclear, radiation, environmental, technical and fire safety of a nuclear facility should be specified in the technical specifications for creation (improvement) of the physical protection system.

5.2.2.6. PPETF should provide:

- reliable and continuous operation in all operation modes specified;
- monitoring for the presence of faults (loss of video signal, equipment rupture, attempts to access communication lines, etc.), notifying the operator about this and archiving this information;
- remote monitoring of the operational capability of the PPETF.

5.2.2.7. PPETF should:

- maintain the operational capability during disconnection of the main power supply, which should be provided by back-up power supplies and carried out by automatic switching of the main power supply to the back-up power supply;
- display information to the appropriate LCU and CCU with mandatory registration of transfer of PPETF or their elements over to back-up power supply.

5.2.2.8. The physical protection technical facilities are elements and devices included in the following major functional systems:

- alarm system;
- ACS;
- AMCS;
- opto-electronic surveillance and situation assessment system;
- RCWS (including wire and radio communications);
- TCS;
- information protection;
- power supply, lighting.

5.2.2.9. Individual elements (devices) used in the composition of the PPTF complex can provide implementation of the requirements placed on one or more functional systems (integrated systems and devices).

5.2.2.10. Failure or damage of any element of the PPETF complex should not disrupt the physical protection system. For this purpose, there should be compensatory measures in place.

5.2.2.11. PPETF management should be performed by the security service with CCU. Managing PPETF with LCU can be performed both by the security service and by the security guard unit of the nuclear facility. The CCU operator should have access to information available at the LCU.

The operators on duty at the CCU and at the relevant LCU should be informed of the features of technological process in details necessary to perform their duties.

In order to organize control, the physical protection system should incorporate:

- a two-way communication system between the central and local control stations, and also between control centers and security guard units;
- radio communication equipments at security guard units and security service.

5.2.2.12. Central and local control stations should be placed in a guarded area.

5.2.2.13. At each nuclear facility, the composition of the equipment of the control station of the physical protection system, their location and equipment, as well as the number of LCU (taking into account partial control of PPETF) should be defined at the design stage of the PPETF complex.

5.2.2.14. Physical protection engineering & technical facilities include:

- physical barriers;
- engineering equipment of the guarded areas and guard checkpoints (posts)

5.2.2.15. The engineering systems should:

- impede the actions of offenders when attempting an unauthorized intrusion;
- generate signals of impact on controlled physical barriers;
- designate the boundaries of guarded areas;
- protect the personnel on duty at control stations of the physical protection system, personnel on duty at checkpoints (posts), duty guards at patrol posts and personnel of the security guard units in performing tasks on prevention of unauthorized actions and detention of offenders.

5.2.2.16. Physical barriers designed to prevent passage of people and vehicles into protected areas (exit of people and vehicles from protected areas), hindering (slowing down) the intrusion (advancement) of offenders.

5.2.2.17. Physical barriers are:

- engineering structures of a nuclear facility (walls, floors, gates, doors);
- specially designed structures (fences, anti-ram devices, grids, reinforced doors, containers);
- other physical (including natural) barriers.

5.2.2.18. In the event of a nuclear facility adjoining an area of water, measures to protect against intrusion of offenders through the water area should be taken – installation of networks and other special equipment, patrol boats (if the shoreline makes it impossible to equip the prohibited zone since this interferes with docking, etc.) etc.

5.3. Requirements to components of the complex of the physical protection technical facilities

5.3.1. Requirements for the intrusion detection system.

5.3.1.1. The intrusion detection system is designed to detect attempts and facts of unauthorized actions and should notify of these events to the physical protection personnel and other functional systems within the physical protection system for performance of the appropriate adequate actions, and automatically issue the necessary control commands to the actuating mechanism and controlled physical barriers.

5.3.1.2. The intrusion detection system should:

- detect unauthorized access;
- issue signal on the triggering of detection device to the CCU (LCU) and making record of this event;

- maintain an archive of all events occurring in the physical protection system, with the recording of all the necessary information for their subsequent unambiguous identification (type and number of device, type and cause of the event, date and time of its onset, etc.);

- eliminate the possibility of uncontrolled disarming and arming;
- carry out functions on assuming (relieving) of a detection device (group of detection devices) under control (from control).

5.3.2. Requirements for ACS.

5.3.2.1. ACS is designed for emergency call for response forces, for notification about commission of unauthorized actions, for issuance of signal of coercion on the part of the offender, for control of vital functions of the duty guard, and for control of passage of patrol along predetermined route.

5.3.2.2. ACS should:

- inform the physical protection personnel of any triggering of ACS devices;
- determine the place of call;
- provide secrecy of its installation and convenience in the use of calling device;
- make removal of ACS devices from control impossible;
- provide difference of signals on triggering of ACS devices from signals on triggering of the devices of the intrusion detection system;
- control the vital functions of operators of control stations, duty guards and controllers who are on duty at the post.

5.3.2.3. Information received by the CCU and LCU from ACS devices should take precedence in being presented to the operator when compared to other signals.

5.3.2.4. When selecting ACS devices and their installation locations, the following should be considered:

- accessibility for the physical protection personnel and dispersion in places of duty;
- impact on the physical protection personnel resulting from threats.

5.3.3. Requirements for AMCS.

5.3.3.1. AMCS is designed to control and provide access of employees (personnel) to nuclear facility, seconded officials, visitors and passage of vehicles to rooms, buildings, structures, guarded areas, at the territory, and exit from them in accordance with the passage regime established at the nuclear facility.

5.3.3.2. AMCS should:

- prevent (or create a maximum possible obstruction) to unauthorized access to the territory, to guarded rooms, buildings, structures and areas. In the event of detection of attempts of unauthorized intrusion, or facts of force impact on the structural elements of AMCS passage devices and terminals, the relevant information should be submitted to the duty official (officials) and operator (operators);

- store information on all facts of passage and breach of passage rules by the nuclear facility personnel, seconded officials and visitors;

- prepare ID cards. Moreover, full archive of ID cards produced and issued should be kept.

5.3.3.3. The design of AMCS devices (human and vehicle checkpoints) should provide emergency manual opening of the devices.

5.3.3.4. ID cards used in AMCS should not contain any information, knowledge and application of which can lead to unauthorized access (personal identification numbers, characteristics and values of biometric parameters and characteristics, and other reference data).

5.3.3.5. The composition of AMCS at checkpoints should include equipments used for inspection of the passing personnel and transport in order to prevent carrying (transportation) of nuclear materials, radioactive materials, explosives, and items made of metal.

5.3.4. Requirements for the opto-electronic surveillance and situation assessment system.

5.3.4.1. The opto-electronic surveillance and situation assessment system is designed for remote monitoring of approach avenues to protected areas, perimeters and other space areas in order to assess the current situation, monitor the actions and movement of offenders, coordinate the actions of the physical protection personnel, as well as to keep a video archive.

5.3.4.2. The following elements should be allocated in the opto-electronic surveillance and situation assessment system:

- OESS;
- devices enabling the duty guards to perform their surveillance functions.

5.3.4.3. OESS should:

- provide the operator with the necessary and sufficient information about the situation on site and at its protected areas, buildings, structures and rooms;
- provide information for assessment of the situation in case of detection of unauthorized actions video confirmation of such unauthorized actions;
- display, record and archive information to the extent necessary for subsequent analysis of emerging abnormal situation;
- provide operational capability under all operation conditions specified in regulatory documents;
- monitor the presence of faults (loss of video signal, equipment rupture, attempts to access communication lines, etc.), informing the operators of control stations about this, and archiving this information.

5.3.4.4. Information provided by OESS to operators of control stations should make it possible to distinguish between the visibility scope of offenders and animals.

5.3.5. Requirements for RCWS.

5.3.5.1. RCWS is intended for exchange of voice information between the physical protection personnel in order to provide coordinated actions on protection of a nuclear facility in normal and emergency situations.

5.3.5.2. RCWS should:

- provide a reliable and continuous operation in the entire territory of a nuclear facility and in areas near it, in all its buildings, structures and rooms in all possible operation modes, including during intrabuilding transportation of nuclear materials;
- carry out accounting and recording of ongoing negotiations indicating their time and duration with intervals determined taking into account the operational

situation at the nuclear facility;

- prevent unauthorized connection of other subscribers to the RCWS and if possible identify, locate and record such facts;
- organize communication channels between the management of a nuclear facility, security service, security guard units, territorial bodies of Federal executive bodies in charge of safety and security of nuclear facilities, and other interested organizations.

5.3.5.3. To provide reliable operation, RCWS should incorporate at least two different technologies of connections between subscribers. Alternative methods of establishing communication should be accessible immediately the main method of information sharing breaks down.

5.3.5.4. If it is impossible to establish radio communication in protected areas, buildings and rooms of a nuclear facility due to technological features, alternative means of two-way communication should be considered.

5.3.6. Requirements for TCS.

5.3.6.1. TCS is designed to provide a reliable information exchange between systems that are part of the physical protection system.

5.3.6.2. The TCS equipment should be used when the standard equipment that is part of the functional systems specified in paragraph 5.2.2.8 does not meet the requirements for transmission of information circulating in the physical protection system, as well as for docking and harmonization of various systems that are part of the physical protection system.

5.3.6.3. TCS should:

- transfer accurate information;
- provide continuity of operations;
- provide tactically acceptable time of message delivery;
- systematize, document and archive information on TCS functioning;
- exchange information with other elements of systems of various types of safety of the nuclear facility.

5.3.6.4. TCS should have backup and alternative channels for transmission of information functionally important for the efficiency of the complex (circuit caching, use of routers, etc.). Backup channels should be routed over routes physically spaced with other main channels.

5.3.6.5. TCS should provide formation of a closed information transmission system, providing the operational capability of individual protected areas. One or a few well-protected communication channels inaccessible to offenders should be used to interact with other elements of PPETF complex.

5.3.7. Requirements for the information security system.

5.3.7.1. The need to protect information in the physical protection system is due to the presence of information containing state and official secrets, information disclosing the physical protection system at a particular nuclear facility, and (or) determining the mode of its operation in this system.

5.3.7.2. The information security system is a necessary component of an automated physical protection system. At all levels of control and phases of operation

of the physical protection system (transmission, collection, processing, analysis, storage, transfer of control commands), information should be protected using a set of devices and implementation of measures aimed at preventing leakage of information or at preventing impact on it through technical channels, at prevention of accidental or intentional software and hardware impacts with the purpose of breaching the integrity (destruction, distortion) of information during its processing, transmission and storage, or disruption of the operational capability of technical equipment.

5.3.8. Requirements for power supply and lighting system.

5.3.8.1. The power supply system is designed to provide uninterruptible power supply to PPETF elements.

5.3.8.2. The power supply of PPETF elements should come from two independent power sources backing up each other. Transition to backup power should be automatic.

5.3.8.3. Information on transition of PPETF or its elements to back-up power should be displayed on the relevant LCU and CCU with compulsory recording.

5.3.8.4. Power supply devices and cable networks should be protected against unauthorized actions aimed at bringing them out of operation.

5.3.9. Requirements for technical equipment of the posts of CCU and LCU operators.

5.3.9.1. LCU and CCU are designed to display prompt and background information on the status of all elements of the PPETF complex or its stand-alone systems and on input of control commands, as well as documentation of circulating messages and actions performed.

5.3.9.2. The necessary and sufficient information enabling the operator on duty to clearly assess the situation and make the right decision, as well as efficiently manage the processes occurring in the physical protection system (for LCU - for the part related to them) should be received and displayed at the control station.

5.3.9.3. At the control stations, there should be:

- protection against unauthorized access to equipment and information in accordance with the requirements of information security regulations;
- documentation of all the operator's actions (including shift transmission and handover);
- testing of equipment without disrupting the PPETF complex or its individual elements;
- duplication and backing up of equipment.

5.3.9.4. If confirmation of the vital functions or operational capability of the operator is absent, this event should be recorded and transmitted to interested subscribers.

5.4. Requirements to components of the physical protection engineering & technical facilities

5.4.1. Requirements for the fences of nuclear installations and storage facilities.

5.4.1.1. The fences of nuclear installations and storage facilities are designed to prevent passage of people and vehicles to and from protected areas bypassing the checkpoints (posts). Fences are constructed along the perimeter of protected areas.

The main fence runs along the perimeter of the protected area. A prohibited zone should be located along the perimeter of the protected area. The inner and outer fences of the prohibited zone pass through its borders.

5.4.1.2. Fences should meet the following requirements:

- the design must have no elements that make it easier to overcome barriers;
- there must be minimum number of fractures.

5.4.2. Requirements for artificial obstacles.

5.4.2.1. Artificial obstacles are devices and constructions installed or arranged in a protected area, on approach avenues to buildings, structures protected of protected nuclear installations, storage facilities in order to hinder the movement of offenders and create favorable conditions for their prompt detention by security guard units within the prohibited zone or on approach avenues to buildings and structures.

5.4.2.2. Artificial obstacles can be permanent and portable, and used for hindering (slowing down) intrusion (movement) of people or vehicles.

5.4.2.3. The design of artificial obstacles should meet the following requirements:

- hinder the movement of offenders deeper into a nuclear facility for a time sufficient for his prompt detention by security guard units;
- not interfere with normal operation of detection devices;
- provide condition for the safe conduct of duties by the personnel of the security guard units.

5.4.2.4. The adequacy of artificial obstacles on the perimeters of protected areas should be supported by calculations in evaluating the effectiveness of physical protection system and by the results of exercises.

5.4.3. For the movement of security guard units on vehicles, roads within the territory of a nuclear facility, nuclear installations, storage facilities, as well as special roads (security guard roads) that can be built in a prohibited zone or outside depending on the width of the prohibited zone should be used. Security guard roads should run outside the operation range of detection devices and have a minimum number of intersections with roads and railways existing at nuclear installations and storage facilities. They should be equipped with signs as stipulated by road traffic regulations. Extension should be constructed on the road for U-turn and patrol with oncoming vehicles. Their width and installation frequency should be determined by local conditions.

5.4.4. Warning signs with the inscription: “Prohibited zone. Passage is prohibited (closed)” should be installed along the obstacle line in order to warn about prohibition of passage to prohibited zone. In separate cases, there should be a warning sign with the inscription: “Passage is prohibited for unauthorized persons”. The inscription should be in Russian language, and in some cases – in Russian and in the respective national language.

Warning signs should be placed on the inner and outer fences of the prohibited zone, using fencing poles or separate columns. Warning signs should be installed on bends (corners) of a prohibited zone, in wickets and gates to prohibited zones.

5.5. General requirements to protected areas

5.5.1. A physical protection system should be built on zonal basis.

5.5.2. Depending on the category of the physical protection items, rooms, buildings, structures, and industrial sites where physical protection items are placed, protected areas and restricted areas at a nuclear facility should be identified and documented with the scheme of arrangement of the perimeters of protected areas and the nuclear facility.

5.5.3. Structures, facilities, installations, devices, equipment, hardware, and communications not provided for in projects of nuclear facility, nuclear installation, and storage facility, should not be located in protected areas.

In places most likely to be intruded by offenders into protected zone with the use of vehicles, measures should be taken to avoid or significantly impede intrusion (installation of anti-ram devices, etc.).

5.5.4. The area adjoining the boundary of the protected area should be cleared of shrubs, trees thinned in such a way as to prevent them from being used to enter the protected area.

5.5.5. For the organization of passage of people and vehicles, checkpoints (posts) should be installed along the perimeter of the protected area. Checkpoints (posts) should be placed in view of organization of passage of people and vehicles and provide the traffic capacity.

At checkpoints (posts), there should be monitoring of eligibility passage of people and vehicles, and identification of people and vehicles passing, authorized access of people and vehicles and detention of offenders, measures should be taken to prevent unauthorized carrying and transportation of nuclear materials, nuclear installations, radioactive materials, explosives, weapons, firearms, and other prohibited items.

Checkpoints (posts) should be equipped with devices for protection of the personnel performing control and crossing functions against small arms.

Transportation checkpoints should be equipped with anti-ram devices.

5.5.6. Local (post) checkpoint (posts) should be provided with information:

- on the switched-on, switched-off and faulty gate mechanisms;
- on the reasons for blocking of people and direction of passage (to the protected zone or from it).

5.5.7. Access to a particularly important area and performance of work there should be carried out applying the two-person rule.

The need to implement the two-person rule and procedure for its implementation, including as regards the organization of protection of nuclear facility during performance of work in categorized areas not designated as a particularly important area, as well as during inspection of vehicles carrying containers and tanks at the checkpoints (posts) should be determined.

5.6. General requirements to equipment of protected areas

5.6.1. Perimeters of protected areas should be equipped with PPETF used for detection of unauthorized actions, for emergency call for response forces and for provision of information to assess the situation, as well as for hindering the movement of offenders towards physical protection items.

5.6.2. There should be no areas of border of protected areas that are inaccessible to surveillance. Detection devices should be placed in such a way that there are no uncontrolled areas (“dead zones”).

5.6.3. Gate mechanism installed at a checkpoint (post), in addition to automatic operation, should make it possible for passage of people with one-time pass and lists for control and operational management at a checkpoint (post).

5.6.4. Entrances (roads, terrains) to the perimeters of protected areas (in routes most likely to be used by offenders to breakthrough using vehicles) and to vehicle checkpoints (posts) should be equipped with anti-ram devices, structures, ditches, anti-ram walls, concrete blocks, while the road bed should have pillars, sharp turns, etc., to eliminate the possibility of development of speeds needed for a breakthrough, or other measures to avoid or significantly impede such a breakthrough should be taken.

5.6.5. Vehicle checkpoints (posts) should be equipped with entry and exit gates, inspection pits, racks, inspection mirrors, or other technical devices that provide a vehicle is inspected from all sides, anti-ram devices, devices for detecting transport of nuclear materials and radioactive materials.

5.6.6. All entrances to categorized buildings, structures, rooms, and exits from them should be equipped with detection devices, access control and monitoring devices, if necessary – surveillance and situation assessment devices.

Emergency exits should provide unhindered exit of people during emergency situations.

5.6.7. The procedure for recording, custody and control of locks and keys that are used in the physical protection system should be designed at a nuclear facility.

The procedure for recording, custody and control of locks and keys should include:

- registration of all persons granted access to the keys;
- registration of issuance and delivery of keys;
- verification of the presence of keys and measures on prevention of their unauthorized use;
- replacement of locks and keys as soon as possible upon discovery of unauthorized use of locks and keys or when suspicion of such arises.

Each lock and key should be assigned an inventory number in accordance with the registry of locks and keys. Each key should have its inventory number stamped on it. Keys should remain within the respective protected area.

6. REQUIREMENTS TO OPERATION OF PHYSICAL PROTECTION ENGINEERING & TECHNICAL FACILITIES

6.1. PPETF operation should include technical maintenance and use of PPETF for the purpose intended.

PPETF technical maintenance is a set of organizational and technical measures aimed at preserving and maintaining it in good condition, providing the constant readiness of PPETF for use, and restoring their operational capability and resource.

Technical maintenance of PPETF should include:

- professional selection and access authorization of physical protection personnel to PPETF operation;
- planning of technical maintenance;
- functional inspection, maintenance and repair;
- logistics and metrological support;
- keeping of maintenance documentation and records;
- record, storage, transportation and conservation;
- collection, recording and analysis of operational data on the reliability and stability of PPETF operation;
- monitoring and assessment of technical condition and maintenance organization;
- organization of works on promotion and compliance with rules and safety measures during operation.

6.2. Professional selection and access authorization of physical protection personnel to operate PPETF.

6.2.1. The following physical protection personnel should be allowed to operate PPETF:

- a personnel who has undergone special training and probation and who has practical experience in PPETF operation as part of his functional responsibilities;
- a personnel who has undergone a test by the qualifying commission on knowledge of the material part of PPETF, rules of their operation, rules and safety measures, and who has the appropriate qualification safety group;
- a personnel who has received a license to operate PPETF.

Access authorization of physical protection personnel who does not meet the above requirements to operate PPETF is strictly prohibited.

6.2.2. Selection of experts should be conducted in accordance with their medical contraindications, educational level, skills, work experience with the device.

6.2.3. A frequency of testing the knowledge of the rules of operation and safety among experts and other physical protection personnel should be established.

6.3. Planning of PPETF technical maintenance.

6.3.1. Technical maintenance of PPETF at nuclear installations and at storage facilities should be planned.

6.3.2. Plans should reflect measures:

- on technical maintenance;
- on organization of repair and storage;
- on logistics support of operation;
- on organization of collection, recording and analysis of data on the noise immunity and serviceability of PPTF;
- on safety regulations;
- on monitoring over the technical condition and organization of PPETF operation.

6.4. Maintenance and repair of PPETF.

6.4.1. The maintenance and repair of PPETF should be a set of organizational and technical measures aimed at maintaining PPETF in a good condition.

6.4.2. Maintenance of PPETF should include:

- routine maintenance work;
- unscheduled maintenance;
- maintenance in storage;
- monitoring the operational capability and prompt verification of measuring instruments.

Routine maintenance work should be the basis for maintenance of PPETF.

6.4.3. The main tasks of PPETF maintenance should be:

- determining the technical condition of PPETF;
- mitigation of the effects of adverse climatic conditions and other conditions on PPETF ;
- instrumental checking of equipment, line-cable devices, and switchgears and bringing them to the set electrical parameters;
- malfunction identification and repair, PPETF failure prevention;
- preparation of PPETF for spring-summer and autumn-winter operation;
- verification of the completeness of mechanisms, devices, and availability of instruments, reinforcement with spare instruments and accessories.

6.4.4. Maintenance of PPETF should be organized and conducted in a timely manner.

6.4.5. Maintenance of PPETF should be carried out according to the schedule preventive system, providing the following routine maintenance intervals: daily, weekly, monthly, quarterly, semiannual and annual maintenance.

The maintenance procedure should be determined in accordance with the PPETF operational documents.

6.5. Logistics and metrological support of PPETF operation should be carried out.

Control of logistics support to PPETF operation should include:

- checking for the availability, quality state and completeness of PPETF in warehouses, in subunits, and in workshops;
- conformity of PPETF availability data to the basic record;
- checking the organization of PPETF record;
- checking for the availability of the stamp of certification on the measuring technical devices of PPETF;
- development of measures aimed at eliminating identified deficiencies.

6.6. The maintenance of PPETF operational documentation should be carried out at PPETF subunits. The basic maintenance documentation should be supplied with a specific PPETF.

6.7. PPETF records, their short-term or long-term maintenance in designated locations in good condition (hereinafter referred to as “storage”), movement within a nuclear installation or storage facility, and conservation should be carried out at nuclear installations and storage facilities in accordance with the requirements of the operational documentation for a specific product.

PPETF records should reflect the correct and timely documentation of their actual existence. PPETF records should be in the prescribed manner on cards and books. PPETF that have become unusable should be written off from the records in the prescribed manner.

All PPETF under long-term storage (more than a year) should be conserved. Conservation should consist of conduct of work on temporary protection of PPETF, stored under adverse conditions, against harmful effects of external factors (mainly humidity and air pollution). Conservation should be conducted by methods of sealing, protective coating, or by a combined method.

6.8. Collection, recording and analysis of operational data on the reliability and noise immunity of PPETF should be conducted in accordance with departmental regulations.

6.9. Monitoring and assessment of technical condition and organization of PPETF operation should be conducted in accordance with the plan for inspection of the technical condition and operational capability of PPETF by persons directly involved in managing the physical protection system, as well as by departmental committees for the purposes of inspections:

- PPETF application effectiveness;
- PPETF operational capability;
- compliance with operation procedures and rules;
- readiness of guards to perform tasks using PPETF.

6.10. Organization of work on promotion and compliance with rules and safety measures during PPETF operation should be carried out in strict accordance with the requirements of governing documents, as well as with the operational documentation.

6.11. Use of PPETF for the purpose intended should be done in the manner prescribed by the operational documentation.