TECHNICAL CODE OF COMMON PRACTICE

THE ORDER OF THE LEVEL DEFINITION OF THE PHYSICAL PROTECTION SYSTEM FOR NUCLEAR SITES

This technical code draft may not to be applied until it is officially approved

Ministry of the Emergency Situations of the Republic of Belarus

Minsk

UDC ICS PC 02

Keywords: conceptual designing , complex of technical means of physical protection; zone of special importance, inner zone, protected zones; pre-project stage, physical protection system of nuclear sites; security service; categories of nuclear materials.

Foreword

The objectives, basic principles and provisions for state regulation and management regarding the issue of technical rationing and standardization are stipulated by the Law of the Republic of Belarus “On the Technical Rate Setting and Standardization”.

The technical code of common practice was

1. DEVELOPED by the State Scientific Institution “Joint Institute for Power and Nuclear Research- Sosny” of the National Academy of Science of the Republic of Belarus
   INTRODUCED by the National Academy of Science of RB
2. *APPROVED* by order of the Ministry for Emergency Situations of the Republic of Belarus of _____No_____.
3. *Put into effect for the first time* _____

Published in Russian

Content

Introduction

The present technical code of common practice was worked out within the framework of the State program “Scientific support for development of nuclear power industry in the Republic of Belarus for 2009-2010 and for the period up to year 2020”, which was approved according to the Decree No. 1116 of the Council of Ministers of the Republic of Belarus of 28.08.2009, considering the requirements introduced in the following documents:

- Convention on physical protection of nuclear material and nuclear facilities of 26.10. 1979;

- The Law of the Republic of Belarus of 30.07.2008 “On nuclear power application”

- Provision on securing physical protection at nuclear power sites, which was approved according to Decree No 1385 of the Council of Ministers of the Republic of Belarus of 27.09.2010.

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Effective Date

1. Application

1.1. The present technical code of common practice (further in the text –technical code) determines the order of level definition of physical protection system for nuclear sites on the basis of conceptual designing of the physical protection system.

1.2. Conceptual designing of nuclear sites physical protection systems is performed at the pre-project stage of formation (improvement) of the above system.

1.3. The results of conceptual designing are used at the stage of working out of technical specifications for formation (improvement) of the physical protection systems and also of specifications for designing of the complex of engineering and technical means of physical protection system, and also at the stage of preparation of act by inter-departmental commission for nuclear site protection organization.

2. Normative references

In the present technical code, there are used references for the following technical normative and legal acts (TNLA – further in the text), in the sphere of technical rate setting and standardization:

Technical code of common practice 28-3.06-2008 Tactics for application of security signaling systems

Technical code of common practice 28-3.07-2008 Security signaling systems. Rules of practice and rules for work acceptance.

Technical code of common practice 28-3.11-2008 Control systems and access control systems. Rules of practice and rules for work acceptance.

Technical code of common practice XXX-20xx (2300) Regulation on general requirements for the nuclear sites physical protection systems

Technical code of common practice xxx-20xx (02300) Physical protection system of nuclear materials and nuclear facilities. Instruction for designing organization

Technical code of common practice xxx-20xx (2300) System of physical protection of nuclear materials and nuclear facilities. Requirements for project decisions

Standard of the Republic of Belarus (STB) 125-2000 Protection of objects and natural persons. Terms and definitions.

STB GOST P-51241- 2003 Control systems and access control systems. Classification. General technical requirements. Methods of testing.

STB GOST P-51558-2003 Television security systems. General technical requirements and testing methods

Note – Using the present technical code, it is recommended to verify correspondence of the technical normative acts with the catalogue, made up as per 1.01.2016, and also with information indices published this year.

If the referred technical normative acts are replaced (amended), it is recommended to use the replaced (amended) normative acts, while using the present technical code. If the referred technical normative acts are cancelled without being replaced, the regulation, where there is reference to this act, is applied partly, without taking the reference into consideration.

3. Terms and definitions

In the present technical code the following terms with correspondent definitions are applied:

3.1. vulnerability analysis: a process performed by the operating organization for defining vulnerable areas on the basis of the projected threat and of possible ways of unauthorized acts performance.

3.2. inner zone: a zone located within the protected zone, where nuclear materials, spent nuclear materials, operated radioactive wastes are used and (or) stored; access to it is limited and controlled; the zone is surrounded by physical barriers being under constant control, protection and observation.

3.3. protected zone: a territory under security and observation, surrounded by physical barriers, access to which is limited and controlled.

3.4. zone of limited access: a zone where there are neither nuclear materials nor vulnerable areas with nuclear facilities; access to it- is limited and controlled.

3.5. entry control point: a place within the protected zone perimeter equipped with engineering and technical means and systems for the authorized access to its territory.

3.6. conceptual project: a detailed description of processes and systematic requirements

3.7. violator's model: accumulated data on the numerical strength, violator's being equipped , prepared, well-informed; tactics for violator's actions, his motivation and targets; these data are used at working out of requirements for the physical protection system and its effectiveness evaluation.

3.8. violator: a person, having performed unauthorized action, and also a person helping violators.

3.9. unauthorized action: a theft or attempted theft of nuclear material, subversive action towards nuclear facility or stock point, unauthorized access to the nuclear facility or to the stock point, any kind of transit of prohibited items to the nuclear facility and to the stock point, deliberate inactivation of engineering and technical means of physical protection or causing its malfunction.

3.10. zone of special importance: zone located within the inner zone, where facilities, systems, equipment, nuclear materials, spent nuclear material, operating radioactive wastes are located; unauthorized actions towards this zone could cause life or health hazard via radiation exposure and cause radioactive contamination of environment.

3.11. subject of physical protection: nuclear materials, including items made on the basis of nuclear materials, nuclear facility and (or) its vulnerable elements, identified as such during vulnerability analysis; carriers of secret information about nuclear site and the subject of physical protection, about organization, composition and operation of the physical protection

system; other systems, elements and communications of the nuclear site. The necessity of prevention of unauthorized actions towards the specified subjects was highlighted during vulnerability analysis.

3.12. projected threat : the characteristics and features of potential human intruders, for counteraction to which physical protection is projected and evaluated

3.13. security service: a structural division at the nuclear site, destined for organization and control over execution of physical protection actions, and fulfilling other special operations.

3.14. tactic-and-technical characteristics: a complex of quantitative characteristics of technical equipment, which describe its scope of options.

3.15. threat: a complex of conditions and factors, which create a possibility to perform unauthorized actions; or a subject which has intentions and possibilities to perform unauthorized actions.

3.16. level of physical protection: is complex of specified necessary conditions for definition, formation and technical re-equipment of the physical protection system of the nuclear site, which secures for the system to withstand the threat of unauthorized actions.

3.17. nuclear site: an organization, on the territory of which nuclear material is used or stored, or where nuclear facility or its stocking point is located and (or) operated.

4. Designations and abbreviated terms

In the present technical code the following designations and abbreviations are applied:

(IZ) inner zone

(PZ)-protected zone

(SSP) -set of spare parts, instruments, materials and devices

(ZLA) -zone of limited access

(ETMPP)-engineering and technical means for physical protection

(CTMPP) - complex of technical means for physical protection

(LCP) - local control point

(MIA RB) - Ministry for Internal Affairs of the Republic of Belarus

(RLA) - regulatory legal act

(VSI) –zone of special importance

(SPP) - subject of physical protection

(SP) - stock point

(PPS) - physical protection system

(SS) - security service

(TS)- technical specification

(TNLA) - technical normative legal act

(TDE) - technical equipment for detection

(TEPP) - technical equipment for physical protection

(TTC) -tactical and technical characteristics

(PP) - physical protection

(CCP) -central control point

(NM) - nuclear material

(NS) -nuclear site

(NF) - nuclear facility

5. General provisions

5.1 The development out of conceptual project for physical protection system (PPS) takes place at the pre-project stage of formation (improvement) of PPS. The target of conceptual designing is working out technical and organizational decisions, aimed at reaching maximal effectiveness of PPS, basing on the specified limitations for financial and other resources, and considering the requirements of technical normative and legal act for PPS.

5.2 The present technical code develops and particularizes regulations of Technical code xxx-20xx (02300) “Regulation on general requirements to the physical protection systems of nuclear sites”, which are applied during the process of conceptual designing at pre-project stage of PPS formation (development).

5.3. For developing the conceptual project for PPS, the following materials are used: materials of design threat, materials of vulnerability analysis, materials of nuclear site rating (categorization), which were held in correspondence with Technical code xxx-20xx (02300) “Regulation on general requirements to the systems of nuclear sites physical protection” and recommendations concerning carrying out vulnerability analysis of nuclear sites.

5.4 The targets of PPS conceptual designing are the following:

- defining PPS configuration in its entirety and its components and elements;

- defining (for PPS being developed – more precise definition) of boundaries of protected zones at the nuclear site;

- defining functional and technological communications as through PPS, as with other security systems of the nuclear site;

- forming different variants of PPS organization at the site;

- the effectiveness evaluation of different variants of PPS organization;

- the cost evaluation of different variants of PPS organization;

- choosing a variant (variants), considering the criterion “effectiveness/cost”;

- the formulation of proposals regarding nuclear site safe-keeping

- the formulation of proposals to be included in the technical specification for formation (improvement) of PPS.

5.5 Technical solutions developed at the stage of conceptual designing are worked out in detail at the stage of PPS designing, held in correspondence with Technical code xxx-20xx (02300) “System of physical protection of nuclear materials and nuclear facilities. Instruction on designing organization” and Technical code xxx-20xx (2300) “System of physical protection of nuclear materials and nuclear facilities. Requirements to project decisions”.

5.6 Physical protection system development or improvement is to be done on the basis of PPS organization principles, described in Technical code xxx-20xx (02300) “Provision on general requirements to the systems of physical protection of nuclear sites”. The issues of securing physical protection are to be considered at the initial stages of designing of new nuclear sites, and also at the time of decision making regarding the architectural and construction part.

5.7 Conceptual designing involves the following operations:

- organization of conceptual designing of PPS

- pre-project nuclear site and its PPS examination

- developing and choosing the right variant (variants) of PPS organization at the site;

- presenting results of conceptual design.

6. Conceptual designing organization of physical protection system

6.1 The procedure of PPS formation and improvement is one of the objectives of planning activities concerning physical protection, held at nuclear site. Work done at pre-project stage of PPS formation and improvement, planned in stages, specified in accordance with Technical code xxx-20xx (02300), is included in the plan of activities of nuclear site security service, and in plans of activities of other structural divisions of nuclear site, which are directly relevant to PPS functioning.

6.2 Conceptual designing is included in correspondent plans, basing on the fact of securing a special procedure of PPS development and improvement, and connected with decision taking on construction (reconstruction) of nuclear site and formation (improvement) of its PPS, according to “Regulation on general requirements to the systems of physical protection of nuclear sites” (Technical code xxx-20xx (02300).

6.3 Activities for PPS conceptual designing are secured by the administrative body of the nuclear site, with participation of specialized organizations and representatives of internal affairs bodies and (or) internal security troops attached to the Ministry of Internal Affairs (it concerns sites, safeguarded by internal security troops attached to the Ministry of Internal Affairs).

Specialized organization, which was attracted by the administrative body of the nuclear site for PPS conceptual designing is to have a special permission (license) to perform design activities at the site, to work with the data which represent state secret information. They also are to have experience in performing work in pre-project inspection of the nuclear site, working out and effectiveness evaluation of variants of PPS organization.

6.4 The organization of conceptual designing includes:

- defining by the administrative body of nuclear site (NS) of financing resources and time frames for conceptual engineering;

- making up a list of requirements to PPS of the ordering party;

- defining specializing organizations, attracted for participation in conceptual designing , negotiation of organizational, technical and financial issues with them;

- preparing, negotiation, approval of organizational-administrative project documents;

- forming a work group involved in conceptual designing (or several work groups).

6.5 Basic requirements to PPS are formed by the ordering party on the basis of analysis of requirements listed in Technical code xxx-20xx (02300) “Regulation on general requirements to the systems of nuclear sites physical protection”, and other technical and regulatory legal acts, which specify requirements to PPS of nuclear sites of specialized type and category.

6.6. Legal and financial relations, mutual obligations of the parties concerned are specified in the agreement concluded by the ordering party and a specializing organization involved in developing the conceptual project.

6.7 The technical specification for the conceptual designing is made up by the ordering party involving, if necessary, a specializing executing organization, and defines kinds of work, scope of work, terms of execution (calendar work plan), and forms reporting each type of work execution. Typical form of technical specification for conceptual designing is specified in Appendix A.

6.8 The head of NS security service, as a rule, is responsible for control over realization of the plan for works regarding PPS conceptual engineering.

6.9 Work group (work groups) are formed by the administrative body and NS security service with participation of specializing organizations, depending on work scope in conceptual designing , peculiarities of work, degree of involvement of specializing organizations in conceptual designing, and also of representatives of internal affairs bodies and (or) internal security troops attached to Ministry of Internal affairs (it concerns objects that are protected by internal security troops of the Ministry).

6.10 At organization of PPS conceptual designing and its implementation, officials of the nuclear site and of the attracted organizations, responsible for works of designing, are to secure execution of the requirements concerning protection of data which represent state secret and other information of limited access.

7. Pre-project inspections of the nuclear site and its systems of physical protection

Pre-project NS inspection is conducted with the purpose of the collection of basic data for further kinds of work for conceptual designing. The process of pre-project examination includes:

- studying the documents on nuclear site regarding physical protection;
- visual inspection of nuclear site and of its PPS state;
- the analysis, generalization and documenting of the results of pre-project inspection**.**

7.1 Studying the documents regarding physical protection at the nuclear site

7.1.1 Within the framework of pre-project inspection, as a rule, it is necessary to study the following documents on physical protection (regarding work groups members):

- materials of the vulnerability analysis, materials of nuclear site categorization, and also materials of PPS effectiveness evaluation (if available);

- project (work) documentation (a plan of the site, floor-plans, etc.);

- site documents on physical protection;

- operating documentation for engineering and technical means of physical protection;

- written acts of state control bodies, organs of departmental and on-site control of physical protection securing, including documents concerning elimination of the remarked insufficiencies.

7.1.2. The results of vulnerability and NS categorization analysis, and also PPS effectiveness evaluation analysis, are studied for the purpose of getting data regarding the following:

- the site, its type, its category, location, particularities of works held, specifics of technological processes;

- vulnerable zones of the site and vulnerable objects of physical protection, categorized areas (buildings, constructions);

- possible threats, possible ways of violation, violator's model.

7.1.3 Project (executive) documentation is studied to get the following information:

- the site in its entirety, its types, production processes at the site;

- construction particularities of buildings, locations, rooms;

- equipping of protected zones and categorized rooms with engineering and technical means of protection.

Here they can use also:

- plans of the nuclear site
- plans of specific zones (local zones), plans of buildings;
- floor-by-floor plans of protected buildings, constructions, locations;
- lay-out plans (schemes) of engineering and technical protection equipment;
- measurement plans, work schemes, and other data.

7.1.4. Site documents concerning physical protection are studied for the purpose of acknowledgment with organization of the site protection in its entirety (means of security organization, layout of posts, timing parameters of security forces operation, effectiveness of security forces management, etc.).

Furthermore, the following documents are analyzed:

- the nuclear site security plan;
- the act of inter-departmental commission;
- the instruction for access control;
- the regulation for the on- site internal security policy;
- the regulation for the access authorization system for the executives working with nuclear materials at nuclear facilities;
- plans of cooperation actions in regular and emergency situations; other regulatory documents.

7.1.5 Operation documents for engineering and technical means of physical protection (ETMPP) are studied with the purpose of evaluation of technical condition of the mentioned technical protective means, and of real condition of the complex of ETMPP in its entirety, according to its operation analysis (analysis of reasons for failures and spurious activation of ETMPP, measures taken for elimination of faults, reasonability of ETMPP application, etc.).

7.2 Visual inspection of the nuclear site and its physical protection system

7.2.1 A visual inspection of the site and its protection system is done with the purpose of collection of data on the nuclear site and its PPS real condition.

During a visual inspection it is recommended to negotiate with managers and specialists of technological and mode divisions, and also with representatives of technical service divisions of the site, with the purpose of collection of the necessary information on the production technology, existence and location of vulnerable zones and objects of physical protection.

7.2.2 It is recommended to follow the sequence of inspection actions, given below:

- inspection of perimeter of site 33;
- inspection of perimeters of other zones under protection;
- nuclear facilities available (for ex., of reactor, separation, and radio-chemical production), nuclear materials stocks, etc.;
- life-support systems (electric lighting, security electric lighting, ventilation systems, water provision, etc.);
- supply lines located off the limits of the protected zones;
- control points of PPS: central control points, local control points;
- ways and means of nuclear materials transportation within the site territory, and off the site boundaries (access to stocks, loading-unloading, etc.);
- communication provision;
- basic data for the creation of information protection sub-system (possible threats to informational safety, protection objects, etc.).

7.2.3 While inspecting the site, it is recommended to pay special attention to the following issues:

- the existence of vulnerable areas, categorized locations, layout of objects of physical protection within the territory of the protected zone and possible ways of access to them;
- the reasonability of the protected zone boundaries layout;
- the execution of prescribed requirements related to equipping of the protected zone with ETMPP;
- possible ways of penetration to the protected zone and to categorized (rated) locations and rooms (and way out), their equipping with ETMPP.

7.2.4 Within the framework of pre-project inspection, beside studying the site documentation concerning physical protection (7.1.4), it is recommended to study other organizational and technical activities held at the nuclear site for guaranteeing physical protection (issues of nuclear site security organization management organization, interrelations and control of PPS, organization of ETMPP operation, etc.).

7.3. Analysis and generalization of the results of pre-project inspection

7.3.1 All the basic information collected during the pre-project inspection, is to be documented in the written version. Based on its analysis and generalization results, a decision is taken regarding the directions of PPS improvement and development.

7.3.2 Upon studying the materials of vulnerability analysis, and also documents related with the site physical protection and visual inspection of the site, forms-questionnaires are filled

such as “Violator’s model”, “Description of protected buildings and locations”. Forms of questionnaires are given in Appendix B and Appendix C, correspondingly.

7.3.4 On the basis of data, collected during the pre-project inspection, the PPS effectiveness is evaluated. The target of this evaluation is to work out some directions for PPS improvement and development. The evaluation is done in correspondence with the nuclear site specific methodic.

7.3.5 At the stage of pre-project examination some directions and ways of PPS improvement are marked, which are to be negotiated previously with the NS administrative body.

8. Working out and selecting variants for physical protection system organization.

The procedure of developing variants of PPS organization includes the following stages:

- forming conceptual decisions for PPS organization;

- defining (or more precise definition) of boundaries of the protected zones;

- forming variants for organization of ETMPP complex;

- forming variants of the protected zones equipping, justification of ETMPP type choosing;

- forming proposals for PPS information protection;

- forming proposals for PPS personnel operation;

- forming proposals for PPS organizational activities;

- effectiveness evaluation of variants of PPS organization;

- definition of approximate composition of ETMPP complex for the proposed variants of PPS organization;

- evaluation of ETMPP complex cost for the proposed variants of PPS organization.

8.1. Formulation of conceptual decisions for physical protection system organization.

8.1.1 Conceptual solutions are to be based on the PPS structure specified for all nuclear sites (PPS personnel, organization and technical operations and ETMPP complex), in accordance with Technical code XXX-20xx (2300) “Regulation on general requirements to physical protection systems of nuclear sites”. The results of vulnerability and nuclear site categorization analysis, pre-project examination results and PPS effectiveness evaluation are to be considered.

8.1.2 Conceptual decisions are worked out with the purpose of developing general viewpoint concerning physical protection of nuclear materials, nuclear facilities and other objects of physical protection, among the administrative body, a specializing organization, which is involved in conceptual design of PPS, and also representatives of internal affairs bodies and (or) internal security troops attached to Ministry of Internal Affairs (in case of involvement of internal troops in nuclear site security organization).

8.1.3 When forming conceptual solutions, functional and technological relations through physical protection means are to be defined, and also its relations with other nuclear site security systems.

8.2 Determining (more precise definition) of the protected zones at the nuclear site.

8.2.1 When forming (improving) the means of the physical protection of a nuclear site, depending on nuclear facility particularities and the category of used nuclear materials and other objects of physical protection, there are defined and formed protected zones, and also it is specified where exactly each object of physical protection is to be located. They can propose several variants regarding the protected zones definition.

8.2.2 In correspondence with given requirements related to physical protection, the following protected zones are formed:

- the protected zone

- the inner zone

- the zone of special importance

Besides, at the nuclear site zones are defined, access to which is limited, - the so-called zones of limited access.

If during the process of PPS effectiveness evaluation it is highlighted that the present protected zones are not sufficient for preventing all potential threats, there can be organized additional protected zones (boundaries).

Objects of physical protection, depending on their specified categories, are to be placed in correspondent protected zones. Order of categorization of objects of physical protection is described in Technical code XXX-20xx (2300) “Regulation on general requirements to nuclear sites physical protection systems”. While zoning the site, the protection is to be amplified from the periphery to the center, (it means in the direction of the objects of physical protection).

8.2.3 Both the whole territory of the site and part (parts) of it, where objects of physical protection are located, can be named as Territory PZ. At defining the boundary (perimeter) PZ, it is recommended to do the following:

- reduce (if possible) the number of buildings and constructions, which are located on the zone boundary, because they represent potential ways of intrusion;

- eliminate (if possible) buildings and constructions with objects of physical protection that are located on the boundary of the zone;

- take into consideration automobile, railway and other kinds of communications, that are located near the zone boundary or that cross the zone boundary (tubes, pipes, waterlines, etc.);

- consider the area landscape, soil characteristics and other local particularities.

8.2.4 Internal zone in general case represents a number of zones located inside zone 33. The boundary of internal zone can be the following:

- the perimeter of the local zone, including a protected building (complex of buildings, constructions);

- the perimeter of a protected building, construction (external walls of the building, roof, etc.);

- the perimeter of a protected room or a group of rooms (walls, inter-floor constructions, etc.).

When forming the boundary of internal zone it is recommended to consider:

- the location of the objects of physical protection at the nuclear site;

- the architectural particularities of the building (construction);

- particularities of technological process (for example, ways of personnel access, the necessity of delivery and transportation of cargo to technological units, etc.);

- the location of zones of nuclear materials balance (it is recommended to avoid intercrossing of boundaries of nuclear material balance with inner zone);

- division of the site into “dirty” (non-occupied zone) and ‘clean’ (normally occupied) zones.

When forming inner zone boundary it is recommended to avoid even partial intercrossing of PZ boundaries and those of the inner zone.

8.2.5 In general, the zone of special importance represents a number of zones, located inside the inner zone. The boundary of the zone of special importance can be the following:

- the perimeter of the protected building or construction (external walls of the building, roof, etc.);

- the perimeter of the protected room or a group of rooms (walls, inter-floor constructions, etc.).

While forming the boundary of the zone of special importance, it is recommended to consider factors, described in clause 8.2.4 of the present technical code. Forming the boundary of the zone of special importance, it is recommended to avoid even partial coincidence of boundaries of the inner zone and the zone of special importance.

8.2.6 Working out the variant of organization of physical protection means, there can be discovered a necessity to organize additional protected zones. Boundaries of such zones are defined, taking into account the type, particularities and requirements for ETMPP of a certain protected zone, and also the results of PPS effectiveness evaluation.

8.2.7 The zone of limited access is intended for the placement of elements and systems, important to guarantee the nuclear site safety or its physical protection equipment. Zones of limited access can be located both inside the protected zones and outside them. Zones of limited access can include the following territories:

- a part of the territory of a nuclear site;

- a building or a construction;

- a room, a group of rooms.

Equipping the zone of limited access with engineering and technical means of protection is made from the perspective of reasonable practicality and effective requirements for protection of elements, devices of ETMPP.

8.2.8 Forming the variants for zonation, both types and boundaries of protected zones can vary. It is recommended to consider the following:

- the necessity of equipping the boundary of protected zone with ETMPP, in correspondence with the requirements, described in Technical code XXX- 20xx (2300) “Regulation on general requirements to the physical protection systems of nuclear sites” and other technical normative regulatory acts for physical protection;

- possibility of ETMPP installation at boundaries and inside the protected zones, in accordance with the requirements, specified in Technical code XXX-20xx (2300) “Regulation on general requirements to the physical protection systems of nuclear sites” and other technical normative regulatory acts for physical protection;

- quality (expert) evaluation of effectiveness of physical protection means for each of the variants;

- quality (expert) evaluation of financial costs for realization of each of the variants;

- production conditions, regime and working arrangements of the nuclear site;

- availability and layout of existing elements of means of physical protection.

8.3 Determining of variants for organization of engineering and technical means of physical protection

8.3.1 Determining of variants for organization of ETMPP complex is to base on the requirements specified for structural components and elements of physical protection system according to Technical code XXX-20xx (2300) “Regulation on general requirements to physical protection systems of nuclear sites”, which are to be concretized according to the results of NS vulnerability analysis, NS categorization results and pre-project examination, including the results of acting physical protection system effectiveness evaluation and accorded conceptual solutions for physical protection system organization.

8.3.2 The introduction of variants for the organization of ETMPP complex is made in the following sequence:

- basing on the analysis of a violator’s model and the effectiveness evaluation results, the security representatives define targets for counteractions against each type of violators. In general case, there can be several ways of violations restraint, and as a result, security representatives have several tactical schemes;

- upon analyzing the named tactical schemes, individual variants of protection are defined; each variant is represented as organizational and (or) technical requirements to various structural elements of physical protection system (requirements to specific boundaries of physical protection, organizational activities at working with objects of physical protection, plan of actions of security stuff, etc.).

- general variant for ETMPP organization at the site represents a number of requirements specified in individual variants for protection organization, applied to various combinations of tactic schemes.

For counteraction to each type of a violator, various requirements to the same element of physical protection system can be advanced. General variant of ETMPP complex organization is to be based on the most “severe” requirements.

8.3.3 The proposed variants are not to contradict the requirements of technological, fire-prevention and other kinds of nuclear site safety.

8.4 Determining of variants for protected zones equipping, choosing engineering and technical means for physical protection

8.4.1 Depending on the type of a protected zone, requirements for its equipping with ETMPP may vary. General requirements for equipping of perimeters (boundaries) of protected zones are described in Technical code XXX-20xx (2300) “Regulation on general requirements to the physical protection systems of nuclear sites”. Requirements for equipping the NS protected zones can be précised during conceptual designing.

8.4.2 On the basis of the formed general variants for ETMPP organization and specified requirements to the boundaries of physical protection, variants of equipping each protected zone are worked out. Working out the variant of protected zone equipping means well-reasoned choosing of technical means and systems of various functional subsystems of ETMPP complex.

8.4.3 Certain types of ETMPP are to be chosen on the basis of the specified index.

8.4.4 Engineering and technical means are to be chosen in the following sequence:

- studying typical project documentation concerning ETMPP application (if available);

- definition of physical principles of ETMPP applied, which fully respond to the objectives of physical protection and conditions of a special protected zone;

- definition of necessary tactic and technical characteristics, to which the applied means are to correspond (for example, means of detection are to correspond to the following characteristics: size of detection zone, possibility of detection, false alarm rate, requirements for electricity supply, etc.);

- definition of placement location of each means of protection;

- preliminary evaluation of quantity of technical means of protection of each type, necessary for equipping of a certain boundary;

- comparative cost evaluation of means of different types, and choosing the most reasonable variant.

8.5 Presentation of proposals for information protection within the physical protection system

8.5.1 When forming proposals for information protection within the physical protection system, there are used the results of pre-project examination and of analytical justification of the necessity for creation of information protection subsystem within the PPS. In particular, the following issues are studied:

- information security threats (a theft, a destruction, a modification, a violation of availability);

- objects of information security (information, means and systems of informing and communication, control points of physical protection systems, etc.);

- information processing modes within the PPS control system and its components;

- means and systems of information protection, to be applied.

8.5.2 At the pre-project stage of creation of information protection sub- system it is necessary to consider the requirements of legal, regulatory acts and legal acts for information protection.

8.5.3 The prepared proposals can be applied at developing technical specification for creation of information protection sub-system within PPS.

8.6 Development of proposals for personnel involvement within the physical protection system

8.6.1 When working out the variants of PPS organization, they can prepare proposals for PPS personnel involvement, proposals for plan of operations of security bodies and for organizational structure of physical protection divisions (security service and its divisions).

8.6.2 The present proposals are to be prepared considering the requirements of regulatory documents of internal security troops (for objects being under control of internal troops) and documents, that regulate correspondent issues that concern internal affairs bodies attached to Ministry of Internal Affairs and NS security service. In particular, the following issues can be examined:

- the location of posts and patrols

- the evaluation of numerical strength of patrol and security service body

- the definition of objects, blockage boundaries, routings, plan of alarm groups moving upon getting alarm signal;

- the definition of powers and authorities among different divisions (for example, military, in-house security service and security service);

- the evaluation of costs for personnel maintenance of NS physical protection divisions (security service and in-house security service).

8.6.3 When developing conceptual solutions for physical protection system for NS, the existing tactics of security body operations can be applied as basic.

8.6.4 During the process of variants presentation for PPS organization, there can be prepared proposals for organizational activities within PPS, in particular:

- the organization of the management, control, and cooperation within PPS;

- the organization of pass and on-site regime;

- the commissioning of PPS;

- PPS functioning organization etc.

8.7 Effectiveness evaluation of the proposed variant (variants) of physical protection system

8.7.1 Effectiveness evaluation of the proposed variant (variants) of PPS is made with the purpose of definition and comparison of quality of works performance in regards to guaranteeing protection of objects of physical protection, considering potential threats and models of a violator.

8.7.2 The effectiveness evaluation of PPS of the nuclear site is made in correspondence with the methodic in effect.

8.7.3 On the basis of the results of the effectiveness evaluation of the proposed variants of PPS, requirements and conceptual solutions concerning physical barriers, boundaries of physical protection, dislocation of posts and guards, and action plans of security can be modified. Besides, the results could be so that it will appear that some variants are unrealizable, for example:

- the requirements for physical barriers (availability of doors, grids on windows, etc.) contradict the requirements of fire safety;

- to secure the precise time frame for the detention of a violator on the perimeter, it is necessary to install correspondent physical barriers in prohibited zone. But topology of the site does not allow to form a prohibited zone of a certain necessary width.

So these variants of PPS organization can be further excluded from being examined.

8.8 Determining the engineering and technical means complex configuration within the physical protection system

For each variant of PPS organization, configuration of ETMPP complex is defined; ETMPP is necessary for realization of this particular variant. Form of the table for defining the equipment configuration is described in Appendix D. The equipment cost is defined for each variant of PPS organization; the equipment is necessary for realization of this particular variant. Form of the table for equipment cost definition is described in Appendix E.

8.9 Choosing the most reasonable variant of physical protection system organization.

8.9.1 Choosing the most reasonable variant of physical protection system organization depends on tactic and technical and also economic factors of the worked out variants. If necessary, the Executing party can propose several variants of PPS organization to the Customer. Final decision on acceptance of any variant is taken by the Customer (as a rule, the administrative body of NS).With the purpose of some kind of assistance in taking decision regarding the PPS variant, there can be defined priorities among the proposed variants during conceptual designing .

8.9.2 For comparing efficiency of the proposed variants of PPS organization and definition of priorities, the basic criterion that is considered is effectiveness of PPS. Besides, it is recommended to consider the following factors:

- oriental cost of stages of implementation of the proposed variant (construction, commissioning, etc.);

- cost of maintenance and repair;

- serviceability of ETMPP complex;

- time, necessary for starting-up of the proposed variant of PPS organization;

- possibility of step-by-step realization of the proposed variant.

8.10 Analysis and more precise definition of a chosen variant of PPS organization can include, if necessary:

- the adjustment of the boundaries of protected zones;

- additional evaluation of effectiveness of PPS organization variant;

- more precise definition of ETMPP complex configuration;

- additional evaluation of ETMPP complex cost;

- more precise definition of proposals for PPS personnel involvement.

8.11 During conceptual designing there can be worked out proposals for order (plan) of PPS activation. These proposals are developed with the purpose of defining the most reasonable consequence of organization and commissioning works for formation (improvement) of ETMPP complex, and a plan of equipping of the protected buildings and rooms. Here, it is recommended to follow the principles specified below:

- in organization and commissioning works, there should be no decline in PPS effectiveness; for this purpose it is necessary to work out the correspondent mitigation strategy;

- initial stages of improvement are to provide the maximal possible increase of the PPS effectiveness;

- plans of nuclear site improvement and development should be coordinated with the NS plan as a whole and plans of its PPS.

8.12 When working out the conceptual designing proposals for a technical specification of PPS formation (improvement) they shall include proposals concerning the following:

- the structure and composition (configuration) of PPS;

- the organization of ETMPP complex and its separate sub-systems;

- the requirements to organizational activities within PPS;

- the requirements to organization of access regime and access control points;

- the requirements to organization of control points within PPS;

- tactic and technical requirements to ETMPP complex and its functional sub-systems;

- the requirements to PPS personnel;

- functional and technological relations both through the physical protection system, and relations with other NS security systems.

9. Procedure formalities for presentation and application of the results of conceptual designing of physical protection system

9.1 Standard contents of conceptual project of PPS and order of its execution

9.1.1 Conceptual designing envisages development, accordance and approval of correspondent reporting documentation in regards to the formed or improved physical protection system. A conceptual project is documented as a book (books) and consists of explanatory note and appendices.

9.1.2 The content of conceptual project is to satisfy the requirements, given in technical specification for conceptual projection.

9.1.3 The conceptual project includes text and graphic part. The recommended content of explanatory note of the conceptual project is given below:

a) The analysis of a physical protection site

- brief characteristics of physical protection object;

- basic project threats, a violator's model;

- description and evaluation of effectiveness of PPS;

b) Development of variants for PPS organization

- conceptual decisions for PPS organization;

- the definition (or more precise definition) of boundaries of protected zones;

- the variants for the organization of ETMPP complex;

- variants for equipping protected zones, choosing ETMPP;

- information protection proposals for PPS;

- personnel involvement proposals for PPS;

- the effectiveness evaluation of proposed variants for PPS organization;

- approximate composition (configuration) of ETMPP complex;

- cost evaluation of ETMPP complex.

c) Choosing a reasonable variant (variants) of PPS organization according to the *effectiveness-cost* criterion.

d) The analysis and precision of chosen variants for PPS organization;

e) Proposals for PPS commissioning procedure;

f) Proposals for PPS formation (improvement) to be included to a technical specification.

9.1.4 Graphical part of the reporting document can include the following:

- the situational site layout;

- the structural scheme of the proposed ETMPP complex;

- cross-sectional drawings of the prohibited zone perimeter, the perimeters of the inner zone, the zone of special importance, specifying their engineering and technical means of protection;

- plans for access control points, specifying their engineering and technical means;

- the plans of control points within PPS (central control points, local control points), specifying their engineering and technical means of protection;

- the plans of rooms with schemes of technical means for physical protection layout and other materials;

- the plans of the security posts layout.

9.1.5 The following materials can be applied to the report:

- filled in questionnaire form “A violator’s model”, “Description of protected buildings and rooms”;

- brief descriptions, structural schemes and basic tactic and technical characteristics of proposed sub-systems of ETMPP complex.

9.2 Upon conceptual projection completion and documenting of results, the reporting materials are studied at the meeting of specialists with participation of members of Security service, internal affairs body and (or) internal security troops, specialists in physical protection, key personnel of the site and other interested parties. Upon studying the results, the accepted organizational and technical decisions are corrected and the administrative body of the nuclear site approves the conceptual project.

The scientific and technical product is passed to the Customer via an acceptance act.

9.3 For sites being under protection of internal security troops attached to Ministry of Internal Affairs, the reporting materials on conceptual designing are to be approved (if necessary) by representatives of internal security troops.

Appendix A

(Recommended)

Technical specification for conceptual designing of nuclear site physical protection system

(Standard form)

Security label (if necessary)

ACCORDED

Head of Executive organization

APPROVED

Head of Customer organization

TECHNICAL SPECIFICATION

For conceptual designing of physical protection system

(*denomination of nuclear site*)

1. GENERAL PROVISIONS

1.1. Work description: full description of work done is specified, for example: “Development of conceptual project for PPS (name of NS is specified)”.

1.2. Authorizing documents: the full names of normative, organizational and regulatory documents, on the basis of which the specified kind of work is executed; dates of approval of the mentioned documents.

1.3. Customer: (*the name of ordering organization*);

1.4. Executive party: (*the name of executive organization*);

1.5. Associate contractors: (*name of organizations – associate contractors (if available).*

2. PURPOSE AND OBJECTIVE

2.1 Purpose of work: (*purpose of certain work is specified)*

2.2 Within the framework of work performance the following objectives are to be achieved (*a list of objectives is specified)*

3. SCOPE OF WORK

3.1 The development of conceptual project of NS PPS includes the following basic issues:

- the analysis of nuclear site as an object of physical protection;

- working out variants of PPS organization;

- choosing the reasonable variant of PPS organization;

- proposals for the PPS commissioning procedure;

- proposals to include the issue of PPS formation (improvement) to the technical specification.

3.2 Conceptual designing is to be performed in correspondence with technical, legal and regulatory acts “Procedure of level definition of nuclear site physical protection”.

4 TERMS AND WORK SEQUENCE

4.1 Work is performed in stages (*number of stages is specified*)

4.2 The terms of work execution are specified by the agreement.

4.3 Procedure of presenting reporting documents is specified by calendar plan (*which is to be presented as a specific appendix).*

4.4 Reporting scientific and technical documents are issued in two copies. The ordering party is to get the second copy of reports.

4.5 Security label of the reporting documents is defined by the Customer.

4.6 At organizing and performance of works for conceptual designing, the specified requirements are to be guaranteed concerning information protection that represent state secret and other data with limited access.

4.7 The present technical specification can be amended and modified in the specified order upon the mutual approval of the both parties.

Appendix B

(Recommended)

Form-questionnaire "Violator's model"

Table B1

Violators' characteristics	No.1	No.2	No.3	No.4	No.5
1.Violator's type					
2.Purpose of violator's actions					
3.Motives for violator's actions					
4.Probable number of violators					
5.Possibility of violators using any means of transport					
6.Violator's being equipped and fitted					
7 Violator's awareness level regarding nuclear site and its vulnerable places					
8 Violator's technical qualification level to perform violation act					
9.Probable tactics of violator's actions					
10.Notes					

Note - Order of the table completion

In row 1 various characteristics of a violator are described. A list of possible meanings of each characteristic is written below in the text. Various meanings of each characteristics altogether define the correspondent model of a violator (row No.1 and No.2 ..). Violator's characteristics meanings are described herewith:

1 Type of violators:

a) Terrorist (diversionist);
b) Criminal;
c) Nuclear site employee, admitted to the zone of operations with nuclear materials;
d) Nuclear site employee, not admitted to the zone of operations with nuclear materials;
e) Nuclear site security guard;
f) Drunk person, under drug intoxication, insane person;
g) Person that comes to the territory occasionally (hunter, mushroom gatherer, etc.).

2. Purpose of a violator's actions:

a) nuclear materials stealing;
b) diversion;
c) sensitive information stealing;
d) breakdown of NS normal operation;
e) extortion attempt.

3.Motives of a violator's actions:

a) political
b) economical
c) ecological
d) personal

4.Possible number of violators

5.Possibility of violator's using a car:

a) high;
b) medium;
c) low.

6. Violator's being equipped and well-fitted with the following:
a) light-weight instrument;
b) special instrument;
c) fire arms;
d) explosives;
e) pass to the protected zones.
7. Violator's awareness level about nuclear site and its vulnerable locations:
a) high;
b) medium;
c) low.
8. Violator's level of technical qualification to perform unauthorized actions:
a) high;
b) medium;
c) low.
9.Probable tactics of violator's actions:

a) violent
b) deceitful
c) clandestine
d) combined

Appendix C

(Recommended)

Form-questionnaire "Description of protected buildings and rooms"

Table C1

Characteristics of the object of protection		Meaning
1. Name of the object of protection (building, room, location, etc.)		
2. Type of protected zone (PZ, inner zone, zone of special importance, zone of limited access)		
3. Location (No. of buildings and rooms, notes, axes, etc.)		
4. Description of intrusion ways	Access control point	
	Doors	
	Windows	
	Fences	
	Inter-floor constructions	
	Other	
5.Character of an expected unauthorized action (0- entry into the protected zone of a higher access level, 1-diversion, 2 – theft, 3 – documents study, 4 – other unauthorized actions)		
6. Possible damage (description)		
7.Time of unauthorized action performance, in seconds		
8.Time of reaction of securities (passage to the protected zone), sec.		
9. Application of technical means of physical protection		
10.Conditions for exploitation of technical means of physical protection		
11.Notes		

Note:

The present form-questionnaire is used for basic data generalization at the stage of the site pre-project examination. Depending on the described object of protection, completing the questionnaire- form, there can be used the following data– the worked out projected threat and information from the nuclear site vulnerability analysis (if available).

As for the information which is not available or does not have sense in regards to a particular issue, you should put dash in the correspondent line (for example, if a building does not have windows, in row 4 you are to put dash).

It is recommended to complete the form in sequential order, starting from the information on the territory of the site (the protected zone) and ending up with areas of special importance. In case there are buildings or rooms at the site, that do not officially make part of inner zone or zone of special importance, but which require protection, such locations are to be specified and described in separate questionnaire -forms. The forms are to be filled in either by nuclear site employees, who work constantly in these protected zones, or officials of security service officers and organs of internal affairs and (or) military security.

Comments for filling in certain lines of the form are described below.

Row 1. Name of the object of protection (number of the building, room, location, etc.), its designation. The row is to be filled in by security service officials.

Row 2. Type of protected zone. The row is to be completed by security service officials.

Row 3. Layout (No. of buildings and rooms, notes, axes, etc.). In case some plans of buildings and rooms are applied to the form, numbers of plans, construction notes and axes, between which the object of protection is situated, are to be specified too. The row is to be filled in by security service officials and employees operating at core production.

Row 4 Description of ways of intrusion. The number of intrusion ways and their brief description are to be specified. In the form you could find two lines which are not filled in, that are destined for description of non-standard ways of intrusion (such as walls, tube lines , etc.). In these particular lines ranks of possible violator's intrusion ways (channels) to the protected zone can also be specified. Ranks are assigned according to 10-point system (the most probable variant of intrusion channel gets 10 points, the less probable – 9-point rank, correspondently, etc.). This row is to be filled in by security service officials and employees operating at core production.

Row 5 Character of expected unauthorized action, which a violator can perform. Is to be filled in by operators of core production.

Row 6 Possible damage (description). Possible consequences of an expected unauthorized action described in line 5, are specified. Is to be filled in by core production operators.

Row 7 Time of unauthorized action performance. Probable time of violation performance (not considering the time of engineering obstacles climbing: grids, doors, safe deposit boxes, etc.) should be given in seconds. This time is defined basing on expert evaluation by specialists of correspondent services of the enterprise.

Row 8 Time of movement of security stuff from the place of dislocation to the correspondent object of protection (is filled in by security service members). In case the object under protection has long frontiers, time of movement from the place of dislocation to the control points is specified; the points are to be indicated at plans. The row is filled in by security service members together with military security staff.

Row 9 Applied technical means of physical protection. Technical equipment is indicated that is installed in this building or room. Is to be filled in by security service members.

Row 10 Operation conditions for technical means of physical protection and interfering factors (temperature, humidity, aggressive or explosive atmosphere, radioactivity presence, resources of electro-magnetic disturbances, etc.) are described. Is to be filled in by core production operators.

Row 11. Additional data not related to previous rows, but which can represent interest for developers of PPS. Is to be filled in by security service members (officials) and employees of core production line and military security representatives.

Appendix D

(Recommended)

Preliminary configuration of engineering and technical means complex within the physical protection system

Table D.1 – configuration of the engineering and technical means complex installed at the perimeter

No. of zone at the perimeter	Boundary of security	Equipment composition	Quantity, pcs.	Tactics of security activation/deactivation	Notes
1	2	3	4	5	6
Notes: Column 2 Boundary of security – fences, gates, access control points, etc. Column 3 Composition (configuration) of equipment – types of proposed ETMPP are to be specified Column 5 Tactics of security activation/deactivation (for example; being constantly under protection; decentralized by means of code, code and pass, pass and biometry; combined way (user and operator); decentralized via commission).					

Table D.2 – Configuration of ETMPP installed in buildings, rooms

No. of building, or room	Name of building or room	Security boundary	Equipment composition	Tactics of security activation/deactivation	Notes
1	2	3	4	5	6
Notes: Column 3. Boundary of security – for ex. door, shelving units, etc.; Column 4. Complex composition – types of proposed ETMPP are specified; Column 6 Tactics of security activation/deactivation (for example; being constantly under protection; decentralized by user by means of code, code and pass, pass and biometry; combined way (both user and operator); decentralized via commission). Column 7. Note. If necessary, additional data are also specified, for example, algorithm of passage (entry/exit) to the protected buildings, rooms, etc.					

Appendix E
(recommended)
Estimated value of engineering and technical means complex

Table E1

Configuration of ETMPP complex	Price for piece	Quantity of spare kits (pcs)	Total cost
1. Means and systems of security signaling system (outside locations and rooms)			
Total:			
2. Means and systems of security signaling system (inside locations and rooms)			
Total:			
3. Means and systems of control and access control			
Total:			
4. Means and systems of optic and electronic control			
Total:			
5. Means and systems of operational communication and prompt notification, alarm signalization			
Total:			
6. Means and systems of information protection			
Total:			
7. Support systems (notification system, electricity system)			
Total:			
8. Engineering means of PPS			
Total:			
TOTAL SUM:			

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