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# JSWG and KRI Crosswalks

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# JSWG Sustainability Analysis of Russian Regulations

Русский

## 1. MPC&A Organization at site. System operation planning

**Effective MPC&A operations require that Russian sites have assigned organizations the MPC&A functions to plan, coordinate, implement, test, and evaluate MPC&A operations. An effective MPC&A organization shall have sufficient authority to carry out all aspects of their MPC&A-related duties and shall be sufficiently independent from other organizations, such as those with production responsibility on site.**

**Analysis:**

Requirements adequately define roles and responsibilities for MPC&A personnel, provide adequate documentation of authority for site management, and require sites to develop site level procedures for MPC&A activities.

There is language in existing PP and MC&A regulations that addresses some portion of the operational planning process. Completion of SCC TO08 and Eleron TO44 will potentially address the gaps. This sub-element will be reevaluated after enactment of these regulations.

**1.1. Document the organization structure of MPC&A system. The framework of this document shall provide a description of roles and responsibilities for MPC&A system operation. - Develop description of how each MPC&A sub-element is organized. - Develop specific job descriptions, tasks and responsibilities for each of the MPC&A Organizational Sub elements.**

The organizations assigned MPC&A functions shall have clearly defined roles and responsibilities for all personnel in charge of physical protection and nuclear material control and accounting (MC&A) activities. This organization shall describe interaction among all organizational elements of MPC&A operations.

**Analysis:**

MC&A - MC&A regulations establish clear roles, responsibilities, and authorities of nuclear licensees to protect, control and account for nuclear material under their control. There is a regulatory requirement for organizations to list the officials in the MC&A program and their job descriptions.

PP - The regulation establishes the role of the site manager and management structure including definitions of management functions. Regulations require that site documents be established to capture PP and Pro-force functions. Pro-force roles are well defined in agency-level documents.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0001	On the Use of Atomic Energy	MC, PP	Law 170-FZ	Article 9 bullet 11, Article 22 paragraph 2, Article 35 bullet 8-9, Article 50 paragraph 1	3	RF Parliament	Enacted

**Citation:**

**Section II The Powers of the President of the Russian Federation, the Federal Assembly of the Russian Federation, the Government of the Russian Federation, and Federal Executive Branch Agencies Regarding the Use of Atomic Energy (as amended by Federal Law № 122-FZ, dated 22 August 2004)**

Article 9 The Powers of the Government of the Russian Federation Regarding the Use of Atomic Energy  
With regard to the use of atomic energy, the Government of the Russian Federation:

...

- Within the limits of its authority, ensures the physical protection of nuclear material, nuclear facilities, storage

points, as well as radiation sources and radioactive substances owned by the federal government (as amended by Federal Law № 13-FZ, dated 05 February 2007)

...

**Section IV Government Management of the Use of Atomic Energy**

Article 22 Governmental Control and Accounting Activities for Nuclear Material, Radioactive Substances, and Radioactive Waste

...

Procedures for organizing the governmental system for nuclear material control and accounting and the governmental system for control and accounting of radioactive substances and radioactive waste, as well as the agencies that conduct governmental control and accounting for nuclear material and for radioactive substances and radioactive waste, are determined by the Government of the Russian Federation.

**Section VII The Legal Status of Organizations That Conduct Activities Related to the Use of Atomic Energy**

Article 35 Obligations and Legal Liability of an Operating Organizing With Regard to Ensuring the Safety of a Nuclear Facility, Radiation Source, or Storage Facility

The operating organization bears complete legal liability for the safety of a nuclear facility, radiation source, or storage facility, as well as for the proper handling of nuclear material and radioactive substances. In the event that an operating organization loses its permit (license) to operate a nuclear facility, radiation source, or storage facility, it shall continue to bear legal liability for the safety of that nuclear facility, radiation source, or storage facility until these objects have been transferred to another operating organization or a new permit (license) has been obtained. In the event that an operating organization is not able to ensure the safety of these objects, responsibility safety and the proper handling is borne by the appropriate agency that manages the use of atomic energy, which is obligated to ensure the safety of these objects until a new operating organization has been founded.

The operating organization develops and carries out measures to maintain the safety of the nuclear facility, radiation source, or storage facility, establishes special departments as needed to monitor safety, and submits information regarding the safety status of the nuclear facility, radiation source, or storage facility to governmental agencies that regulate safety.

The operating organization shall provide for the following:

...

- Conducting control and accounting activities for nuclear material and radioactive substances
- Providing physical protection for the nuclear facility, radiation source, storage facility, nuclear material, and radioactive substances

...

**Section XI Physical Protection for Nuclear Facilities, Radiation Sources, Storage Points, Nuclear Material, and Radioactive Substances**

Article 50 Requirements to Provide Physical Protection for Nuclear Facilities, Radiation Sources, Storage Points, Nuclear Material, and Radioactive Substances

Requirements for providing physical protection for nuclear facilities, radiation sources, storage points, nuclear material, and radioactive substances are established in the rules and regulations regarding the use of atomic energy.

...

**Analysis:**

Article 9 bullet 11: This establishes state responsibility for MPC&A.

Article 22 paragraph 2: Establishes the basis for MPC&A regulations to elaborate the requirements.

Article 35 bullet 8-9: The Law on Atomic Energy establishes a clear role and responsibility for nuclear licensees to protect, control and account for nuclear material under their control.

Article 50 paragraph 1: Establishes the basis for MPC&A regulations to elaborate the requirements.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	2.1, 2.2.3, 6.3.1, 8.2, 8.6	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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**Citation:**

**2 General Provisions**

2.1 Structure of governmental control and accounting of nuclear material  
Governmental control and accounting of nuclear material shall be performed:

- In MBAs:
- By operating organizations and the organizations that handle nuclear material (henceforth, organizations)

**2.2 Principles of governmental control and accounting of nuclear material**

2.2.3 Operating organizations shall establish MBAs for each nuclear facility or nuclear material storage point.

**6.0 Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference**

**6.3 Organizing physical inventories**

6.3.1 In order to conduct a physical inventory, the manager of the organization shall issue a directive designating the inventory team and the individual in charge of the physical inventory and establishing the timeframes for preparations and for conducting the physical inventory, including the time beyond which all movement of nuclear material.

**8 Nuclear Material Control and Accounting in Organizations**

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- How nuclear material control and accounting activities are organized in MBAs and within the organization as a whole
- What nuclear material control and accounting policies and technical documents have been adopted within the organization

8.6 For each MBA, individuals shall be designated as the custodians for the nuclear material present in that MBA.

**Analysis:**

2.1: This regulation requires organizations to establish material balance areas (MBAs). In other sections, MBA custodians are assigned to each MBA.

2.2.3: This regulation requires organizations to establish material balance areas (MBAs).

6.3.1: This regulation requires the manager of an organization to assign a physical inventory team to conduct physical inventories.

8.2: This section requires organizations to establish material balance areas (MBAs). In other sections, MBA custodians are assigned to each MBA.

8.6: This section requires custodians to be appointed to each MBA.

0010	Physical Inventory of Nuclear Material Procedures	MC	OST 95 10560-2001 (Minatom Order # 80)	6.6 -6.20, 7.4	7	Minatom/Rosatom	Enacted
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**Citation:**

The listed sections identify the physical inventory process.

**Analysis:**

The listed sections identify the physical inventory process.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	5.4.1	7	Minatom/Rosatom	Enacted
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**Citation:**

5.4.1 An individual responsible for organizing and operating the MC&A measurement system shall be designated at the enterprise.

**Analysis:**

Requires identification of a responsible individual, assigning the role of running the MC& measurement program at the site.

0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	Section 2 (2.1, 2.2, 2.3)	7	Minatom/Rosatom	Enacted
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**Citation:**

**2 Administrative Structure for Management and Cooperation in Physical Protection Systems at Potentially Hazardous Nuclear Sites**

2.1 The physical protection system at a potentially hazardous nuclear site is managed by:

- The director or deputy director of the administration
- The commander and chief of staff of the military units (forces) of the internal affairs troops

2.2 In addition to the positions specified in Para. 2.1, the following officials also participate directly in PP system management:

2.3 The physical protection system is operated at the various hierarchical levels by: (see document for complete

citation)

**Analysis:**

This document provides an example of how a site should organize its PP system management to comply with the requirements of higher level regulations.

0030	Management Structure in Automated PP Systems at Potentially Hazardous Nuclear Facilities	PP	Minatom Order # 387	2 (2.1 and 2.2), and 3.6	7	Minatom/Rosatom	Enacted
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**Citation:**

**2. Management Structure within PP Systems**

Organizational management within PP systems consists in coordinated, purposeful activities by site administration, the security service management staff, the command of the military units (detachments) that perform site security functions, and management at agencies collaborating in the comprehensive preparation and effective use of the PP system equipment and resources to provide the requisite level of physical protection at the potentially hazardous nuclear site.

2.1. PP System Structure. Management Functions in PP Systems. (see document for full citation)

2.2 Modifications (types of PP system) for various types and categories of potentially hazardous nuclear site.

Possible PP system modifications and design requirements for such modifications. (see document for full citation)

3.6. Recommendations on management organization

Providing effective operation of the PP system requires that issues related to coordinated management of PP system constituent elements be resolved; optimal decision making mechanisms must be established during the design (upgrade) phase and system rollout, as well as during operation in real time.

**Analysis:**

This document focuses on the configuration of automated PP systems, defined as the equipment and personnel that comprise the system. Statements relevant to the sustainability element in this document are general and more pertinent to automated systems.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.3.5, 4.3.11	7	Minatom/Rosatom	Enacted
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**Citation:**

4.3.5 A description of each MBA shall be presented in this chapter of the Regulation or in a separate document entitled "Instructions for NM control and accounting in MBAs" and shall contain the following information:

- A list of officials in the MBA control and accounting system;
- A list of job descriptions for those individuals...

4.3.11 This chapter shall specify that the assignment of functions, rights, obligations, and responsibilities among MC&A system personnel shall be governed by the Regulation and position descriptions.

**Analysis:**

This regulation provides the requirement to list officials in the control and accounting system and their job descriptions in an organization's planning documents.

This section requires the MC&A at a site to be structured so the department structure and personnel involved in MC&A, as well as personnel qualifications, rights, and responsibilities can be determined.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	1.9, 6.2.1 - 6.2.3, 6.3.3	7	Minatom/Rosatom	Enacted
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**Citation:**

1.9 Responsibility for providing physical protection at a potentially hazardous nuclear site shall be borne by the site director.

6.2.1 The following individuals directly participate in the management of the PP system:

- The administration at the potentially hazardous nuclear site represented by the manager (director) and his deputy;
- The director of the security service at the potentially hazardous nuclear site (the deputy director for security), his deputy or the head of the Access Control and Security Department;
- The director of an administrative unit at the potentially hazardous nuclear site (his deputy), as well as the director of the security service unit in this administrative unit (the security service unit that serves this administrative unit);
- The command and headquarters staff of the military units (security units) of the internal security troops represented by the commander and his chief of staff;
- The commandants of the secure sites (duty officers).

6.2.2 The operation of the PPS is supported at various hierarchical levels by:

- Personnel in the security service unit at the potentially hazardous nuclear site that serves the site as a whole and centrally implements the major tasks and functions of the PP system;
- Personnel in the security service unit that serves the administrative units at the potentially hazardous nuclear site which operate the nuclear facilities and NM storage points;
- Personnel in the security force that reports to site management;
- The staff of the Ministry of Internal Affairs internal security troops that guard potentially hazardous nuclear sites.

6.2.3 Organizational structures of the PP system personnel are identified in the Regulation of the Security Service and in other regulations at each potentially hazardous nuclear site and the staffing regulations of the military units (security units) of Russian Federation Ministry of Interior troops that have been developed based on Acts of the Inter-agency commission regarding the organization of security forces at specific sites and other regulatory documents.

6.3.3 PPS organizational measures include development of site level regulations that take into consideration of the nature of PPS operations at a specific potentially hazardous nuclear facility, including the site category, the organizational and staffing structure of its security service and security force units, its physical protection equipment, the specific nature of its secure areas, and other specific characteristics of the site.

**Analysis:**

This document is the primary agency level PP document. It contains critical language for this element, including specific identification of the roles of certain people, as well as the requirement that each site develop documents governing organization of PP personnel.

6.3.3: This particular citation from Order 550 clearly requires the development of site-level regulations.

0037	On the Adoption of Regulation on Minatom of Russian Site Security Forces	PP	RF Government Decree # 139	4, 9, 10	4	RF Government	Enacted
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**Citation:**

4 Site security forces constitute an aggregate of management entities, manpower, and equipment, which are intended to protect secure sites from unlawful actions; they consist of the following:

- [Para. repealed by Russian Federation Government Decree № 49, dated 01 February 2005]
- The site security force management entity (henceforth, management entity)
- Site security force units that provide protection at the sites

9 [Para. repealed by Russian Federation Government Decree № 57, dated 01 February 2006.]

The administrative structure and staffing levels for site security force units that provide protection at the sites are adopted by the director of the management entity upon approval by the Federal Atomic Energy Agency. (Revised by Russian Federation Government Decrees № 49, dated 01 February 2005, and № 57, dated 01 February 2006.)

The administrative structure and staffing levels for site security force units are determined by the specific characteristics of the secure sites, the degree to which they are provided with security equipment, and by other conditions related to the provision of reliable protection at secure sites.

10 Standard staffing levels for site security force employees on duty at posts are based on the need for them to carry out their duties to protect sites over a 24-hour period (a 24-hour post) or a 12-hour period (a 12-hour post). These levels are based on a calculation of 6.5 units for a 24-hour post and 3.2 units for a 12-hour post. For

protection at sites located in the Far North Regions and equivalent locations, they are based on a calculation of 7.2 units for a 24-hour post and 3.6 units for a 12-hour post. (Revised by Russian Federation Government Decree № 57, dated 01 February 2006.)

Standard staffing levels for site security force employees performing duties that do not involve service at posts are established by the Federal Atomic Energy Agency. (Revised by Russian Federation Government Decree № 49, dated 01 February 2005.)

**Analysis:**

This document provides additional direction for the organization of site security forces.

0123	State Nuclear Material Protection, Control, and Accounting System. Terminology Dictionary	MC	Minatom Order # 59-r	5.4.4, 5.5.7, 5.5.8	7	Minatom/Rosatom	Enacted
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**Citation:**

5.4.4 Facility Manager: An official who has been granted specific rights and responsibilities and who is responsible for the normal operation of a facility and for ensuring the excellent performance of the NM control and accounting system.

5.5.7 NM Accounting Manager: An employee installed in accordance with established procedures, specially trained, and designated by an enterprise order to conduct activities related to receiving, accounting, and storing NM, and also for its security within the areas specified for these activities.

5.5.8 NM Custodian: A person responsible for accounting documents and for source and special NM accounting.

**Analysis:**

This document provides a description of the responsibilities for the staff in this role.

0533	Russian Federation Law On Site Protective Forces	PP	Law # 77-FZ (2006-#88-FZ)	Ch 1 Art 2 and Art 3, Ch 2 Art 5, Ch 3 Art 12	3	RF Parliament	Enacted
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**Citation:**

**Article 2. The Main Objectives of Site Security Forces**

The main objectives of site security forces include:  
 Protecting secure sites against illegal appropriation;  
 Supporting off-site and on-site access control procedures;  
 Preventing and interdicting the commission of crimes and administrative infractions at secure sites.  
 Other objectives may be assigned to site security forces as specified by Federal Law.

**Article 3. Basic Principles of Site Security Force Actions**

Site security forces act on the basis of the following principles:  
 Respecting the rights and freedoms of individuals and citizens;  
 Lawfulness;  
 Cooperation with government safety agencies.

**Article 5. The Organization of Site Security Forces**

Federal executive branch agencies authorized to organize governmental site security forces shall be determined by the Russian Federation Government.  
 The List of federal executive branch agencies authorized to organize site security forces was adopted by Russian Federation Government Decree ? 514, dated 12 July 2000.  
 The structure of site security forces, standards governing the number of site security force personnel, and procedures for organizing their activities are determined by Regulations regarding site security forces developed by federal executive branch agencies authorized to organize site security forces and adopted by the Russian Federation Government.

**Article 12. The Responsibilities of Site Security Force Personnel**

Site security force personnel must:  
 Protect secure sites against illegal appropriation;  
 Take steps to prevent violations of the on-site and off-site access control procedures;

Interdict crimes and administrative infractions at secure sites;  
 Search and detain individuals who have unlawfully penetrated secure sites;  
 Participate in the monitoring of compliance with procedures for fire protection and fire suppression and in the mitigation of accidents, man-made or natural disasters, or other emergencies at secure sites in accordance with established procedure;  
 Assist in measures to ensure the safekeeping of information constituting a state or other secret protected by law;  
 Within the scope of their authority, assist law enforcement agencies perform assigned tasks.

**Analysis:**

Document identifies the objectives and organizational structure of Site Security Forces.

0705	The Organization and Management of Rosatom Site Security Force Unit Operations	PP	(Not obtained)	4.7, 4.18, 5.2 (including 5.6 and 5.7), 5.15	7	Minatom/Rosatom	Enacted
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**Citation:**

4.7 Site security force units that provide protection to sites will be established, reorganized, and disbanded by the site security force management entity.

4.18 Responsibility for staffing site security force units is borne by officials within Atom-Guard (henceforth, the Enterprise) who have been granted authority to hire and dismiss employees.

5.2 Management in site security forces is organized:

- On a general level
- On an intermediate level
- At the site level
- At the individual unit level (see 5.6 and 5.7 for detailed organizational info)

5.15 Managers in site security force units are required to perform the following organizational functions:

- Gathering, studying, and analyzing duty operations data and drawing conclusions based on it
- Establishing the duty roster and distributing this information to [subordinates] in a timely manner
- Organizing collaboration and communications between site management and the employees in security service departments, guard units, patrols, and sentry posts
- Maintaining collaboration with regional security agencies, Russian Federation Ministry of Internal Affairs offices and internal security troop units

**Analysis:**

The regulation includes detailed job descriptions of all major positions that comprise the pro-force.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	1	4	RF Government	Enacted
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**Citation:**

**I General Provisions**

1 This Regulation has been developed in accordance with Russian Federation laws regarding the handling of nuclear material and special non-nuclear material (henceforth, nuclear material). It establishes the organization of the State System for Nuclear Material Accounting and Control and procedures for control and accounting of nuclear material that must be carried out by all legal entities, irrespective of their organizational or legal status, involved in the production, use, processing, storage, transportation and movement of nuclear material across Russian Federation customs border, as well as by government agencies that manage the use of atomic energy and government agencies that regulate the safe use of atomic energy.

**Analysis:**

This regulation establishes high-level responsibilities for organization of MC&A activities in the Russian Federation.

Methodological Instructions for Organizing and Conducting Initial and Advanced Training in the Area

0719	of Nuclear Material Protection, Control, and Accounting for Personnel at Open Stock Companies, Institutions, and Federal Government Enterprises Under the J	MC, PP	(Not obtained)	3.2.5 (bullet 1)	7	Minatom/Rosatom	Enacted
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**Citation:**

3.2.5 The following information is collected to identify the training needs of individual personnel/positions:  
 - Job duties and functions

**Analysis:**

This citation requires the documentation of job duties and functions.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	4.2		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

4.2 The nuclear material measurement system is developed and operated in accordance with a site policy document (procedure) regarding nuclear material control and accounting activities that was developed at the organization and approved by its manager. The manager of the organization shall issue an order appointing an individual to be responsible for the administration and operation of the nuclear material measurement system. The nuclear material measurement system consists of the following elements:

- Key measurement points
- The analysis laboratory at the organization
- Measuring instruments
- Measurement methodologies (methods)
- Calculational methodologies (methods)
- Reference standards
- Sampling procedures and sample preparation procedures
- Measurement programs in the material balance areas
- A measurement quality control program

**Analysis:**

Documents the fact that a site level measurement plan is developed and then approved by the organization manager and requires the manager to appoint an individual responsible for this system

0727	Set of Standard (Model) Forms to Be Developed When Operating Physical Protection and Security Equipment and Procedures for Completing the Forms	PP	(Not obtained)	4.2.2	7	Minatom/Rosatom	Enacted
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**Citation:**

4.2.2 The site administration shall provide the departments that operate physical protection and security equipment with materials and equipment (physical protection and security system equipment, measuring equipment, spare parts, operating materials, engineered barriers, tools, protective clothing, consumable supplies) through the Purchasing Department under nuclear site Security Department supervision in accordance with the "Procurement Requisition Form for Integrated Physical Protection and Security Equipment," the recommended form for which is provided in Appendix 2.

Materials and equipment shall be received and issued in accordance with established procedures at the site.

**Analysis:**

This section establishes nuclear facility administration responsibility for supply of material and technical means for ETM operation and defines contribution of other facility units in such supply.

0731	Procedures for establishing Reporting Areas	MC		Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

**Analysis:**

This document establishes the requirements for physical organization of reporting zones for MC&A activities.

0746	Standard (Model) Programs and Methodologies for Testing Physical Protection Equipment	PP	(Not obtained)	3.4	7	Minatom/Rosatom	Enacted
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**Citation:**

3.4 Technical specifications for designing (upgrading) physical protection systems (and individual technical specifications for physical protection equipment) shall specify who will develop the programs and methodologies, based on a joint decision of the Client and the Contractor.

**Analysis:**

This citation assigns responsibility for developing programs and methodologies for operational testing.

3127	Russian Federation Law On Rosatom State Corporation for Atomic Energy	PP, MC	317-FZ	Entire Document	3	RF Parliament	Enacted
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**Citation:**

**Analysis:**

This regulation establishes high-level responsibilities for organization of MPC&A activities in the Russian Federation.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	Paragraph 16, 17, 23	4	RF Government	Enacted
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**Citation:**

16. Within the scope of their authority, nuclear sites:

- a) Establish physical protection systems
- b) Operate physical protection systems
- c) Develop proposals for upgrading physical protection systems
- d) Hire specialized organizations, when necessary, to perform physical protection tasks
- e) Cooperate with Russian Federation internal affairs offices and the Federal Security Service of the Russian Federation in the specified area of activity

17. The management staff of nuclear sites supports the development, upgrade, and operation of the site physical protection system. Nuclear sites guarded by internal security troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies implement these activities jointly with the leaders of the appropriate military units or forces and, if necessary, with specialized organizations hired for this purpose.

23. The management staff of the nuclear site develops administrative measures, issues physical protection policy documents (together with the leadership of the appropriate military units and forces at sites guarded by internal troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies), and adopts the following documents in accordance with established

procedures:

- a) Site policies regarding the access system, as well as access to objects of physical protection and information concerning the operation of the physical protection system (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)
- b) Site policies regarding the security service (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)
- c) Access control procedures
- d) Site policies regarding onsite access control procedures
- e) Site policies regarding the site security forces
- f) The nuclear site security plan
- g) Action plans for physical protection personnel and nuclear site personnel for routine and emergency situations
- h) A plan for the cooperation of nuclear site managers and the leaders of the Russian Federation Ministry of Internal Affairs internal security troops (forces) with Russian Federation law enforcement agencies and offices of the Federal Security Service of the Russian Federation during routine and emergency situations
- i) A plan for inspecting the status and performance of physical protection and security system equipment
- j) A plan for upgrading the physical protection system

**Analysis:**

The referenced citations establish high-level, managerial responsibilities for organization of MPC&A activities at nuclear sites.

3174	On the Metrology Department of the Federal Atomic Energy Agency	MC	Order 15	1.5	7	Minatom/Rosatom	Enacted
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**Citation:**

1.5 The Rosatom metrology department will be responsible for performing a full set of metrology support measures; for the status and continued development of metrology support for agency activities; and for compliance and observance of current legal metrology rules and regulations intended to support uniformity of measurement, industrial safety, and testing and certification of products.

**Analysis:**

Establishes responsibility of Rosatom for a metrology department that will perform metrology activities.

**1.2. Establish a documented mechanism for coordination of activities, so that mechanism will have a mandatory effect on operation of MPC&A Systems (maintenance programs, self-inspection programs, and performance testing programs). - Develop or revise procedures for coordination and information exchange among the MPC&A Organizational Sub elements and other organizations on site.**

The MPC&A-related organization(s) shall have a mechanism for coordinating activities between the site's MPC&A organization(s) and other site organizations (such as the site protective force and transportation office) as well as Federal bodies and agencies for nuclear operations.

**Analysis:**

MC&A - Inter-agency interactions are specified in the regulations with adequate detail to describe required MC&A inter-agency interactions. Rosatom stated that there are site-level MC&A procedures that govern the interactions between site organizations that address this sub-element. These procedure are not in the library and cannot be provided.

PP - Collaboration is based on requirements for collaboration plans including interaction with MVD, FSB and law enforcement agencies.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	5.1.1, 5.2.2, 5.4, 7.3, 9.1	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

5.1.1 The following documents shall be generated when nuclear material is to be transferred:

- An advance notice signed by the manager of the shipping organization

5.2.2 When nuclear material is shipped, the shipping organization removes the material from account after it has

received a nuclear material certificate of receipt duly filled out by the receiving organization in accordance with established procedures or a bill of lading with the notarized signature of an authorized representative of the receiving organization.

5.4 Actions taken when a nuclear material control and accounting anomaly is discovered

5.4.1 When a statistically significant discrepancy has been discovered, based on a 0.99 confidence probability for data from both the shipping organization and the receiving organization, steps shall be taken to determine the cause of the discrepancy.

5.4.2 If the statistically significant discrepancy between data from the shipping organization and the receiving organization is confirmed, the receiving organization must compile a special report and send that report to the ministry (agency) level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, the federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and the agency that regulates the safe use of nuclear energy.

7.3 System of advance notices regarding nuclear material transfers

7.3.1 When nuclear material is shipped between organizations, at least ten (10) days prior to the anticipated date the nuclear material is to be shipped, the shipping organization shall send an advance notice regarding the nuclear material shipment to the receiving organization, the federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and to the administrative unit within the agency that regulates the safe use of nuclear energy that provides oversight of the governmental system for nuclear material control and accounting at the shipping organization.

7.3.2 In the event of an unscheduled shipment resulting from a special order issued by the appropriate executive branch agencies, notices shall be sent no later than three days after the shipping date has been established.

7.3.3 After receiving nuclear material in situations described in Paras. 7.3.1 and 7.3.2 of these Rules and entering the material into account, the receiving organization shall send receipt confirmation to the shipping organization, federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and to the administrative unit within the agency that regulates the safe use of nuclear energy that provides oversight of the governmental system for nuclear material control and accounting at the receiving organization.

9.1 Procedures for implementing ministry (agency) monitoring of governmental control and accounting of nuclear material; for communications between the representatives of agencies and organizations, on the one hand, and [site] officials and employees (personnel); and procedures for conducting audit inspections shall be established in the ministry (agency) regulation regarding nuclear material control and accounting. A report shall be generated after each inspection.

**Analysis:**

- 5.1.1 - Specifies the documentation required to be sent to NM receivers by NM shippers prior to NM shipments.
- 5.2.2 - Specifies the requirement for NM receivers to communicate with the shippers that material was received.
- 5.4 - Specifies the requirement for reporting anomalies between organizations and agencies.

7.3: Specifies the requirements for NM shipping and receiving organizations to communicate about the shipment of NM.

9.1: Specifies the requirements of communication between inspection (monitoring) agencies and organizations.

0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

These sections describe the content of this document.

Section 1: (2nd paragraph of 1.1) The Guidelines establish the administration of physical protection operations for potentially hazardous nuclear sites, including cooperation of the site administration with military units (forces) of Russian Ministry of Internal Affairs (RF MVD) internal security troops that guard potentially hazardous nuclear sites (security forces), as well as with other applicable directorates of federal executive branch agencies during all phases of designing, building, operating, renovating, and decommissioning the physical protection (PP) systems of

potentially hazardous nuclear sites during normal operating conditions and in emergency situations.\* These directorates include regional internal affairs agencies, the Russian Federal Security Service, regional offices of the Russian Federal Regulatory Commission for Nuclear Safety and Radiation Protection (Gosatomnadzor of Russia), the Russian Federation Ministry of Defense Office of Government Oversight for Nuclear Safety and Radiation Protection, and professional emergency rescue units of the Russian Federation Ministry of Emergency Management.

1.2 These Guidelines establish the following: the administrative structure for management and coordination of physical protection systems for potentially hazardous nuclear sites; the major objectives of cooperation; the physical protection functions of the potentially hazardous nuclear site administration, its security service, and security forces; the coordination of their operations; the assignment of responsibilities for PP system management; rights, and obligations of the applicable parties; and cooperation with other relevant agencies.

Section 6: The entire section is relevant to cooperation/interaction of site admin and security forces (including MVD forces)

4.10 (PP Functions of site administration include) With the approval from the relevant parties, develop site-level regulations, work plans, measures, plans to coordinate the actions of the site administration, security department, personnel, and security forces with regional internal affairs agencies, the Russian Federal Security Service, and professional emergency rescue units of the RF Ministry of Emergency Management during normal operations and in emergencies; also develop physical protection proposals intended for parent and cooperating agencies.

**Analysis:**

This document provides methodological recommendations for organizing management of PP systems in accordance with higher-level requirements. The cited sections address site-level and inter-agency cooperation.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.3.8, 4.3.9, 4.3.10	7	Minatom/Rosatom	Enacted
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**Citation:**

4.3.8 This chapter shall present the main elements of MC&A system activities at the enterprise:

- Organizing liaison and assistance when working with inspection agencies;
- Providing necessary information during liaison with the regional administrative and military organizations.

4.3.9 This chapter shall present the procedures for enterprise liaison with other enterprises, higher level administrative agencies, and outside organizations on MC&A issues.

4.3.10 This chapter shall present the procedure for MC&A system liaison with other enterprise systems including:

- The physical protection system;
- The bookkeeping system;
- Nuclear safety, radiation protection, industrial safety, and fire safety systems;

**Analysis:**

4.3.8: This regulation provides the requirement to describe liaison with inspection agencies, and regional administrative and military organizations in an organization's planning documents.

4.3.9, 4.3.10: This section addresses the content necessary in the MC&A procedures and plans that describe the interagency interactions necessary for proper conduct of MC&A activities.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	1.2 Bullet 2, 6.3.4 Bullet 7-8, 6.3.6	7	Minatom/Rosatom	Enacted
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**Citation:**

**1.2 This document establishes:**

- Procedures for Minatom of Russia interface with other federal executive branch agencies within the limits of their jurisdiction regarding physical protection issues as established by federal legislation;

**6.3.4 The list of major site level regulations to be developed by the units that provide management in**

**the PP system are specified in the requirements of the Procedures and regulations issued by Minatom of Russia and the Russian Federation Ministry of the Interior that govern requirements for PP systems and the organization of site security.**

**These regulations include:**

- Plans for cooperation among the site administration, security service, security force units, and personnel at the potentially hazardous nuclear site in normal and emergency situations;
- Plans for cooperation of the site administration, security service, security force units at the potentially hazardous nuclear site and agencies of the Russian Federation Ministry of the Interior and the Federal Security Service of Russia in normal and emergency situations;

6.3.6 Organizing liaison at the level of site administration with the military units (security units) of the Russian Federation Ministry of Interior troops, as well as with other appropriate federal executive branch management agencies (regional offices of the Ministry of the Interior, Federal Security Service of Russia, Gosatomnadzor of Russia regional offices, the Russian Federation Ministry of Defense Directorate for Government Oversight of Nuclear Safety and Radiation Protection, and professional emergency rescue units of the Russian Federation Emergencies Ministry) in normal operating modes and in emergency situations shall be conducted as specified in the "Regulation on Collaboration in Physical Protection Systems at Potentially Hazardous Nuclear Sites" and are promulgated in the Act of the Inter-agency Commission for each potentially hazardous nuclear site and in the appropriate plans.

**Analysis:**

Order 550 contains a number of citations that establish requirements for interaction between site-level entities, between the site and other agencies, and between Rosatom and other agencies.

0276	On Special Equipment and Firearms for Issuing These Items To Site Security Forces	PP	RF Government Decree #1436	Article 4	4	RF Government	Enacted
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**Citation:**

4 That the federal executive branch agencies authorized to create site security forces be responsible for the following actions:

- With the approval of the Russian Federation Ministry of Internal Affairs, adopt instructions regarding procedures for site security forces to account for, store, issue, use, and ship special equipment, service weapons, and combat firearms, as well as a training program for site security force personnel to take action under conditions associated with the use of combat firearms and weapons, special equipment, and physical force
- Conduct an inventory of previously obtained combat firearms and enter them into Russian Federation Ministry of Internal Affairs accounts
- Ensure that site security force personnel are trained to take action under conditions associated with the use of combat firearms and weapons, special equipment, and physical force
- As necessary, create administrative units within the federal executive branch agencies to carry out accounting and maintenance of special equipment, service weapons, and firearms
- Bring agency level regulations into compliance with this Decree and the Federal Laws "On Site Security Forces" and "On Weapons."

**Analysis:**

This document provides discussion of inter-agency interaction in the area of protective force.

0705	The Organization and Management of Rosatom Site Security Force Unit Operations	PP	(Not obtained)	3.6, 5.12, 5.13	7	Minatom/Rosatom	Enacted
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**Citation:**

3.6 The protection of secure sites by site security force units is carried out in collaboration with the upper management and Security Department at secure sites, regional security agencies, and Russian Federation Ministry of Internal Affairs offices and internal security troop units in accordance with procedures established by the Federal Atomic Energy Agency.

5.12 The collaboration of forces and equipment on the local, site, inter-agency, and agency levels is a constituent element in organizing and managing the protection of secure sites.

5.13 Collaboration consists in efforts coordinated in purpose, time, and location to provide mutual assistance to all units, organizations, agencies, and other forces when carrying out the military objectives assigned to them.

**Analysis:**

This document provides greater detail regarding inter-agency interaction in the area of pro-force.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	19, 24-26	4	RF Government	Enacted
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**Citation:**

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

19. The actual quantity, qualitative composition, and status of nuclear material located in material balance areas shall be determined during nuclear material physical inventories.

The procedures for organizing and conducting nuclear material physical inventories, as well as the frequency and scope of the inventories, shall be established by organizations handling nuclear material in accordance with the federal rules and regulations for governmental nuclear material control and accounting. These shall be based on the technological process, equipping the material balance area with physical protection and security equipment, and implementing access control measures and equipment for this material.

A nuclear material balance shall be performed based on the nuclear material physical inventory results in each material balance area, and an MBA material balance report shall be generated, which the director of the organization will approve. The material balance report for the MBA shall contain information regarding the actual and recorded quantities of nuclear material, the inventory difference, and its uncertainty.

**VI Governmental Nuclear Material Control and Accounting at the Federal Level**

24. On an annual basis by February 1 following the reporting year, the Russian Federation Ministry of Internal Affairs and the Federal Security Service of the Russian Federation shall submit summarized information on the discovery, prevention, and exposure of illegal acts involving nuclear material, as well as the reasons these actions were committed, to the Rosatom Government Atomic Energy Corporation and the Federal Environmental, Industrial, and Nuclear Regulatory Authority.

25. The Federal Customs Service shall provide the Rosatom Government Atomic Energy Corporation with the summarized information contained in the cargo customs declarations regarding the movement of nuclear material across Russian Federation customs borders. This information shall be presented on an annual basis by March 1 following the reporting year.

If necessary, the Federal Customs Service shall provide the Rosatom Government Atomic Energy Corporation, the Russian Federation Ministry of Internal Affairs, or the Federal Security Service of Russia, upon their request, with information regarding specific instances of nuclear material movement across Russian Federation customs borders.

**VII Oversight of the State System for Nuclear Material Accounting and Control**

26. Federal executive branch agencies authorized to conduct governmental regulation of nuclear safety, radiation protection, industrial safety, and fire protection during the use of atomic energy perform the following within the limits of their authority:

- Oversight of the state system of accounting and control
- Development, adoption, and enactment of the federal rules and regulations regarding governmental nuclear material control and accounting in accordance with the procedures established by the Russian Federation Government

**Analysis:**

This document establishes the organization and oversight of the state system of nuclear material accounting and control and establishes these procedures irrespective of the legal or organizational status.

0757	Procedures for the Turnover of Physical Protection and Security Equipment to Security Forces	PP	10697-A-D1	2.1.2	7	Minatom/Rosatom	Enacted
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**Citation:**

**2 Organizing Preparations for the Turnover of Physical Protection and Security Equipment to Security Force Units**

**2.1 Procedures for Administering and Monitoring the Development of Integrated Physical Protection and Security Equipment with the Participation of Security Force Representatives**

2.1.2 During construction, installation, startup, and testing activities, in order to verify the completeness and quality of execution, the director of the nuclear site shall issue an order in accordance with established procedures appointing an ad hoc committee and an acceptance/turnover committee that include representatives of the appropriate nuclear site departments and organizations, including the design and installation organizations, the nuclear site Security Department, and security forces.

Participation of security force representatives on the committees indicated above for monitoring deadlines and the completeness and quality of work performed is mandatory.

**Analysis:**

This document provides for inter-agency interaction at the stages of construction, installation, start-up and testing (for both new PP systems and upgrades to existing systems) in the form of an ad hoc committee.

Participation of security force representatives on the committees indicated above for monitoring deadlines and the completeness and quality of work performed is mandatory.

	Methodological		4.1.1,			
	Recommendations		4.1.2,			
	Regarding		4.2.1,			
	Scheduled		4.2.2,			
0794	Maintenance	PP	4.2.3,	7	Minatom/Rosatom	Enacted
	Procedures for		4.3.2,			
	Physical Protection		4.3.7,			
	and Security		4.3.8,			
	Equipment		4.8.1			

**Citation:**

4.1.1 Planning of maintenance of physical protection and security equipment is organized by the security department and performed by the nuclear site administrative units and protective forces (Russian Federation Ministry of Internal Affairs internal security troops, Atom-Guard) responsible for maintenance in accordance with the maintenance responsibility matrix for physical protection and security equipment.

4.1.2 Maintenance is planned for each type of physical protection and security equipment (group of items). The primary planning document for establishing equipment maintenance dates is the Schedule of Maintenance (Appendix 1), which is developed annually by specialists from the nuclear site administrative units and protective forces responsible for maintaining physical protection and security equipment. The Schedule is approved by the security department and adopted by the administration of the nuclear site and the command of protective forces, as applicable.

4.2.1 The nuclear site management and security force command staff conjointly organize the maintenance of physical protection and security equipment at the nuclear site. Maintenance is performed by department(s) within the enterprise and/or by outside specialized organizations and/or specialists from security force units.

4.2.2 The nuclear site management and security force command staff are responsible for organizing and conducting maintenance activities for physical protection and security equipment in accordance with the operational responsibility matrix, which is prepared as specified in the "Procedures for Turning Over Physical Protection and Security System Equipment to the Security Forces" [4] when physical protection and security equipment is transferred to the security forces. In order to allocate responsibilities for organizing and conducting maintenance activities among the security department, other enterprise departments, and security force units, it is recommended that a separate document be developed, if necessary, to define procedures for collaboration during the operation of physical protection and security equipment.

4.2.3 The duties of officials for organizing and conducting maintenance are set forth in policy documents regarding the department responsible for operating physical protection and security equipment and in job descriptions adopted by the nuclear site (security department) management and security force command staff (according to jurisdiction).

4.3.2 Logistical support is monitored by nuclear site security department officials and individuals responsible for operating physical protection and security equipment.

4.3.7 Officials are appointed by an order issued by the nuclear site administration to ensure that measuring instrument verification is organized in a timely manner.

4.3.8 The officials who provide metrology support are responsible for the following:

- An inventory of all measuring instruments, including those subject to regular verification
- Monitoring to ensure that measuring instruments are maintained in good working order, used properly, and submitted promptly for verification
- Monitoring to ensure that measuring instruments are repaired promptly

4.8.1 Monitoring of the timeliness and quality of maintenance must be performed in accordance with the enterprise plan for inspecting the material condition and performance of physical protection and security equipment\* and conducted by officials and specialists of the security department and the departments responsible for maintaining the equipment, as well as by agency and site inspection teams.

**Analysis:**

The document establishes responsibilities of nuclear facility administration and personnel for planning, organizing and carrying out technical maintenance.,

0796	Instructional Guidelines for Preparation of Statements of Work for the Creation (Modernization) of Physical Protection Systems at Nuclear Facilities	PP		Article 3.1, 3.2	7	Minatom/Rosatom	Enacted
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**Citation:**

3.1. A draft PPS SOW is prepared by the security department of the nuclear site in cooperation with the capital construction, production, operation, and other nuclear site departments involved in creating (upgrading) the PPS. A list of the specific departments involved in creating (upgrading) the PPS will be prepared by nuclear site management depending on the organizational structure of the nuclear site and the scope of work for the PPS upgrade.

If necessary, specialized organizations and representatives of RF MVD interior troops units (for nuclear sites guarded by interior troops units) or Rosatom site security forces (for nuclear sites guarded by site security force units) can be contracted for the development of the draft PPS SOW. The determination that the involvement of specialized organizations is required for the development of the draft PPS SOW shall be made by the nuclear site administration based on the results of previous deliverables during the pre-design phase for the creation (modernization) of the PPS and on the development of the needs analysis for the development of an automated PPS information protection system.

For nuclear facilities under construction that do not have a security department, the draft PPS SOW will be prepared by the appropriate services of higher-level organizations with the assistance of specialized organizations.

3.2. The PPS SOW shall be approved by the prime contractor (a design organization or general contractor organization in the field of physical protection), by the Rosatom Department for the Protection of Information and State Secrets, by the regional command of the RF MVD interior troops (for nuclear facilities guarded by interior troops units) or by the command of the Rosatom site security forces (for nuclear facilities guarded by Rosatom site security force units), and by other interested organizations providing the funds (the appropriate Rosatom departments, higher-level organizations, etc.).

If necessary, the relevant parts of the PPS SOW must also be approved by the specialized organizations engaged by the Customer for various deliverables on the creation (modernization) of the PPS.

In order to limit the distribution of information concerning the PPS being created (or upgraded), it is permissible to transmit the relevant excerpts from the PPS SOW to the said contractors for approval.

**Analysis:**

These citations establish the procedure for interagency interaction at the stage of physical protection system design.

3127	Russian Federation Law On Rosatom State Corporation for Atomic Energy	PP, MC	317-FZ	Article 33, paragraph 2, 3)	3	RF Parliament	Enacted
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**Citation:**

**Article 33. Regulations of The Corporation**

**2. The regulations of The Corporation shall establish the procedure and rules of performance of powers and functions incumbent on The Corporation as prescribed by this Federal Law, and shall contain the following divisions:**

3) the procedure of interaction between The Corporation and federal agencies of state power, agencies of state power of entities of the Russian Federation and agencies of local self-administration of municipal structures during performance by The Corporation of its functions;

**Analysis:**

This citation provides the high-level requirement for Rosatom to establish a regulatory basis for its interaction with other agencies and ministries.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites	PP	RF Government Decree # 456	23 h), 46	4	RF Government	Enacted
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of Nuclear Materials

**Citation:**

23. The management staff of the nuclear site develops administrative measures, issues physical protection policy documents (together with the leadership of the appropriate military units and forces at sites guarded by internal troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies), and adopts the following documents in accordance with established procedures:

h) A plan for the cooperation of nuclear site managers and the leaders of the Russian Federation Ministry of Internal Affairs internal security troops (forces) with Russian Federation law enforcement agencies and offices of the Federal Security Service of the Russian Federation during routine and emergency situations

46. Collaboration within the framework of the physical protection system at a secure site is implemented in accordance with inter-agency regulations and collaboration plans.

**Analysis:**

This document provides the high-level directive that inter-agency collaboration plans must be developed.

**1.3. Develop/compile MPC&A operations plan(s). - Develop a site level MPC&A Sustainability Plan.**

The site needs to develop site-level instructions to address MPC&A activities, and those instructions must address the specific conditions of that site.

**Analysis:**

There is language in existing regulations that addresses some portion of the operational planning process. Completion of SCC TO08 and Eleron TO44 will potentially address the gaps. This sub-element will be reevaluated after enactment of these regulations

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	Entire Document	7	Minatom/Rosatom	Enacted

**Citation:**

*Entire Document*

**Analysis:**

This regulation provides a recommended standard for the content of an MC&A site-level regulation.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	6.3.5, Section 10-11	7	Minatom/Rosatom	Enacted
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**Citation:**

6.3.5 Measures regarding creating and modernizing PP systems, planning and organizing PP system operations, organizing the operation of physical protection and security equipment, organizing and conducting training exercises, as well as monitoring the status of PP systems, are presented in Chapters Nine, Ten, Eleven, Thirteen, and Sixteen of this document, respectively.

10 Organizational Requirements for the Operation of Physical Protection Systems and for Planning Physical Protection Activities.

11 Requirements for physical protection and security equipment operation.

**Analysis:**

Sections 10 and 11 of this document address requirements for operation of PP systems at the site.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	15 c), 16, 17, 19	4	RF Government	Enacted
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**Citation:**

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

15. Organizations handling nuclear material shall perform the following:

...

c) Providing the nuclear material control and accounting system with methodologies, equipment, and hardware and software to ensure compliance with control and accounting requirements for nuclear material

...

16. Nuclear material control and accounting at organizations handling nuclear material is conducted based on material balance areas and in accordance with the federal rules and regulations for governmental nuclear material control and accounting, as well as in accordance with policy and technical documents to be developed and adopted by these organizations in order to implement these federal rules and regulations.

The organizations establish material balance areas upon approval with the Rosatom Government Atomic Energy Corporation.

17. Nuclear material control and accounting in material balance areas shall be conducted by the material custodian or official responsible for nuclear material control and accounting, in accordance with the MC&A procedures and regulations adopted by the director of the organization that handles nuclear material.

19. The actual quantity, qualitative composition, and status of nuclear material located in material balance areas shall be determined during nuclear material physical inventories.

The procedures for organizing and conducting nuclear material physical inventories, as well as the frequency and scope of the inventories, shall be established by organizations handling nuclear material in accordance with the federal rules and regulations for governmental nuclear material control and accounting. These shall be based on the technological process, equipping the material balance area with physical protection and security equipment, and implementing access control measures and equipment for this material.

A nuclear material balance shall be performed based on the nuclear material physical inventory results in each material balance area, and an MBA material balance report shall be generated, which the director of the organization will approve. The material balance report for the MBA shall contain information regarding the actual and recorded quantities of nuclear material, the inventory difference, and its uncertainty.

**Analysis:**

The citations establish requirements that largely correspond to the content of the US MC&A Plan.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	23	4	RF Government	Enacted
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**Citation:**

23. The management staff of the nuclear site develops administrative measures, issues physical protection policy documents (together with the leadership of the appropriate military units and forces at sites guarded by internal troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies), and adopts the following documents in accordance with established procedures:

- a) Site policies regarding the access system, as well as access to objects of physical protection and information concerning the operation of the physical protection system (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)
- b) Site policies regarding the security service (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)
- c) Access control procedures
- d) Site policies regarding onsite access control procedures
- e) Site policies regarding the site security forces
- f) The nuclear site security plan
- g) Action plans for physical protection personnel and nuclear site personnel for routine and emergency situations
- h) A plan for the cooperation of nuclear site managers and the leaders of the Russian Federation Ministry of Internal Affairs internal security troops (forces) with Russian Federation law enforcement agencies and offices of the Federal Security Service of the Russian Federation during routine and emergency situations
- i) A plan for inspecting the status and performance of physical protection and security system equipment
- j) A plan for upgrading the physical protection system

**Analysis:**

This citation from Decree 456 establishes requirements for site-level documents that cover many components of

the physical protection aspects of an MPC&A Plan.

**2. Regulatory Documents for MPC&A System Operation at site (Guides/Statues, Manuals, Procedures)**

**Physical protection, material control and accounting programs require a set of operating procedures to direct MPC&A and operational personnel in the proper operation of equipment and technology, reporting, and use of nuclear material. Site regulations shall describe the procedures and activities necessary to ensure MPC&A-related organizations meet the requirements of federal and agency regulations and minimize risk to nuclear material. Process and operational regulations (procedures) shall ensure proper protection, control and accounting is maintained during activities.**

**Analysis:**

Regulations require the development of site-specific written procedures for all key MPC&A operations. However, there is no requirement for the development of a configuration management plan or performance testing plan.

For MC&A, there is a requirement for periodic review of MC&A measurements at least once every five years. However, regulations imply periodic review of site-level procedures due to the requirement to meet current higher-level regulations or changes in site operations. No mention is made of the need for emergency response plans.

Regarding PP, requirements for periodic review of site-level documents exist, but do not specify a timeframe.

**2.1. Develop a set of the site-level regulations covering all key aspects of MPC&A activities, including: - Develop procedures that are customized to the documented nuclear processes on site - Develop procedures that mitigate MPC&A risks previously identified by Vulnerability Analysis**

MPC&A operating procedures shall have the following attributes:

- Sites shall develop written and management approved MPC&A procedures and establish a schedule that identifies the frequency for the review of the procedures.
- The procedures shall address all aspects of MPC&A operations, including material control, material accounting, training, internal monitoring (assessments), measurements, shipping and receiving, secure transportation and protective force operations.
- Site MPC&A operating procedures should be based on system requirements developed from information contained in technical manuals, system analysis reports (SARs), and Vulnerability Assessments (VAs), and they should be customized to the site's nuclear processes.
- The operating procedures shall address emergency situations such as fire, adverse weather, natural disasters, interruption of electricity, and other site infrastructure support and associated compensatory measures as they pertain to MPC&A.

The site procedures are documented, approved by management, and controlled by means of an officially approved change control process. For more on site configuration control see Element 7 - MPC&A System configuration management.

**Analysis:**

MC&A - Site management is required to develop site-level procedures that implement a MC&A program.

PP - PP organizational measures include development of site-level regulations that take into consideration the nature of PP operations at the site.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0001	On the Use of Atomic Energy	MC, PP	Law 170-FZ	Article 20	3	RF Parliament	Enacted

**Citation:**

Article 20: Government management of the use of atomic energy is performed by federal executive branch agencies and the Government Atomic Energy Corporation Rosatom (henceforth also "agencies that manage the use

of atomic energy") in accordance with procedures established by this federal law.... The following activities fall within the purview of the government agencies that manager the use of atomic energy, as specified in the regulations establishing these agencies:

- Conducting governmental control and accounting of nuclear material and radioactive substances
- Formulating and implementing programs for handling of radioactive waste.

**Analysis:**

Establishes state responsibilities for MPC&A.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	3.4.2.4, 4.1, 4.2, 4.7, 7.1, 7.2, 8.2, 8.4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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**Citation:**

3.4.2.4 The use and handling of TIDs within an organization (receipt, receipt inspection, storage, installation/removal, authenticity verification, and destruction of TIDs that have been replaced or that are defective) shall be conducted in accordance with the procedures (program) established by the operating organization.

4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.

4.2 - Measurement methodologies shall be incorporated into individual site policy documents that shall be compiled in accordance with the requirements set forth in metrology standards.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

**7.1 Accounting documents**

7.1.1 Accounting documents shall be maintained for each MBA; these documents shall contain data on each nuclear material kind [present in the MBA], including:

- The quantity of material in the MBA
- Changes in the quantity of material in the MBA

7.1.2 Accounting documents shall reflect all changes in the quantity of material for each batch, the characteristics of the batch, and initial batch preparation data. Dates on which changes in the quantity of nuclear material occurred shall be indicated, along with the shipping organization MBA and the receiving organization MBA.

7.1.3 The data used to determine the quantitative and qualitative changes to nuclear material in an MBA—including results from the calibration, inspection, and qualification of measuring instruments, sample selection data and analysis results, measurement quality control results, and the random uncertainty and bias of measurements—shall be reflected in the appropriate documents.

**7.2 Reporting documents**

7.2.1 Every organization shall create and actively maintain the following reporting documents, which shall be based on accounting documents:

- Inventory change reports
- Material balance reports
- Inventory listings
- Physical inventory listings
- Special reports

7.2.2 The organization submits reporting documents on a regular schedule approved in advance to the agency that manages the use of atomic energy [within the ministry] to which it reports, and also to the federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities.

7.2.3 ICRs, ILs, and PILs shall be compiled at the MBA level and at the organization level. These reports shall contain information regarding the actual quantity of nuclear material and its movement between MBAs or between organizations.

7.2.4 MBA level ICRs shall be submitted to the office within the organization that routinely carries out nuclear material accounting activities immediately after each event associated with a change in nuclear material quantity, or monthly on all the changes in nuclear material quantity that have occurred over that period, but not later than the 15th day in the month immediately following the month in which these changes occurred.

7.2.5 Organization level ICRs shall be submitted quarterly and shall contain data on all the changes in nuclear material quantity that have occurred over that period.

7.2.6 When no changes in the inventory quantity of nuclear material have occurred in the MBAs at the organization during a reporting period, the organization shall submit a report using the official form filled out in accordance with established procedures and indicating that there have been no changes in the inventory quantity of nuclear material over the reporting period.

7.2.7 Material balance reports shall be prepared based on the results of the physical inventories conducted within MBAs.

7.2.8 MBA material balance reports shall reflect the following information for each nuclear material in the form of separate entries:

- The initial book inventory
- Increases and/or decreases in the quantity of nuclear material over the reporting period
- The ending quantity of nuclear material actually present [in the MBA] as established by a physical inventory
- The inventory difference and its uncertainty

7.2.9 Organization material balance reports shall indicate the nuclear material balance based on the quantity of nuclear material actually present [in the organization] as established in the course of a physical inventory.

7.2.10 Organization material balance reports shall reflect the following information for each nuclear material in the form of separate entries:

- The initial book inventory
- The final book inventory and the ending quantity of nuclear material actually present [in the organization] as established by a physical inventory

7.2.11 If comparison of the ending quantity of nuclear material actually present and the IL final book inventory of material present reveals an anomaly, the required documents confirming the justification for accepting the quantity of nuclear material actually present as the initial [book inventory] for the next reporting period.

7.2.12 A PIL for the end of the reporting period shall be compiled at the same time the material balance report is compiled.

7.2.13 The MBA PIL shall be compiled on the [end] date of the physical inventory in the form of a sequenced list for each material kind and material batch; the PIL shall indicate the identification and other characteristics of each nuclear material batch and nuclear material kind separately.

7.2.14 MBA MBRs and PILs shall be submitted by the individual in charge of control and accounting in the MBA to the nuclear material accounting office within the organization within 15 days of determining the quantity of nuclear material actually present [in the MBA].

7.2.15 Special reports shall be compiled by the operating organization (organization) whenever the loss, theft, or unauthorized use of nuclear material has been revealed, when a deficit (excess) of nuclear material has been detected, and also whenever the established limits for inventory difference or statistically significant discrepancies between data from the shipping organization and the receiving organization have been exceeded.

Special reports are submitted to the appropriate agencies that manage the use of atomic energy and the agency that regulates the safe use of nuclear energy within 24 hours of establishing [any of] the facts specified above.

7.2.16 Special reports shall contain the following information:

- A description of the circumstances, events, and/or series of events associated with unauthorized use of the nuclear material
- Identification and definition of the nuclear material kind
- Initial data for determining the quantitative characteristics of the nuclear material
- The measures taken and the action plan to resolve the problems that have arisen

7.2.17 Upon request, organization reporting documents regarding its MBAs are submitted by the organization to the agency that regulates the safe use of nuclear energy and provides oversight of the governmental system for nuclear material control and accounting (or to one of its regional offices).

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- How nuclear material control and accounting activities are organized in MBAs and within the organization as a whole
- What nuclear material control and accounting policies and technical documents have been adopted within the organization
- The number of MBAs, their boundaries, and their structure
- What measurement methodologies and measuring instruments have been adopted within the organization for nuclear material control and accounting purposes
- Nuclear material access control equipment
- A list of accounting and reporting documents and [copies of] the forms to be used
- Procedures for monitoring the status of nuclear material control and accounting activities within MBAs
- Procedures for investigating nuclear material control and accounting anomalies
- Procedures for training employees (personnel) and granting them access to nuclear material control and accounting related work
- Deadlines for compiling ILs for MBAs and for the organization as a whole
- Procedures for conducting physical inventories

8.4 - For each MBA, the manager of the organization shall develop and approve nuclear material control and accounting procedures that identify the following:

- KMPs, as well as the measurement methodologies and measuring instruments adopted for use
- Nuclear material access control equipment
- The nuclear material control and accounting procedures adopted for use in each MBA
- The procedures used to estimate nuclear material losses

**Analysis:**

OPUK requires the manager of an organization to develop and approve procedures and site-specific instructions for MC&A. These subjects include, but are not limited to activities organized in MBAs, the number of MBAs and their boundaries, measurement methodologies and instrumentation, access control equipment, accounting and reporting documents, etc. OPUK also requires the manager to develop and approve MBA-specific procedures. These subjects include physical structures and borders of MBAs, location of material within the MBAs, key measurement points, and measurement methodologies and equipment, access control devices, etc.

0010	Physical Inventory of Nuclear Material Procedures	MC	OST 95 10560-2001 (Minatom Order # 80)	13.1	7	Minatom/Rosatom	Enacted
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**Citation:**

13.1 On the basis of this standard, every enterprise (organization) engaged in the use of nuclear material must develop "Instructions for Physical Inventory of Nuclear Materials at the Enterprise (Organization)."

**Analysis:**

Requires development of a site-level inventory instructions document.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	6.2.3.1, 6.2.3.5, 6.2.5.1, 6.2.8.2, Appendix C	7	Minatom/Rosatom	Enacted
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**Citation:**

6.2.3.1: Measurement methodologies shall comply with the general requirements set forth in OST 95 10351 and shall contain an indication regarding the possibility of use within the SSAC. Measurement methodologies for accounting and verification (arbitration) measurements shall be no lower than at the agency level. Enterprise level measurement methodologies may be used for confirmatory measurements.

6.2.3.5: Measurement methodologies are not required for direct measurements (weighing)....

6.2.5.1 Measurement methodologies are developed as required by GOST R 8.563 on the basis of initial data, including the following: the title of the measurement methodology, measurement uncertainty requirements, measurement conditions, and other requirements for the measurement methodology.

6.2.8.2: The analytical methods used at KMPs in MBAs shall be documented as separate instructions and approved in accordance with established procedures.

**Appendix C: "Procedures for Generating Measurement Methodologies in the Form of Industry (Agency) Instructions"**

**Analysis:**

These citations establish the measurement methodologies and the attestation process.

0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	1.5, 4.10	7	Minatom/Rosatom	Enacted
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**Citation:**

1.5 Potentially hazardous nuclear sites under the jurisdiction of Minatom of Russia are to develop site level regulations on the basis of these Guidelines, as well as the aforementioned "Procedures for the Physical

Protection," taking into account site-specific operating conditions.

4.10 With the approval from the relevant parties, develop site-level regulations, work plans, measures, plans to coordinate the actions of the site administration, security department, personnel, and security forces with regional internal affairs agencies, the Russian Federal Security Service, and professional emergency rescue units of the RF Ministry of Emergency Management during normal operations and in emergencies

**Analysis:**

This document provides methodological recommendations for organizing management of PP systems in accordance with higher-level requirements. The cited sections address inter-agency cooperation.

Based on document language, sites should utilize this document as the basis for site-level procedures.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

**Scope**

This Standard Regulation establishes general requirements for the structure, style, content, and format of the "Minatom of Russia Enterprise Regulation on Nuclear Material Control and Accounting" (henceforth, Regulation).

This Standard Regulation applies to all enterprises that engage in activities related to nuclear material control and accounting as specified in regulations [1] and [2] listed in the bibliography to this document, and that manage nuclear material subject to governmental control and accounting as specified in federal rules and regulations.

**Analysis:**

This regulation requires organizations to produce comprehensive plans and procedures for MC&A.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	6.3.3, 6.3.4, 10.3.3, 10.3.5, 11.6.1, 11.6.2	7	Minatom/Rosatom	Enacted
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**Citation:**

6.3.3 PPS organizational measures include development of site level regulations that take into consideration of the nature of PPS operations at a specific potentially hazardous nuclear facility, including the site category, the organizational and staffing structure of its security service and security force units, its physical protection equipment, the specific nature of its secure areas, and other specific characteristics of the site.

6.3.4 The list of major site level regulations to be developed by the units that provide management in the PP system are specified in the requirements of the Procedures and regulations issued by Minatom of Russia and the Russian Federation Ministry of the Interior that govern requirements for PP systems and the organization of site security.

These regulations include:

- A regulation regarding the authorization system for clearances and access to NM, nuclear facilities, NM storage points, and information regarding operation of their PP systems;
- Instructions regarding access control procedures [off-site];
- A regulation regarding the on-site site security system;
- A regulation regarding the security service;
- A regulation regarding the security force that reports to site management;
- A security and defense plan for the potentially hazardous nuclear site;
- Plans for cooperation among the site administration, security service, security force units, and personnel at the potentially hazardous nuclear site in normal and emergency situations;
- Plans for cooperation of the site administration, security service, security force units at the potentially hazardous nuclear site and agencies of the Russian Federation Ministry of the Interior and the Federal Security Service of Russia in normal and emergency situations;
- Plans for verifying the technical status and operability of physical protection and security equipment.

Site level regulations shall update the requirements of federal and ministry level standards documents regarding physical protection taking into account the organizational structure and special characteristics of operations at the potentially hazardous nuclear site, without contradicting the federal and ministry level standards documents.

10.3.3 Requirements for the organization and operation of the access control and management system shall be governed by the "Instructions regarding access control procedures" and other documentation developed at the site that shall specify:

- The characteristics of the established access control system;
- Procedures for site personnel, security force units, individuals on temporary assignment, and visitors to access the premises of secure areas, restricted access areas, and classified rooms by passing through access control points;
- Procedures for vehicles delivering (receiving) nuclear material and items containing them or other material assets to access the premises of a site;
- Types and groups of badges, procedures for preparing and issuing them, the serial numbers encoded in the badges;
- Accounting and reporting procedures, badge storage procedures, seals and serial numbers;
- A description of the badges and a list of the serial numbers currently in use at the site;
- The duties of the administration, the security service and security force units, and directors of administrative units of the potentially hazardous nuclear site to support the access control system;
- The duties of administrative personnel in the security service and security force units regarding the implementation of the badging system, and response procedures in normal and emergency situations.

10.3.5 Organizational requirements for on-site access control procedures shall be governed by a Regulation developed at the potentially hazardous nuclear site that specifies the following:

- Compliance with the on-site daily work routine by the site personnel and security force personnel, as well as persons on temporary assignment and visitors;
- Security of the site premises, buildings, structures and rooms in which nuclear material or items containing them are being extracted, (re)processed, used or stored;
- Concealment of the physical locations of nuclear material and items containing them;
- Conduct of informational sessions with personnel who work directly with nuclear material and/or items containing them to explain their responsibility for the containment and integrity of the material and products;
- Support of the established procedure for using documentation containing information about the nuclear material and items containing them, the security systems, including the PP system, and also containing the locations where nuclear material and items containing them are used, stored and (re)processed, and the dates and routes of their movement;
- Implementing fire safety rules and regulations;
- Monitoring compliance with the requirements of the on-site access control procedures.

11.6.1 Operation of engineered barriers and equipment is planned by the managers (commanders) of the administrative units that support their operation in conjunction with the administration and security service at the potentially hazardous nuclear site.

11.6.2 Plans shall include the following measures:

- Maintenance;
- Organizing repair and storage;
- Provide logistical support for operations;
- Gathering, calculating and analyzing data on the invulnerability to jamming and the operational reliability of PP system equipment;
- Industrial safety;
- Monitoring operational organization and status.

**Analysis:**

6.3.3, 6.3.4, 10.3.3, 10.3.5 - This document is the primary agency-level PP document for Rosatom.

The document provides a list of specific documents/regulations to be prepared by the site.

11.6.1, 11.6.2 - The cited sections provide the requirements for content of the PP equipment operations plan.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	V: 15 c, 16, 17, 19	4	RF Government	Enacted
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**Citation:**

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

15. Organizations handling nuclear material shall perform the following:

c) Providing the nuclear material control and accounting system with methodologies, equipment, and hardware and software to ensure compliance with control and accounting requirements for nuclear material

16. Nuclear material control and accounting at organizations handling nuclear material is conducted based on material balance areas and in accordance with the federal rules and regulations for governmental nuclear material

control and accounting, as well as in accordance with policy and technical documents to be developed and adopted by these organizations in order to implement these federal rules and regulations.

The organizations establish material balance areas upon approval with the Rosatom Government Atomic Energy Corporation.

17. Nuclear material control and accounting in material balance areas shall be conducted by the material custodian or official responsible for nuclear material control and accounting, in accordance with the MC&A procedures and regulations adopted by the director of the organization that handles nuclear material.

19. The actual quantity, qualitative composition, and status of nuclear material located in material balance areas shall be determined during nuclear material physical inventories.

The procedures for organizing and conducting nuclear material physical inventories, as well as the frequency and scope of the inventories, shall be established by organizations handling nuclear material in accordance with the federal rules and regulations for governmental nuclear material control and accounting. These shall be based on the technological process, equipping the material balance area with physical protection and security equipment, and implementing access control measures and equipment for this material. ...

**Analysis:**

This document establishes the requirements for procedures to be established for MC&A.

0721	Set of Standard (Model) Documents Regarding the Deployment of Physical Protection Systems and Recommendations for Completing the Forms	PP	(Not obtained)	2.4.3, 2.4.4	7	Minatom/Rosatom	Enacted
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**Citation:**

2.4.3 Major site level documents include:

- A policy regarding the system for clearances and access to objects of physical protection, and information regarding operation of their physical protection systems
- A policy regarding the security service
- Instructions regarding access control procedures [off-site]
- A policy regarding on-site access procedures
- A policy regarding site security force units
- The nuclear site security plan
- The response plans for physical protection personnel and nuclear site personnel during normal operations and in emergencies
- A plan for cooperation between the nuclear site and military units (departments) of the Russian Federation Ministry of Internal Affairs internal security troops with internal affairs agencies and agencies of the Russian Federation Federal Security Service during normal operations and in emergencies
- A plan to check the technical condition and operability of physical protection and security equipment
- A plan for modernizing the physical protection system.

2.4.4 The following documents shall be developed (revised) at the site in order to supplement (expand) major documents during preparation of the nuclear site for physical protection system deployment:

- Documents regarding physical protection system deployment as specified by these Methodological Recommendations
- Documents for organizing initial (requal) and in-service training of physical protection personnel
- Documents for organizing physical protection and security equipment operation
- Documents for organizing cooperation between health physics, radiation monitoring, and nuclear material control and accounting departments
- Other documents developed and enacted at the discretion of the nuclear site management

**Analysis:**

This document provides templates for preparing the site-level documents. Templates are, strictly speaking, optional.

State System for Common Measurement	4.2, 4.3, 5,	Federal Agency on
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0723	Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	6.3 last paragraph, 6.6, 8.2, 10.1	Technical Regulation and Metrology	Enacted
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**Citation:**

4.2 The nuclear material measurement system is developed and operated in accordance with a site policy document (procedure) regarding nuclear material control and accounting activities that was developed at the organization and approved by its manager. The manager of the organization shall issue an order appointing an individual to be responsible for the administration and operation of the nuclear material measurement system. The nuclear material measurement system consists of the following elements:

The nuclear material measurement system consists of the following elements:

- Key measurement points
- The analysis laboratory at the organization
- Measuring instruments
- Measurement methodologies (methods)
- Calculational methodologies (methods)
- Reference standards
- Sampling procedures and sample preparation procedures
- Measurement programs in the material balance areas
- A measurement quality control program

4.3 All measurements are carried out in the measurement system in accordance with measurement programs that include lists of KMPs, the sampling procedures to be used, measurement methodologies (methods), calculational methodologies (methods), measuring instruments, reference standards, information regarding the frequency with which measurement results are carried out, parameters for the accuracy that is achieved, along with forms and deadlines for reporting measurement results. Measurement programs are developed and approved by the organization for each MBA. Measurement programs shall be structured in such a way that they provide the scope and range of measurements required for governmental control and accounting of nuclear material, including coordination of deadlines for reporting the results with the deadlines established in the site policy document (procedures) at the organization for compiling nuclear material inventory listings

## Requirements for Sampling Procedures and Sample Preparation

5.1 The procedures for sampling and sample preparation shall provide the ability to obtain representative samples.

5.2 The organization develops and approves instructions governing the procedures for sampling, sample preparation, wrapping, and shipping samples, the quantity of material selected at sampling points and the number of samples of each material kind, package marking, and the rules for recording and transferring samples. Sampling procedures, including the requirements for the number of samples selected, are established depending upon the aggregate status and the degree of heterogeneity of the nuclear material. The instructions will present an assessment of sampling uncertainty if this is not covered in the measurement methodology (method) used when analyzing the sample.

5.3 When samples are transferred among various MBAs, the requirements set forth in the Rules [2] regarding entering the nuclear material into account and removing the material from accounting shall be satisfied, including the requirements for carrying out accounting and confirmatory measurements, the use of access control devices, and filling out documentation.

5.4 The taking, storage, and shipping of samples is carried out in such a manner that there is an unambiguous matching of the sample and the product from which it was taken.

5.5 The following conditions are to be maintained when using and storing the sample:

- The storage conditions shall ensure that the chemical composition of the samples that have been selected remain unchanged throughout the entire period that they are stored
- Samples shall be placed in closable containers that are appropriate for the number of samples
- A label shall be provided for each sample; the label will indicate the name of the sample and its source, the date the sample was taken, and, in instances where necessary, the purpose of the analysis. In addition, other conditions for identifying the sample shall be provided in accordance with the procedures established at the organization
- Samples shall have the required mass for the number of parallel determinations specified by the methodology
- TIDs shall be installed on the containers

5.6 As a rule, samples are not taken from the following products:

- Objects one cannot take samples from without destroying them (for example, rods and assemblies)
- Heterogeneous products from which a representative sample cannot be taken

Non-destructive methods shall be utilized when measuring the characteristics of such products for control and accounting purposes.

5.7 Use of samples selected at KMPs in the nuclear material measurement system for product quality control purposes is permitted.

6.3 (...) As specified in GOST 8.207, algorithms for assessing [measurement] error (uncertainty) can be applied when confirming the compliance of these measurement methodologies. Procedures for assessing the accuracy of these measurements are established by the organization

6.6 Calculational methodologies (methods) shall be developed in the form of separate procedures and shall be approved in accordance with established procedures.

8.2 Measuring instruments used in the nuclear material measurement system shall undergo testing in accordance with the Procedures [7] to confirm their type and shall be entered into the State Registry for Measuring Instruments.

**10 Measurement Quality Assurance**

10.1 Analysis laboratories that perform measurements within a nuclear material measurement system, shall comply with the requirements set forth in (GOST R ISO/IEC 17025) and shall be accredited in accordance with the procedures established in the GOST R 51000.4-96.

**Analysis:**

- 4.2: Documents the fact that a site level measurement plan is developed and then approved by the organization manager and requires the manager to appoint an individual responsible for this system.
- 4.3: requires all measurements be carried out according to the measurement plan,
- 5 all: Requires the use of sampling procedures,
- 6.3 last paragraph: requires attestation of measurement methodologies
- 6.6: requires calculational methodologies shall be developed separately
- 8.2: Requires instruments to be tested according than procedures,
- 10.1: Requires analytical laboratories performing measurements within the system be accredited to comply with appropriate GOST R

0759	INSTRUCTIONS FOR ORGANIZING COMMUNICATIONS FOR ROSATOM SECURITY FORCES	PP		Entire Document	7		Minatom/Rosatom	Enacted
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**Citation:**

The entire document is a manual for communications activities for Rosatom security forces.

**Analysis:**

The entire document serves as a manual for Rosatom security force communication activities.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	23, 32, 51, 60	4		RF Government	Enacted
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**Citation:**

23. The management staff of the nuclear site develops administrative measures, issues physical protection policy documents (together with the leadership of the appropriate military units and forces at sites guarded by internal troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies), and adopts the following documents in accordance with established procedures:

- a) Site policies regarding the access system, as well as access to objects of physical protection and information concerning the operation of the physical protection system (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)
- b) Site policies regarding the security service (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)
- c) Access control procedures
- d) Site policies regarding onsite access control procedures
- e) Site policies regarding the site security forces
- f) The nuclear site security plan
- g) Action plans for physical protection personnel and nuclear site personnel for routine and emergency situations
- h) A plan for the cooperation of nuclear site managers and the leaders of the Russian Federation Ministry of Internal Affairs internal security troops (forces) with Russian Federation law enforcement agencies and offices of the Federal Security Service of the Russian Federation during routine and emergency situations
- i) A plan for inspecting the status and performance of physical protection and security system equipment
- j) A plan for upgrading the physical protection system

32. The necessity of the two-person rule and the procedures for carrying it out when activities are conducted in categorized rooms outside of vital areas, as well as when inspecting vehicles carrying containers and tanks at access control points (posts) is determined by the management staff of the nuclear site. Site management makes this determination jointly with the leadership of the appropriate military units or forces when the nuclear site is guarded by internal security troops of the Russian Federation Ministry of Internal Affairs or site security forces of Russian Federation law enforcement agencies.

51 In exceptional circumstances when it is impossible for a nuclear site to comply in full with the physical protection requirements set forth in these Procedures and agency regulations developed thereof, the management staff of the nuclear site (together with the leadership of the appropriate military units and forces at sites guarded by internal troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies) must adopt compensatory administrative and technical measures. The adequacy of these measures is confirmed by a physical protection system effectiveness assessment and is approved by the federal executive branch agency managing (coordinating) the activities of the nuclear site, as well as by the Russian Federation Ministry of Internal Affairs, if necessary.

60. Nuclear site management, conjointly with the command staff of the units guarding nuclear material and nuclear facilities during their shipment and transport, establishes the primary and secondary routes, stopping points, procedures for transferring nuclear material and nuclear facilities at the designated destinations, and procedures for providing progress reports, which are approved with the applicable federal executive branch agencies.

**Analysis:**

- 23: This section provides the high-level guidance for development of site-specific regulations.
- 32: The cited section specifically pertains to the site-level policy regarding implementation of the two-person rule.
- 51: The cited section specifically pertains to the necessity for a site to utilize compensatory measures.
- 60: This section deals with procedures for transportation.

**2.2. Emergency response plan - Develop or identify procedures that provide compensatory security measures at the site level during emergency situations such as fire, criticality accident or loss of primary site power. - Provide specific site instructions for operations that compensate for security and accountability degradation during emergency situations.**

MPC&A personnel at a nuclear site must have site level procedures to direct their actions during emergency situations. Those procedures should identify requirements for implementation of compensatory measures as needed to mitigate any loss of MPC&A system integrity which may result from the emergency situation.

**Analysis:**

MC&A - Currently, the U.S could not identify a requirement for this subelement. However, this subelement is mentioned in the latest draft revision of OPUK and may cover existing gaps (sections 6.4.4 and 8.2 last bullet).

PP - Rosatom order 550 clearly requires development of emergency response plans for PP personnel.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	6.3.4 bullet 8	7	Minatom/Rosatom	Enacted

**Citation:**

6.3.4 The list of major site level regulations to be developed by the units that provide management in the PP system are specified in the requirements of the Procedures and regulations issued by Minatom of Russia and the Russian Federation Ministry of the Interior that govern requirements for PP systems and the organization of site security.

These regulations include:

- Plans for cooperation of the site administration, security service, security force units at the potentially hazardous nuclear site and agencies of the Russian Federation Ministry of the Interior and the Federal Security Service of Russia in normal and emergency situations;

**Analysis:**

Establishes Rosatom level requirement for site emergency action plan for PP personnel.

Methodological

0715	Recommendations for Categorizing Objects of Physical Protection and Nuclear Sites	PP	(Not obtained)		7	Minatom/Rosatom	Enacted
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**Citation:**

**Analysis:**

Rosatom stated that specific emergency response requirements are available in the document developed under Eleron TO18. However, these provisions are contained in the "Russian only" version of the document.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	23 g	4	RF Government	Enacted
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**Citation:**

23. The management staff of the nuclear site develops administrative measures, issues physical protection policy documents (together with the leadership of the appropriate military units and forces at sites guarded by internal troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies), and adopts the following documents in accordance with established procedures:

- g) Action plans for physical protection personnel and nuclear site personnel for routine and emergency situations

**Analysis:**

Establishes high level requirement for site to develop emergency action plan for PP personnel

**2.3. Maintenance procedures and manuals - Develop procedures tied to higher level regulations that prescribe details regarding maintenance activities (frequencies, standards).**

Site level maintenance procedures are a key component of ensuring the sustainability of MPC&A equipment and the systems they support.

**Analysis:**

MC&A - Refer to Sustainability Element 5 for maintenance issues.

PP - Refer to Sustainability Element 5 for maintenance issues.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	Entire Document		Federal Agency on Technical Regulation and Metrology	Enacted

**Citation:**

*Entire Document*

**Analysis:**

The whole document because it refers to metrology of the equipment throughout the standard.

0794	Methodological Recommendations Regarding Scheduled Maintenance	PP		4.5.4	7	Minatom/Rosatom	Enacted
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Procedures for Physical Protection and Security Equipment

**Citation:**

4.5.4 When an item of equipment requires maintenance during operation and there is no maintenance schedule in the operating documentation, maintenance schedules shall be developed by specialists from the administrative units that operate the physical protection and security equipment directly at the nuclear site. Maintenance schedules for physical protection and security equipment must contain the following sections:

- Section 1: General Provisions
- Section 2: Safety Procedures
- Section 3: Process Control Cards for Maintenance
- Appendix 1: Standard Annual Consumption of Materials for Maintenance (if necessary)
- Appendix 2: Change Sheet

4.5.4.1 The section "General Provisions" must contain the following:

- The characteristics and frequency of each type of maintenance for physical protection and security equipment
- A list of the maintenance specialists for physical protection and security equipment and their required qualifications
- A list of operations and descriptions of activities, including preparatory work (Appendix 2)
- Procedures for sealing items of equipment following maintenance (if necessary)
- Procedures for documenting maintenance work in the equipment log and in the accounting log for scheduled maintenance of physical protection and security equipment (Appendix 4)

4.5.4.2 Section 2, "Safety Measures," must define the following:

- Requirements for work areas and maintenance personnel
- Responsibility for organizing safety procedures during maintenance

4.5.4.3 Section 3, "Process Control Cards for Maintenance," must contain the following:

- A list of measurement and control devices, tools, and materials required for scheduled maintenance
- Labor expenditures required for scheduled maintenance
- The technical sequence for performing maintenance procedures

**Analysis:**

The document contains provisions about maintenance plans development and its' content. The plans shall establish scope and frequency of technical maintenance.

**2.4. Establish a mechanism for keeping regulations and procedures current - Identify or develop a site document control program to help ensure site level instructions and procedures support current regulations. - Develop a site program for periodic review of regulations, instructions and procedures.**

Sites shall have a mechanism for periodic evaluation and modification of site procedures in response to changing plant conditions such as changes in the design basis threat, program deficiencies, operational changes, and for continuing improvement. The modifications that take place shall be managed as stated in Element 7.

**Analysis:**

MC&A - Regulations contain specific requirements for periodic (every 5 years) review of measurement procedures. However, there is no specific requirement for the review of other MC&A procedures.

PP - Regulations provide for revisions to existing documentation when PP systems are established or modernized, and for maintenance of technical documentation. Site-level regulations are included in self monitoring activities. However, regulations do not stipulate a timeframe for periodic review and revision of documents if not prompted by modernization of PP systems.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	4.1	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

4.1 A (measurement) program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.

**Analysis:**

Specific requirements for periodic measurement procedure reviews are found in the requirements. There are no OPUK requirements for periodic review of other MC&A Procedures.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	5.4.8	7	Minatom/Rosatom	Enacted
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**Citation:**

5.4.8 One or more measurement quality control programs shall be developed and implemented at the enterprise; these shall include a schedule for calibration or calibration certification for measuring instruments, plans for reviewing and recertifying measurement methodologies and reference materials, plans for internal operational measurement quality control, etc. ...

**Analysis:**

This document contains the only MC&A reference to document review and revision for measurement systems. No other references to the review of MC&A documents was identified.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	3.7	7	Minatom/Rosatom	Enacted
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**Citation:**

3.7 Establishes requirements for the regulation expiration date, after which the Regulation shall be reviewed and re-adopted.

**Analysis:**

This regulation requires organizations to produce a planning document that describes the MC&A program at a site. Section 3.7 identifies the need for the document to contain an expiration date after which the document needs to be reviewed and reapproved.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	10.1.6, 11.9	7	Minatom/Rosatom	Enacted
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**Citation:**

10.1.6 Physical protection work plans shall include:

- Development and revision of the site level regulations specified in Section 6.3.4 of this document;

11.9 Maintaining operating and technical documentation for physical protection and security equipment is conducted in the physical protection and security equipment department. Major operating documentation is supplied by the manufacturer together with each piece of physical protection and security equipment. Major operating documentation include:

- Specifications;
- Operations procedures;
- Installation, start-up, and adjustment instructions;
- Item log;
- Vendor manual;
- A list of all the parts.

**Analysis:**

10.1.6: This citation provides for revision of regulations when PP Systems are established or revised. However, it does not stipulate a timeframe for revision.

11.9: This document is the primary agency-level PP document for Rosatom. This citation requires that operating and technical documentation be maintained, but there is no discussion about review procedures or timeframes for review.

Guideline Process for Agency (Not

0493	Inspections of PP Systems at Nuclear Sites	PP	obtained)	4.1.3.3	7	Minatom/Rosatom	Enacted
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**Citation:**

4.1.3.3 The availability and quality of [the following] nuclear site procedures and planning documents, including their compliance in form and content with the requirements set forth in federal and agency (interagency) regulations:

- Regulation regarding the authorization system for access to nuclear material, nuclear facilities, nuclear material storage points, and to information regarding the operation of their physical protection systems
- Instructions for Offsite Access Control Procedures
- Regulation on Onsite Access Control Procedures
- Regulation on the Security Service
- Regulation on Units of the Site Security Forces
- Nuclear site security plan
- Response Plan for Physical Protection Personnel and Nuclear Site Personnel during Normal Operations and in Emergencies
- Plan for Cooperation between the Nuclear Site Administration, Military Units of Russian Federation Ministry of Internal Affairs Internal Security Troops, and Site Security Force Units with Internal Affairs Agencies of the Russian Federation Ministry of Internal Affairs and Agencies of the Federal Security Service of Russia during Normal Operations and in Emergencies
- Plan for Inspecting the Material Condition and Operability of Physical Protection System Security Equipment-

**Analysis:**

Establishes inspection requirement to ensure quality of site-level documentation.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	10.3		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

10.3 The conduct of measurement activities for nuclear material control and accounting purposes shall be governed by the job description of the appropriate employee.

**Analysis:**

Requires the performance of measurements be in the individuals job

0830	Methodology and Criteria for Assessing the Status of the Physical Protection System	PP		3.3, 3.3.2	7	Minatom/Rosatom	Enacted
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**Citation:**

3.3. Criteria for the physical protection status assessment based on individual functional assessment criteria for physical protection activities and their components that determine the status of the physical protection system This subsection identifies the physical protection system functional (second level criteria) and component (third level) criteria established in Section 6 of the "Guidelines" [4] that are to be assessed:

3.3.2. Site physical protection documents (2), which are assessed according to the following component criteria:

- The presence of nuclear site physical protection documents required by the document "Procedures for the Physical Protection of Nuclear Material, Nuclear Facilities, and Nuclear Material Storage Points" and agency regulations
- The extent to which requirements set forth in site level physical protection documents comply with the requirements in federal and agency regulations
- The quality of documentation and the document management system

**Analysis:**

This document requires that Rosatom monitors verify the existence of required site level documents and the

appropriateness of their content.

3108	Sealing Devices. Requirements for Test Methods of Locking Systems Realiability, and Resistance to Unauthorized Access	MC	GOST 52365-2005	6	6	Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

**6 Expert Review of Methodologies to Test Sealing Devices**

6.1 The following testing methodologies require expert review:

- Methodologies for testing sealing devices that fall into Groups One, Two, or Three for robustness of their protective properties and Subgroups One or Two for resistance to unauthorized non-destructive removal, as defined in GOST 31282
- Methodologies that include complex procedures or specifications requiring the use of special test equipment and measuring instruments, and also methodologies requiring special test conditions (for example, those requiring measurements and varying the test condition parameters)

6.2 Expert review is not required for sealing device testing methods that do not incorporate measurement procedures, including methodologies that utilize qualitative comparison (verification) against established metrics.

6.3 Expert metrology review of sealing device testing methods is conducted in compliance with the requirements set forth in this standard and in GOST R 8.563. Organizations shall take into consideration [the requirements set forth in] reference [1] when conducting expert reviews of sealing device testing methods.

6.4 Certificates issued as the result of expert reviews shall be effective for a period determined under the expert review procedures for sealing device testing methods adopted by the organizations that conduct such reviews, but for no more than five (5) years.

**Analysis:**

This national standard establishes the requirements for testing TIDs (sealing devices). It establishes the frequency for expert review of methodologies for testing sealing devices to a maximum of 5 years.

**3. Human Resource Management at site and staff training**

**The purpose of a site Human Resources Management and Site Training (HRMT) Program is to ensure that there is a qualified workforce to operate and support the site MPC&A Program.**

**Analysis:**

Current regulations mandate the Systematic Approach to Training and all that it entails. Regulations also require the establishment of site-level training infrastructure or the use of regional (specialized) training centers. Agency and site-level monitoring activities include evaluation of personnel knowledge.

**3.1. Perform analysis of training needs. - Conduct a site level training needs assessment for activities in all of the MPC&A Organizational sub elements. - Compare identified needs with what is offered at regional facilities (e.g. RMTC, ISTC) - Develop system specific training and familiarization courses for effective implementation of MPC&A related regulations.**

A site shall specify a process whereby management can identify and analyze job task requirements. The process shall include job task analysis that leads to development of position descriptions and training requirements. This process, sometimes called a training needs analysis, serves as the foundation activity that ultimately determines the overall training program for a site. It serves to determine who, how many, what, how much and how often.

**Analysis:**

Regulations governing training mandate conduct of a needs assessment which drives the development of courses to address those training needs.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0001	On the Use of Atomic Energy	MC, PP	Law 170-FZ	Article 27	3	RF Parliament	Enacted

**Citation:**

**Article 27 Permits Issued to Employees at Sites Engaged in the Use of Atomic Energy to Conduct**

**Activities related to the Use of Atomic Energy**

Specific types of activity related to the use of atomic energy are carried out by employees at sites engaged in the use of atomic energy who possess permits issued by the federal government agencies that regulate safety.

The list of specialists among these employees... must obtain a permit. ...

**Analysis:**

The citation establishes requirements for permits for personnel working in MPC&A.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	8.2, 10.1, 10.2	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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**Citation:**

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- Procedures for training employees (personnel) and granting them access to nuclear material control and accounting related work

10.1 Employees (personnel) who conduct nuclear material control and accounting activities shall complete training on how to perform these procedures in specialized courses organized within the framework of the nuclear material control and accounting system. In addition, they shall undergo regular testing in accordance with procedures established by the organization.

10.2 The frequency of testing personnel on their knowledge of nuclear material control and accounting procedures for various categories of employees (personnel) shall be established by the manager of the organization. Testing shall be conducted no less than once every three (3) years.

**Analysis:**

8.2 - This section requires the manager of organizations to develop procedures for training MC&A personnel.  
10.1, 10.2 - These sections require personnel performing MC&A to be trained, tested, and periodically retested. This section in the upcoming revision of OPUK has a slightly more detailed description of the training requirements.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	5.3.2, 6.6.1, 6.6.2, 6.6.3, 6.6.4, 6.6.5	7	Minatom/Rosatom	Enacted
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**Citation:**

5.3.2 Minatom of Russia shall coordinate and manage the administrative methodological efforts to establish the SSAC, including the methodology, equipment and metrology support of measurements and personnel training, such as:...

- Establishment of educational methods centers to train specialists in the field of nuclear material control and accounting

**6.6 Personnel Requirements**

6.6.1: Individuals are permitted to perform measurements if they meet the following conditions:

- They are qualified as specified in the measurement methodologies and have practical experience working with nuclear material.

6.6.2 A personnel training and attestation program must be developed and approved by enterprise management for NM control and accounting measurements staff.

6.6.3 The personnel training and attestation program shall specify:

- The screening criteria for NM control and accounting measurements staff;
- The training to provide personnel with the qualifications necessary to take samples and measurements for nuclear material control and accounting;
- The attestation of personnel for measurement-taking authority;
- Periodic skills testing and re-attestation.

6.6.4 Persons who have passed training and attestation shall receive an appropriate certificate to that fact.

6.6.5 Control and accounting measurements personnel shall be re-attested at least once every three years

**Analysis:**

5.3.2 - This section specifies that Rosatom shall establish training centers to train specialists in the field of MC&A.

6.6.1: Identifies requirements for training and qualification of measurement personnel.

6.6.2, 6.6.3, 6.6.4, 6.6.5 - These sections specify the requirement to train, test, qualify, and requalify personnel performing MC&A measurements.

0030	Management Structure in Automated PP Systems at Potentially Hazardous Nuclear Facilities	PP	Minatom Order # 387	2.1.3	7	Minatom/Rosatom	Enacted
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**Citation:**

2.1.3 ... PP system personnel shall undergo education, training, and requal training that is appropriate to their operational responsibilities and current Russian Federation regulations regarding security and other types of activity related to the physical protection of nuclear materials and facilities.

**Analysis:**

This methodological recommendation document provides recommendations for a manner in which requirements dictated by other documents can be implemented. The cited section directs PP personnel to undergo education, training, and requalification training.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.12	7	Minatom/Rosatom	Enacted
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**Citation:**

**4.12 Chapter on "Personnel Training for Nuclear Material Control and Accounting Activities"**

4.12.1 This chapter shall reflect that personnel performing MC&A procedures shall undergo training on carrying out the appropriate procedures, as well as periodic testing according to established procedures

4.12.2 It shall be specified that personnel training (in-service training) shall encompass the following disciplines:

- Fundamentals and regulatory basis for NM control and accounting;
- Methodology for inventory-taking and NM transfers;
- Quality control of methodologies and equipment for measuring NM characteristics;
- Methods and equipment for measuring NM mass and composition;
  - 1) Methodologies and instruments for NM non-destructive analysis (gamma spectrometry, neutronics control methods, calorimetry);
  - 2) Methodologies and instruments for NM destructive analysis (titrimetry, coulometry, mass spectrometry);
  - 3) Scale verification;
  - 4) Methodologies and equipment for measuring solution density and volume;
  - 5) Vessel calibration;
- Barcode technology for automated MC&A;
- Equipment for monitoring and surveillance of NM presence and transfer;
- Tamper indicating devices;
- Statistical methods for MC&A;
- NM accounting automation;

4.12.3 It shall be established that the frequency of in-service personnel training on MC&A is determined by the enterprise director for the various personnel categories. This training shall take place at least once every five years.

**Analysis:**

This section requires the site plan to contain a description of the training, testing, and retesting requirements for MC&A personnel performing a number of identified tasks.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	9.4.2, 9.4.3, 9.4.13, 14.1.4	7	Minatom/Rosatom	Enacted
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**Citation:**

9.4.2 Preparing the potentially hazardous nuclear site for deployment of the PP system shall include conducting the following activities to prepare the site administratively for deployment of the PP system:

- Developing and approving draft site regulations regarding physical protection, as well as position descriptions and work assignments for PP system personnel.

9.4.3 Training PP system personnel includes:

- Providing instruction to PP system personnel;
- Presenting PP system personnel information about their position descriptions and work assignments, as well as relevant site regulations regarding physical protection;

9.4.13 During PP system modernization, depending on its scope and content, phased introduction of additional or upgraded PP system components may also be performed. Changes in the structure or functional design of the PP system and its components must be accompanied by an explanation of organizational measures in the PP system to include development (or modification) of physical protection regulations and job descriptions for PP system personnel.

14.1.4 Members of the physical protection security force who have not completed professional training (in-service training) and competitive selection are prohibited from carrying out physical protection activities at a potentially hazardous nuclear site.

**Analysis:**

Cited sections provide for development of position descriptions, as well as training, and a requirement for modifying PDs as needed when PP Systems are modified.

Note that 14.1.4 prohibits anyone from conducting PP functions without first receiving initial training.

0325	Russian Federation Law On the Interior Troops of the Ministry of Interior of the Russian Federation	PP	Law #27-FZ, 1997 (2000- #83,135; 2002-#49; 2003- #12,86,141; 2004-#122; 2005-#15)	Article 25	3	RF Parliament	Enacted
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**Citation:**

**Article 25. Conditions for and Limits on the Use of Physical Force, Special Gear, Weapons and Combat and Special Equipment**

Members of the internal security troops must undergo special training and regular testing of their fitness for actions involving the use of physical force, special gear, weapons and combat and special equipment, as well as for their knowledge of first aid. ...

**Analysis:**

This citation provides training requirements for Internal Security Troops (MVD).

0705	The Organization and Management of Rosatom Site Security Force Unit Operations	PP	(Not obtained)	Appendix 2	7	Minatom/Rosatom	Enacted
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**Citation:**

Note that this document deals with agency pro-force. Provides extensive PDs for the following:

Appendix 2 - Job Descriptions for Various Categories of Site Security Force Employees

- Director of a Local Office
- Deputy Director for Weaponry and Security Equipment
- Deputy Director (Assistant to the Director) for Procurement
- Commandant of the Site Security Force
- Shift Assistant to the Commandant of the Site Security Force
- Team Commander (Head of Security for a Site or Group of Sites)
- Deputy Team Commander (Deputy Head of Security for a Site or Group of Sites)

- Professional Development Instructor
- Duty Operations Inspector
- Armorer
- Security Equipment Technician
- Procurement Inspector
- Warehouse Manager
- Group Commander
- Deputy Group Commander
- Guard (Controller, Marksman)

**Analysis:**

This document deals with agency Pro-force. It provides extensive position descriptions for a significant group of site security force employees.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	I 5 b), IV 11 l), V 15 d)	4	RF Government	Enacted
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**Citation:**

**I General Provisions**

**5. The State System for Nuclear Material Accounting and Control shall provide for the following:**

- b) Professional training and retraining of staff in the area of control and accounting of nuclear material

**IV Activities of Governmental Atomic Energy Management Agencies Related to Governmental Nuclear Material Control and Accounting**

**11. The Rosatom Government Atomic Energy Corporation performs the following within the scope of its authority:**

- l) Establishing and operating centers for providing specialists with basic and advanced training in the area of nuclear material control and accounting, as established by Russian Federation law

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

**15. Organizations handling nuclear material shall perform the following:**

- d) Recruiting personnel who perform nuclear material control and accounting and providing basic and advanced training for them

**Analysis:**

This decree requires the professional training and retraining of state and organization personnel.

0719	Methodological Instructions for Organizing and Conducting Initial and Advanced Training in the Area of Nuclear Material Protection, Control, and Accounting for Personnel at Open Stock Companies, Institutions, and Federal Government Enterprises Under the J	MC, PP	(Not obtained)	2.3.1, 2.3.4, 2.4, 2.5, 2.5.2, 2.5.3, Section 3	7	Minatom/Rosatom	Enacted
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**Citation:**

2.3.1 Institutions providing MPC&A educational services (educational institutions for continuing professional education, specialized institutions, etc.) conduct training in accordance with standard (model) training programs. Standard (model) training programs are developed in accordance with current regulations pertaining to advanced training, requalification and in-service training.

Training departments established at Rosatom organizations (training facilities, training centers, methodological centers, etc.) provide initial and advance training for MPC&A specialists in accordance with training programs that are based on standard (model) programs and take into consideration the specific features of the organization.

2.3.4 Teachers/instructors who are on staff at training facilities and who conduct initial training, advanced training, and professional education for MPC&A personnel also complete a course in teaching skills and receive a certificate of completion.

2.4 Categories of specialists who must undergo initial and advanced training (full section applies).

2.5 As appropriate to their functions, the following entities that are involved in the training process determine the training needs, develop training programs, organize and conduct training, and assess its effectiveness:

- Training departments within organizations.

2.5.2 Training departments within Rosatom organizations develop working training programs based on the systematic approach to training and taking into consideration the specific features of their own organization.....

2.5.3 The long-term results of training are compiled by institutions that provide educational services and by the supervisors of trainees at the organizations that sent the specialists for training.

### 3 Needs Analysis for MPC&A Initial and Advanced Training for Specialists (Analysis Phase)

3.1 A needs analysis for training of MPC&A specialists (henceforth, "specialists") is a prerequisite for organizing all types of initial and advanced training.

3.2 Needs analyses for training of specialists are conducted at Rosatom organizations and at institutions that provide educational services.

3.2.1 Needs analyses for training of specialists are conducted by specialists at the site and/or by outside experts and are coordinated by the appropriate Rosatom departments.

Needs analyses are carried out by senior and mid-level organization managers, including the immediate supervisors of MPC&A specialists, working together with methodologists and instructors at educational institutions and specialized training centers and/or training departments within the organization.

3.2.2 The procedure for analyzing initial and advanced training needs shall be based on job descriptions of various personnel categories and a task analysis, as well as an analysis of personnel competencies, taking applicable regulations into consideration. Training needs for MPC&A specialists may also be identified by the results of agency monitoring.

3.2.3 The procedure for analyzing initial and advanced training needs includes studying a list of the most common errors committed by enterprise personnel, how often job descriptions are updated, new equipment is installed, and new operating instructions are implemented.

3.2.4 The method used to analyze initial and advanced training needs (method for analyzing occupational competence, method for analyzing job assignments, integrated analysis) is selected according to the training objectives identified by the director of the organization that is sending its specialists to an educational institution, training center, or enterprise training department.

3.2.5 The following information is collected to identify the training needs of individual personnel/positions:

- Job duties and functions
- Inadequacies related to the performance of designated functions (recurrent mistakes, poor quality of work, etc.)
- Changes in job performance methods, production processes, and equipment
- Experience related to any aspect of human activity, including information regarding incidents and infractions involving MPC&A and other activities, as well as their root causes
- Changes in the structure of the facility and documentation (e.g., policies, technical specifications)
- The content of existing training programs
- Requirements established by regulatory agencies

3.3 Institutions that provide educational services analyze initial and advanced training needs based on the information above; this needs analysis then serves as the basis for deciding whether or not it is necessary to develop programs for initial and advanced training of specialists.

Initial and advanced training tasks are selected according to the following criteria:

- There have been changes to the legislative and regulatory basis for this area of activity
- There are significant consequences if the tasks are performed improperly
- Recommended personnel requalification intervals
- The tasks are impossible to perform correctly without training
- Policies set forth in regulations and operations documents

The remaining tasks are included in briefings, exercises, and other means for ensuring that qualifications are met and maintained.

3.4 General requirements for using a systematic approach to training, including the needs analysis phase, are described in a standard.

3.5 A method or a combination of methods is selected according to the availability of resources (labor, funding, and time); the positions for which training is being developed; the impact on safety).

3.6 A needs analysis is performed for each kind of training (post-secondary professional education and advanced training) and for each category of MPC&A specialist cited herein.

3.7 The following indicators are obtained during the Analysis phase of the systematic approach to training:

- The scope and content of qualifications requirements in the form of a list of knowledge and skills that are required for the appropriate MPC&A personnel categories
- A list of training goals and objectives for the personnel/position
- Initial requirements for individuals who undergo MPC&A initial and advanced training, as well as requirements for

individuals and organizations that conduct training  
 - A list of knowledge and skills acquired by MPC&A specialists through training

**Analysis:**

The referenced citations identify the aspects of a training program that correspond to the sustainability element. The document as a whole provides a comprehensive articulation of training program content. RF representatives have assured the Regulatory Development Project that the content of this regulation is mandatory.

0721	Set of Standard (Model) Documents Regarding the Deployment of Physical Protection Systems and Recommendations for Completing the Forms	PP	(Not obtained)	2.5.6, 2.5.11, 5.14	7	Minatom/Rosatom	Enacted
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**Citation:**

The following information pertains to PP staff.

2.5.6 Requirements for the content and procedure for development, approval, and adoption of job descriptions are presented in the document "Compilation of Job Descriptions and Work Assignments" (RD-95 3476-91) [7]. Adopted and approved job descriptions are internal documents within physical protection system administrative units and are subject to inventory accounting in a file archive or general accounting in the records management department in order to ensure their retention.

2.5.11 During the training phase, physical protection personnel shall be presented information regarding the requirements of relevant site procedures and other regulations regarding physical protection, as well as their job descriptions and work assignments.

5.14 The results of activities performed by the specified working group shall be documented in the form of a report with findings regarding the readiness of the appropriate specialist administrative units with regard to their staffing level, training, skills, and multilevel support for the conduct of physical protection and security equipment maintenance according to the scheduled maintenance system, as well as with regard to repair and the availability of the required supply of backup hardware and other material and technical resources.

**Analysis:**

Section 5.14 provides for a report to confirm readiness of PP system and personnel. The reference in Section 2.5.6 to a document on job descriptions is not specific to MPC&A and is unlikely to adequately address PD development.

0794	Methodological Recommendations Regarding Scheduled Maintenance Procedures for Physical Protection and Security Equipment	PP		4.8.6	7	Minatom/Rosatom	Enacted
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**Citation:**

4.8.6 For personnel who perform maintenance, the management of the security department and of other administrative units develops qualification requirements regarding the knowledge and practical skills (abilities) necessary for performing their duties. Qualification requirements shall be reflected in job descriptions.

Maintenance personnel shall periodically undergo certification for compliance with qualification requirements. The nuclear site director establishes the procedures for certifying maintenance personnel and when these should be conducted. The results of certification are reflected in the appropriate inspection team reports and adopted by order of the nuclear site director.

**Analysis:**

The document sets requirement on identification of qualification requirements for personnel carrying out technical maintenance.

3122	Requirement for Training and Qualification Maintenance Programs for Professional Development Trainer (Instructor)	MC, PP	OST 95 10587-2004	Entire document	7	Minatom/Rosatom	Enacted
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**Citation:**

**1 Scope**

This standard establishes the requirements for programs to train and maintain the qualifications of professional training instructors in organizations that operate potentially hazardous radiation and nuclear production facilities and sites (henceforth – organizations).

This standard is applicable to organizations with potentially hazardous radiation and nuclear production facilities and sites.

This standard may be used by organizations that provide instruction for professional training instructors.

The requirements contained in this standard serve as recommendations that will facilitate the development of a professional training system in accordance with industry standard OST 95 10581.

**Analysis:**

This industry standard establishes the requirements for programs to train and maintain qualification of professional training instructors.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	61, 74	4	RF Government	Enacted
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**Citation:**

61. The owner of the transportation vehicles (carrier):  
 c) Provides highly qualified drivers and teams or crews who have been specially trained and granted the appropriate clearance

74. Category I or II nuclear material and nuclear facilities based on these materials, as well as uranium hexafluoride containing any U-235 and all irradiated nuclear material, are guarded during shipment and transport by specially trained armed security personnel who wear body armor and carry communications and night vision equipment.

**Analysis:**

Provides a high-level requirement for training of drivers, teams, and crews for transport of nuclear material.

**3.2. Develop a training infrastructure to conduct training in MPC&A. - Construct and equip site specific training facilities (classrooms, workshops, etc.) for training needs not offered regionally. - Develop a site MPC&A Training plan that utilizes site training resources as well as regional. - Develop training schedules for training at the identified facilities. - Develop a system for maintaining training records and conduct a periodic review of these records.**

The site has a documented training plan or/and a formalized process that outlines an approach to accomplishing its training needs. This training encompasses site-specific training based on site-specific operations and environment. The site can also use agency or national and regional training resources, such as the Interdepartmental Specialized

Training Center, to provide specialized training in a given discipline, as well as vendor training, when available and appropriate.

**Analysis:**

Adequate requirements for site-level training activities have been identified.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	8.2, 10	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- Procedures for training employees (personnel) and granting them access to nuclear material control and accounting related work.

**10 Requirements for Employees (Personnel) Who Conduct Nuclear Material Control and Accounting Activities**

10.1 Employees (personnel) who conduct nuclear material control and accounting activities shall complete training on how to perform these procedures in specialized courses organized within the framework of the nuclear material control and accounting system. In addition, they shall undergo regular testing in accordance with procedures established by the organization.

10.2 The frequency of testing personnel on their knowledge of nuclear material control and accounting procedures for various categories of employees (personnel) shall be established by the manager of the organization. Testing shall be conducted no less than once every three (3) years.

**Analysis:**

8.2 - This section identifies the requirement for site managers to establish training programs for MC&A personnel at sites.

10 - These sections require personnel performing MC&A to be trained, tested, and periodically retested.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	5.3.2, 5.3.3, 6.6.2, 6.6.3, 6.6.4, 6.6.5	7	Minatom/Rosatom	Enacted
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**Citation:**

5.3.2 Minatom of Russia shall coordinate and manage the administrative methodological efforts to establish the SSAC, including the methodology, equipment and metrology support of measurements and personnel training, such as:

- Establishment of educational methods centers to train specialists in the field of nuclear material control and accounting.

5.3.3 The main organizations of Minatom of Russia which, within the ministry system of nuclear material control and accounting, are in charge of the following functions:...

- Specialist training,

**6.6 Personnel Requirements**

6.6.2 A personnel training and attestation program must be developed and approved by enterprise management for NM control and accounting measurements staff.

6.6.3 The personnel training and attestation program shall specify:

- The screening criteria for NM control and accounting measurements staff;
- The training to provide personnel with the qualifications necessary to take samples and measurements for nuclear material control and accounting;
- The attestation of personnel for measurement-taking authority;
- Periodic skills testing and re-attestation.

6.6.4 Persons who have passed training and attestation shall receive an appropriate certificate to that fact.

6.6.5 Control and accounting measurements personnel shall be re-attested at least once every three years

**Analysis:**

5.3.2, 5.3.3 - This section identifies the requirement for Rosatom to manage and coordinate training for those individuals performing nuclear material measurements. This regulation requires Rosatom to establish training centers for MC&A specialists.

6.6.2, 6.6.3, 6.6.4, 6.6.5 - These sections specify the requirement to train, test, qualify, and requalify personnel performing MC&A measurements.

0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	4.18, 5.9, 6.2, 6.2.10	7	Minatom/Rosatom	Enacted
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**Citation:**

**4 Major Physical Protection Functions of the Administration at the Potentially Hazardous Nuclear Site and Its Security Department**

4.18 Select, allocate, and train the personnel of security force departments; provide advanced training in physical protection at the Minatom of Russia training center. Assist with the initial and requalification training of security force staff using modern physical protection equipment.

**5 Major Functions of the Security Forces**

5.9 Train the staff of the security forces using modern physical protection equipment and make arrangements for their requalification training at enterprises under the jurisdiction of Minatom of Russia or at training centers of the RF MVD internal security troops.

**6 Coordinating Operations Performed by the Administration at the Potentially Hazardous Nuclear Site and Its Security Department with the Security Forces**

6.2 The major areas in the physical protection of the site that require cooperation between the site administration and security department with the security force include:

- Training and retraining technical personnel from the security forces

6.2.10 Cooperation for the organization of training and retraining of security force technical personnel is implemented as specified in the approved plans at enterprises under the jurisdiction of Minatom of Russia or at training centers of the RF MVD internal security troops according to the approved methods (training programs).

**Analysis:**

This is a methodological recommendations document. Section 4.18 and 5.9 identify one of the major functions of the site administration as selection, allocation, and training of security force personnel.

Section 6.2 discusses the need for cooperation on training between the site administration, security department, and security forces.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	Section 13, Section 15.	7	Minatom/Rosatom	Enacted
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**Citation:**

13 Requirements for Organizing and Conducting Training Drills on the Inspection and Development of Cooperation within Physical Protection Systems.

(Refer to document for full citation. This section provides a lot of detailed information on training drills.

15 Initial and In-service Training Requirements for Physical Protection System Personnel. (Refer to document for full citation. This section provides detailed information for initial and ongoing training.)

This regulation applies to PP personnel -- this includes site security personnel, PP technicians, as well as collaboration with MVD, FSB, and personnel of other agencies that participate in the provision of PP at sites.

**Analysis:**

Section 13 discusses requirements for organizing drills. Section 15 discusses initial and in-service training requirements. 15.2.6, and 15.3.2 provide for initial and professional training to be provided at either a licensed facility or at the site itself.

0297	On the Organization of Site Security Forces	PP	RF Government Decree #514	3	4	RF Government	Enacted
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**Citation:**

3. The performance of the following tasks by the Russian Federation Ministry of Internal Affairs:

- Develop a program within a two-month period for training the personnel in site security forces created by federal executive branch agencies in appropriate responses to situations requiring the use of service firearms, combat rifles, special equipment, and physical force, including a procedure for offices of the Ministry of Internal Affairs to inspect the fitness of personnel for duty in these situations.

**Analysis:**

This document deals with training of site security forces.

0705	The Organization and Management of Rosatom Site Security Force Unit Operations	PP	(Not obtained)	5.14, and Section 7	7	Minatom/Rosatom	Enacted
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**Citation:**

5.14 Supervising the activities of security force units includes the following:

- Providing training (initial, planned) for employees to perform their task of defending secure sites from unlawful actions, conducting professional development classes, directly instructing subordinates about the rules, procedures, and methods regarding performance of their duties

**7 Training and Professional Development of Site Security Force Employees**

Sections 7.1 - 7.35 apply. Of special note are:

7.2 Professional development for the site security force is subdivided as follows:

- Professional development for site security force employees within the Initial Training Program as established by Rosatom
- Professional development for various employee categories during the normal academic year
- Advanced training for site security force employees at Rosatom training centers

7.6 A training program shall be developed for individual instruction. This program will include the following information:

- Training topics and required reading or manuals
- The individual responsible for providing the instruction, as well as a schedule of meetings and exams
- The time and place for consultation meetings
- Procedures for conducting on-the-job training in a guard unit (including a listing of sentry posts, the functions performed at each post, and the amount of time to be spent at these posts)
- The place, time, and mechanism for taking exams within the Initial Training Program

7.22 Practical courses and drills are the major mechanisms used to improve and monitor the level of professional development and for exercising collaboration issues. Practical courses and drills regarding protection for secure sites are conducted in order to achieve the following goals:

- Training various categories of site security force employees to assess situations properly and to respond effectively to interdict unlawful actions at secure sites
- Improving the coordination of actions taken by site security force employees and other personnel participating in exercises
- Exercising the tactics employed by the guard force and accompanying personnel given various adversary action scenarios when nuclear material and other types of cargo are transported
- Inculcating the proper psychological and moral qualities required by site security force employees in difficult operational situations
- Assessing the condition of physical protection and security equipment and the readiness of site security force employees to perform the function of detecting and interdicting unlawful acts in a timely manner
- Researching new tactics that may be employed by site security force employees in various situations
- Verifying the realism of force and equipment calculations employed to perform in emergencies
- Conducting exercises related to collaboration between site security force employees and regional security agencies, Russian

Federation Ministry of Internal Affairs offices and internal security troop units, and units of the Russian Federation Emergency Management Ministry engaged to perform functions during emergencies at the site

**Analysis:**

Section 7 applies as a whole. It provides for training and professional development of site security forces, including the contents of the training program and types of professional development. Section 5 contains the broad statement that training must be provided to the employees.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	I 5 b), V 15 d)	4	RF Government	Enacted
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**Citation:**

**I General Provisions**

5. The State System for Nuclear Material Accounting and Control shall provide for the following:

- b) Professional training and retraining of staff in the area of control and accounting of nuclear material

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

15. Organizations handling nuclear material shall perform the following:

- d) Recruiting personnel who perform nuclear material control and accounting and providing basic and advanced training for them

**Analysis:**

This decree requires the professional training and retraining of state and organization personnel.

0719	Methodological Instructions for Organizing and Conducting Initial and Advanced Training in the Area of Nuclear Material Protection, Control, and Accounting for Personnel at Open Stock Companies, Institutions, and Federal Government Enterprises Under the J	MC, PP	(Not obtained)	2.4, 2.5, 2.5.2, 2.5.3, 3, 6.7, 7	7	Minatom/Rosatom	Enacted
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**Citation:**

2.4 Categories of Specialists who Must Undergo Initial and Advanced Training.

2.5 As appropriate to their functions, the following entities that are involved in the training process determine the training needs, develop, training programs, organize and conduct training and assess its effectiveness:

- Rosatom organizations whose purpose is to train their employees
- Institutions that provide educational services

2.5.2 Training department within Rosatom organizations develop working training programs based on the systematic approach to training and taking into consideration the specific features of their own organization....

2.5.3 The long-term results of training are compiled by institutions that provide educational services and by the the supervisors of trainees at the organization that sent the specialists for training.

**3 Needs Analysis for MPC&A Initial and Advanced Training for Specialists (Analysis Phase)**

3.1 A needs analysis for training of MPC&A specialists (henceforth, "specialists") is a prerequisite for organizing all types of initial and advanced training.

3.2 Needs analyses for training of specialists are conducted at Rosatom organizations and at institutions that provide educational services.

3.2.1 Needs analyses for training of specialists are conducted by specialists at the site and/or by outside experts and are coordinated by the appropriate Rosatom departments.

Needs analyses are carried out by senior and mid-level organization managers, including the immediate supervisors of MPC&A specialists, working together with methodologists and instructors at educational institutions and specialized training centers and/or training departments within the organization.

3.2.2 The procedure for analyzing initial and advanced training needs shall be based on job descriptions of various personnel categories and a task analysis, as well as an analysis of personnel competencies, taking applicable

regulations into consideration. Training needs for MPC&A specialists may also be identified by the results of agency monitoring.

3.2.3 The procedure for analyzing initial and advanced training needs includes studying a list of the most common errors committed by enterprise personnel, how often job descriptions are updated, new equipment is installed, and new operating instructions are implemented.

3.2.4 The method used to analyze initial and advanced training needs (method for analyzing occupational competence, method for analyzing job assignments, integrated analysis) is selected according to the training objectives identified by the director of the organization that is sending its specialists to an educational institution, training center, or enterprise training department.

3.2.5 The following information is collected to identify the training needs of individual personnel/positions:

- Job duties and functions
- Inadequacies related to the performance of designated functions (recurrent mistakes, poor quality of work, etc.)
- Changes in job performance methods, production processes, and equipment
- Experience related to any aspect of human activity, including information regarding incidents and infractions involving MPC&A and other activities, as well as their root causes
- Changes in the structure of the facility and documentation (e.g., policies, technical specifications)
- The content of existing training programs
- Requirements established by regulatory agencies

3.3 Institutions that provide educational services analyze initial and advanced training needs based on the information above; this needs analysis then serves as the basis for deciding whether or not it is necessary to develop programs for initial and advanced training of specialists.

Initial and advanced training tasks are selected according to the following criteria:

- There have been changes to the legislative and regulatory basis for this area of activity
- There are significant consequences if the tasks are performed improperly
- Recommended personnel requalification intervals
- The tasks are impossible to perform correctly without training
- Policies set forth in regulations and operations documents

The remaining tasks are included in briefings, exercises, and other means for ensuring that qualifications are met and maintained.

3.4 General requirements for using a systematic approach to training, including the needs analysis phase, are described in a standard.

3.5 A method or a combination of methods is selected according to the availability of resources (labor, funding, and time); the positions for which training is being developed; the impact on safety).

3.6 A needs analysis is performed for each kind of training (post-secondary professional education and advanced training) and for each category of MPC&A specialist cited herein.

3.7 The following indicators are obtained during the Analysis phase of the systematic approach to training:

- The scope and content of qualifications requirements in the form of a list of knowledge and skills that are required for the appropriate MPC&A personnel categories
- A list of training goals and objectives for the personnel/position
- Initial requirements for individuals who undergo MPC&A initial and advanced training, as well as requirements for individuals and organizations that conduct training
- A list of knowledge and skills acquired by MPC&A specialists through training

6.7 Information regarding the training of each specialist is recorded independently by the human resources department at the organization and by the educational institution.

To coordinate qualifications maintenance and advanced training for each individual MPC&A specialist, the organization creates a database that specifies the training topics and dates of training for the course completed.

## **7 Assessment of Initial and Advanced Training for MPC&A Specialists (Assessment Phase)**

7.1 The objective of assessing initial and advanced training is to determine the effectiveness of training and to provide instructions for structural changes or the improvement of the training process. The assessment is a systematic process of collecting and analyzing data to determine the effectiveness of training. Implementation of the assessment phase entails the careful application of assessment techniques, comparing actual results to expected results, enhancing the training programs, strengthening the qualifications of instructors and teachers, and improving the mechanism for conducting the training process.

7.2 The effectiveness of professional training is evaluated by training course developers and instructors with the participation of the site supervisors (regarding class composition) who send their site specialists for specific training courses. All educational services organizations that provide initial and advanced training for MPC&A specialists conduct professional training assessments.

7.3 The expected results of initial and advanced training include the following:

- Acquisition of new theoretical knowledge in the applicable professional field, an understanding of the necessary terms and definitions, and the skills to use them in actual practice
- Practical skills to independently solve standard problems in their area of professional expertise
- The ability to devise independent approaches to problem solving in their area of professional expertise
- The ability to expand the range of knowledge to related areas that may help to solve problems in their area of professional expertise

7.4 Professional training results are assessed in two phases: short-term results and long-term results.

Instructors, management, and instruction specialists assess short-term results at the educational institution immediately after the training course is completed and exams and quizzes have been given. Trainees receive standard documents (whose form depends on the duration of instruction) that guarantee the quality of the professional training received and confirm the level of the educational services provided.

Long-term results are assessed within a specific time period after training is completed (between six months and one year). When accessing long-term results, teachers and developers of the training course take into consideration recommendations received from the immediate supervisors of the trainees. This step makes it possible to assess the quality of educational services provided based on the extent to which the work of the trained specialist has improved, with significant changes (e.g., assuming greater responsibility) becoming apparent only over time.

7.5 The results assessment focuses on the following aspects:

- The extent to which trainees mastered the theoretical material and practical skills
- The trainee's attitude toward his job duties after completing training
- Quantitative indicators associated with personnel carrying out their duties (a decrease in the number of violations, for example)

7.6 Exam questions are based on training objectives. The quality assessment for training encompasses all objectives.

All exam and test questions should be clear and understandable to eliminate the possibility of misinterpretation; trainees should be given an adequate amount of time to answer them (trainees think through and formulate written answers at different speeds); use different types of questions in the different forms of exams/tests (multiple choice, fill in the blank, compare and contrast, short answer).

7.7 Training assessment criteria are formal (measurable) or informal (observations by the teacher/instructor).

List of formal criteria: written/computer exam/test resulted in the required percentage of correct answers; oral exam (individual questions) showed that most of the material had been mastered; practical exercises were performed at a satisfactory level; the trainee plans to use more than 50% of the material in the future.

List of informal criteria: the level of trainee participation, including attentiveness, the subject matter and number of questions asked, and degree of engagement in the exercises, can be rated as high. The teacher/instructor is responsible for assessing the level of participation. At the end of each practical exercise, the teacher reviews the results together with the trainees, taking note of whether the trainees understood their mistakes.

7.8 The training assessment is based on results from trainee tests and exams and from feedback from the trainees and their supervisors (questionnaires, conversations, interviews). The major criteria for assessing the training quality are based on confirmation that the trainee:

- Can select the correct answer from the options provided
- Understands the principles, fundamentals, and concepts presented during the course of training
- Is able to apply the knowledge acquired when answering exam questions (written and oral)
- Remembers terms and definitions provided during training
- Is able to apply the knowledge acquired in his or her daily work
- Is shown to have improved his or her work performance (fewer infractions, etc.) within a specific period of time

The professional training quality assessment is based on an analysis of the quality of the training program, quality of the instruction, and class composition.

7.9 The quality of training programs is assessed based on the topics selected for the training course, the completeness with which they are explored, and the methods used to provide materials and training aids (workbooks) to trainees. Trainees are asked which additional material they would recommend including in the course.

7.10 Feedback questionnaires are designed to measure the quality of training programs. Trainees use them to report, in their opinion, what amount of the course material is applicable to their work. They answer this question immediately upon completing training, then again after a specific amount of time (six months to one year), reporting what amount of the course material they have actually used in the workplace. In this way, it is possible to draw conclusions not only regarding the quality of the training program itself, but also regarding the composition of the class and the training objectives from the perspective of the trainee's supervisor at the enterprise.

7.10.1 The feedback questionnaires that trainees complete immediately after the course contain questions that help assess the extent to which the course training objectives conformed to the expectations of the trainees, as well as the quality of instruction, including the ability of the instructor to ensure the active participation of each trainee in the practical exercises. Sample questions are provided in Appendix D.

7.10.2 The feedback questionnaires filled out by trainees immediately upon completion of the course are collected by the instructor and turned over to the instruction specialist at the educational institution who is responsible for documenting the training process. The duties of this specialist include maintaining a database on trainees (name, place of work, position, experience in topical area, completion of professional requalification training at the specified educational institution, dates of professional training, etc.) and the quantitative characteristics of the training process, including data from the feedback questionnaires.

7.11 The feedback questionnaires that trainees complete after a specific period of time (between six months and one year) following the training course contain questions regarding how the training helped, and what unexpected problems the trainee encountered when completing his/her work. The trainee also reports which aspects of the training were most useful and which additional topics and/or practical exercises should be added to the course in the future. Examples of these questions also are presented in Appendix D.

The feedback questionnaires completed after a fixed period time (between six months and one year) following the

completion of training on a form provided by the training center (or the educational organization) are sent to the educational organization with a note to return the questionnaire by a specific date.

A training specialist at the training center (or educational organization) processes and analyzes the information.

7.12 Educational service organizations and training departments within organizations annually review (update) their course syllabi and programs annually, including methods for organizing the training process in order to confirm they are up-to-date and consistent with current regulatory requirements.

7.13 The general assessment of training effectiveness is based on the following:

- Measurable training results
- Data from the feedback questionnaires
- Observing the instructor in class
- Comments and suggestions from the supervisors who evaluate the performance of the trainees

7.14 Based on the results of the general assessment, the educational institution administration prepares a list of recommendations for the enhancement of all components in the training process. The administration selects independently the means and methods used to monitor the implementation of its recommendations.

**Analysis:**

3: This section establishes requirements for conducting needs analyses in order to establish training programs for MPC&A personnel.

2.4, 2.5, 2.5.2, 2.5.3, 6.7: The regulation establishes the methodology for a systematic approach for organizing and conducting MPC&A training.

7: Establishes requirements for assessing training of personnel.

	Methodological Recommendations Regarding Scheduled						
0794	Maintenance Procedures for Physical Protection and Security Equipment	PP	4.4.3	7	Minatom/Rosatom	Enacted	

**Citation:**

4.4.3 Personnel training may be conducted at the following locations:

- Rosatom Government Corporation instruction centers within the system for in-service and advanced training of physical protection system personnel
- Directly at the nuclear site
- At enterprises that manufacture physical protection and security equipment

To facilitate personnel training, the vendor may provide training documentation for the operation of security system equipment to nuclear sites and Rosatom Government Corporation training centers.

**Analysis:**

The referred section lists organizations where personnel training may be conducted.

	Requirement for Training and Qualification Programs for Professional Development Trainer (Instructor)						
3122	Maintenance Programs for Professional Development Trainer (Instructor)	MC, PP	OST 95 10587-2004	Entire document	7	Minatom/Rosatom	Enacted

**Citation:**

**1 Scope**

This standard establishes the requirements for programs to train and maintain the qualifications of professional training instructors in organizations that operate potentially hazardous radiation and nuclear production facilities

and sites (henceforth – organizations).

...

This standard may be used by organizations that provide instruction for professional training instructors.

The requirements contained in this standard serve as recommendations that will facilitate the development of a professional training system in accordance with industry standard OST 95 10581.

**Analysis:**

This standard establishes the requirements for programs to train and maintain the qualifications of professional training instructors in organizations that operate potentially hazardous radiation and nuclear production facilities and sites

**3.3. Develop curriculum, training courses and train instructors. - Develop/revise site training courses for MPC&A training consistent with Site Operating Procedures. - Train instructors using regional or vendor resources.**

An effective training curriculum and qualified instructors who are able to instruct MPC&A personnel and the content of that curriculum are necessary to ensure personnel are able to perform duties and operate the MPC&A system as designed.

**Analysis:**

Regulatory content exists to require the development of curricula and training courses, and to provide for the training of instructors.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0001	On the Use of Atomic Energy	MC, PP	Law 170-FZ	Article 27, Article 52	3	RF Parliament	Enacted

**Citation:**

Work Permits regarding the Use of Atomic Energy Issued to Personnel at Facilities Engaged in the Use of Atomic Energy  
 Specific kinds of activities involving the use of atomic energy shall be carried out by personnel at facilities engaged in the use of atomic energy with valid permits issued to them by government safety regulatory agencies  
 The list of specialists among the personnel who, depending on the activity they perform, must obtain a permit regarding the use of atomic energy, and the qualifications required for such specialists, shall be determined by the Government of the Russian Federation. The absence of medical, including psycho-physiological, contra-indications is a mandatory condition of obtaining such permits.

Clearance for Persons to Work at a Nuclear Facility, Radiation Source, and Storage Point, and with Nuclear Material and Radioactive Substances  
 In accordance with the state security requirements established by Russian Federation legislation, persons who meet the appropriate qualifications requirements, and also persons with state secret clearance for such work may work at a nuclear facility, radiation source, and storage point, and with nuclear material and radioactive substances.  
 Persons with employment restrictions as indicated on the list of medical contra-indications may not work at a nuclear facility, radiation source, or storage point, or with nuclear material and radioactive substances

**Analysis:**

Article 27: This article establishes the need to obtain a work permit in order to participate in MC&A activities. It provides the basis for rejecting the issuance of these permits.

Article 52: This article establishes the need for a clearance to work at a nuclear facility for MC&A.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	8.2	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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**Citation:**

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear

material control and accounting, which shall identify the following:

- Procedures for training employees (personnel) and granting them access to nuclear material control and accounting related work.

**Analysis:**

8.2 - This section identifies the requirement for site managers to establish training programs for MC&A personnel at sites.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	6.3.3, 6.3.4, 9.4.2	7	Minatom/Rosatom	Enacted
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**Citation:**

6.3.3 PPS organizational measures include development of site level regulations that take into consideration of the nature of PPS operations at a specific potentially hazardous nuclear facility, including the site category, the organizational and staffing structure of its security service and security force units, its physical protection equipment, the specific nature of its secure areas, and other specific characteristics of the site.

6.3.4 The list of major site level regulations to be developed by the units that provide management in the PP system are specified in the requirements of the Procedures and regulations issued by Minatom of Russia and the Russian Federation Ministry of the Interior that govern requirements for PP systems and the organization of site security.

These regulations include:

- A security and defense plan for the potentially hazardous nuclear site;

9.4.2 Preparing the potentially hazardous nuclear site for deployment of the PP system shall include conducting the following activities to prepare the site administratively for deployment of the PP system:

- Generating and refining the organizational and staffing structure of its security service and security force units at the potentially hazardous nuclear site;

**Analysis:**

The citations here require that sites develop a Security and Defense Plan. The content of the Security and Defense Plan is not known to us. It is possible that it contains information on staffing and personnel requirements for PPS, but this is not confirmed.

Additionally, 9.4.2 states that generation of a staffing plan must occur as part of the deployment of the PP system.

0705	The Organization and Management of Rosatom Site Security Force Unit Operations	PP	(Not obtained)	6.6	7	Minatom/Rosatom	Enacted
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**Citation:**

6.6 Personnel are appointed to positions within authorized staffing limits by means of the appropriate [enterprise] orders.

**Analysis:**

This document stipulates that there are staffing limits.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	I 5 b), V 15 d)	4	RF Government	Enacted
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**Citation:**

**I General Provisions**

5. The State System for Nuclear Material Accounting and Control shall provide for the following:

- b) Professional training and retraining of staff in the area of control and accounting of nuclear material

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

15. Organizations handling nuclear material shall perform the following:

- d) Recruiting personnel who perform nuclear material control and accounting and providing basic and advanced

training for them

**Analysis:**

This decree requires the professional training and retraining of state and organization personnel.

0719	Methodological Instructions for Organizing and Conducting Initial and Advanced Training in the Area of Nuclear Material Protection, Control, and Accounting for Personnel at Open Stock Companies, Institutions, and Federal Government Enterprises Under the J	MC, PP	(Not obtained)	3.1	7	Minatom/Rosatom	Enacted
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**Citation:**

3.1 A needs analysis for training of MPC&A specialists (henceforth, "specialists") is a prerequisite for organizing all types of initial and advanced training.

**Analysis:**

This section establishes requirements for conducting needs analyses in order to establish training programs for MPC&A personnel.

0719	Methodological Instructions for Organizing and Conducting Initial and Advanced Training in the Area of Nuclear Material Protection, Control, and Accounting for Personnel at Open Stock Companies, Institutions, and Federal Government Enterprises Under the J	MC, PP	(Not obtained)	2.3.3, 2.3.4, 3.2, 3.2.1, 3.2.2, 3.2.5, 4.2, 4.4, 4.4.2	7	Minatom/Rosatom	Enacted
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**Citation:**

2.3.3 Individuals who participate in the conduct of initial and advanced training for MPC&A specialists undergo a course of instruction that defines the use of the systematic approach to training, after which they are given a document of an established form regarding their completion of the course.

It is recommended that individuals engaged for this purpose have at least three years of experience in the field of MPC&A.

2.3.4 Teachers/instructors who are on staff at training facilities and who conduct initial training, advanced training, and professional education for MPC&A personnel also complete a course in teaching skills and receive a certificate of completion.

3.2 Needs analyses for training of specialists are conducted at Rosatom organizations and at institutions that provide educational services.

3.2.1 Needs analyses for training of specialists are conducted by specialists at the site and/or by outside experts and are coordinated by the appropriate Rosatom Departments....

3.2.2 The procedure for analyzing initial and advanced training needs shall be based on job descriptions of various personnel categories and a task analysis, as well as an analysis of personnel competencies, taking applicable

regulations into consideration.

3.2.5 The following information is collected to identify the training needs of individual personnel/positions:

- Job duties and functions
- Inadequacies related to the performance of designated functions
- Changes in job performance methods, production processes, and equipment.

4.2 A training program consists of individual training courses, sections, and/or modules. The development of a training program includes the preparation of an overall curriculum and a set of training courses.

4.4 The information in the curriculum is organized in logical sequence by major topical area, which is reflected in the title of the training course, section, or module. Individual topics are established for each course, section, or module. An example is presented in Appendix D.

4.4.2 When developing the curriculum for training programs, the following factors are considered:

- The length of courses, course sections, and modules
- Changes to the regulatory and legal basis regarding the use of atomic energy in general and MPC&A in particular
- The appearance of new technological models and changes to existing models
- Deficiencies identified in the operation of the MPC&A system, the causes of equipment failures, and the special features of system operation during emergencies

**Analysis:**

Establish requirements and methods for training needs analyses.

3122	Requirement for Training and Qualification Maintenance Programs for Professional Development Trainer (Instructor)	MC, PP	OST 95 10587-2004	Entire document	7	Minatom/Rosatom	Enacted
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**Citation:**

**1 Scope**

This standard establishes the requirements for programs to train and maintain the qualifications of professional training instructors in organizations that operate potentially hazardous radiation and nuclear production facilities and sites (henceforth – organizations).

This standard is applicable to organizations with potentially hazardous radiation and nuclear production facilities and sites.

This standard may be used by organizations that provide instruction for professional training instructors.

The requirements contained in this standard serve as recommendations that will facilitate the development of a professional training system in accordance with industry standard OST 95 10581.

**Analysis:**

This standard establishes the requirements for programs to train and maintain the qualifications of professional training instructors in organizations that operate potentially hazardous radiation and nuclear production facilities and sites

**3.4. Ensure that staff attends refresher training courses at ISTC, RMTc and other training centers on the regular basis. - Establish system to track needs and attendance in classes by individual and provide funding for refresher training**

Ongoing training and records to ensure the training is being performed at appropriate intervals are necessary for the sustained effectiveness of the MPC&A system.

**Analysis:**

Regulatory content exists that requires tracking of, and periodic refresher training, either at the site or at the regional training centers.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
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0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	2.11, Section 13, Section 15.	7	Minatom/Rosatom	Enacted
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**Citation:**

2.11 Minatom of Russia sites utilize the services of the following specialized organizations to perform physical protection functions at potentially hazardous nuclear sites:

- Educational organizations that conduct initial, requal and in-service training of physical protection system specialists;

13 Requirements for Organizing and Conducting Training Drills on the Inspection and Development of Cooperation within Physical Protection Systems.

(Refer to document for full citation. This section provides a lot of detailed information on training drills.

15 Initial and In-service Training Requirements for Physical Protection System Personnel.

(Refer to document for full citation. This section provides detailed information for initial and ongoing training.)

This regulation applies to PP personnel -- this includes site security personnel, PP technicians, as well as collaboration with MVD, FSB, and personnel of other agencies that participate in the provision of PP at sites.

**Analysis:**

Section 13 discusses requirements for organizing drills. Section 15 discusses initial and in-service training requirements. 15.2.6, and 15.3.2 provide for initial and professional training to be provided at either a licensed facility or at the site itself.

0037	On the Adoption of Regulation on Minatom of Russian Site Security Forces	PP	RF Government Decree # 139	9	4	RF Government	Enacted
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**Citation:**

9 The administrative structure and staffing levels for site security force units that provide protection at the sites are adopted by the director of the management entity upon approval by the Federal Atomic Energy Agency. (Revised by Russian Federation Government Decrees № 49, dated 01 February 2005, and № 57, dated 01 February 2006.)

The administrative structure and staffing levels for site security force units are determined by the specific characteristics of the secure sites, the degree to which they are provided with security equipment, and by other conditions related to the provision of reliable protection at secure sites.

**Analysis:**

This regulation also deals with pro-force personnel, requires that the structure and size of the pro-force be based on site-specific characteristics.

0091	On the Professional Training of Rosatom Site Security Force Personnel	PP	(Not obtained)	Entire document	7	Minatom/Rosatom	Enacted
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**Citation:**

Introduction: The Regulation is an agency-level regulatory document that establishes the procedures for organizing and conducting the professional training of various categories of site security force personnel that provide protection for the agency facilities.

**Analysis:**

This entire document focuses on training issues and frequency.

0705	The Organization and Management of Rosatom Site Security Force Unit	PP	(Not obtained)	6.5	7	Minatom/Rosatom	Enacted
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Operations

**Citation:**

6.5 Recruitment for work on the site security force is conducted competitively on the basis of an application, submitted materials, and interviews in the Human Resources Department, with security agencies, and in site security force administrative departments. A contract is signed for a three-month trial period during which the site security force employee (guard) will complete initial professional development training and pass a background investigation conducted by the appropriate local office of the Russian Federation Ministry of Internal Affairs. Based on the results of training and the background investigation conducted by the local MVD office, the candidate is granted the right to carry a sidearm and perform duties at sentry posts. Individuals who do not pass the initial training course and individuals who do not pass the MVD background investigation will not be offered a [permanent] position within the site security forces. Managers in site security force departments and in the Human Resources Department at the facility shall comply with the document entitled "Methodological Recommendations for Recruiting Site Security Force Personnel" [20] when conducting the recruitment of personnel for work in these units.

**Analysis:**

This regulation deals with pro-force personnel, and addresses the recruitment process.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	I 5 b), V 15 d)	4	RF Government	Enacted
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**Citation:**

**I General Provisions**

5. The State System for Nuclear Material Accounting and Control shall provide for the following:  
 b) Professional training and retraining of staff in the area of control and accounting of nuclear material

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

15. Organizations handling nuclear material shall perform the following:  
 d) Recruiting personnel who perform nuclear material control and accounting and providing basic and advanced training for them

**Analysis:**

This decree requires the professional training and retraining of state and organization personnel.

0719	Methodological Instructions for Organizing and Conducting Initial and Advanced Training in the Area of Nuclear Material Protection, Control, and Accounting for Personnel at Open Stock Companies, Institutions, and Federal Government Enterprises Under the J	MC, PP	(Not obtained)	2.4 (Table 1 and 2), 3.2, 6.7, Appendix B	7	Minatom/Rosatom	Enacted
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**Citation:**

**Table 1**

Groups of MC&A Specialists and the Frequency for Their Initial and Advanced Training  
 № Groups of MC&A Specialists Training Frequency  
 1 Nuclear material control and accounting management personnel - When hired  
 - At least once every five years  
 - When job duties are changed (due to promotion or rotation)  
 2 MC&A specialists (who develop and implement components of nuclear material control and accounting procedures) - When hired  
 - At least once every three years  
 - When job duties are changed (due to promotion or rotation)

- 3 Employees directly engaged in nuclear material control and accounting work - When hired
  - At least once every three years
  - When job duties are changed (due to promotion or rotation)
- 4 Specialists who inspect the status of nuclear material control and accounting within the enterprise - When hired
  - At least once every three years
  - When job duties are changed (due to promotion or rotation)

## Table 2

Groups of Physical Protection Specialists and the Frequency for Their Initial and Advanced Training

Nº Groups of Physical Protection Specialists Frequency

- 1 Managers of departments responsible for the physical protection of nuclear material and potentially hazardous nuclear sites - When hired
  - At least once every five years
  - When job duties are changed (due to promotion or rotation)
- 2 Analytical department employees - When hired
  - At least once every three years
  - When job duties are changed (due to promotion or rotation)
- 3 Operations, engineering, and technical personnel - When hired
  - At least once every three years
  - When job duties are changed (due to promotion or rotation)
- 4 Site security specialists - When hired
  - At least once every three years
  - When job duties are changed (due to promotion or rotation)
- 5 Specialists in agency and site-level monitoring - When hired
  - At least once every three years
  - When job duties are changed (due to promotion or rotation)
- 6 Specialists transporting special cargo - When hired
  - At least once every three years
  - When job duties are changed (due to promotion or rotation)

3.2 Needs analyses for training of specialists are conducted at Rosatom organizations and at institutions that provide educational services.

3.2.1 Needs analyses for training of specialists are conducted by specialists at the site and/or by outside experts and are coordinated by the appropriate Rosatom departments.

Needs analyses are carried out by senior and mid-level organization managers, including the immediate supervisors of MPC&A specialists, working together with methodologists and instructors at educational institutions and specialized training centers and/or training departments within the organization.

3.2.2 The procedure for analyzing initial and advanced training needs shall be based on job descriptions of various personnel categories and a task analysis, as well as an analysis of personnel competencies, taking applicable regulations into consideration. Training needs for MPC&A specialists may also be identified by the results of agency monitoring.

3.2.3 The procedure for analyzing initial and advanced training needs includes studying a list of the most common errors committed by enterprise personnel, how often job descriptions are updated, new equipment is installed, and new operating instructions are implemented.

3.2.4 The method used to analyze initial and advanced training needs (method for analyzing occupational competence, method for analyzing job assignments, integrated analysis) is selected according to the training objectives identified by the director of the organization that is sending its specialists to an educational institution, training center, or enterprise training department.

3.2.5 The following information is collected to identify the training needs of individual personnel/positions:

- Job duties and functions
- Inadequacies related to the performance of designated functions (recurrent mistakes, poor quality of work, etc.)
- Changes in job performance methods, production processes, and equipment
- Experience related to any aspect of human activity, including information regarding incidents and infractions involving MPC&A and other activities, as well as their root causes
- Changes in the structure of the facility and documentation (e.g., policies, technical specifications)
- The content of existing training programs
- Requirements established by regulatory agencies

6.7 Information regarding the training of each specialist is recorded independently by the human resources department at the organization and by the educational institution.

To coordinate qualifications maintenance and advanced training for each individual MPC&A specialist, the organization creates a database that specifies the training topics and dates of training for the course completed.

## Appendix B

List of Educational Institutions and Training Centers

That Provide Initial and Advanced Training for Personnel at Rosatom Organizations

in the Area of Nuclear Material Protection, Control, and Accounting

- 1 Inter-Agency Specialized Training Center (ISTC)
- 2 Training Center for Nuclear Material Control & Accounting (RMTC) at the A. I. Leipunsky Institute of Physics and Power Engineering
- 3 National Institute for Continuing Education (Obninsk)
- 4 Atomenergo Inter-Agency Advanced Training Institute
- 5 ATOMPROM Institute for Continuing Professional Education
- 6 Moscow Engineering Physics Institute (Technical University) (MEPhI)
- 7 Tomsk Polytechnic University
- 8 Seversk State Technological Academy
- 9 Siberian Advanced Training Institute (Rosatom)

**Analysis:**

The table establishes training frequency for the various categories of personnel. Other sections establish criteria for defining training needs and keeping training records.

0721	Set of Standard (Model) Documents Regarding the Deployment of Physical Protection Systems and Recommendations for Completing the Forms	PP	(Not obtained)	2.5.20	7	Minatom/Rosatom	Enacted
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**Citation:**

The working group shall monitor the timely, complete, and quality implementation of measures for the selection, staffing, and training of physical protection personnel.

**Analysis:**

This regulation is not mandatory, but refers to the actions of the interagency group that must approve all PP Systems prior to implementation or modernization, and covers PP personnel more generally.

**3.5. Establish training requirements for various MPC&A job positions. - Develop a formal training plan for each employee in a position critical to the MPC&A Organizational sub elements.**

In order for a training program to be effective, site management must have a mechanism or procedure for determining the job performance requirements for MPC&A positions, and thereby ensure that personnel are trained to perform those required activities. Formal training plans for each employee position provides the documented basis for training activities.

**Analysis:**

Regulatory content exists to require establishment of training requirements for various MPC&A positions using the systematic approach to training.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	15	7	Minatom/Rosatom	Enacted

**Citation:**

**15 Initial and In-service Training Requirements for Physical Protection System Personnel.**

- 15.1 Forms and procedure for training physical protection system personnel.
  - 15.1.1 The training of PP system personnel shall be directed toward achieving, maintaining the levels of qualification required of specific PP system personnel categories in order to take action and perform their duties during normal and emergency operation of the PP system.
  - 15.1.2 The major forms of training for the PP system personnel at a potentially hazardous nuclear site:
    - Initial training;
    - Professional training;
    - In-service and advanced training.

15.1.3 Initial training shall be conducted with candidates who meet the qualification requirements for specific categories of PP personnel and who have been selected for to fill vacancies.

15.1.4 Professional training is a system of measures to provide categories of PP system personnel the knowledge, skills and experience required for the proper performance of their duties.

15.1.5 In-service and advanced training of PP system personnel is a system of measures to provide in-depth training for managerial staff and specialists in physical protection in order to increase their professional knowledge, skills and experience.

15.1.6 Regulations regarding the Russian Federation Ministry of Internal Affairs internal security troops stipulate the procedure for training security force personnel guarding potentially hazardous nuclear sites.

15.1.7 When organizing the instruction of various categories of PP system personnel, differentiated access to information regarding the organization and operating procedures of the PP system shall be maintained; in addition, information security requirements shall be observed.

15.2 Initial training procedure.

15.2.1 During the hiring process, security service candidates shall undergo testing for their occupational suitability. The test procedure and program for different categories of PP system personnel take into account the type and category of the nuclear site, the specific operation of the PP system.

15.2.2 Initial training is generally conducted at the nuclear site according to an individual training plan compiled by the administrative unit manager of the security service and approved by the manager of the approved by the security service manager of the potentially hazardous nuclear site.

15.2.3 The initial training program shall include issues regarding the foundations of nuclear material and nuclear facility physical protection and shall take into account the way in which each specialist will be utilized, his work experience and level of preparation. The manager of the administrative unit stipulates the scope and duration of initial training for security service personnel based on the positions of the trainees, the specific scope of their duties, and the type and category of the potentially hazardous nuclear site.

15.2.4 For each personnel category, the security service manager or the commander of the site militarized security forces develops and approves a list of issues and regulations related to the qualifications required for the given security service personnel category; this list shall be reviewed (revised) annually.

15.2.5 Initial training of PP system personnel culminates in an exam (test) on knowledge of their duties and the procedures and methods used to perform those duties. Additional training and a second exam is given in the event that the results of the first exam (test) are unsatisfactory. Exam (test) results shall be written up in a protocol and stored for at least three years.

15.2.6 Based on the approval of Minatom of Russia or a contract, initial training for specific categories of PP system personnel may be conducted at training centers possessing the appropriate licenses or by contracting with specialized organizations.

15.3 Professional training procedure.

15.3.1 Professional training of PP system personnel shall be directed at enabling personnel at the potentially hazardous nuclear site to acquire and increase the knowledge, skills and experience of that is crucial to the proper performance of their duties. Professional training of PP system personnel shall be conducted continuously and in accordance with an established program;

Time shall be set aside for independent work by PP system personnel with regard to the professional training they require.

15.3.2 Professional training of PP system personnel in various disciplines may take place at the potentially hazardous nuclear facility or at training centers possessing the appropriate licenses.

15.3.3 Professional training of PP system personnel shall include: the study of theoretical issues necessary for the proper performance of their duties; practical development of methods and means of providing physical protection related to the performance of their duties; and assessment of their knowledge and skills.

15.3.4 The manager of the administrative unit establishes the professional training procedure for PP system personnel, the form of training, and the scope and objectives of the classes for each personnel category based on the requirements of regulations and methodologies, instructions from supervising organizations, plans for upgrading PP systems and physical protection and security equipment, and the status of physical protection at the specific nuclear site (including problems identified as a result of government oversight and agency control).

15.3.5 PP system command point operators and administrators shall regularly undergo training and inspection for different normal and emergency situations, using workstations included among the physical protection and security equipment. The workstations shall be operational with software that corresponds to the requirements of PP system personnel. The automated workstation shall be equipped with all the resources of the actual working conditions (field control panel and/or main control panel).

15.3.6 Training exercises are one of the methods for improving and inspecting the level of professional preparation and developing cooperation.

The personnel instruction and training work station hardware and software may be used in the process of conducting training exercises and working out the interaction among physical protection system personnel. The work station must be able to simulate all types of normal and emergency situations corresponding to the threats identified for the site in the vulnerability analysis stage.

15.4 Procedures for In-service and Advanced Training of PP System Personnel.

15.4.1 Training centers in the system of in-service and advanced training for PP system personnel are designated by Minatom orders. These centers shall have the required licenses issued by federal executive branch agencies.

15.4.2 In-service and advanced training of PP system personnel are conducted:

- In training centers that meet the requirements in this document are have been designated by Minatom of Russia

orders;

- At the potentially hazardous nuclear site by specialists from the training centers that have been designated by Minatom of Russia orders;
- At the potentially hazardous nuclear site by PP system personnel who have received instruction at the training centers that have been designated by Minatom of Russia orders (without the right to issue federal level certificates);

15.4.3 Minatom of Russia establishes the training (in-service training) procedure and the PP system personnel categories that must undergo training (in-service training) at the Inter-agency Specialized Training Center or at other specialized centers when assigned to positions; Minatom of Russia also establishes the procedures whereby they receive training (in-service training).

15.4.4 The training centers are responsible for:

- Developing training programs based on the area of physical protection and training objectives and goals;
- Training nuclear site personnel by organizing and conducting training courses for different specializations;
- Issuing trainees an appropriate federal level certificate for the successful completion of the course;
- Providing scientific and methodological support for initial and professional training of security service personnel directly at the nuclear site.

15.4.5 Based on the approval of Minatom of Russia or a contract, in-service or advanced training for specific categories of PP system personnel may be conducted at specialized organizations possessing the appropriate licenses or by contracting with these organizations.

15.4.6 Minatom enterprises and Ministry of Internal Affairs internal security troop training centers that have been designated by Minatom orders will be used to raise the qualifications of the unit and force management staffs and trains the staff of the Ministry of Internal Affairs internal security troops with respect to the use, elimination of defects, and maintenance of modern PP equipment.

**Analysis:**

This section establishes requirements for Rosatom sites to conduct training activities for PP personnel.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	I 5 b), V 15 d)	4	RF Government	Enacted
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**Citation:**

**I General Provisions**

5. The State System for Nuclear Material Accounting and Control shall provide for the following:

- b) Professional training and retraining of staff in the area of control and accounting of nuclear material

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

15. Organizations handling nuclear material shall perform the following:

- d) Recruiting personnel who perform nuclear material control and accounting and providing basic and advanced training for them

**Analysis:**

This decree requires the professional training and retraining of state and organization MC&A personnel.

0719	Methodological Instructions for Organizing and Conducting Initial and Advanced Training in the Area of Nuclear Material Protection, Control, and Accounting for Personnel at Open Stock Companies, Institutions, and Federal Government Enterprises Under the J	MC, PP	(Not obtained)	2.4.1, 2.4.2	7	Minatom/Rosatom	Enacted
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**Citation:**

2.4.1 Table 1 lists the groups of MC&A specialists who must undergo mandatory advanced MC&A training, as well as how often the training must be conducted.

Table 1

Groups of MC&A Specialists and the Frequency for Their Initial and Advanced Training

№ Groups of MC&A Specialists Training Frequency

1 Nuclear material control and accounting management personnel - When hired

- At least once every five years
- When job duties are changed (due to promotion or rotation)

2 MC&A specialists (who develop and implement components of nuclear material control and accounting procedures) - When hired

- At least once every three years
- When job duties are changed (due to promotion or rotation)

3 Employees directly engaged in nuclear material control and accounting work - When hired

- At least once every three years
- When job duties are changed (due to promotion or rotation)

4 Specialists who inspect the status of nuclear material control and accounting within the enterprise - When hired

- At least once every three years
- When job duties are changed (due to promotion or rotation)

Appendix A contains the full list of categories of personnel who shall complete nuclear material control and accounting training.

2.4.2 Table 2 lists the groups of physical protection specialists and site security forces at Rosatom organizations who shall complete advanced training in physical protection and site security, as well as how often the training must be conducted.

Table 2

Groups of Physical Protection Specialists and the Frequency for Their Initial and Advanced Training

№ Groups of Physical Protection Specialists Frequency

1 Managers of departments responsible for the physical protection of nuclear material and potentially hazardous nuclear sites - When hired

- At least once every five years
- When job duties are changed (due to promotion or rotation)

2 Analytical department employees - When hired

- At least once every three years
- When job duties are changed (due to promotion or rotation)

3 Operations, engineering, and technical personnel - When hired

- At least once every three years
- When job duties are changed (due to promotion or rotation)

4 Site security specialists - When hired

- At least once every three years
- When job duties are changed (due to promotion or rotation)

5 Specialists in agency and site-level monitoring - When hired

- At least once every three years
- When job duties are changed (due to promotion or rotation)

6 Specialists transporting special cargo - When hired

- At least once every three years
- When job duties are changed (due to promotion or rotation)

Appendix A contains the full list of categories of personnel who shall complete physical protection and site security training.

**Analysis:**

These citations identify the personnel categories requiring training and the frequency for training of each personnel category.

	Methodological Recommendations Regarding Scheduled						
0794	Maintenance Procedures for Physical Protection and Security Equipment	PP	4.4.2	7	Minatom/Rosatom	Enacted	

**Citation:**

4.4.2 Training for personnel who operate physical protection and security equipment and perform scheduled maintenance and repairs includes the following:

- Theoretical training for specialists regarding the equipment, its functioning, and procedures for its use, maintenance, and repair
- Review of operating documentation for physical protection and security equipment

- Practical training in actions to be taken during the operation of physical protection and security equipment as part of functional responsibilities, in order to acquire the necessary skills
- Training in safety rules and procedures to be observed during maintenance and repair of physical protection and security equipment

**Analysis:**

The document contains requirements for scope of the training for personnel involved in ETM operation (maintenance).

**3.6. Establish a mechanism to monitor the skill level of specialists through conducting inspections and tests, develop a system of additional training and refresher training. - Include skills testing in the formal performance assurance process through examinations. - Develop a system for reviewing root cause analyses that addresses training deficiencies.**

A training program without a procedure to verify the effectiveness of training provided to personnel risks creating a gap in MPC&A effectiveness that results in the overall failure of the system. Testing, monitoring, and inspection activities should ensure that personnel do in fact know how to perform their job tasks, and identified weaknesses should result in modifications to training activities in order to address them.

**Analysis:**

Regulations define training monitoring requirements for site and agency management.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	9.4 bullet 7, 10	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

9.4 Agency monitoring activities shall include the following:

- Verifying the availability and the quality of the measurement methodologies and measuring instruments have been adopted for nuclear material control and accounting purposes, including by having employees (personnel) at the organization carry out additional measurements of nuclear material parameters

10 Requirements for Employees (Personnel) Who Conduct Nuclear Material Control and Accounting Activities

10.1 Employees (personnel) who conduct nuclear material control and accounting activities shall complete training on how to perform these procedures in specialized courses organized within the framework of the nuclear material control and accounting system. In addition, they shall undergo regular testing in accordance with procedures established by the organization.

10.2 The frequency of testing personnel on their knowledge of nuclear material control and accounting procedures for various categories of employees (personnel) shall be established by the manager of the organization. Testing shall be conducted no less than once every three (3) years.

**Analysis:**

This corporation level requirement establishes the monitoring activities to validate the skill level of MC&A measurement personnel.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	16.4	7	Minatom/Rosatom	Enacted
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**Citation:**

16.4 Monitoring the operation of physical protection at a potentially hazardous nuclear site is implemented at the enterprise level with the following objectives:

- Verify that the potentially hazardous nuclear site satisfies the requirements of the "Physical Protection Procedures," this document, as well as agency and site level regulations developed in accordance with these two documents;
- Assess the effectiveness of the PP system at the site as a whole, in its production areas, and for its objects of physical protection;
- Verify compliance of PP system structural components to relevant requirements;
- Develop and implement the measures needed to correct deficiencies disclosed when verifying the physical protection system.

Accordingly, the administration of the potentially hazardous nuclear site regularly organizes and holds training drills for personnel, the security service and security forces in order to verify that they work together effectively with agencies of the Russian MVD and FSB during emergencies.

**Analysis:**

Establishes general criteria for agency level for monitoring physical protection activities, presumably to include training.

0091	On the Professional Training of Rosatom Site Security Force Personnel	PP	(Not obtained)	5.7	7	Minatom/Rosatom	Enacted
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**Citation:**

**5.7. Monitoring Personnel Training**

Monitoring is an integral part of training for site security force specialists during all phases of training. In order to increase the effectiveness of the training process, the following types of monitoring and assessment of knowledge, abilities, and skills shall be conducted

- On-going monitoring
- Comprehensive monitoring

5.7.1 On-Going Monitoring

The major task of on-going monitoring and assessment of the quality of participants' knowledge is to manage the training process.

The class instructor is responsible for on-going monitoring. Assessment, which is made during the course of on-going monitoring, allows the instructor to determine the extent to which personnel have mastered the training information, the development of their thinking, and their ability to perform practical tasks independently. Feedback makes it possible to identify the paths and means by which the training process can streamline and enhance the transfer of knowledge. Therefore, on-going monitoring shall be employed at the beginning of essentially each training exercise to monitor the acquisition of the material covered.

To reduce the amount of time required for on-going monitoring and to increase its effectiveness, the monitoring method may involve written or oral tests, practical applications, quizzes given via computer, or any combination thereof. On-going monitoring shall include all trainees.

5.7.2 Comprehensive Monitoring

The objective of comprehensive monitoring is to assess the extent to which knowledge, abilities, and skills have developed in each student, both for individual subjects (e.g., specialized training) and for the Program as a whole. Comprehensive monitoring takes place as an annual comprehensive examination that determines the extent to which site security force personnel have learned the material studied and their preparedness to perform their job duties under conditions that require the use of firearms, military weapons, special equipment, and physical force. The comprehensive examination is conducted by a committee composed of local AtomGuard office administrators. Personnel from the Russian Federation Ministry of Internal Affairs may participate in order to concurrently administer the periodic scheduled assessment of personnel for their suitability for actions requiring the use of service firearms and military weapons, special equipment, and physical force.

The comprehensive examination contains a theoretical part and a practical part.

5.7.2.1 The theoretical part consists of a written test requiring detailed answers to questions. The knowledge of trainees is tested in all areas of the Training Program.

5.7.2.2 Practical skills and abilities are tested in the following areas:

- Compliance with standards
- Firearms tests

Compliance with standards by AtomGuard personnel is tested all training areas in accordance with the Training Program. At the end of the academic year, these comprehensive examination standards may be met during in-class testing for a particular subject at the discretion of the local office director.

The procedure for assessing individual personnel and the training group as a whole is presented in Appendix 2. If an AtomGuard employee does not pass comprehensive testing (or periodic assessments) in the primary subject areas, he shall be retested within 30 days, but no earlier than 15 days later. If the employee does not pass the second examination, then a decision must be rendered as to whether he should be allowed to retain his position. The examination schedule is determined by the director of site security force unit, taking into consideration the primary subjects and topics included in the training program.

If a site security force employee has not performed his job responsibilities for six or more months because of a health condition or other legitimate reason, he shall attend additional courses and take an examination.

**Analysis:**

The cited sections deal specifically with activities to monitor training of personnel, with the purpose of increasing effectiveness of the training process.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	I 5 b), V 15 d)	4	RF Government	Enacted
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**Citation:**

**I General Provisions**

5. The State System for Nuclear Material Accounting and Control shall provide for the following:

- b) Professional training and retraining of staff in the area of control and accounting of nuclear material

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

15. Organizations handling nuclear material shall perform the following:

- d) Recruiting personnel who perform nuclear material control and accounting and providing basic and advanced training for them

**Analysis:**

This decree requires the professional training and retraining of state and organization personnel.

	Methodological Recommendations Regarding Scheduled		4.4.4, 4.4.5, 4.8.6	7	Minatom/Rosatom	Enacted
0794	Maintenance Procedures for Physical Protection and Security Equipment	PP				

**Citation:**

4.4.4 Equipment operators are tested on operating procedures for physical protection and security equipment periodically, but at least once every year.

4.4.5 Personnel who operate physical protection and security equipment and who perform scheduled maintenance and repairs shall have clearance to conduct activities related to maintenance and repairs, in accordance with procedures established at the nuclear site; they shall also possess authorization to operate physical protection and security equipment.

4.8.6 For personnel who perform maintenance, the management of the security department and of other administrative units develops qualification requirements regarding the knowledge and practical skills (abilities) necessary for performing their duties. Qualification requirements shall be reflected in job descriptions.

Maintenance personnel shall periodically undergo certification for compliance with qualification requirements. The nuclear site director establishes the procedures for certifying maintenance personnel and when these should be conducted. The results of certification are reflected in the appropriate inspection team reports and adopted by order of the nuclear site director.

**Analysis:**

The document establishes requirements for personnel testing and qualification evaluation frequency. The minimal frequency is defined. The document also prescribes to document evaluation results.

**4. Operational Cost Analysis**

**An operational costs analysis examines all costs associated with pending upgrades, subsequent operations throughout the life-cycle of MPC&A programs onsite. The operational cost analysis is a key process in determining the future financial burden for an MPC&A program operation.**

**Analysis:**

Based on budgeting legislation Rosatom plans MPC&A funding as part of targeted federal programs. Additionally, in accordance with the Law "On Rosatom State Corporation" Rosatom establishes special reserves for funding MPC&A expenses. At facility level, MC&A activities are considered part of the production processes, and funding and budget planning issues are addressed in production planning documents.

**4.1. Perform analysis, identify and document lifecycle costs and costs associated with replacing installed MPC&A capital equipment. - Develop operational cost estimates for MPC&A systems on site, including MPC&A organization, operation of physical protection systems, carrying out physical protection activities, personnel labor costs, MPC&A equipment replacement, Maintenance costs, operations cost for each guarded area and system. - Develop a site specific budget for the site level MPC&A Program. - Determine the cost of each of the MPC&A Organizational sub elements for use in the Operational Cost Analysis.**

The MPC&A-related organizations shall develop a plan that outlines all costs for sustaining any MPC&A system to

ensure all costs are identified and included in planning. The emergence or elimination of a threat, technical obsolescence, or the end of a system's life-cycle will dictate replacement of physical protection and MC&A systems.

A budget plan shall be periodically reviewed or prepared to support site MPC&A organization and activities. The budget plan shall address the recurring (i.e. labor, spare parts, recertification and attestation costs) and non-recurring costs (i.e. equipment purchases, installation, certification and attestation).

**Analysis:**

MC&A activities are considered part of the production processes, and funding and budget planning issues are normally addressed in production planning documents.

RDP will further work with Rosatom to complete analysis of facility level planning of PP expenses.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	11.6.4	7	Minatom/Rosatom	Enacted

**Citation:**

11.6.4 The annual and future construction (modernization) and repair plans for site's engineered barriers and equipment include the construction, modernization or repair of new/existing engineered barriers and equipment located at the site, the associated costs and deadlines, and specify the responsible parties. The plan is developed by the physical protection and security equipment department at the site; if the site is protected by Russian Federation Ministry of the Interior internal security troops, by the staff of the military unit together with the site security department. It is approved by the site manager and the military unit commander.

**Analysis:**

Document requires annual planning for current and future equipment needs.

0735	Methodological Recommendations for Collecting, Processing, and Submitting Information to Government Corporation Rosatom Regarding the Physical Protection System Components at Nuclear Sites	PP		Table 1, FZ-3	7	Minatom/Rosatom	Enacted
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**Citation:**

**FZ-3**

Installing Physical protection and security equipment at the Nuclear Site

Planning the replacement of physical protection and security equipment at nuclear sites

Identifying nuclear sites with obsolete physical protection and security equipment in order to perform resource planning for system upgrades. Planning within the agency for the production of physical protection and security equipment. Calculating special government corporation program performance indicators

**Analysis:**

Document FZ-3 identified in table 1 of the regulation is intended to identify for site and Rosatom management plans for replacement of PP equipment at the site. This implies some consideration for the cost/budget aspect of the planning process.

Russian Federation  
Law On Rosatom

Article 19,

3127	State Corporation for Atomic Energy	PP, MC	317-FZ	20	3	RF Parliament	Enacted
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**Citation:****Chapter 4. Program of Activity of The Corporation for the Long-Term Period and Procedure for its Financial Support**

Article 19. Program of Activity of The Corporation for the Long-Term Period

1. To achieve the purposes established by this Federal Law, The Corporation shall develop a program of activity of The Corporation for the long-range period, specifying therein the fulfillment of production, investment and financial indicators, including assignments of state defense procurement orders.
2. Financial support for the program of activity of The Corporation for the long-term period shall be provided by:
  - 1) income from activity of The Corporation;
  - 2) subsidies from the federal budget;
  - 3) funds received by The Corporation for fulfilling assignments of state defense procurement orders;
  - 4) capital contributions of the Russian Federation from funds of the federal budget;
  - 5) funds of special reserve capital of The Corporation;
  - 6) other funds of The Corporation and organizations of The Corporation.
3. The program of activity of The Corporation for the long-term period shall be the basis for drawing up the financial plan of activity of The Corporation.
4. The financial plan of activity of The Corporation shall be approved by the supervisory council of The Corporation for at least a three-year period, and shall be subject to annual adjustment.

Article 20. Special Reserve Capital of The Corporation

1. The Corporation shall create and manage special reserve capital of The Corporation.
2. The special reserve capital of The Corporation shall include:
  - 1) a fund for financing expenditures on ensuring nuclear, radiation, engineering and fire safety, maintaining and equipping emergency rescue structures, payment for their work (services) on prevention and cleanup of the aftermath of emergency situations;
  - 2) a fund for financing expenditures on providing for physical protection, control and accounting of nuclear materials, radioactive agents and radioactive wastes;
  - 3) a fund for financing expenditures related to decommissioning of nuclear facilities, radiation sources, or points of storage, spent nuclear fuel management and financing research and development for analysis and enhancement of the safety of these installations;
  - 4) a fund for financing expenditures to ensure updating the organizations of the nuclear industrial power complex and the nuclear weapons complex of the Russian Federation, development of nuclear science and engineering, conducting planning and research operations, and implementing other investment projects.
3. The special reserve capital of The Corporation shall be generated through contributions from facilities and organizations that operate especially radiation-hazardous and nuclear-hazardous plants and installations. The capital in the said funds shall accumulate in bank accounts of The Corporation.
4. The capital of the fund for financing expenditures related to decommissioning of nuclear facilities, radiation sources, or points of storage, spent nuclear fuel management and financing research and development for analysis and enhancement of the safety of these installations shall accumulate in the bank account of The Corporation in the Central Bank of the Russian Federation.
5. The assets of the special reserve capital of The Corporation shall be used in a procedure approved by the supervisory council of The Corporation. The list of operations (services) financed out of assets of the special reserve capital shall be approved by the supervisory council of The Corporation.
6. Assets of the special reserve capital of The Corporation shall be subject to separately kept accounting.
7. The targeted disbursement of assets of the special reserve capital of The Corporation shall be supervised by the administrative review board of The Corporation.

**Analysis:**

The citation identifies the requirement that Rosatom Corporation develop a financial plan based on a long-term action plan. Budgetary requirements will be defined based on projected activities.

**4.2. Identify the internal sources of funding MPC&A system operation. - Identify all sources of internal and external funding for MPC&A Operations. - Identify candidate sources of indigenous Russian funding for MPC&A Operations. - Create a plan that distinguishes internal from external sources of funding and the funding entity. - Create a funding forecast (future funding profile) and present to Rosatom.**

The site budget plan should identify funding sources that will support the execution of the MPC&A program, including maintenance, repair, and replacement costs for equipment that has reached the end of its service life.

**Analysis:**

MC&A - Regulatory citations identifying state-level funding exists. Regulatory citations identifying organization-level funding exist only for FIS and metrology services (calibration, maintenance of methodologies, measurement quality

control program, and standards). MC&A activities are considered part of the production processes, and funding and budget planning issues are normally addressed in production planning documents

PP - RDP will further work with Rosatom to complete analysis of facility level planning of PP expenses

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0004	Russian Federation Law On Measurement Uniformity	MC, PP	Nº 102-FZ	Article 26	3	RF Parliament	Enacted

**Citation:**

Article 26. Payment for Activities and/or Services Related to Measurement Uniformity

1 Activities and/or services related to the following are paid for using controlled prices, in accordance with procedures established by the Russian Federation government: the performance of mandatory expert metrology reviews of the requirements for measurements, reference materials, and measurement devices set forth in Russian Federation draft regulations; the transmission of units of measurements from governmental measurement standards and the qualification of measurement devices included in the list of measurement devices that may be qualified only by regional government metrology centers accredited in measurement uniformity.

2 Activities and/or services related to the following are paid for by the relevant parties in accordance with the conditions of signed agreements (contracts), unless otherwise specified in Russian Federation law: the performance of testing of reference materials or measurement devices in order to approve a type; attestation of measurement methodologies (methods); the expert metrology review indicated in Sections 2 and 4 of Article 14 of this Federal Law; the qualification of measurement devices not included in the list of measurement devices indicated in Section 1 of this Article; and the calibration of measurement devices.

**Analysis:**

The regulation establishes requirements for funding of metrology activities by the parties involved, based on contractual agreements they sign.

0013	Instructions for Developing Physical Protection Systems for Nuclear Materials, Nuclear Facilities and Nuclear Materials Storage Points. Principles for Organizing the Design Process	PP	RD 95 10544-99; Minatom Order # 538	3.2.7	7	Minatom/Rosatom	Enacted
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**Citation:**

3.2.7 Feasibility indices for the PP system design section shall present the following information:

- The estimated cost of the PP system;
- Expenses for each member of the security department, the security service and PP equipment maintenance and operations personnel;
- Operating expenses (materials, spare parts, energy resources, amortization, etc.);
- Specific cost indices for the PP system (list of cost indices established based on the type of construction);
- Expenses for investigations to assess the vulnerability of a potentially hazardous nuclear site and its PP system.

**Analysis:**

The document identifies elements of cost analysis related to PP system design.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	2.3, 9.2.5, 11.6.4	7	Minatom/Rosatom	Enacted
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**Citation:**

2.3. Funding sources for activities related to physical protection at potentially hazardous nuclear sites may include:

- Resources of the federal budget;
- Ministry resources from special appropriations;

- Internal resources of the potentially hazardous nuclear sites;
- Resources obtained by the potentially hazardous nuclear sites in the form of technical assistance provided under international scientific and technical cooperation.

These resources may be appropriated in accordance with established procedures under ministry or special federal scientific and technical programs, capital construction (renovation) of potentially hazardous nuclear sites and technologies, or research, design, and experimental activities conducted for purposes of increasing the operational safety of potentially hazardous nuclear sites and technologies and increasing PP system effectiveness.

9.2.5 Developing the conceptual design of the PP system includes:

- Estimating the cost of these PP system structural alternatives;
- Selecting an alternative (alternatives) from a cost-benefit standpoint.

11.6.4 The annual and future construction (modernization) and repair plans for site’s engineered barriers and equipment include the construction, modernization or repair of new/existing engineered barriers and equipment located at the site, the associated costs and deadlines, and specify the responsible parties. The plan is developed by the physical protection and security equipment department at the site; if the site is protected by Russian Federation Ministry of the Interior internal security troops, by the staff of the military unit together with the site security department. It is approved by the site manager and the military unit commander.

**Analysis:**

Document identifies funding sources for PP systems and requirements for evaluating costs.

0037	On the Adoption of Regulation on Minatom of Russian Site Security Forces	PP	RF Government Decree # 139	12	4	RF Government	Enacted
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**Citation:**

12 [Para. repealed by Russian Federation Government Decree № 49, dated 01 February 2005.]

Funding for support of site security force units (acquisition of weapons; ammunition; and security, transportation, and communications equipment, etc.) is provided by the protected federal government enterprises, government institutions, and organizations under other forms of ownership. (Revised by Russian Federation Government Decrees № 49, dated 01 February 2005, and № 57, dated 01 February 2006.)

**Analysis:**

Document identifies site responsibility for funding agency security force units.

0708	On Federal Automated Info Sys for Gov Nuc MCA	MC	(Not obtained)	Section 6	7	Minatom/Rosatom	Enacted
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**Citation:**

**6 FINANCIAL SUPPORT FOR THE FIS**

41 Financial support for the operation and enhancement of the FIS is provided by Rosatom with resources from the federal budget and other sources specified by Russian Federation legislation, including international technical assistance.

42 Financial support for the operation of nuclear material control and accounting system elements at organizations generating information to be submitted to the FIS Information Analysis Center is provided by those organizations

**Analysis:**

This section requires Rosatom and the site to fund their FIS MC&A activities.

0725.2	Technical Specifications for the Development of a Federal Automated Nuclear Material Control and Accounting Information System for the State System of Nuclear Material Accounting and Control	MC	(Not obtained)	1.9	7	Minatom/Rosatom	Enacted
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**Citation:**

1.9 Funding

- Financial support for the operation and enhancement of the FIS is provided by Rosatom with resources from the federal budget and other sources specified by Russian Federation legislation, including international technical assistance.
- Financial support for the operation of nuclear material control and accounting system elements at organizations generating information to be submitted to the FIS Information Analysis Center is provided by those organizations.

**Analysis:**

This section requires sites to fund their FIS MC&A activities.

0727	Set of Standard (Model) Forms to Be Developed When Operating Physical Protection and Security Equipment and Procedures for Completing the Forms	PP	(Not obtained)	Appendix 2	7	Minatom/Rosatom	Enacted
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**Citation:**

"Appendix 2 Sample Procurement Requisition Form for Integrated Physical Protection and Security Equipment Procurement requisition lists necessary equipment and prices of listed items. The appendix contains basic requirements for procurement requisition compiling and drawing up."

**Analysis:**

The document prescribes to develop procurement request containing a list of items necessary for the following year and their prices.

3014	Rules for the Funding of Safety Assurance Reserves by Operating Organizations for the Entire Life Cycle and Expansion of Their Especially Hazardous Nuclear and Radiation Production Units and Sites (Excluding Nuclear Power Plants)	MC, PP	RF Decree #576	1, 2(b), 3	4	RF President	Enacted
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**Citation:**

1. The rules herein establish procedures for organizations that operate especially hazardous nuclear and radiation production units and sites to contribute to safety assurance reserves for the entire life cycle and expansion of these units and sites.

2. The organizations must allocate funds to create reserves for the following expenses:  
 (b) support for the physical protection, control and accounting of nuclear material, radioactive material and radioactive waste.

3. Standards for funding of these reserves.... No more than 2% for the reserve stipulated in subsection "b" of section 2 above.

**Analysis:**

Establishes requirement for sites to contribute to a reserve fund, part of which goes toward MPC&A expenses.

3127	Russian Federation Law On Rosatom State Corporation for Atomic Energy	PP, MC	317-FZ	Article 5: 2. 1) a), Article 19-21	3	RF Parliament	Enacted
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**Citation:**

**Article 5. Powers of the President of the Russian Federation and the Government of the Russian Federation with Respect to The Corporation**

2. The Government of the Russian Federation:
  - 1) shall approve:
    - a) the procedure for transferring a capital contribution of the Russian Federation to The Corporation (in the part not regulated by this Federal Law);

**Chapter 4. Program of Activity of The Corporation for the Long-Term Period and Procedure for its Financial Support****Article 19. Program of Activity of The Corporation for the Long-Term Period**

1. To achieve the purposes established by this Federal Law, The Corporation shall develop a program of activity of The Corporation for the long-range period, specifying therein the fulfillment of production, investment and financial indicators, including assignments of state defense procurement orders.
2. Financial support for the program of activity of The Corporation for the long-term period shall be provided by:
  - 1) income from activity of The Corporation;
  - 2) subsidies from the federal budget;
  - 3) funds received by The Corporation for fulfilling assignments of state defense procurement orders;
  - 4) capital contributions of the Russian Federation from funds of the federal budget;
  - 5) funds of special reserve capital of The Corporation;
  - 6) other funds of The Corporation and organizations of The Corporation.
3. The program of activity of The Corporation for the long-term period shall be the basis for drawing up the financial plan of activity of The Corporation.
- 4) The financial plan of activity of The Corporation shall be approved by the supervisory council of The Corporation for at least a three-year period, and shall be subject to annual adjustment.

**Article 20. Special Reserve Capital of The Corporation**

1. The Corporation shall create and manage special reserve capital of The Corporation.
2. The special reserve capital of The Corporation shall include:
  - 1) a fund for financing expenditures on ensuring nuclear, radiation, engineering and fire safety, maintaining and equipping emergency rescue structures, payment for their work (services) on prevention and cleanup of the aftermath of emergency situations;
  - 2) a fund for financing expenditures on providing for physical protection, control and accounting of nuclear materials, radioactive agents and radioactive wastes;
  - 3) a fund for financing expenditures related to decommissioning of nuclear facilities, radiation sources, or points of storage, spent nuclear fuel management and financing research and development for analysis and enhancement of the safety of these installations;
  - 4) a fund for financing expenditures to ensure updating the organizations of the nuclear industrial power complex and the nuclear weapons complex of the Russian Federation, development of nuclear science and engineering, conducting planning and research operations, and implementing other investment projects.
3. The special reserve capital of The Corporation shall be generated through contributions from facilities and organizations that operate especially radiation-hazardous and nuclear-hazardous plants and installations. The capital in the said funds shall accumulate in bank accounts of The Corporation.
4. The capital of the fund for financing expenditures related to decommissioning of nuclear facilities, radiation sources, or points of storage, spent nuclear fuel management and financing research and development for analysis and enhancement of the safety of these installations shall accumulate in the bank account of The Corporation in the Central Bank of the Russian Federation.
5. The assets of the special reserve capital of The Corporation shall be used in a procedure approved by the supervisory council of The Corporation. The list of operations (services) financed out of assets of the special reserve capital shall be approved by the supervisory council of The Corporation.
6. Assets of the special reserve capital of The Corporation shall be subject to separately kept accounting.
7. The targeted disbursement of assets of the special reserve capital of The Corporation shall be supervised by the administrative review board of The Corporation.

**Article 21. Financial Support of the Program of Activity of The Corporation for the Long-Term Period out of Funds of the Federal Budget**

1. The Corporation in conformance with budgetary legislation of the Russian Federation shall be a recipient of subsidies for exercising individual state powers with which it is charged by this Federal Law and providing services for state needs.
2. For purposes of carrying out measures provided for by the program of activity of The Corporation for the long-term period, The Corporation shall receive capital contributions of the Russian Federation out of funds of the federal budget.
3. The Corporation shall prepare and submit to the Government of the Russian Federation proposals for the draft of the federal law on the federal budget for the next fiscal year and for the plan period. The basis for preparation of budgetary proposals of The Corporation for the next fiscal year and for the plan period shall be the program of activity of The Corporation for the long-term period.
4. In conformance with this Federal Law on the basis of decisions of the President of the Russian Federation or the Government of the Russian Federation, state guarantees may be provided to The Corporation as prescribed by budgetary legislation of the Russian Federation.

**Analysis:**

This document establishes federal government responsibility for providing funding for MPC&A activities of Rosatom.

3174	On the Metrology Department of the Federal Atomic Energy Agency	MC	Order 15	5.2	7	Minatom/Rosatom	Enacted
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**Citation:**

5.2 Metrology services rendered by parent and lead organizations, metrology centers, and agency enterprises will be funded by the enterprises involved as stated in the agreements concluded among them.

**Analysis:**

Require arrangements/agreements be made to address financial responsibility for metrology services.

3175	On the Adoption of the Procedures for Allocating, Accounting for, and Disbursing Reserve Funds Accumulated in a Special Rosatom Account Intended to Ensure the Safety of Production Facilities and Sites That Pose a Potential Nuclear or Radiation Hazard...	MC, PP	Order 21	3	7	Minatom/Rosatom	Enacted
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**Citation:**

3. Sources for the reserve funds, which are being accumulated in a special Rosatom account, are funds allotted by organizations for the formation of the following:

- A reserve intended to fund the cost of providing physical protection, control, and accounting for nuclear material, radioactive substances, and radioactive waste.

**Analysis:**

Discusses the allocation of site funds to a special reserve account, part of which covers MPC&A activities.

**5. Preventative Maintenance, repair and calibration**

**The objective of equipment maintenance, repair, and calibration is to ensure MPC&A systems operate as designed, reduce the amount of time systems are not operating due to equipment failures, and to maximize, to the extent possible, the operational life of equipment. An MPC&A system may become vulnerable if there are unscheduled system outages.**

**Analysis:**

MC&A - Regulations address the requirement of this element but do not specifically call out the requirement of a maintenance plan or work control system. Listings of the MC&A equipment are required. Maintenance activities are addressed by facility processing organizations with the participation of MC&A personnel.

PP - PP regulations establish requirements for assessing and devising a site maintenance plan that includes a schedule and process for conducting maintenance activities. There is a clear requirement for a list of installed equipment and spare parts to be maintained. Russian side acknowledged that there is potential regulatory gap and additional regulation might be needed.

**5.1. Conduct evaluation of requirements for MPC&A system maintenance. - Develop an overall site self assessment plan that provides guidance for determining compliance to identified MPC&A related regulations. - Identify vendor requirements for system maintenance**

Nuclear facilities and storage sites shall have an internally published program that establishes requirements for maintaining MPC&A systems. This program shall identify: who is responsible; what shall be done as well as when and how often. This program shall also identify manufacturer warranty requirements and calibration requirements.

**Analysis:**

MC&A - MC&A requirements have been identified that address this sub-element. Facility processing controls this function with participation of MC&A organization. This activity is conducted in accordance with the Law "On Ensuring Uniformity of Measurements" and supporting regulations.

PP - Citations establish requirements for assessing existing maintenance programs.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0004	Russian Federation Law On Measurement Uniformity	MC, PP	Nº 102-FZ	Article 13	3	RF Parliament	Enacted

**Citation:**

**Chapter 3. Government Regulation of Measurement Uniformity**

Article 13. Qualification of Measuring Instruments

- 1 Measuring instruments intended for use in government regulation of measurement uniformity are subject to initial qualification both before commissioning and after repair; during operation, they are subject to periodic qualification. Legal entities and sole proprietors that use measuring instruments in government regulation of measurement uniformity are obligated to submit these measuring instruments for qualification in a timely manner.
- 2 Qualification of measuring instruments is performed by legal entities and sole proprietors accredited in measurement uniformity in accordance with established procedures.
- 3 The Russian Federation government establishes a list of measuring instruments that may be qualified only by regional government metrology centers accredited in measurement uniformity in accordance with established procedures.
- 4 The results of qualification of measuring instruments are attested by a qualification mark and/or a qualification certificate. The design of the measuring instrument shall be such that the qualification mark can be placed on it in a visible location. If the specific features of the design of the measuring instrument or its operating conditions do not allow the mark to be placed directly on it, then it is placed on the qualification certificate.
- 5 The federal executive branch agency that develops government policy and conducts legislative and regulatory control with regard to measurement uniformity establishes the procedures for qualifying measuring instruments and the requirements for qualification marks and the contents of qualification certificates.
- 6 Information regarding the results of the qualification of measuring instruments intended for use in government regulation of measurement uniformity is submitted to the Federal Information System for measurement uniformity by the legal entities and sole proprietors that qualify measuring instruments.
- 7 Measuring instruments not intended for use in government regulation of measurement uniformity may be qualified on a voluntary basis.

**Analysis:**

This article provides requirements for initial and periodic qualification of measuring instruments.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	4, 8.2 Bullet 2 and 7	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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**Citation:**

4 Nuclear Material Measurements

- 4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.
- 4.2 Measurement methodologies shall be incorporated into individual site policy documents that shall be compiled in accordance with the requirements set forth in metrology standards.
- 4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible.
- 4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.
- 4.5 The list of measuring instruments used in the nuclear material measurement system shall contain the instrument name, type, and manufacturer's serial number.
- 4.6 Measuring instruments shall be inspected as specified in current regulations.
- 4.7 Every organization shall develop and implement a measurement quality control program within its nuclear

material measurement system.

**8 Nuclear Material Control and Accounting in Organizations**

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- ...
- What nuclear material control and accounting policies and technical documents have been adopted within the organization
- ...
- Procedures for monitoring the status of nuclear material control and accounting activities within MBAs
- ...

**Analysis:**

This citation directs the manager of the organization to establish policies, technical documents and monitoring programs for the operation of MC&A activities. This includes maintenance activities, documentation and measurement methodologies that successfully pass metrology certification for compliance.

	Provision on		Minatom				
	Interaction of PP		Order #	6.2, 6.2.7,			
0029	Systems at Nuclear	PP	387;	6.2.8,	7	Minatom/Rosatom	Enacted
	Hazardous Facilities		attachment	6.2.9, 7.6			
	of RF Minatom		1				

**Citation:**

6.2 The major areas in the physical protection of the site that require cooperation between the site administration and security department with the security force include:

- Extending the service of life of physical protection and security equipment (security equipment) and replacing the equipment at the end of its service life
- Maintaining physical protection and security equipment (security equipment)

6.2.7 The performance and status of PPS equipment (security system equipment) is verified by:

1. Representatives of the security forces, independently (for systems they bring into operation), based on service needs and at a frequency and scope established by the operating documents for the security system equipment (physical security equipment) and guidelines of the RF MVD internal security troops
2. Representatives of the security department, independently (for systems operated by the physical protection and security equipment department within the security department), based on service needs and at a frequency and scope established by the operating documents for the security system equipment (physical security equipment)

6.2.8 When renovating and performing major overhauls for security system equipment (security equipment), cooperation between the security forces and site security service is organized and implemented during the following stages:

- Analyzing the status of security system equipment (security equipment), developing and issuing design documents for renovating and upgrading security system equipment (security equipment), and determining material and financial expenses
- Procuring equipment and installing, setting up, and bringing security system equipment (security equipment) into operation
- Developing plans to replace electronic detection devices that have exceeded their useful service life and providing a supply of backup instruments

Cooperation is implemented as specified in the design documents and calendar plans for the repair, renovation, and upgrades for the PPS, which are developed based on the technical specifications for the security system equipment (security equipment) and the analysis of security system equipment (security equipment) and PPS effectiveness conducted by the security service and operating security system equipment departments.

6.2.9 Cooperation for the maintenance of physical protection and security equipment (security equipment) is implemented according to the adopted equipment maintenance plans.

**7 Dividing PPS Management Responsibilities between the Security Department and Security Forces**

7.6 In all cases, the security department of the potentially hazardous nuclear site (site security forces) operate the PPSs of local high-risk areas and are responsible for the performance and maintenance of the physical protection systems and equipment in these areas, as well as for the management of the PPSs there. The latter function is performed from the corresponding control rooms and the central control panel.

**Analysis:**

The cited sections address cooperation of site administration, security department and security force to ensure PP equipment is maintained.

0030	Management Structure in Automated PP Systems at Potentially Hazardous Nuclear Facilities	PP	Minatom Order # 387	2.1.2, section 3.1, para 8, 3.8	7	Minatom/Rosatom	Enacted
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**Citation:**

2.1.2. Providing for the effective operation of a PP system as a whole, of its constituent elements, and for their interface which means, first and foremost, the actions to be taken by PP system personnel requires resolution of issues related to the joint command of subsystems and components within the PP system, creating optimal decision making mechanisms, including real-time decisions.

Command within a PP system shall be directed toward:

- Maintaining physical protection equipment in good repair and taking appropriate reinforcement measures if equipment malfunctions or is undergoing routine maintenance;

3.1 para 8: Requirements that the vitality of the PP system be preserved in spite of sabotage or other unauthorized actions leads to the necessity of constructing distributed databases to go along with the distributed, decentralized organizational structures. Their distribution, the DB management and maintenance procedures, data structures, backup and alignment shall be established by standards documents for the respective categories of sites.

**3.8. Recommendations on the operation of automated PP systems**

The process of effectively operating and expanding automated PP systems is supported by compliance with Procedures and regulations regarding operational use, operational servicing, recovery and upgrading of automated systems.

In order to operate PP systems effectively, a set of standards documents must be developed for each category of site; these documents shall specify requirements for the performance of all necessary functions. This set of requirements shall reflect:

- Operational support procedures (technical maintenance and repair);

The conduct of activities to support and upgrade automated subsystems that operate within the framework of the PP system shall be assigned to the appropriate administrative units at the site. Operational support for automated subsystems turned over to units of the MVD internal security troops shall be performed by the personnel of these units....

System functionality shall be maintained by means of:

- Compliance with the requirements of operations documentation and standards documents during the operation, recovery, and upgrading of all automation equipment;
- Rational planning and management of the full scope of activities related to the operation, servicing, recovery, and upgrading of all automation equipment;
- Timely and efficient entry into technical documentation of all changes associated with changing subsystem operating conditions, increasing operational effectiveness, correcting errors, hardware and software upgrades and replacements;
- Periodically conducting preventive testing, verification, and developing regular steps to eliminate operational deficiencies that are uncovered;
- Repairing equipment and testing the equipment after it has been returned to service;
- Organizing the maintenance and monitoring of auxiliary subsystems, devices, and facilities in the central and field command posts (including personnel life support systems).

The following forms of operational servicing may be employed:

- Individual - by establishing at each site a specialized unit to operate hardware and software and ensure the performance of all types of servicing;
- Centralized - by servicing through regional centers that have staff specialists, all necessary documentation, spare parts, and specialized equipment;
- Comprehensive - by performing all activities related to maintaining the functionality of the automated PP system, including technical maintenance and repairs, software support, personnel training, and other activities.

A system of remote servicing and diagnosis may be employed for automated PP systems in unmanned or remote sites equipped with distributed computer complexes. Remote and unmanned systems that are connected by communications links to a center geographically remote from them, can be diagnosed remotely using built-in diagnostic systems with test results transmitted to the center.

Software and hardware operating procedures shall be based on implementation of Procedures and regulations for servicing automated PP systems software and hardware related to:

- Conducting preventive maintenance activities as prescribed in operating documentation for the automated PP

systems hardware;

- Setup and diagnostic testing of software and hardware;
- Periodic verification and debugging of existing and newly installed software;
- Testing and refinement of new technological modes for information processing;
- when hardware and software systems fail or crash;
- Transitioning to backup equipment and changing information processing schema in emergency mode or when failure occurs....

Improving the indicators related to operations, maintenance, effectiveness, and technical level is a constituent element in automated PP system operational support....

In order to improve operational effectiveness and reliability and to isolate the effects of software and hardware crashes (failures) in complex, multi-level automated PP systems, it is recommended that an automated monitoring and recovery system be established and that it contain the following subsystems:

- Automated diagnostics;
- Automated conduct of preventive testing;
- Automated logging and processing [of information] regarding failures and crashes.

Using such a system makes it possible to reduce costs and shorten the time required for system setup and rollout, and to ensure the effectiveness and targeting of preventive maintenance.

**Analysis:**

2.1.2, section 3.1, para 8: This document is a methodological recommendation document and focuses on automated PP systems. It directs management to maintain PP system equipment in good repair and to ensure that automated systems have "distributed, decentralized organizational structures."

3.8: This document requires sites to conduct preventive maintenance for automated PP systems hardware.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.3.6.3, 7.13.1, 11.2, 11.3, 11.6.3, 11.6.5, 11.7, 11.9	7	Minatom/Rosatom	Enacted
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**Citation:**

3.3.6.3 The operation of physical protection and security equipment shall provide for implementation of a preventive maintenance program.

7.13.1 The components of the physical protection equipment complex must include work stations for conducting scheduled maintenance and repair work.

11.2 Managers and leaders at all levels are responsible for the proper organization and operation of the physical protection and security equipment.

Within the scope of their duties, managers, department heads, the engineering staff and physical protection and security equipment personnel are directly responsible for the status of physical protection and security equipment, as well as for their maintenance and repair in a proper and timely manner.

11.3 Servicing, operational maintenance and minor repairs to physical protection and security equipment and engineered barriers shall be funded by the potentially hazardous nuclear facility.

11.6.3 Major documents for planning the construction and operation of physical protection and security equipment include:

- An annual maintenance schedule for the site's engineered barriers and equipment;

11.6.5 The physical protection and security equipment department at the site (if the site is protected by Russian Federation Ministry of the Interior internal security troops, by the staff of the military unit together with the site security

department) develops the annual site maintenance schedule for physical protection and security equipment; this plan is approved by the staff supervisor of the unit (force) and the assistant manager of the security service. The maintenance plan is specified for each type (groups of examples of each type) of physical protection equipment.

11.7 Physical protection and security equipment maintenance and repair.

11.7.1 A set of administrative and engineering measures shall be established to ensure the servicing and

maintenance of physical protection and security equipment to keep it in proper working order.

11.7.2 Maintenance of physical protection and security equipment includes:

- Routine activities;
- Unscheduled maintenance;
- Maintenance while in storage;
- Inspection of measuring instruments.

Basic maintenance of engineered barriers and equipment consists of routine activities.

11.7.3 physical protection and security equipment maintenance includes the following major tasks:

- Identifying and eliminating deficiencies in the engineered barriers and equipment of the potentially hazardous nuclear site;
  - Establishing a qualitative status for engineered barriers and equipment and verifying their operation;
  - Ensuring that PP equipment operates at its optimum level and that operating time between repairs is extended;
  - Mitigate the effects of adverse climatic and other conditions on engineered barriers and equipment;
  - Instrument verification and bringing the electrical parameters of lines, cables and switches within established norms;
  - Identifying and eliminating defects and warning of PP equipment failures;
  - Identifying and eliminating violations of safety rules and measures by personnel;
  - Preparing engineered barriers and equipment for operation in summer and winter;
  - Verifying that the devices are fully equipped and that the appropriate instruments and spare parts are available.
- 11.7.4 Maintenance of physical protection and security equipment is organized by the managers of the physical protection and security equipment departments and is performed at intervals established by the departments that have been assigned these devices.

11.7.5 Physical protection and security equipment is maintained according to a scheduled maintenance systems that may stipulate the following intervals for routine maintenance: daily, weekly, monthly, quarterly, bi-annually and annually.

Procedures for performing routine maintenance are established in the technical documentation for the physical protection and security equipment.

11.7.6 During the performance of routine activities:

- Deficiencies in engineered barriers and equipment are identified and eliminated;
- PP equipment and power sources are serviced;
- PP equipment parameters are checked and adjusted to the norms stipulated in the operator's documentation;
- The procedures for PP equipment maintenance and its quality are monitored for compliance;
- Compliance with safety rules and measures is monitored;
- Operations documentation is checked and filled out.

The individuals who perform routine activities are responsible for the quality and completion of the activities.

11.7.7 Depending on the specific characteristics of the physical protection and security equipment and the nature and extent of the damage, repairs may be conducted within or outside the normal maintenance schedule. The physical protection and security equipment is repaired where the equipment is installed if it will not require a long time to complete. In all other cases removable apparatus (modules) are replaced by spares, and repairs are conducted in the repair shop or at the manufacturer.

11.7.8 As a rule, major overhauls, routine maintenance and remediation maintenance to fixed structures are performed using site personnel and funds within the annual construction and maintenance plan for the physical protection and security equipment at the site.

11.9 Maintaining operating and technical documentation for physical protection and security equipment is conducted in the physical protection and security equipment department. Major operating documentation is supplied by the manufacturer together with each piece of physical protection and security equipment. Major operating documentation include:

- Specifications;
- Operations procedures;
- Installation, start-up, and adjustment instructions;
- Item log;
- Vendor manual;
- A list of all the parts.

#### **Analysis:**

3.3.6.3, 7.13.1, 11.2, 11.3, 11.6.3 - Citations include requirements for a preventive maintenance program at the site level, as well as an annual maintenance schedule.

11.6.5 - Citation assigns responsibility for developing annual maintenance schedule

11.7 - Section 11.7 identifies four different types of maintenance activities (routine, unscheduled, maintenance in storage, inspection of measuring instruments), and identifies the major tasks of the maintenance program.

11.9: This section requires maintenance of operating and technical documentation for PP equipment.

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	Nuclear Material Control and Accounting Standard (Model) Quality Control Program for Nuclear Material Measurements	MC	OST 95 10598-2008	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

**Analysis:**

This agency standard (OST 95 10598-2008) has been adopted by Rosatom and sets the standards for a measurement quality control for MC&A measurements. It contains status monitoring, performance evaluation, maintenance, and calibration standards for measurements.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	Entire Document		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

The whole document because it refers to metrology of the equipment throughout the standard.

0727	Set of Standard (Model) Forms to Be Developed When Operating Physical Protection and Security Equipment and Procedures for Completing the Forms	PP	(Not obtained)	4.1.2	7	Minatom/Rosatom	Enacted
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**Citation:**

4.1.2 Physical protection system equipment maintenance plans shall include mandatory activities for inspecting or calibrating the measurement equipment used. The ability to change the calibration of measurement equipment shall be determined by the director of the organization that operates the physical protection system equipment in accordance with Russian Federation laws on measurement uniformity.

**Analysis:**

Physical protection system equipment maintenance plans shall include mandatory activities for inspecting or calibrating the measurement equipment used.

0757	Procedures for the Turnover of Physical Protection and Security Equipment to Security Forces	PP	10697-A-D1	3.8, 3.9	7	Minatom/Rosatom	Enacted
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**Citation:**

3.8 Security force units and the administration at the nuclear site organize measures directed at maintaining the physical protection and security equipment and restoring it to good working order, as specified in the provisions and requirements set forth in the Inter-Agency (Agency) Committee Report and at the expense of the nuclear site. The scope and specific types of activities conducted by site personnel and by security force personnel with regard to operating the physical protection and security equipment are established in Appendix 3 (the "Assignment of

Responsibilities”) to the Transfer Certificate that is generated when the physical protection and security equipment is transferred to the security forces.

In order to perform servicing, repairs, storage, and other measures intended to maintain and restore the operability, performance, and reliability of physical protection and security equipment, the nuclear site may create specialized units or use existing technical units, or contract with specialized outside organizations that are licensed to perform the specified types of activity.

All documents regarding the organization and conduct of measures to provide for the technical operation/maintenance of the physical protection and security equipment are developed in accordance with established procedures by both the administration at the nuclear site and the security force command staff and shall be coordinated with one another.

3.9 The commander of the security force unit (military unit commander or Atom Guard unit commander) is responsible for organizing the proper use of physical protection and security equipment as intended. Responsibility for the material condition of the equipment and for organizing its technical operation/maintenance is borne by the nuclear site director. The security force commander is responsible for carrying out the measures directed at maintaining the equipment in proper operating condition, which are assigned to the security force unit per the “Assignment of Responsibilities.”

**Analysis:**

This regulation establishes that the security force commander is responsible to ensure that PPS equipment assigned to the security force is maintained in proper operating condition. It also requires agreement on the scope of specific maintenance activities that will be conducted by site personnel and security personnel.

0802	Regulation on Agency Monitoring of the Status of Physical Protection for Nuclear Material, Nuclear Facilities, and Nuclear Material Storage Points Within the Government Atomic Energy Corporation Rosatom	PP	Appendix to Order № 865	4.1.3 Bullet 3, 4.1.7 Bullet 2	4	RF Government	Enacted
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**Citation:**

**4.1.3 Management of physical protection personnel hiring and training. The following are inspected under this category:**

- Results of verifying practical skills in the use and technical maintenance of physical protection equipment, measures taken to interdict an unauthorized action, etc. (to include performance tests)

**4.1.7 Operation of physical protection and security equipment. The following are inspected under this category:**

- The quality and timeliness of maintenance and repairs performed on physical protection and security equipment

**Analysis:**

These citations establish the requirement for agency monitoring and inspection of site maintenance activities and maintenance documentation for PPS equipment.

0830	Methodology and Criteria for Assessing the Status of the Physical Protection System	PP		4.7 Bullet 2, 4.7.2	7	Minatom/Rosatom	Enacted
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**Citation:**

4.7 Assessing the status of activities related to the function “operation of physical protection and security equipment”

The rating for the criterion “operation of physical protection and security equipment” is based on the results of the component criteria assessment:

- ...
- The quality and timeliness of maintenance and repairs for integrated physical protection and security equipment
- ...

4.7.2 Procedures for assessing the component criterion “quality and timeliness of maintenance and repairs for integrated physical protection and security equipment”

The rating for the component criterion “quality and timeliness of maintenance and repairs for integrated physical protection and security equipment” is based on an inspection to confirm compliance of the following individual assessment criteria with established requirements:

- Procedures for developing maintenance schedules for physical protection and security equipment (if not provided in operations documents), and their compliance with the requirements set forth in regulatory and operations documents
- Performing maintenance and repairs when physical protection and security equipment is used for its intended purpose
- Performing maintenance when physical protection and security equipment is in storage
- Procedures for prepping physical protection and security equipment for the spring-summer and fall-winter seasons
- The organization of maintenance quality control by officials
- The organization of procurement and storage of supplies required for the operation of physical protection and security equipment
- The presence and status of measuring instruments, testing equipment, and their technical documentation, and testing programs and methodologies required to periodically inspect and test physical protection and security equipment
- The presence of maintenance work areas and equipping them in accordance with operations documentation; procedures and implementation of standards for field testing and calibration of the measuring instruments and devices being used

The result of the assessment for individual criteria is specified using the two level rating scale.

Procedures for assessing the component criterion “quality and timeliness of maintenance and repairs for integrated physical protection and security equipment” are presented in Table 4.7.2.

**Analysis:**

These citations establish the methodology to be used for agency and site assessments of site maintenance activities and maintenance documentation for PPS equipment.

**5.2. Identify and document methods and schedules of maintenance. - Develop a maintenance schedule that corresponds to the Master Equipment List (MEL) and identify responsible maintenance organizations and update as necessary. - Develop a site maintenance plan for all MPC&A System components. - Develop or identify a work control system for planning and conducting maintenance.**

Methods and schedules of maintenance activities must be documented and tied to the master equipment list or an equivalent document in order to ensure that no equipment is overlooked in the maintenance plan.

**Analysis:**

MC&A - The citations listed address this subelement requirement, but do not specifically address preventative maintenance or repair of equipment, site maintenance plan, or a work control system for planning and conducting maintenance. Facility processing controls this function with participation of MC&A organization. Facility documentation is not available to the US team. This activity is conducted in accordance with the Law “On Ensuring Uniformity of Measurements” and supporting regulations.

PP - The citations require development of site-level maintenance plan that includes a schedule and process for conducting maintenance.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0004	Russian Federation Law On Measurement Uniformity	MC, PP	Nº 102-FZ	Article 13	3	RF Parliament	Enacted

**Citation:**

**Chapter 3. Government Regulation of Measurement Uniformity**

Article 13. Qualification of Measuring Instruments

- 1 Measuring instruments intended for use in government regulation of measurement uniformity are subject to initial qualification both before commissioning and after repair; during operation, they are subject to periodic qualification. Legal entities and sole proprietors that use measuring instruments in government regulation of measurement uniformity are obligated to submit these measuring instruments for qualification in a timely manner.
- 2 Qualification of measuring instruments is performed by legal entities and sole proprietors accredited in measurement uniformity in accordance with established procedures.

- 3 The Russian Federation government establishes a list of measuring instruments that may be qualified only by regional government metrology centers accredited in measurement uniformity in accordance with established procedures.
- 4 The results of qualification of measuring instruments are attested by a qualification mark and/or a qualification certificate. The design of the measuring instrument shall be such that the qualification mark can be placed on it in a visible location. If the specific features of the design of the measuring instrument or its operating conditions do not allow the mark to be placed directly on it, then it is placed on the qualification certificate.
- 5 The federal executive branch agency that develops government policy and conducts legislative and regulatory control with regard to measurement uniformity establishes the procedures for qualifying measuring instruments and the requirements for qualification marks and the contents of qualification certificates.
- 6 Information regarding the results of the qualification of measuring instruments intended for use in government regulation of measurement uniformity is submitted to the Federal Information System for measurement uniformity by the legal entities and sole proprietors that qualify measuring instruments.
- 7 Measuring instruments not intended for use in government regulation of measurement uniformity may be qualified on a voluntary basis.

**Analysis:**

This article provides requirements for initial and periodic qualification of measuring instruments.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	6.3, 6.5.4	7	Minatom/Rosatom	Enacted
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**Citation:**

**6.3 Measuring Instruments**

- 6.3.1 General Requirements
- 6.3.2 Calibration of Measuring Instruments
- 6.3.3 Field Calibration (Checking) of Measuring Instruments
- 6.3.4 Graduation of Measuring Instruments

6.5.4 Internal Measurements Quality Control

**Analysis:**

These sections require measurement equipment and methods to be calibrated and certified. Quality control programs are required that identify when measurement methods are failing and corrective maintenance is required.

0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	6.2, 6.2.7, 6.2.8, 6.2.9, 7.6	7	Minatom/Rosatom	Enacted
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**Citation:**

- 6.2 The major areas in the physical protection of the site that require cooperation between the site administration and security department with the security force include:
  - Extending the service of life of physical protection and security equipment (security equipment) and replacing the equipment at the end of its service life
  - Maintaining physical protection and security equipment (security equipment)
- 6.2.7 The performance and status of PPS equipment (security system equipment) is verified by:
  1. Representatives of the security forces, independently (for systems they bring into operation), based on service needs and at a frequency and scope established by the operating documents for the security system equipment (physical security equipment) and guidelines of the RF MVD internal security troops
  2. Representatives of the security department, independently (for systems operated by the physical protection and security equipment department within the security department), based on service needs and at a frequency and scope established by the operating documents for the security system equipment (physical security equipment)
- 6.2.8 When renovating and performing major overhauls for security system equipment (security equipment), cooperation between the security forces and site security service is organized and implemented during the following stages:
  - Analyzing the status of security system equipment (security equipment), developing and issuing design documents for renovating and upgrading security system equipment (security equipment), and determining material and financial expenses
  - Procuring equipment and installing, setting up, and bringing security system equipment (security equipment) into

operation

- Developing plans to replace electronic detection devices that have exceeded their useful service life and providing a supply of backup instruments

Cooperation is implemented as specified in the design documents and calendar plans for the repair, renovation, and upgrades for the PPS, which are developed based on the technical specifications for the security system equipment (security equipment) and the analysis of security system equipment (security equipment) and PPS effectiveness conducted by the security service and operating security system equipment departments.

6.2.9 Cooperation for the maintenance of physical protection and security equipment (security equipment) is implemented according to the adopted equipment maintenance plans.

**7 Dividing PPS Management Responsibilities between the Security Department and Security Forces**

7.6 In all cases, the security department of the potentially hazardous nuclear site (site security forces) operate the PPSs of local high-risk areas and are responsible for the performance and maintenance of the physical protection systems and equipment in these areas, as well as for the management of the PPSs there. The latter function is performed from the corresponding control rooms and the central control panel.

**Analysis:**

The cited sections address cooperation of site administration, security department and security force to ensure PP equipment is maintained.

0030	Management Structure in Automated PP Systems at Potentially Hazardous Nuclear Facilities	PP	Minatom Order # 387	2.1.2, section 3.1, 7 para 8	Minatom/Rosatom	Enacted
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**Citation:**

2.1.2. Providing for the effective operation of a PP system as a whole, of its constituent elements, and for their interface which means, first and foremost, the actions to be taken by PP system personnel requires resolution of issues related to the joint command of subsystems and components within the PP system, creating optimal decision making mechanisms, including real-time decisions.

Command within a PP system shall be directed toward:

- Maintaining physical protection equipment in good repair and taking appropriate reinforcement measures if equipment malfunctions or is undergoing routine maintenance;

3.1 para 8: Requirements that the vitality of the PP system be preserved in spite of sabotage or other unauthorized actions leads to the necessity of constructing distributed databases to go along with the distributed, decentralized organizational structures. Their distribution, the DB management and maintenance procedures, data structures, backup and alignment shall be established by standards documents for the respective categories of sites.

**Analysis:**

This document is a methodological recommendation document and focuses on automated PP systems. It directs management to maintain PP system equipment in good repair and to ensure that automated systems have "distributed, decentralized organizational structures."

0030	Management Structure in Automated PP Systems at Potentially Hazardous Nuclear Facilities	PP	Minatom Order # 387	3.8	7	Minatom/Rosatom	Enacted
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**Citation:**

**3.8. Recommendations on the operation of automated PP systems**

The process of effectively operating and expanding automated PP systems is supported by compliance with Procedures and regulations regarding operational use, operational servicing, recovery and upgrading of automated systems.

In order to operate PP systems effectively, a set of standards documents must be developed for each category of site; these documents shall specify requirements for the performance of all necessary functions. This set of requirements shall reflect:

- Operational support procedures (technical maintenance and repair);

The conduct of activities to support and upgrade automated subsystems that operate within the framework of the

PP system shall be assigned to the appropriate administrative units at the site. Operational support for automated subsystems turned over to units of the MVD internal security troops shall be performed by the personnel of these units....

System functionality shall be maintained by means of:

- Compliance with the requirements of operations documentation and standards documents during the operation, recovery, and upgrading of all automation equipment;
- Rational planning and management of the full scope of activities related to the operation, servicing, recovery, and upgrading of all automation equipment;
- Timely and efficient entry into technical documentation of all changes associated with changing subsystem operating conditions, increasing operational effectiveness, correcting errors, hardware and software upgrades and replacements;
- Periodically conducting preventive testing, verification, and developing regular steps to eliminate operational deficiencies that are uncovered;
- Repairing equipment and testing the equipment after it has been returned to service;
- Organizing the maintenance and monitoring of auxiliary subsystems, devices, and facilities in the central and field command posts (including personnel life support systems).

The following forms of operational servicing may be employed:

- Individual - by establishing at each site a specialized unit to operate hardware and software and ensure the performance of all types of servicing;
- Centralized - by servicing through regional centers that have staff specialists, all necessary documentation, spare parts, and specialized equipment;
- Comprehensive - by performing all activities related to maintaining the functionality of the automated PP system, including technical maintenance and repairs, software support, personnel training, and other activities.

A system of remote servicing and diagnosis may be employed for automated PP systems in unmanned or remote sites equipped with distributed computer complexes. Remote and unmanned systems that are connected by communications links to a center geographically remote from them, can be diagnosed remotely using built-in diagnostic systems with test results transmitted to the center.

Software and hardware operating procedures shall be based on implementation of Procedures and regulations for servicing automated PP systems software and hardware related to:

- Conducting preventive maintenance activities as prescribed in operating documentation for the automated PP systems hardware;
- Setup and diagnostic testing of software and hardware;
- Periodic verification and debugging of existing and newly installed software;
- Testing and refinement of new technological modes for information processing;
- when hardware and software systems fail or crash;
- Transitioning to backup equipment and changing information processing schema in emergency mode or when failure occurs....

Improving the indicators related to operations, maintenance, effectiveness, and technical level is a constituent element in automated PP system operational support....

In order to improve operational effectiveness and reliability and to isolate the effects of software and hardware crashes (failures) in complex, multi-level automated PP systems, it is recommended that an automated monitoring and recovery system be established and that it contain the following subsystems:

- Automated diagnostics;
- Automated conduct of preventive testing;
- Automated logging and processing [of information] regarding failures and crashes.

Using such a system makes it possible to reduce costs and shorten the time required for system setup and rollout, and to ensure the effectiveness and targeting of preventive maintenance.

**Analysis:**

This document requires sites to conduct preventive maintenance for automated PP systems hardware.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.3.6.3, 7.13.1, 11.2, 11.3, 11.6.3, 11.6.5, 11.7	7	Minatom/Rosatom	Enacted
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**Citation:**

3.3.6.3 The operation of physical protection and security equipment shall provide for implementation of a preventive maintenance program.

7.13.1 The components of the physical protection equipment complex must include work stations for conducting scheduled maintenance and repair work.

11.2 Managers and leaders at all levels are responsible for the proper organization and operation of the physical protection and security equipment.

Within the scope of their duties, managers, department heads, the engineering staff and physical protection and security equipment personnel are directly responsible for the status of physical protection and security equipment, as well as for their maintenance and repair in a proper and timely manner.

11.3 Servicing, operational maintenance and minor repairs to physical protection and security equipment and engineered barriers shall be funded by the potentially hazardous nuclear facility.

11.6.3 Major documents for planning the construction and operation of physical protection and security equipment include:

- An annual maintenance schedule for the site's engineered barriers and equipment;

11.6.5 The physical protection and security equipment department at the site (if the site is protected by Russian Federation Ministry of the Interior internal security troops, by the staff of the military unit together with the site security department) develops the annual site maintenance schedule for physical protection and security equipment; this plan is approved by the staff supervisor of the unit (force) and the assistant manager of the security service. The maintenance plan is specified for each type (groups of examples of each type) of physical protection equipment.

### **11.7 Physical protection and security equipment maintenance and repair.**

11.7.1 A set of administrative and engineering measures shall be established to ensure the servicing and maintenance of physical protection and security equipment to keep it in proper working order.

11.7.2 Maintenance of physical protection and security equipment includes:

- Routine activities;
- Unscheduled maintenance;
- Maintenance while in storage;
- Inspection of measuring instruments.

Basic maintenance of engineered barriers and equipment consists of routine activities.

11.7.3 physical protection and security equipment maintenance includes the following major tasks:

- Identifying and eliminating deficiencies in the engineered barriers and equipment of the potentially hazardous nuclear site;
- Establishing a qualitative status for engineered barriers and equipment and verifying their operation;
- Ensuring that PP equipment operates at its optimum level and that operating time between repairs is extended;
- Mitigate the effects of adverse climatic and other conditions on engineered barriers and equipment;
- Instrument verification and bringing the electrical parameters of lines, cables and switches within established norms;
- Identifying and eliminating defects and warning of PP equipment failures;
- Identifying and eliminating violations of safety rules and measures by personnel;
- Preparing engineered barriers and equipment for operation in summer and winter;
- Verifying that the devices are fully equipped and that the appropriate instruments and spare parts are available.

11.7.4 Maintenance of physical protection and security equipment is organized by the managers of the physical protection and security equipment departments and is performed at intervals established by the departments that have been assigned these devices.

11.7.5 Physical protection and security equipment is maintained according to a scheduled maintenance systems that may stipulate the following intervals for routine maintenance: daily, weekly, monthly, quarterly, bi-annually and annually.

Procedures for performing routine maintenance are established in the technical documentation for the physical protection and security equipment.

11.7.6 During the performance of routine activities:

- Deficiencies in engineered barriers and equipment are identified and eliminated;
- PP equipment and power sources are serviced;
- PP equipment parameters are checked and adjusted to the norms stipulated in the operator's documentation;
- The procedures for PP equipment maintenance and its quality are monitored for compliance;
- Compliance with safety rules and measures is monitored;
- Operations documentation is checked and filled out.

The individuals who perform routine activities are responsible for the quality and completion of the activities.

11.7.7 Depending on the specific characteristics of the physical protection and security equipment and the nature and extent of the damage, repairs may be conducted within or outside the normal maintenance schedule. The physical protection and security equipment is repaired where the equipment is installed if it will not require a long time to complete. In all other cases removable apparatus (modules) are replaced by spares, and repairs are conducted in the repair shop or at the manufacturer.

11.7.8 As a rule, major overhauls, routine maintenance and remediation maintenance to fixed structures are performed using site personnel and funds within the annual construction and maintenance plan for the physical protection and security equipment at the site.

### **Analysis:**

3.3.6.3, 7.13.1, 11.2, 11.3, 11.6.3 - Citations include requirements for a preventive maintenance program at the

site level, as well as an annual maintenance schedule.

11.6.5 - Citation assigns responsibility for developing annual maintenance schedule

11.7 - Section 11.7 identifies four different types of maintenance activities (routine, unscheduled, maintenance in storage, inspection of measuring instruments), and identifies the major tasks of the maintenance program.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	11.9	7	Minatom/Rosatom	Enacted
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**Citation:**

11.9 Maintaining operating and technical documentation for physical protection and security equipment is conducted in the physical protection and security equipment department. Major operating documentation is supplied by the manufacturer together with each piece of physical protection and security equipment. Major operating documentation include:

- Specifications;
- Operations procedures;
- Installation, start-up, and adjustment instructions;
- Item log;
- Vendor manual;
- A list of all the parts.

**Analysis:**

This section requires maintenance of operating and technical documentation for PP equipment.

0034	Provision on Agency Monitoring of PP System Status at Nuclear Hazardous Facilities	PP	Minatom Order # 309	1.5.1, 2.4.1	7	Minatom/Rosatom	Enacted
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**Citation:**

1.5.1 The members of committees monitoring the physical protection system status at a potentially hazardous nuclear site shall have the right to obtain and review materials related to the site vulnerability analysis, including the location of points of vulnerability at the potentially hazardous nuclear site, on which an unauthorized action may lead to hazardous consequences, as well as with the following documentation:

- The plan of inspection and maintenance of physical protection equipment;

2.4.1 The administration at the potentially hazardous nuclear site shall undertake to furnish the committee with the following to prepare for an inspection:

- Information on the operability and status of physical protection equipment;
- The plan for inspecting the status and operability of physical protection equipment;

**Analysis:**

Document deals with the scope of agency monitoring activities, and states that presence of documents related to maintenance plan/program will be checked during agency monitoring activities.

0722	Nuclear Material Control and Accounting Standard (Model) Quality Control Program for Nuclear Material Measurements	MC	OST 95 10598-2008	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

**Analysis:**

This agency standard (OST 95 10598-2008) has been adopted by Rosatom and sets the standards for a measurement quality control for MC&A measurements. It contains status monitoring, performance evaluation, maintenance, and calibration standards for measurements.

State System for Common

0723	Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	Entire Document		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

The whole document because it refers to metrology of the equipment throughout the standard.

0727	Set of Standard (Model) Forms to Be Developed When Operating Physical Protection and Security Equipment and Procedures for Completing the Forms	PP	(Not obtained)	4.1.2, 4.1.3, Appendix 1	7	Minatom/Rosatom	Enacted
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**Citation:**

4.1.2 Physical protection system equipment maintenance plans shall include mandatory activities for inspecting or calibrating the measurement equipment used. The ability to change the calibration of measurement equipment shall be determined by the director of the organization that operates the physical protection system equipment in accordance with Russian Federation laws on measurement uniformity.

4.1.3 The frequency with which inspection or laboratory calibration is performed on measurement equipment used when operating physical protection system equipment shall be established in accordance with the operating documentation for the measurement equipment. In the event there is no such documentation, inspection or laboratory calibration shall be conducted every 12 months.

Measurement equipment shall be tested or calibrated by an authorized regional metrology agency or the Metrology Department at the organization that operates the physical protection system equipment (if this service possesses the necessary testing and calibration accreditation).

Appendix 1 - Sample Measuring Instrument Accounting Log

the log is a list of measurement instrument used for ETM operation, information about verification frequency, planned and actual dates of verification. The appendix also contains recommendation for log maintenance and defines personnel responsible for the maintenance.

**Analysis:**

The document requires to include measurement instrument verification and calibration in technical maintenance plans. Requirements for frequency of verification and calibration of measurement instrument used for PPS TM operation are also set.

0794	Methodological Recommendations Regarding Scheduled Maintenance Procedures for Physical Protection and Security Equipment	PP		4.3.5, 4.5.2, 4.5.3, 4.5.4 bullet 1,3 (4.5.4.1 bullet 1,3,5, 4.5.4.3 bullet 3)	7	Minatom/Rosatom	Enacted
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**Citation:**

4.3.5 The nuclear site metrology department or the organization that operates security system equipment develops a list of the measuring instruments subject to verification.

4.5.2 The type and frequency of maintenance are established in operating documents, including the operating manual, maintenance instructions, and operating instructions. The operating documents that establish maintenance procedures may differ depending on the type of physical protection and security equipment and the year the equipment was produced.

4.5.3 The scope of work (including of testing) for performing maintenance is defined by its schedule. The following types of schedules for physical protection and security equipment are called for:

- Schedule № 1: daily
- Schedule № 2: weekly
- Schedule № 3: monthly
- Schedule № 4: quarterly
- Schedule № 5: semi-annual
- Schedule № 6: annual

Certain schedules may be omitted as appropriate for specific types of physical protection and security equipment (groups of items). The developer of the physical protection and security equipment specifies the content of each schedule in the operating documentation.

The recommended list of activities for each schedule is presented in Appendix 3 herein.

4.5.4 When an item of equipment requires maintenance during operation and there is no maintenance schedule in the operating documentation, maintenance schedules shall be developed by specialists from the administrative units that operate the physical protection and security equipment directly at the nuclear site. Maintenance schedules for physical protection and security equipment must contain the following sections:

- Section 1: General Provisions

Section 3: Process Control Cards for Maintenance

4.5.4.1 The section "General Provisions" must contain the following:

- The characteristics and frequency of each type of maintenance for physical protection and security equipment
- A list of operations and descriptions of activities, including preparatory work (Appendix 2)
- Procedures for documenting maintenance work in the equipment log and in the accounting log for scheduled maintenance of physical protection and security equipment (Appendix 4)

4.5.4.3 Section 3, "Process Control Cards for Maintenance," must contain the following:

- The technical sequence for performing maintenance procedures

**Analysis:**

The document requires to develop maintenance procedures (if there are no such procedures established in manufacturer documentation). Procedures shall set scopes, procedures and frequency of technical maintenance. The document requires to compile a list of measurement instruments which subject to verification.

0796	Instructional Guidelines for Preparation of Statements of Work for the Creation (Modernization) of Physical Protection Systems at Nuclear Facilities	PP	2.5.3	7	Minatom/Rosatom	Enacted
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**Citation:**

2.5.3. The subsection entitled Requirements for PP and Security Equipment shall contain the following:

- Requirements for integrated PP and security equipment as a whole:
  - Requirements for the structure and operation of integrated PP and security equipment
  - Restrictions regarding the use of various integrated PP and security equipment components (elements) and hardware, including certification requirements
  - Requirements for the operation, servicing, and repair of various integrated PP and security equipment components (elements) and hardware
  - Requirements for restrictions with respect to the number and qualifications of integrated PP and security equipment maintenance personnel (these requirements are revised during PPS design and startup)
  - The list of design, detail design, operating, and administrative documentation presented to the acceptance committee for PP and security equipment system (subject to revision during PPS design and startup)
  - Additional requirements (as necessary)
- Requirements for security system equipment:
  - Functional requirements
  - Electromagnetic compatibility requirements
  - Reliability requirements
  - Requirements for stability against external factors
  - Requirements for the compatibility of security system and other facility equipment
  - Ergonomic requirements
  - Design requirements
  - Operational requirements
  - Software requirements
  - Requirements regarding the necessary complement and packaging of operating documentation

- Safety requirements
- Additional requirements (as necessary)
- Requirements for PP equipment
- Requirements for installation of PP and security equipment in secure areas:
- Exclusion area at the perimeter of the protected area
- Perimeters of other secure areas
- Secure buildings, structures, and rooms
- Requirements for primary (central and field) and backup control panels and for automated analysis workstations
- Requirements for vehicles and PP and security equipment used during onsite transportation of nuclear material

**Analysis:**

This citation identifies that requirements for operation, servicing, and repair of PP equipment be identified at the planning stages of physical protection system development. Additionally, a listing of PP equipment is part of the design process for physical protection systems at the design and upgrade stages.

3101	Information Technology. Set of Standards for Automated Systems. Technical Directions for Automated System Making	MC, PP	GOST 34.602-89	2.6.1.	6	Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

2.6.1 System-wide Requirements shall indicate:

- Requirements for Operation, Maintenance, Repair, and Storage of System Components

**Analysis:**

This standard provides the general requirements for automated systems across a broad spectrum that includes MPC&A.

**5.3. Develop the master equipment list of installed MPC&A system equipment and prioritize its maintenance and replacement. - Develop a Master Equipment List that describes the integrated state of all MPC&A System components for each site specific facility.**

The master equipment list shall serve as the source document for mandatory equipment and maintenance management activities, ensuring a comprehensive approach that incorporates all site equipment and minimizes the potential for errors and oversights.

**Analysis:**

MC&A - This subelement is partially addressed in that there are requirements for a list of installed equipment and operational testing, however it does not address prioritization of maintenance and replacement. Facility processing controls this function with participation of MC&A organization. Facility documentation is not available to the US team.

PP - Regulations contain a clear requirement that a list of installed equipment and spare parts be maintained.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	4, 8.2 bullet 1	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

4 Nuclear Material Measurements

4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.

4.2 Measurement methodologies shall be incorporated into individual site policy documents that shall be compiled in accordance with the requirements set forth in metrology standards.

4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the

requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible.

4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.

4.5 The list of measuring instruments used in the nuclear material measurement system shall contain the instrument name, type, and manufacturer’s serial number.

4.6 Measuring instruments shall be inspected as specified in current regulations.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- What measurement methodologies and measuring instruments have been adopted within the organization for nuclear material control and accounting purposes

**Analysis:**

These sections describe the lists required for MC&A equipment installed at a site.

	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	11.10	7	Minatom/Rosatom	Enacted
0032							

**Citation:**

11.10 Inventory, storage, transportation, and removal of physical protection and security equipment is conducted at the potentially hazardous nuclear site as specified by the requirements in operations documentation for specific pieces of equipment.

The inventory of physical protection and security equipment is maintained in the supply and financial departments, as well as in the warehouse, using inventory cards and accounting books in accordance with established procedures. Physical protection and security equipment that becomes unusable is written off the books in accordance with established procedure. Certificates issued by the write-off committee are approved by the site director. The physical protection and security equipment inventory shall reflect the correct and timely documentation of the actual presence of the equipment.

Storing physical protection and security equipment consists of maintaining the equipment short- or long-term in established locations in good working order. All physical protection and security equipment held in long term storage (more than a year) shall be protected from the elements. Protecting equipment from the elements consists in conducting activities to temporarily protect the physical protection and security equipment that is stored in deleterious

circumstances from the effects of outside factors (primarily humidity and air pollution). Protecting equipment from the elements may entail shrink wrapping, applying a protective coating, or the combination of these methods.

**Analysis:**

This document defines equipment inventory and storage procedures.

	Set of Standard (Model) Documents Regarding the Deployment of Physical Protection Systems and Recommendations for Completing the Forms	PP	(Not obtained)	Appendix 14	7	Minatom/Rosatom	Enacted
0721							

**Citation:**

Appendix 14 List of Installed Integrated Physical Protection and Security Equipment (Devices) provides the format for completing a list of installed equipment at system start-up

**Analysis:**

This document provides a model format for master equipment lists.

State System for

0723	Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	Entire Document		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**  
*Entire Document*

**Analysis:**  
 The whole document because it refers to metrology of the equipment throughout the standard.

0727	Set of Standard (Model) Forms to Be Developed When Operating Physical Protection and Security Equipment and Procedures for Completing the Forms	PP	(Not obtained)	Appendix 1 7		Minatom/Rosatom	Enacted
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**Citation:**  
 "Appendix 1 - Sample Measuring Instrument Accounting Log the log is a list of measurement instrument used for ETM operation, information about verification frequency, planned and actual dates of verification. The appendix also contains recommendation for log maintenance and defines personnel responsible for the maintenance."

**Analysis:**  
 The document requires creation of the magazine containing the list of all means of measurements, applied in CФ3, the information on their metrological characteristics planned and actual dates of checking.

**5.4. Develop MPC&A system maintenance databases to log equipment inventory, preventive maintenance schedules and system maintenance procedures. - Incorporate MPC&A systems into the site's maintenance management system for routing, preventative maintenance and for repair maintenance.**

Documenting maintenance activities to ensure they are carried out according to established schedules and procedures is vital to ensuring the sustainable operation of the MPC&A system at a nuclear site.

**Analysis:**  
 MC&A - No regulatory content has been identified to establish requirements that address this sustainability element in the area of MC&A. Facility processing controls this function with participation of MC&A organization. Facility documentation is not available to the US team.

PP - The cited portions of the document contain requirements of the physical protection and security equipment maintenance and repair activities.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0004	Russian Federation Law On Measurement Uniformity	MC, PP	Nº 102-FZ	Article 13	3	RF Parliament	Enacted

**Citation:**  
**Chapter 3. Government Regulation of Measurement Uniformity**  
 Article 13. Qualification of Measuring Instruments  
 1 Measuring instruments intended for use in government regulation of measurement uniformity are subject to initial qualification both before commissioning and after repair; during operation, they are subject to periodic

qualification. Legal entities and sole proprietors that use measuring instruments in government regulation of measurement uniformity are obligated to submit these measuring instruments for qualification in a timely manner.  
 2 Qualification of measuring instruments is performed by legal entities and sole proprietors accredited in measurement uniformity in accordance with established procedures.  
 3 The Russian Federation government establishes a list of measuring instruments that may be qualified only by regional government metrology centers accredited in measurement uniformity in accordance with established procedures.  
 4 The results of qualification of measuring instruments are attested by a qualification mark and/or a qualification certificate. The design of the measuring instrument shall be such that the qualification mark can be placed on it in a visible location. If the specific features of the design of the measuring instrument or its operating conditions do not allow the mark to be placed directly on it, then it is placed on the qualification certificate.  
 5 The federal executive branch agency that develops government policy and conducts legislative and regulatory control with regard to measurement uniformity establishes the procedures for qualifying measuring instruments and the requirements for qualification marks and the contents of qualification certificates.  
 6 Information regarding the results of the qualification of measuring instruments intended for use in government regulation of measurement uniformity is submitted to the Federal Information System for measurement uniformity by the legal entities and sole proprietors that qualify measuring instruments.  
 7 Measuring instruments not intended for use in government regulation of measurement uniformity may be qualified on a voluntary basis.

**Analysis:**

This article provides requirements for initial and periodic qualification of measuring instruments.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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**Citation:**

4 Nuclear Material Measurements  
 4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.  
 4.2 Measurement methodologies shall be incorporated into individual site policy documents that shall be compiled in accordance with the requirements set forth in metrology standards.  
 4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible.  
 4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.  
 4.5 The list of measuring instruments used in the nuclear material measurement system shall contain the instrument name, type, and manufacturer’s serial number.  
 4.6 Measuring instruments shall be inspected as specified in current regulations.  
 4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

**Analysis:**

These sections describe the lists required for MC&A equipment installed at a site.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	11.7 - 11.15	7	Minatom/Rosatom	Enacted
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**Citation:**

11.7 Physical protection and security equipment maintenance and repair.  
 11.7.1 A set of administrative and engineering measures has been established to ensure the servicing and maintenance of physical protection and security equipment to keep it in proper working order.  
 11.7.2 Maintenance of physical protection and security equipment includes:  
 • Routine activities;  
 • Unscheduled maintenance;  
 • Maintenance while in storage;

- Inspection of measuring instruments.

Basic maintenance of engineered barriers and equipment consists of routine activities.

11.7.3 physical protection and security equipment maintenance includes the following major tasks:

- Identifying and eliminating deficiencies in the engineered barriers and equipment of the potentially hazardous nuclear site;
- Establishing a qualitative status for engineered barriers and equipment and verifying their operation;
- Ensuring that PP equipment operates at its optimum level and that operating time between repairs is extended;
- Mitigate the effects of adverse climatic and other conditions on engineered barriers and equipment;
- Instrument verification and bringing the electrical parameters of lines, cables and switches within established norms;
- Identifying and eliminating defects and warning of PP equipment failures;
- Identifying and eliminating violations of safety rules and measures by personnel;
- Preparing engineered barriers and equipment for operation in summer and winter;
- Verifying that the devices are fully equipped and that the appropriate instruments and spare parts are available.

11.7.4 Maintenance of physical protection and security equipment is organized by the managers of the physical protection and security equipment departments and is performed at intervals established by the departments that have been assigned these devices.

11.7.5 Physical protection and security equipment is maintained according to a scheduled maintenance systems that may stipulate the following intervals for routine maintenance: daily, weekly, monthly, quarterly, bi-annually and annually.

Procedures for performing routine maintenance are established in the technical documentation for the physical protection and security equipment.

11.7.6 During the performance of routine activities:

- Deficiencies in engineered barriers and equipment are identified and eliminated;
- PP equipment and power sources are serviced;
- PP equipment parameters are checked and adjusted to the norms stipulated in the operator's documentation;
- The procedures for PP equipment maintenance and its quality are monitored for compliance;
- Compliance with safety rules and measures is monitored;
- Operations documentation is checked and filled out.

The individuals who perform routine activities are responsible for the quality and completion of the activities.

11.7.7 Depending on the specific characteristics of the physical protection and security equipment and the nature and extent of the damage, repairs may be conducted within or outside the normal maintenance schedule. The physical protection and security equipment is repaired where the equipment is installed if it will not require a long time to complete. In all other cases removable apparatus (modules) are replaced by spares, and repairs are conducted in the repair shop or at the manufacturer.

11.7.8 As a rule, major overhauls, routine maintenance and remediation maintenance to fixed structures are performed using site personnel and funds within the annual construction and maintenance plan for the physical protection and security equipment at the site.

11.8 Equipment supply and metrology support for operation of the physical protection and security equipment is conducted by the administration of the potentially hazardous nuclear site through the appropriate departments of the security force and equipment supply division in accordance with established site procedures and the requirements of regulatory documents. Monitoring equipment supply to support the operation of physical protection and security equipment consists of the following elements:

- Verifying the presence, quality, and completeness of protection and security equipment in the warehouse, in administrative units, and in repair shoppes;
- determining how well physical protection and security equipment actually present correlates with inventory data;
- Verifying how the inventory system for physical protection and security equipment is organized;
- Develop measures to eliminate identified deficiencies.

11.9 Maintaining operating and technical documentation for physical protection and security equipment is conducted in the physical protection and security equipment department. Major operating documentation is supplied by the manufacturer together with each piece of physical protection and security equipment. Major operating documentation include:

- Specifications;
- Operations procedures;
- Installation, start-up, and adjustment instructions;
- Item log;
- Vendor manual;
- A list of all the parts.

11.10 Inventory, storage, transportation, and removal of physical protection and security equipment is conducted at the potentially hazardous nuclear site as specified by the requirements in operations documentation for specific pieces of equipment.

The inventory of physical protection and security equipment is maintained in the supply and financial departments, as well as in the warehouse, using inventory cards and accounting books in accordance with established procedures. Physical protection and security equipment that becomes unusable is written off the books in accordance with established procedure. Certificates issued by the write-off committee are approved by the site director. The physical protection and security equipment inventory shall reflect the correct and timely documentation of the actual presence of the equipment.

Storing physical protection and security equipment consists of maintaining the equipment short- or long-term in established locations in good working order. All physical protection and security equipment held in long term storage (more than a year) shall be protected from the elements. Protecting equipment from the elements consists in conducting activities to temporarily protect the physical protection and security equipment that is stored in deleterious circumstances from the effects of outside factors (primarily humidity and air pollution). Protecting equipment from the elements may entail shrink wrapping, applying a protective coating, or the combination of these methods.

11.11 The collection, accounting, and analysis of operations data regarding the reliability and invulnerability to jamming of physical security and protection equipment is conducted as specified in the requirements of guidance documents and directions issued by specialized organizations via the Department of Information, Nuclear Material, and Nuclear Site Security.

11.12 Monitoring and assessing the condition of physical protection and security equipment and the manner in which its operation is organized shall be conducted by officials directly participating in the management of the PP system as specified in Plans developed at the potentially hazardous nuclear site for verifying the technical status and operability of physical protection and security equipment, as well as by agency committees as specified in "Regulation on Agency Monitoring of Physical Protection System Status at Potentially Hazardous Nuclear Sites" in order to verify:

- The effectiveness of the way in which the physical protection and security equipment is utilized;
- The operability of the physical protection and security equipment;
- Adherence to operating procedures and rules;
- The preparedness of the guards to perform military operations utilizing the physical protection and security equipment.

11.13 Organization of activities to support and adhere to safety rules and measures when operating physical protection and security equipment shall be implemented in strict conformity with the requirements of current guidance documents as well as operations documentation.

11.14 Remediation activities are conducted by the physical protection and security equipment department in conjunction with the security force units at the potentially hazardous nuclear site.

The purpose of remediation is to restore product quality (or the quality of activities performed) within established deadlines, to identify and eliminate the causes of defects, and to increase the responsibility of suppliers for the quality of products delivered, of contractors for the quality of activities they perform (installation, testing, etc.), and of consumers for satisfying the operating, storage, and transportation conditions.

The remediation report shall be prepared in the form stipulated in the appropriate regulations by a bi-lateral committee composed of representatives from the potentially hazardous nuclear site and the supplier enterprise. Particular attention shall be paid to how complete an explanation of the cause of the malfunction is provided and the objectivity of the commission findings.

11.15 When it is impossible or impractical to repair physical protection and security equipment because it has lost its functionality due to wear, or having worked through its full service life, or because it has been destroyed due to a natural disaster or an accident, the equipment shall be written off. Completion of the established service life or the lack of parts cannot be the basis for writing off physical protection and security equipment if its technical condition is suitable for further use in its primary function.

The write-off certificate for physical protection and security equipment shall be signed by the members of a specially created commission and shall be approved by the director of the potentially hazardous nuclear site. Completed item logs signed by the appropriate officials and bearing the seal of the potentially hazardous nuclear site shall be attached to the certificate.

**Analysis:**

The cited portions of the document contain requirements of the physical protection and security equipment maintenance and repair activities.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	Entire Document	Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

The whole document because it refers to metrology of the equipment throughout the standard.

Automated

Federal Agency on

3104	Systems. Requirements to Document Content	MC, PP	RD 50- 34.698-90	2.4, 2.8.6, 2.9	6	Technical Regulation and Metrology	Enacted
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**Citation:**

2.4. Purchased Component List - as per GOST 2.106

2.8.6. Manufacturer's (Supplier's) Warranty shall state the warranty period for the Automated System as a whole and for its individual components, unless the latter coincide with the warranty period for the whole Automated System.

2.9. Maintenance Log

**Analysis:**

The whole document reflects requirements for the maintenance program.

**5.5. Identify required inventory of spare parts, spare part supply sources, and spare parts usage and handling procedures. - Identify site specific and system specific spare parts requirements. - Procure initial cache of spare parts. - Identify long term suppliers of spare parts. - Identify equipment and/or tools necessary to perform maintenance, repair, and calibration.**

Sites shall have a process to determine what spare parts shall be maintained in inventory at a site, and what is the minimal number that shall be maintained in inventory. Determining the quantity of spare parts to have on hand shall be based on the operational and maintenance history of a particular system as well as the criticality of that system and its impact on the overall MPC&A program at a site.

**Analysis:**

MC&A - Explicit citations that address spare parts requirements for the area of MC&A have not been identified. Facility processing controls this function with participation of MC&A organization. Facility documentation is not available to the US team.

PP - The citations establish the requirement for maintenance of spare parts on-hand, and assigns responsibility for PP spare parts and equipment support to site administration.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	6.2.8	7	Minatom/Rosatom	Enacted

**Citation:**

6.2.8 When renovating and performing major overhauls for security system equipment (security equipment), cooperation between the security forces and site security service is organized and implemented during the following stages:

- Developing plans to replace electronic detection devices that have exceeded their useful service life and providing a supply of backup instruments

**Analysis:**

This document is a methodological recommendation document. Its contents are not mandatory, but provide a recommended method for complying with requirements. The cited section discusses a plan to replace worn out electronic detection devices, implying a plan for identifying and procuring spare parts.

0030	Management Structure in Automated PP Systems at Potentially Hazardous Nuclear Facilities	PP	Minatom Order # 387	3.7	7	Minatom/Rosatom	Enacted
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**Citation:**

...

There must be two monitoring regimes provided when organizing timely responses to abnormal situations that arise in system status:

- Direct monitoring of the situation;
- Prediction of failures based on analysis of system operations.

...

**Analysis:**

This is methodological recommendation document. Prediction of failures in citation allows for planning for having spare parts on hand.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	11.8, 11.9	7	Minatom/Rosatom	Enacted
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**Citation:**

11.8 Equipment supply and metrology support for operation of the physical protection and security equipment is conducted by the administration of the potentially hazardous nuclear site through the appropriate departments of the security force and equipment supply division in accordance with established site procedures and the requirements of regulatory documents. Monitoring equipment supply to support the operation of physical protection and security equipment consists of the following elements:

- Verifying the presence, quality, and completeness of protection and security equipment in the warehouse, in administrative units, and in repair shops;
- determining how well physical protection and security equipment actually present correlates with inventory data;
- Verifying how the inventory system for physical protection and security equipment is organized;
- Develop measures to eliminate identified deficiencies.

11.9 Maintaining operating and technical documentation for physical protection and security equipment is conducted in the physical protection and security equipment department. Major operating documentation is supplied by the manufacturer together with each piece of physical protection and security equipment. Major operating documentation include:

- Specifications;
- Operations procedures;
- Installation, start-up, and adjustment instructions;
- Item log;
- Vendor manual;
- A list of all the parts.

**Analysis:**

This is the primary agency-level PP document for Rosatom. Citations assign equipment supply as a responsibility of site administration, and includes verifying presence of parts in the warehouse and ensuring the material on-hand corresponds to the inventory. In addition, they identify the required list of operating documentation to be maintained by the site for physical protection equipment.

**5.6. Identify the procedure of servicing the equipment under warranty and mechanisms (contracts) that would entertain replacement of equipment. - Determine all routine and repair maintenance needs (including funding) for MPC&A equipment at the site. - Organize maintenance needs into two categories: tasks that can be performed by site personnel and tasks that must be performed by the vendor. - Determine and plan for indigenous or site specific capabilities to perform non vendor site maintenance on MPC&A equipment. - Determine all equipment requiring extended or expert services that can be provide exclusively by the vendor. - Execute maintenance and repair plan per information gathered from above.**

Nuclear site management should incorporate warranty repair and maintenance activities into the site maintenance plan to take advantage of expertise and cost-saving opportunities.

**Analysis:**

PP - This defines requirements for a site PP maintenance program, and includes language to assign responsibility for performance of maintenance activities to site personnel and/or contractors.

MC&A - Facility processing controls this function with participation of MC&A organization. Facility documentation is not available to the US team.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
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0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.3.6.3, 7.13.1, 11.2, 11.3, 11.6.3, 11.6.5, 11.7	7	Minatom/Rosatom	Enacted
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**Citation:**

3.3.6.3 The operation of physical protection and security equipment shall provide for implementation of a preventive maintenance program.

7.13.1 The components of the physical protection equipment complex must include work stations for conducting scheduled maintenance and repair work.

11.2 Managers and leaders at all levels are responsible for the proper organization and operation of the physical protection and security equipment.

Within the scope of their duties, managers, department heads, the engineering staff and physical protection and security equipment personnel are directly responsible for the status of physical protection and security equipment, as well as for their maintenance and repair in a proper and timely manner.

11.3 Servicing, operational maintenance and minor repairs to physical protection and security equipment and engineered barriers shall be funded by the potentially hazardous nuclear facility.

11.6.3 Major documents for planning the construction and operation of physical protection and security equipment include:

- An annual maintenance schedule for the site's engineered barriers and equipment;

11.6.5 The physical protection and security equipment department at the site (if the site is protected by Russian Federation Ministry of the Interior internal security troops, by the staff of the military unit together with the site security department) develops the annual site maintenance schedule for physical protection and security equipment; this plan is approved by the staff supervisor of the unit (force) and the assistant manager of the security service. The maintenance plan is specified for each type (groups of examples of each type) of physical protection equipment.

**11.7 Physical protection and security equipment maintenance and repair.**

11.7.1 A set of administrative and engineering measures shall be established to ensure the servicing and maintenance of physical protection and security equipment to keep it in proper working order.

11.7.2 Maintenance of physical protection and security equipment includes:

- Routine activities;
- Unscheduled maintenance;
- Maintenance while in storage;
- Inspection of measuring instruments.

Basic maintenance of engineered barriers and equipment consists of routine activities.

11.7.3 physical protection and security equipment maintenance includes the following major tasks:

- Identifying and eliminating deficiencies in the engineered barriers and equipment of the potentially hazardous nuclear site;
- Establishing a qualitative status for engineered barriers and equipment and verifying their operation;
- Ensuring that PP equipment operates at its optimum level and that operating time between repairs is extended;
- Mitigate the effects of adverse climatic and other conditions on engineered barriers and equipment;
- Instrument verification and bringing the electrical parameters of lines, cables and switches within established norms;
- Identifying and eliminating defects and warning of PP equipment failures;
- Identifying and eliminating violations of safety rules and measures by personnel;
- Preparing engineered barriers and equipment for operation in summer and winter;
- Verifying that the devices are fully equipped and that the appropriate instruments and spare parts are available.

11.7.4 Maintenance of physical protection and security equipment is organized by the managers of the physical protection and security equipment departments and is performed at intervals established by the departments that have been assigned these devices.

11.7.5 Physical protection and security equipment is maintained according to a scheduled maintenance systems that may stipulate the following intervals for routine maintenance: daily, weekly, monthly, quarterly, bi-annually and annually.

Procedures for performing routine maintenance are established in the technical documentation for the physical protection and security equipment.

11.7.6 During the performance of routine activities:

- Deficiencies in engineered barriers and equipment are identified and eliminated;
- PP equipment and power sources are serviced;

- PP equipment parameters are checked and adjusted to the norms stipulated in the operator's documentation;
- The procedures for PP equipment maintenance and its quality are monitored for compliance;
- Compliance with safety rules and measures is monitored;
- Operations documentation is checked and filled out.

The individuals who perform routine activities are responsible for the quality and completion of the activities.  
 11.7.7 Depending on the specific characteristics of the physical protection and security equipment and the nature and extent of the damage, repairs may be conducted within or outside the normal maintenance schedule. The physical protection and security equipment is repaired where the equipment is installed if it will not require a long time to complete. In all other cases removable apparatus (modules) are replaced by spares, and repairs are conducted in the repair shop or at the manufacturer.

11.7.8 As a rule, major overhauls, routine maintenance and remediation maintenance to fixed structures are performed using site personnel and funds within the annual construction and maintenance plan for the physical protection and security equipment at the site.

**Analysis:**

These sections of the regulation define requirements for a site maintenance program, and includes language to assign responsibility for performance of maintenance activities to site personnel and/or contractors.

0727	Set of Standard (Model) Forms to Be Developed When Operating Physical Protection and Security Equipment and Procedures for Completing the Forms	PP	(Not obtained)	4.5, Appendix 4-7	7	Minatom/Rosatom	Enacted
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**Citation:**

section 4.5 and appendixes 4-7 defines cases, order of warranty claims rising and order of interaction between vendor and nuclear facility aimed on warranty claims satisfaction. The Appendixes contain forms of the documents necessary for such interaction implementation.

**Analysis:**

The document sets grounds and procedures for warranty claims submission and resolution.

0794	Methodological Recommendations Regarding Scheduled Maintenance Procedures for Physical Protection and Security Equipment	PP		4.7.4, 4.7.5	7	Minatom/Rosatom	Enacted
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**Citation:**

"4.7.4 To perform minor repairs to physical protection and security equipment after the warranty has expired, it is recommended that enterprises create repair areas furnished with the necessary measurement and control equipment, tools, and supplies.

4.7.5 Physical protection and security equipment under warranty, including storage warranty, is repaired by the manufacturer (vendor) in response to a claim filed by the enterprise that operates the physical protection and security equipment.

In order to repair physical protection and security equipment that is no longer under warranty, the equipment is sent to the manufacturer. The manufacturer may organize repairs directly at the nuclear site and inspect the equipment for compliance with the technical specifications under an agreement with the manufacturer.

**Analysis:**

Document prescribes to set up working places for equipment repairs after warranty period expiration. The document also contains provisions about repairing equipment by manufacturer under warranty based on warranty claims and by agreement between facility and manufacturer after warranty period expiration.

**5.7. Identify the procedures for conducting periodic calibration of MPC&A equipment and its components. - Identify all calibration procedures required by the MPC&A System and system**

**subcomponents. - Write an MPC&A equipment standards-based calibration plan, consistent with RF regulations. - Conduct an initial calibration for all relevant equipment.**

Calibration plans must be executed based on a documented plan that ensures the use of standard materials and applies to all relevant equipment to ensure proper functionality.

**Analysis:**

Regulations exist to require calibration for MPC&A equipment. Eleron TO55 being developed will cover this sub-element as well. In addition, this issue is covered in pro-force documents on PP equipment maintenance, which cannot be shared with the U.S. side.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0004	Russian Federation Law On Measurement Uniformity	MC, PP	№ 102-FZ	Article 13, 18	3	RF Parliament	Enacted

**Citation:**

Article 13. Qualification of Measuring Instruments

- 1 Measuring instruments intended for use in government regulation of measurement uniformity are subject to initial qualification both before commissioning and after repair; during operation, they are subject to periodic qualification. Legal entities and sole proprietors that use measuring instruments in government regulation of measurement uniformity are obligated to submit these measuring instruments for qualification in a timely manner.
- 2 Qualification of measuring instruments is performed by legal entities and sole proprietors accredited in measurement uniformity in accordance with established procedures.
- 3 The Russian Federation government establishes a list of measuring instruments that may be qualified only by regional government metrology centers accredited in measurement uniformity in accordance with established procedures.
- 4 The results of qualification of measuring instruments are attested by a qualification mark and/or a qualification certificate. The design of the measuring instrument shall be such that the qualification mark can be placed on it in a visible location. If the specific features of the design of the measuring instrument or its operating conditions do not allow the mark to be placed directly on it, then it is placed on the qualification certificate.
- 5 The federal executive branch agency that develops government policy and conducts legislative and regulatory control with regard to measurement uniformity establishes the procedures for qualifying measuring instruments and the requirements for qualification marks and the contents of qualification certificates.
- 6 Information regarding the results of the qualification of measuring instruments intended for use in government regulation of measurement uniformity is submitted to the Federal Information System for measurement uniformity by the legal entities and sole proprietors that qualify measuring instruments.
- 7 Measuring instruments not intended for use in government regulation of measurement uniformity may be qualified on a voluntary basis.

Article 18. Calibration of Measuring Instruments

- 1 Measuring instruments not intended for use in government regulation of measurement uniformity may undergo calibration on a voluntary basis. Measuring instruments are calibrated using measurement standards that are traceable to primary governmental reference standards for the appropriate unit of measurement or, if there is no primary governmental standard for the appropriate unit of measurement, to national measurement standards of foreign nations.
- 2 Legal entities and sole proprietors that perform calibration of measuring instruments on a voluntary basis may be accredited in measurement uniformity.
- 3 The results of calibration of measuring instruments performed by legal entities and sole proprietors accredited in measurement uniformity in accordance with established procedures may be used during the qualification of measuring instruments in accordance with procedures established by the federal executive branch agency that develops government policy and conducts legislative and regulatory control with regard to measurement uniformity.

**Analysis:**

These citations establish requirements for initial and periodic qualification of measuring instruments, which includes calibration as one step toward qualification.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	4.3, 4.6, 4.7	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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**Citation:**

4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the

nuclear material measurement system shall approach recommended international target values as closely as possible.

4.6 Measuring instruments shall be inspected as specified in current regulations.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

**Analysis:**

These references address the MC&A metrology certification process and the development and implementation of a measurement quality control program.

0028	Certified Reference Samples of State Nuclear Materials Accounting and Control System. Basic Provisions	MC	GOST R 8.609-2004	Entire Document	6	Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

**Analysis:**

This national standard (OST R8.609-2004) sets the standards for nuclear reference materials intended to provide metrological support (including calibration) for MC&A measurements.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	11.7.2 Bullet 4, 11.7.3 Bullet 5, 11.7.6 Bullet 3	7	Minatom/Rosatomb	Enacted
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**Citation:**

11.7.2 Maintenance of physical protection and security equipment includes:

- ...
- Inspection of measuring instruments.
- ...

11.7.3 physical protection and security equipment maintenance includes the following major tasks:

- ...
- Instrument verification and bringing the electrical parameters of lines, cables and switches within established norms;
- ...

11.7.6 During the performance of routine activities:

- ...
- PP equipment parameters are checked and adjusted to the norms stipulated in the operator’s documentation;
- ...

**Analysis:**

These citations identify aspects of routine maintenance requirements that include calibration activities for PP equipment.

0722	Nuclear Material Control and Accounting Standard (Model) Quality Control Program for Nuclear Material Measurements	MC	OST 95 10598-2008	Entire Document	7	Minatom/Rosatomb	Enacted
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**Citation:**

**Analysis:**

This agency standard (OST 95 10598-2008) has been adopted by Rosatom and sets the standards for a measurement quality control for MC&A measurements. It contains status monitoring, performance evaluation, maintenance, and calibration standards for measurements.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	8.4, 10.2		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

8.4 Measuring instruments used in the nuclear material measurement system are subject to calibration when issued by the manufacturer or released from maintenance, when imported, and when operated.

10.2 The organization shall develop and implement a measurement quality control program that contains the requirements for developing calibration schedules, review and re-attestation of measurement methodologies (methods) and reference standards, and an internal measurement stability monitoring program in accordance with the document entitled "Accuracy (Trueness and Precision) of Measurement Methods and Results. Part 6. Use in Practice of Accuracy Values" (GOST R ISO 5725-6-2002) and operational quality control of measurement results in accordance with the Recommendations [8], etc. This program shall establish deadlines and the individuals responsible for the development and review of schedules and monitoring plans, as well as for verification that the activities addressed in these schedules and plans are carried out.

**Analysis:**

8.4: requires measurement instruments be subject to calibration after maintenance,  
 10.2: Requires the development of a measurement quality control program

0727	Set of Standard (Model) Forms to Be Developed When Operating Physical Protection and Security Equipment and Procedures for Completing the Forms	PP	(Not obtained)	4.1.1, 4.1.3	7	Minatom/Rosatom	Enacted
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**Citation:**

4.1.1 The purpose of metrology support of physical protection system equipment operations is to maintain the proper material condition of monitoring instruments used during its operations. Metrology maintenance of measurement equipment (inspection, calibration, maintenance, or repair) shall be organized by the Metrology Department at the nuclear site or organization that operates the physical protection system.

4.1.3 The frequency with which inspection or laboratory calibration is performed on measurement equipment used when operating physical protection system equipment shall be established in accordance with the operating documentation for the measurement equipment. In the event there is no such documentation, inspection or laboratory calibration shall be conducted every 12 months. Measurement equipment shall be tested or calibrated by an authorized regional metrology agency or the Metrology Department at the organization that operates the physical protection system equipment (if this service possesses the necessary testing and calibration accreditation).

**Analysis:**

These citations state that calibration activities will be performed by the metrology department.

0794	Methodological Recommendations Regarding Scheduled Maintenance Procedures for	PP		4.3.6	7	Minatom/Rosatom	Enacted
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Physical Protection  
and Security  
Equipment

**Citation:**

"4.3.6 Measuring instruments are submitted for verification at the following times:  
- At their scheduled calibration date  
- When there is a violation with regard to the verification mark or when calibration documents have been lost  
- Whenever there is reason to doubt the accuracy of instruments  
"

**Analysis:**

Referred section lists cases when verification of measurement instruments used for ETM operation is required.

**5.8. Establish the required inventory of calibration standards and procedures for their usage and handling. - Provide site specific and equipment specific calibration standards, traceable to a national or international standard.**

Site shall have a process for determining what standards or reference materials are required for the calibration and adjustment of MPC&A equipment. The site shall also have a process for the procurement of these standards and maintaining their certification. The use of standards or reference materials for the calibration and adjustment of equipment shall be controlled through procedures to ensure their use follows agency requirements, methodologies, and guidelines. Calibration activities are essential to maintaining accuracy of sensors and surveillance equipment in a physical protection system; they are also essential to maintaining measurement accuracy for material composition and quantity.

**Analysis:**

MC&A - Russian regulations provide direction for determining standards and reference materials that are required for calibration and adjustment of MC&A equipment. A document exists that provides guidance on certification of facility level standards. However, the document is not yet in the regulatory library.

PP - While existing PP regulations cover this issue in general, there is no specific document governing calibration activity. There is a potential regulatory gap and additional regulation might be needed.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0004	Russian Federation Law On Measurement Uniformity	MC, PP	Nº 102-FZ	Article 12	3	RF Parliament	Enacted

**Citation:**

Article 12. Approval of Reference Material Type or Measuring Instrument Type  
 1 Reference material types or measuring instrument types used in government regulation of measurement uniformity are subject to mandatory approval. The following are established when approving a measuring instrument type: accuracy indicators, the interval between qualifications of measuring instruments, and a methodology for qualification of the measuring instrument type in question.  
 2 The decision to approve a reference material type or measuring instrument type is rendered by the federal executive branch agency that performs functions related to rendering government services and property management with regard to measurement uniformity; the decision is based on positive test results for the reference material or measuring instrument.  
 3 Approval of a reference material type or measuring instrument type is attested by a certificate of approval for a reference material type or measuring instrument type, issued by the federal executive branch agency that performs functions related to rendering government services and property management with regard to measurement uniformity. During the period of validity for the certificate of approval for a reference material type or measuring instrument type, the interval between qualifications of measuring instruments can be altered only by the federal executive branch agency that performs functions related to rendering government services and property management with regard to measurement uniformity.  
 4 A mark indicating approval of type is placed on each measuring instrument of an approved type, on accompanying documents for the indicated measuring instrument, and on accompanying documents for reference materials of an approved type. The design of the measuring instrument shall such that this mark can be placed on it in a visible location. If the specific features of the design of the measuring instrument do not allow the mark to be placed directly on it, then it is placed on the accompanying documents.  
 5 Testing of reference materials or measuring instruments in order to approve a type is conducted by legal entities that have been accredited in measurement uniformity in accordance with established procedures.  
 6 Information regarding approved types of reference materials and measuring instruments is entered into the

Federal Information System for measurement uniformity.

7 The federal executive branch agency that develops government policy and conducts legislative and regulatory control with regard to measurement uniformity establishes the following: procedures for testing reference materials or measuring instruments in order to approve a type; procedures for approving types of reference materials or measuring instruments; procedures for issuing certificates of approval for a reference material type or measuring instrument type and for establishing and revising the effective dates of these certificates and the interval between qualifications of measuring instruments; and the requirements for approval marks for reference material types or measuring instrument types and the procedures for placing them. Procedures for testing reference materials or measuring instruments in order to approve a type, as well as procedures for approving a reference material type or measuring instrument type are established by taking into consideration the type of production used for the reference materials or measuring instruments (serial or single-unit production).

8 Legal entities and sole proprietors that develop, issue, import into the Russian Federation, sell, or use within the Russian Federation reference materials or measuring instruments not intended for use in government regulation of measurement uniformity may voluntarily submit them for approval of reference material type or measuring instrument type.

**Analysis:**

This article provides requirements for mandatory approval of reference materials and measuring instruments.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	4.4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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**Citation:**

**4 Nuclear Material Measurements**

4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.

**Analysis:**

The regulation requires the use of reference materials to calibrate measurement equipment.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	6.4	7	Minatom/Rosatom	Enacted
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**Citation:**

**6. ELEMENTS OF THE MEASUREMENT SYSTEM**

6.4 Reference Materials

6.4.1 General Requirements

6.4.1.1 Reference materials of three categories are used during measurements for MC&A purposes: federal, industry (agency), and enterprise level reference materials. Federal level reference materials are intended for use in measurement methodologies of any level. Industry (agency) level reference materials are intended for use in industry (agency) and enterprise level measurement methodologies. Enterprise level reference materials are intended for use in enterprise level measurement methodologies.

6.4.1.2 In accordance with current regulations, reference materials used for accounting and control measurements of nuclear material (except category <text missing>) may be assigned a rank depending on the uncertainty of the attested value and the range of use for the reference material.

6.4.1.3 Reference materials shall undergo metrology certification. The certificate for the reference materials of specific types shall include the established metrological characteristics of reference materials from among the following:

- The value of the attested characteristic of the reference materials
- The uncertainty of the attested value of the reference materials
- The uncertainty due to the heterogeneity of the material (substance) in the reference materials
- The reference material shelf-life

6.4.1.4 When conducting research to establish the attested characteristics of a given reference material, it is mandatory to use a reference material of a higher rank than the proposed rank for the material undergoing attestation.

6.4.2 Procedures for Developing, Certifying, and Registering Reference Materials

6.4.2.1 Federal level reference materials and industry (agency) level reference materials are developed and attested by enterprise metrology departments accredited to perform this activity.

6.4.2.2 Industry (agency) level reference materials are developed and certified as specified in OST 95 10319 and [17]. Registration and accounting of the industry (agency) level reference materials is conducted as specified in RD 05 10396.

6.4.2.4 [sic] Enterprise level reference materials are developed and certified in accordance with procedures

established by the enterprise. Registration and accounting of enterprise level reference materials will be conducted by the metrology departments at the enterprises that developed them.

**Analysis:**

This section establishes the requirements for the certification and attestation of measurement methods. It addresses the certification of site metrology laboratories and how the authority to attest measurement method performance flows from the Rosatom metrology department to site laboratories to the certification of measurement methodologies.

0028	Certified Reference Samples of State Nuclear Materials Accounting and Control System. Basic Provisions	MC	GOST R 8.609-2004	Entire Document	6	Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

**Analysis:**

This national standard (OST R8.609-2004) sets the standards for nuclear reference materials intended to provide metrological support (including calibration) for MC&A measurements.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	11.8	7	Minatom/Rosatom	Enacted
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**Citation:**

11.8 Equipment supply and metrology support for operation of the physical protection and security equipment is conducted by the administration of the potentially hazardous nuclear site through the appropriate departments of the security force and equipment supply division in accordance with established site procedures and the requirements of regulatory documents.

**Analysis:**

This is the primary agency-level PP document for Rosatom. The citation refers to a metrology program.

0722	Nuclear Material Control and Accounting Standard (Model) Quality Control Program for Nuclear Material Measurements	MC	OST 95 10598-2008	6.2.1 bullet e), 6.2.3, 6.3.2 bullet 2, 6.4.5	7	Minatom/Rosatom	Enacted
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**Citation:**

6.2 Measurement Quality Control Administrative Measures

6.2.1 This section shall assign responsibilities for the implementation of the measurement quality control program at the level of the organization and of its administrative units (or MBAs); in addition, it establishes the functions of individuals related to the following aspects of the program:

...

e) Responsibility for reference materials

...

6.2.3 The appointment of individuals to be responsible for elements of the measurement quality control system may follow one of two principles: by element for all MBAs or by measurement methodology, in which case one person is responsible for everything that is subsumed under the concept "measurement quality control conducted using a specific measurement methodology" —the measuring instruments and auxiliary equipment required by the methodology; reference materials required by the methodology; the taking of samples for the methodology; internal quality control of measurement results obtained using the methodology; etc.

**6.3 Inspection of Regulatory and Methodology Support**

6.3.2 It is recommended that this section present a list of the documents that should be present in MBAs.

In addition to [required] regulations, the following documents that shall also be present and available in all MBAs at enterprises that participate in MC&A measurements:

- ...
- Copies of certificates for reference materials
- ...

**6.4 Inspection of Technical Support**

6.4.5 The status of reference materials is monitored by tracking compliance with the [mandatory] conditions for their use and storage presented in the instructions for using these reference materials or in the text of the measurement methodology itself. The expiration date of the reference materials is verified as well. Expiration dates for reference materials must be extended well in advance in accordance with the requirements of GOST 8.315 and GOST R 8.609. The proper use of reference materials, based on their rank, is also verified per GOST R 8.609.

**Analysis:**

The citations require that individuals responsible for insuring Reference Materials meet all Russian Federation requirements and standards be designated and that status of Reference Materials be monitored for compliance with Russian Federation requirements and standards.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	8.4, 10.2		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

8.4 Measuring instruments used in the nuclear material measurement system are subject to calibration when issued by the manufacturer or released from maintenance, when imported, and when operated.

10.2 The organization shall develop and implement a measurement quality control program that contains the requirements for developing calibration schedules, review and re-attestation of measurement methodologies (methods) and reference standards, and an internal measurement stability monitoring program in accordance with the document entitled "Accuracy (Trueness and Precision) of Measurement Methods and Results. Part 6. Use in Practice of Accuracy Values" (GOST R ISO 5725-6-2002) and operational quality control of measurement results in accordance with the Recommendations [8], etc. This program shall establish deadlines and the individuals responsible for the development and review of schedules and monitoring plans, as well as for verification that the activities addressed in these schedules and plans are carried out.

**Analysis:**

8.4: requires measurement instruments be subject to calibration after maintenance,  
 10.2: Requires the development of a measurement quality control program

0745	Nuclear Material Control and Accounting Reference Materials. Assigning Reference Material Rank	MC	OST 95 10599-2009	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

This OST provides a hierarchy and the requirements for establishing the rank of reference materials and traceability of calibration standards.

0829	Nuclear Material Control and Accounting. Certifying Reference Materials Using the Witness Sample Method	MC	OST 95 10600-2009	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

**Analysis:**

This standard establishes a method for determining the metrology characteristics of reference materials - the witness sample method.

**6. Performance quality verification and technical control**

**A performance assurance program allows site MPC&A personnel to assess the effectiveness of MPC&A components and systems and to take corrective actions when deficiencies are identified. An effective system effectiveness testing and operational monitoring capability, as part of a performance assurance program, supports a strong MPC&A security program onsite by promoting continuous improvement.**

**Analysis:**

There are no documents available to the U.S. that require the establishment of a comprehensive performance testing program for either MC&A or PP. There are no provisions to provide reports to the U.S.

MC&A - Regulations contain requirements for the conduct of agency and site level monitoring activities, and investigation and documentation of MC&A anomalies. However, performance testing of MC&A as required in the U.S. is not specified in the RF regulations.

PP - Regulations contain requirements for the conduct of agency and site level monitoring activities, for compiling and analyzing monitoring results, and for taking corrective measures. Rosatom representatives state that sensitive documents exist which define a testing program that meets the U.S. definition of Performance Testing. There are Russian documents governing this sub-element, which cannot be shared with the U.S. side.

**6.1. Develop a self inspection capability to evaluate MPC&A system performance, or identify and designate an off-site specific organization for that effort and conclude a contract with that organization. - Identify an organization that will conduct regular performance assessments for all MPC&A Systems and subcomponents. - If the responsible organization is on-site, develop and implement performance assessment training. - Develop methods for conducting site performance assurance activities.**

Performance assurance represents a comprehensive on-going examination of all activities associated with a MPC&A program. Using data and informational outputs from everyday operations, system effectiveness tests for equipment and personnel, and specific system tests, site MPC&A personnel can evaluate performance of the overall MPC&A program or specific sub-systems such as physical protection, material control and accounting, or guard force operations. This evaluation can measure the program's, system's or sub-system's effectiveness and identify potential deficiencies.

**Analysis:**

MC&A - The regulations contain requirements for the establishment of self-assessment programs for MC&A at sites. Rosatom representatives stated that there are documents governing internal control at facilities. However, these documents cannot be shared with RDP. Details on site-level evaluations will be provided in one of the documents being developed under IPPE TO54.

PP - Regulations contain guidance for the conduct of agency and site-level monitoring and assessment activities, and include methodologies for performing those activities.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	3.4.2.2, 3.4.2.3, 4.3, 4.4, 4.6, 8.2 Bullet 6, 8.3	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

3.4.2.2 The operability and physical condition of TIDs shall be inspected on a regular basis at a frequency exceeding the frequency of physical inventories. The results of such inspections shall be documented in writing.

3.4.2.3 Random inspections of TIDs in an MBA must be performed in the periods between inventories. The requirement of establishing with a confidence level of 0.95 that at least 95% of the TIDs are in an appropriate

condition shall be used when determining the size of the random sample.

4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible

4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.

4.6 Measuring instruments shall be inspected as specified in current regulations.

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- ...
- Procedures for monitoring the status of nuclear material control and accounting activities within MBAs
- ...

8.3 The reliability level for information submitted to the nuclear material control and accounting system in MBAs regarding item identifiers, TID identifiers, and the physical location of items shall be not less than 99%.

**Analysis:**

3.4.2.2, 3.4.2.3 - Establishes requirements for inspections of TIDs and the performance standard that must be met.

4.3, 4.4, 4.6 - These sections describe the need for a performance assessment program for measurement methods.

8.2 - This section requires organizations to develop procedures for self-monitoring of the status of their MC&A program.

8.3 - Establishes the performance standard for MC&A accounting system data on the item identifiers, TIDs and physical location of NM items.

0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	4.9, 6.2 Bullet 6-7, 6.2.3 Bullet 4, 6.2.4 Bullet 5	7	Minatom/Rosatom	Enacted
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**Citation:**

**4. Major Physical Protection Functions of the Administration at the Potentially Hazardous Nuclear Site and Its Security Department**

4.9 Assess the effectiveness of the existing PPS or the PPS in the design stage, using duly attested methods, and establish options for upgrading the system (independently or with a specialized subcontractor).

6.2 The major areas in the physical protection of the site that require cooperation between the site administration and security department with the security force include:

- ...
- Conducting joint inspections of the guard combat force and posted guards with access control functions
- Planning and conducting joint performance and status checks of integrated physical protection and security equipment (integrated security equipment)
- ...

6.2.3 The following steps must be taken to organize and implement off-site and on-site access control procedures:

- ...
- Design, build, equip, test, attest, install, and operate the command and control system for access to secure areas
- ...

6.2.4 The following steps must be taken when organizing on-site communications, communications with participating agencies, and radio monitoring based on federal, agency, and interagency regulations, including the "Regulation on the Procedure for Using Radio Communication Systems at Minatom Enterprises":

- ...
- Design, build, equip, test, attest, install, and operate the communications system

**Analysis:**

This is a methodological recommendation document. It provides recommendation for assessing effectiveness of the PP system.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.11	7	Minatom/Rosatom	Enacted
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**Citation:**

4.11 Chapter on "Monitoring NM Accounting Status"

4.11.1 This chapter shall specify that NM status, presence, and transfer shall be monitored by administrative units authorized to do so (the methodology verification group, nuclear safety group, chief engineer's office, security service, etc., in accordance with the regulations of [each] administrative unit) on the organizational structure level specified in Section 4.3.7.

4.11.2 The following basic principles and procedures for monitoring MC&A status at the enterprise shall be established:

- NM control shall be an integral part of all NM activities;
- NM control shall be carried out on a regular basis;
- Nuclear material shall be controlled from the time it is produced, throughout the entire life (production) cycle until it is used for its intended purpose, ending when it is transferred to the appropriate radioactive substance (radwaste) nuclear material storage points;
- Compliance with rules and regulations in the enterprise MC&A system shall be monitored;

4.11.3 The following shall be established:

- Administrative units and individuals that shall perform monitoring functions at all levels of the enterprise MC&A system;
- Requirements for the position duties and responsibilities of these individuals.
- The necessity and regulation of real time NM transfer monitoring by the appropriate enterprise administrative units;
- The frequency of verification depending on NM category in the MBA;
- The frequency of administrative verification;
- The frequency of investigating committee verification of MC&A status;
- Procedures and measures to be used during control of nuclear material accounting, storage, and use according to established rules and standards.

4.11.4 It shall be specified that MC&A status in administrative units shall be monitored using approved instructions, methodologies, and regulations that include rules on the following:

- Verifying compliance with MC&A requirements in the administrative unit and in the MBA;
- Verifying the sequence in which nuclear material operations and technical procedures are to be performed and accounting results recorded;
- Inspecting accounting record and report maintenance;
- Reconciling (random reconciling) of data in accounting and reporting forms;
- Verifying the procedure for organizing and conducting a physical inventory and an NM balance close out;
- Verifying the procedure for using access control equipment;
- Verifying the presence of NM on site; random reconciling of NM accounting and actual inventory data;
- Verifying the presence and quality of measuring procedures and devices to be used in MC&A, including by having enterprise personnel take additional measurements of NM parameters at the request of the inspector;
- Verifying procedures and (or) methodologies for estimating NM losses;
- Monitoring access to NM, information, and equipment;
- Monitoring investigations into the causes and circumstances for MC&A anomalies and taking the appropriate measures;

4.11.5 This chapter shall specify that the procedures for monitoring information security are defined in a separate administrative unit regulation. A reference to that document shall be provided.

**Analysis:**

This document establishes comprehensive requirements for internal monitoring of the status of all aspects of MC&A.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.3.8.2, 9.5.2, 16.1, 16.4 (all of section 13)	7	Minatom/Rosatom	Enacted
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**Citation:**

3.3.8.2 In order to determine the effectiveness of the PP system and resolve interface issues drills shall be conducted regularly as well as analyses of the effectiveness of the PP system using analytical and other methods. Results of the of effectiveness analyses are to be used for improving the PP system.

9.5.2 The evaluation of PP system effectiveness may be determined experimentally (by a training exercise),

analytically, or using computer modeling at various stages and phases in the creation of the PP system, as well as during its operation. Results of the PP system effectiveness evaluation are to be used to determine the manner in which the system may be improved.

16.1 Monitoring and oversight of the status of physical protection systems shall be conducted at three levels:

- The security service of the potentially hazardous nuclear site shall conduct on-site monitoring of the status of physical protection systems;

16.4 Monitoring the operation of physical protection at a potentially hazardous nuclear site is implemented at the enterprise level with the following objectives:

- Verify that the potentially hazardous nuclear site satisfies the requirements of the "Physical Protection Procedures," this document, as well as agency and site level regulations developed in accordance with these two documents;
- Assess the effectiveness of the PP system at the site as a whole, in its production areas, and for its objects of physical protection;
- Verify compliance of PP system structural components to relevant requirements;
- Develop and implement the measures needed to correct deficiencies disclosed when verifying the physical protection system.

Accordingly, the administration of the potentially hazardous nuclear site regularly organizes and holds training drills for personnel, the security service and security forces in order to verify that they work together effectively with agencies of the Russian MVD and FSB during emergencies.

**Analysis:**

Order 550 contains elements of monitoring and testing program. However, based on the document language and conversations with Rosatom representatives, this does not meet the criteria of a performance testing program as understood by the U.S.

0034	Provision on Agency Monitoring of PP System Status at Nuclear Hazardous Facilities	PP	Minatom Order # 309	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

This document provides requirements for agency-level activities, but NOT for site-level activities.

**Analysis:**

This document provides a hierarchy of inspection activities. This document provides for agency-level activities. Included here to show the redundancy/overlap of inspection activities.

0039	Methodological Recommendations for Assessing the Effectiveness of Physical Protection Systems	PP	BOA 297922-A-D1	Entire Document		Minatom/Rosatom	Enacted
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**Citation:**

Entire Document

**Analysis:**

The document describes the methodological recommendations, definitions, goals and tasks utilized in assessing the effectiveness of a physical protection system. The evaluation can measure the program's, system's or sub-system's effectiveness and identify potential deficiencies.

0493	Guideline Process for Agency Inspections of PP Systems at Nuclear Sites	PP	(Not obtained)	Section 3 of Appendix 4	7	Minatom/Rosatom	Enacted
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**Citation:**

This section provides list of activities to be conducted during inspections, including review of documentation, random testing to ID dead zones in use of detection equipment (3.3.5), response force reaction (3.3.10), etc.

(Note: DCN 494 refers to the appendices of this document, making them applicable to site-level activities.)

**Analysis:**

This appendix provides the list of activities to be conducted during the inspections, including response force reaction times and use of random testing to identify dead zones in use of detection equipment.

The entire document applies to agency inspections.

0494	Guideline Process for Site Inspections of PP Systems at Nuclear Sites	PP	(Not obtained)	Section 1, 2, 3, 4, 5	7	Minatom/Rosatom	Enacted
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**Citation:**

**1 General Provisions**

1.1 These "Guidelines for Organizing and Conducting Site Inspections of Physical Protection Systems at Nuclear Sites under the Jurisdiction of the Federal Atomic Energy Agency" (henceforth - Guidelines) define the standard program for site inspections of physical protection systems for nuclear material, nuclear facilities, and nuclear material storage points at nuclear sites under the jurisdiction of the Federal Atomic Energy Agency and at the nuclear sites of enterprises having agreements with the Federal Atomic Energy Agency for physical protection. The Guidelines also establish the procedures for planning, preparing, and conducting site inspections, as well as the methods and types of activities involved.

...

**2 Planning Site Inspections**

Describes the high-level planning for all types of site inspections and outlines the major elements:

- 2.1 Who is responsible for planning site inspections, and the basis for inspections
- 2.2 Describes the types of inspections (special, daily(regular), annual)
- 2.3 Describes who approves and is notified of inspection plans
- 2.4 Notification of departments/units to be inspected

**3 Preparing to Conduct Site Inspections**

This section describes the planning process for site level scheduled and unscheduled site-level inspections. It includes establishing authority, planning, scheduling, team composition and team roles and responsibilities. The inspection plan will include:

- Goals and tasks
  - Inspection timeframes
  - A summarized list of activities, indicating deadlines and the individuals responsible (as well as issues and objects to be inspected)
  - Inspection types and methods, necessary devices, instruments and fixtures
  - The assignment of responsibilities among team members
  - The persons responsible for preparing the various sections in the findings
- The plan will also specify other issues.

**4 Standard Site Inspection Program**

Section 4 establishes the requirements for a comprehensive inspection. Sites will follow the specific requirements established for conducting a comprehensive inspection through agency monitoring; however, at the discretion of the site director this comprehensive inspection may be modified in scope and depth. This section identifies six areas to be evaluated during a comprehensive inspection: organization of PP activities; site PP documentation; PP personnel recruitment and training; administrative and technical measures; inspecting PP system components; and transfer of nuclear materials. The section provides detailed information on how to inspect these areas.

**5 The Organization of Site Inspections**

5.1 The various types of site inspection may involve the use of the same methods and types of activity used for agency inspections. However, there may be differences in the use of hardware and software due, on the one hand, to the level of detail involved in site inspections, and on the other hand, to the specific features of the physical protection and security system equipment used.

...

5.2 The organization of comprehensive and special scheduled inspections performed by site teams

...

5.3 Organizing individual daily and audit inspections

...

**Analysis:**

The entire document describes the process for site inspections including the methods used such as performance-type tests.

0705	The Organization and Management of Rosatom Site Security Force Unit Operations	PP	(Not obtained)	7.22, 7.23	7	Minatom/Rosatom	Enacted
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**Citation:**

7.22 Practical courses and drills are the major mechanisms used to improve and monitor the level of professional development and for exercising collaboration issues. Practical courses and drills regarding protection for secure sites are conducted in order to achieve the following goals:

- Training various categories of site security force employees to assess situations properly and to respond effectively to interdict unlawful actions at secure sites
- Improving the coordination of actions taken by site security force employees and other personnel participating in exercises
- Exercising the tactics employed by the guard force and accompanying personnel given various adversary action scenarios when nuclear material and other types of cargo are transported
- Inculcating the proper psychological and moral qualities required by site security force employees in difficult operational situations
- Assessing the condition of physical protection and security equipment and the readiness of site security force employees to perform the function of detecting and interdicting unlawful acts in a timely manner
- Researching new tactics that may be employed by site security force employees in various situations
- Verifying the realism of force and equipment calculations employed to perform in emergencies
- Conducting exercises related to collaboration between site security force employees and regional security agencies, Russian Federation Ministry of Internal Affairs offices and internal security troop units, and units of the Russian Federation Emergency Management Ministry engaged to perform functions during emergencies at the site

Federation Emergency Management Ministry engaged to perform functions during emergencies at the site

7.23 Procedures for conducting drills and exercises are established in the appropriate Enterprise document.

**Analysis:**

This document deals with agency pro-force, and discusses the requirements for drills and training for pro-force personnel to ensure performance.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree N° 352	4.e	4	RF Government	Enacted
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**Citation:**

**4 The State System for Nuclear Material Accounting and Control includes the following:**

- e) Monitoring and oversight of the status of nuclear material control and accounting

**Analysis:**

This section requires monitoring of MC&A at sites to evaluate compliance to regulations.

0722	Nuclear Material Control and Accounting Standard (Model) Quality Control Program for Nuclear Material Measurements	MC	OST 95 10598-2008	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

Entire Document

**Analysis:**

This agency standard (OST 95 10598-2008) has been adopted by Rosatom and sets the standards for a measurement quality control for MC&A measurements. It contains status monitoring, performance evaluation, maintenance, and calibration standards for measurements.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	9.1, 10.2		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

9.1 [Only] reference standards in the categories "inter-governmental reference standards" and "state reference standards" per GOST 8.315 are permitted to be used in nuclear material measurement system when calibrating (graduating) measuring instruments, monitoring the accuracy of measurement methodologies (methods) in accordance with their established algorithms, as well as for other kinds of metrology control.

10.2 The organization shall develop and implement a measurement quality control program that contains the requirements for developing calibration schedules, review and re-attestation of measurement methodologies (methods) and reference standards, and an internal measurement stability monitoring program in accordance with the document entitled "Accuracy (Trueness and Precision) of Measurement Methods and Results. Part 6. Use in Practice of Accuracy Values" (GOST R ISO 5725-6-2002) and operational quality control of measurement results in accordance with the Recommendations [8], etc. This program shall establish deadlines and the individuals responsible for the development and review of schedules and monitoring plans, as well as for verification that the activities addressed in these schedules and plans are carried out.

**Analysis:**

- 9.1: Requires the use of the appropriate category of reference standard
- 10.2: Requires the development of a measurement quality control program

0746	Standard (Model) Programs and Methodologies for Testing Physical Protection Equipment	PP	(Not obtained)	1.2, 4.5, 4.5.2, 4.5.4	7	Minatom/Rosatom	Enacted
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**Citation:**

1.2 The Standard (Model) Programs and Methodologies establish the format (structure) for testing programs and methodologies for all types of physical protection equipment, including its functional systems (alarm system, alarm calling system, access control and monitoring system, visual and electronic surveillance and situation assessment system, etc.)

4.5 Organization of Operational Testing for the Physical Protection System Equipment

4.5.2 The tests will be conducted in the following situations while the physical protection system equipment is operating:

- During routine activities
- After maintenance and repairs
- During extension of service life

4.5.4 After maintenance or repair activities (replacement, adjustment, calibration, or any other changes due to repair) have been conducted, the physical protection equipment is tested to verify that the technical parameters of the components that were repaired comply with the requirements of the operating documentation.

**Analysis:**

All citations in this document support the conclusion that testing in the Russian Federation is of the operational and functional testing variety, but there is nothing to suggest that performance testing as understood by the U.S. is conducted.

	Methodological Recommendations Regarding Scheduled			4.8.1,			
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0794	Maintenance Procedures for Physical Protection and Security Equipment	PP		4.8.2	7	Minatom/Rosatom	Enacted
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**Citation:**

4.8.1 Monitoring of the timeliness and quality of maintenance must be performed in accordance with the enterprise plan for inspecting the material condition and performance of physical protection and security equipment\* and conducted by officials and specialists of the security department and the departments responsible for maintaining the equipment, as well as by agency and site inspection teams.

4.8.2 The primary methods used to monitor the timeliness and quality of maintenance are:

- Inspection of the material condition of physical protection and security equipment during agency and site inspections of physical protection status
- Technical inspections of physical protection and security equipment
- Performance inspections of physical protection and security equipment
- Verification that reports on the material condition of physical protection and security equipment are present and that they have been compiled properly and in a timely manner. A sample report is provided in Appendix 6
- Accounting and analysis

**Analysis:**

The document requires development of ETM status and operability inspections plan. The plan shall include verification of timeliness and effectiveness of technical maintenance. The document defines personnel responsible for such verification and scopes of verification.

0830	Methodology and Criteria for Assessing the Status of the Physical Protection System	PP		Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

**Analysis:**

Document provides criteria and methodology for evaluating the operational status of the Physical Protection System, but does not fully address performance testing activities as defined by the U.S.

3100	Information Technology. Set of Standards for Automated Systems. Atomated Systems. Stages of Development	MC, PP	GOST 34.601-90	Section 24	6	Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

24. Phase 8.2. "Post-warranty Service" includes:

- a) System performance analysis;
- b) Detecting deviation of Automated System performance from design;
- c) Establishing rules for these deviations;
- d) Troubleshooting and ensuring stable Automated System performance;
- e) Making the necessary revisions to the Automated System documentation.

**Analysis:**

This section requires the computerized accounting system performance to be monitored to evaluate machine performance.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	21 g) j)	4	RF Government	Enacted
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**Citation:**

- 21. To perform physical protection tasks, the management staff at the nuclear site (conjointly with the leadership of the appropriate military units and forces at sites guarded by the Russian Federation Ministry of Internal Affairs internal security troops or by site security forces affiliated with Russian Federation law enforcement agencies):
- g) Assesses the effectiveness of the physical protection system during its development (upgrade) and as necessary
- j) Conducts site-level monitoring of compliance with physical protection requirements

**Analysis:**

This document provides high level guidance for the need to assess effectiveness of PP Systems and to conduct site-level monitoring of compliance with requirements.

**6.2. Develop a site performance testing plan, covering physical protection, material control and accounting, and protective forces, with goals, objectives, schedule, a list of the types of tests to be performed, description of how the test is performed, and a list of personnel authorized to perform the test. - Develop site specific and facility specific performance test plans and schedules for implementation; identify responsible organization for implementation of performance assurance. - Develop performance testing program that includes a process for identifying and correcting MPC&A system deficiencies; developing corrective action plans; following up on completion of these plans. - Develop a programmatic self assessment plan for the MPC&A Organizational sub elements.**

The site shall have a process for gathering and analyzing data from maintenance logs and operations, and using that data to determine the presence of weaknesses in the MPC&A system. Maintenance and system operational data provide essential data points that when examined by site MPC&A personnel can present an accurate picture of the site's MPC&A Program's status. The data can then be used to assist in development of budget, equipment, and personnel requirements.

**Analysis:**

MC&A - Regulations require site self-assessment program procedures be developed. RF regulations possess the detailed requirements for TIDs, measurements and operability checks along with reliability level for information submitted to the MC&A system. RF regulations do not specifically require performance testing plans.

PP - The regulations that discuss site and agency-level monitoring and assessment activities, and analysis of monitoring activity data, provide a solid foundation for a performance testing program. If Rosatom does conduct performance-testing activities as that term is understood by the U.S. (which Rosatom has indicated to be the case), then this sustainability element may in fact be properly addressed. There are Russian documents governing this sub-element, which cannot be shared with the U.S. side.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	3.4.2.2, 3.4.2.3, 4.3, 4.4, 4.6, 4.7, 8.2, 8.3, 10	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

3.4.2.2 The operability and physical condition of TIDs shall be inspected on a regular basis at a frequency exceeding the frequency of physical inventories. The results of such inspections shall be documented in writing.

3.4.2.3 Random inspections of TIDs in an MBA must be performed in the periods between inventories. The requirement of establishing with a confidence level of 0.95 that at least 95% of the TIDs are in an appropriate condition shall be used when determining the size of the random sample.

4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible

4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.

4.6 Measuring instruments shall be inspected as specified in current regulations.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear

material measurement system.

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- Procedures for monitoring the status of nuclear material control and accounting activities within MBAs

8.3 The reliability level for information submitted to the nuclear material control and accounting system in MBAs regarding item identifiers, TID identifiers, and the physical location of items shall be not less than 99%.

**10 Requirements for Employees (Personnel) Who Conduct Nuclear Material Control and Accounting Activities**

10.1 Employees (personnel) who conduct nuclear material control and accounting activities shall complete training on how to perform these procedures in specialized courses organized within the framework of the nuclear material control and accounting system. In addition, they shall undergo regular testing in accordance with procedures established by the organization.

10.2 The frequency of testing personnel on their knowledge of nuclear material control and accounting procedures for various categories of employees (personnel) shall be established by the manager of the organization. Testing shall be conducted no less than once every three (3) years.

**Analysis:**

These sections describe the need to develop procedures for a performance assessment program for the status of the MC&A program and the skill level of MC&A personnel. Performance criteria for TIDs and measurement methods are also identified.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.11	7	Minatom/Rosatom	Enacted
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**Citation:**

4.11 Chapter on "Monitoring NM Accounting Status"

4.11.1 This chapter shall specify that NM status, presence, and transfer shall be monitored by administrative units authorized to do so (the methodology verification group, nuclear safety group, chief engineer's office, security service, etc., in accordance with the regulations of [each] administrative unit) on the organizational structure level specified in Section 4.3.7.

4.11.2 The following basic principles and procedures for monitoring MC&A status at the enterprise shall be established:

- NM control shall be an integral part of all NM activities;
- NM control shall be carried out on a regular basis;
- Nuclear material shall be controlled from the time it is produced, throughout the entire life (production) cycle until it is used for its intended purpose, ending when it is transferred to the appropriate radioactive substance (radwaste) nuclear material storage points;
- Compliance with rules and regulations in the enterprise MC&A system shall be monitored;

4.11.3 The following shall be established:

- Administrative units and individuals that shall perform monitoring functions at all levels of the enterprise MC&A system;
- Requirements for the position duties and responsibilities of these individuals.
- The necessity and regulation of real time NM transfer monitoring by the appropriate enterprise administrative units;
- The frequency of verification depending on NM category in the MBA;
- The frequency of administrative verification;
- The frequency of investigating committee verification of MC&A status;
- Procedures and measures to be used during control of nuclear material accounting, storage, and use according to established rules and standards.

4.11.4 It shall be specified that MC&A status in administrative units shall be monitored using approved instructions, methodologies, and regulations that include rules on the following:

- Verifying compliance with MC&A requirements in the administrative unit and in the MBA;
- Verifying the sequence in which nuclear material operations and technical procedures are to be performed and accounting results recorded;
- Inspecting accounting record and report maintenance;
- Reconciling (random reconciling) of data in accounting and reporting forms;
- Verifying the procedure for organizing and conducting a physical inventory and an NM balance close out;
- Verifying the procedure for using access control equipment;
- Verifying the presence of NM on site; random reconciling of NM accounting and actual inventory data;
- Verifying the presence and quality of measuring procedures and devices to be used in MC&A, including by having enterprise personnel take additional measurements of NM parameters at the request of the inspector;
- Verifying procedures and (or) methodologies for estimating NM losses;
- Monitoring access to NM, information, and equipment;

- Monitoring investigations into the causes and circumstances for MC&A anomalies and taking the appropriate measures;
- 4.11.5 This chapter shall specify that the procedures for monitoring information security are defined in a separate administrative unit regulation. A reference to that document shall be provided.

**Analysis:**

This document establishes comprehensive requirements for internal monitoring of the status of all aspects of MC&A.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.3.8.2, 7.12, 7.13	7	Minatom/Rosatom	Enacted
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**Citation:**

3.3.8.2 In order to determine the effectiveness of the PP system and resolve interface issues drills shall be conducted regularly as well as analyses of the effectiveness of the PP system using analytical and other methods. Results of the of effectiveness analyses are to be used for improving the PP system.

7.12 Requirements for equipment of analytical work stations

7.13 Requirements for equipment of work stations for conducting scheduled maintenance and repair work.

**Analysis:**

3.3.8.2: The citation directs sites to use drills and analysis to evaluate effectiveness of the PPS and use the results of those activities to improve the PPS.

7.12, 7.13: The sections refer to work stations where analysis of PP systems can be conducted, including "re-creation" of failures to identify and fix problems. Not clear this is in any way tied into a performance assessment program, however.

0034	Provision on Agency Monitoring of PP System Status at Nuclear Hazardous Facilities	PP	Minatom Order # 309	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

This document provides requirements for agency-level activities, but NOT for site-level activities.

**Analysis:**

This document provides a hierarchy of inspection activities. This document provides for agency-level activities. Included here to show the redundancy/overlap of inspection activities.

0248	Tamper Indicating Devices. Basic Technical Provisions	MC	OST 95 10557-2000	5.3, 5.7, 8.6, 8.8	7	Minatom/Rosatom	Enacted
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**Citation:**

5.3 The enterprise TID program must include the following sections:  
 -- The methods for and frequency of inspecting installed TIDs

5.7 To help ensure its effectiveness, the enterprise TID program shall include requirements for organizing periodic and unscheduled inspections arranged by the enterprise administration. The frequency of scheduled inspections shall be determined by the enterprise administration depending on the category of the protected objects. For containers of category-1 and -2 nuclear materials located in internal and vital secured areas scheduled inspections are conducted once a year. All other objects should be inspected once every two years.

8.6 Requirements for Methods and Frequency of TID Checks

8.6.1 TID identification is mandatory in the following cases:

- Immediately following TID installation
- When reinstalling a TID
- When removing a TID
- Upon arrival of an (accountable) item at an MBA
- When an accountable item is sent out of an MBA
- When taking physical inventories of nuclear materials
- When taking confirmatory measurements
- When an (accountable) item is dispatched from an MBA for use and returned to the storage area
- During an inspection by a higher level organizations and during internal administrative audits.

8.6.2 TID related anomalies include:

- TID disappearance
- TID failure
- TID damage
- Incorrect TID installation
- TIDs that fail proper identification
- Mismatch of the TID type
- Mismatch of TID manufacturer’s technical specifications.

8.6.3 TID identification shall be performed in conjunction with the inspection of a TID protected object.

8.8 Requirements for Establishing Administrative Monitoring of TID Program Performance

8.8.1 The TID program performance review in the enterprise subunits shall be carried out while conducting the periodic spot checks organized by the enterprise administration.

8.8.2 A committee of enterprise staff shall perform spot checks at the direction of enterprise management.

8.8.3 During the spot check compliance with the design specifications and regulatory requirements for TID use shall be evaluated.

8.8.4 The findings shall be documented with notations regarding discovered deficiencies and corrective actions.

8.8.5 By decision of the committee, a check may be performed:

- For all TIDs installed in a given control area and/or MBA
- Using statistical sampling of installed TIDs.

TIDs installed on containers containing NM must be checked without exception.

8.8.6 Spot checks and TID program performance evaluations may be performed in combination with nuclear material physical inventory.

**Analysis:**

These sections define the requirements for an extensive monitoring program for TIDs that will supply the information to determine if the error rate in the TID program is below the maximum acceptable level defined in OPUK.

0493	Guideline Process for Agency Inspections of PP Systems at Nuclear Sites	PP	(Not obtained)	Section 3 of Appendix 4	7	Minatom/Rosatom	Enacted
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**Citation:**

This section provides list of activities to be conducted during inspections, including review of documentation, random testing to ID dead zones in use of detection equipment (3.3.5), response force reaction (3.3.10), etc. (Note: DCN 494 refers to the appendices of this document, making them applicable to site-level activities.)

**Analysis:**

This appendix provides the list of activities to be conducted during the inspections, including response force reaction times and use of random testing to identify dead zones in use of detection equipment. The entire document applies to agency inspections.

0494	Guideline Process for Site Inspections of PP Systems at Nuclear Sites	PP	(Not obtained)	Section 1, 2, 3, 4, 5	7	Minatom/Rosatom	Enacted
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**Citation:**

**1 General Provisions**

1.1 These "Guidelines for Organizing and Conducting Site Inspections of Physical Protection Systems at Nuclear Sites under the Jurisdiction of the Federal Atomic Energy Agency" (henceforth - Guidelines) define the standard program for site inspections of physical protection systems for nuclear material, nuclear facilities, and nuclear material storage points at nuclear sites under the jurisdiction of the Federal Atomic Energy Agency and at the

nuclear sites of enterprises having agreements with the Federal Atomic Energy Agency for physical protection. The Guidelines also establish the procedures for planning, preparing, and conducting site inspections, as well as the methods and types of activities involved.

...

**2 Planning Site Inspections**

Describes the high-level planning for all types of site inspections and outlines the major elements:

- 2.1 Who is responsible for planning site inspections, and the basis for inspections
- 2.2 Describes the types of inspections (special, daily(regular), annual)
- 2.3 Describes who approves and is notified of inspection plans
- 2.4 Notification of departments/units to be inspected

**3 Preparing to Conduct Site Inspections**

This section describes the planning process for site level scheduled and unscheduled site-level inspections. It includes establishing authority, planning, scheduling, team composition and team roles and responsibilities. The inspection plan will include:

- Goals and tasks
  - Inspection timeframes
  - A summarized list of activities, indicating deadlines and the individuals responsible (as well as issues and objects to be inspected)
  - Inspection types and methods, necessary devices, instruments and fixtures
  - The assignment of responsibilities among team members
  - The persons responsible for preparing the various sections in the findings
- The plan will also specify other issues.

**4 Standard Site Inspection Program**

Section 4 establishes the requirements for a comprehensive inspection. Sites will follow the specific requirements established for conducting a comprehensive inspection through agency monitoring; however, at the discretion of the site director this comprehensive inspection may be modified in scope and depth. This section identifies six areas to be evaluated during a comprehensive inspection: organization of PP activities; site PP documentation; PP personnel recruitment and training; administrative and technical measures; inspecting PP system components; and transfer of nuclear materials. The section provides detailed information on how to inspect these areas.

**5 The Organization of Site Inspections**

5.1 The various types of site inspection may involve the use of the same methods and types of activity used for agency inspections. However, there may be differences in the use of hardware and software due, on the one hand, to the level of detail involved in site inspections, and on the other hand, to the specific features of the physical protection and security system equipment used.

...

5.2 The organization of comprehensive and special scheduled inspections performed by site teams

...

5.3 Organizing individual daily and audit inspections

...

**Analysis:**

The entire document describes the process for site inspections including the methods used such as performance-type tests.

	State System for Common Measurement Standards Nuclear					Federal Agency on Technical Regulation and Metrology	
0723	Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	9, 10			Enacted

**Citation:**

**9 Requirements for Reference Standards**

- 9.1 [Only] reference standards in the categories "inter-governmental reference standards" and "state reference standards" per GOST 8.315 are permitted to be used in nuclear material measurement system when calibrating (graduating) measuring instruments, monitoring the accuracy of measurement methodologies (methods) in accordance with their established algorithms, as well as for other kinds of metrology control.
- 9.2 In the event that there are no reference standards in the categories "inter-governmental reference standards"

and "state reference standards" in the State Registry, the use of reference standards developed in accordance with the document entitled document entitled "State System for Common Measurement Standards. Reference Standards for the State System for Nuclear Material Accounting and Control. General Provisions" (GOST R 8.609-2004) may be used for these purposes.

**10 Measurement Quality Assurance**

10.1 Analysis laboratories that perform measurements within a nuclear material measurement system, shall comply with the requirements set forth in (GOST R ISO/IEC 17025) and shall be accredited in accordance with the procedures established in the GOST R 51000.4-96.

10.2 The organization shall develop and implement a measurement quality control program that contains the requirements for developing calibration schedules, review and re-attestation of measurement methodologies (methods) and reference standards, and an internal measurement stability monitoring program in accordance with the document entitled "Accuracy (Trueness and Precision) of Measurement Methods and Results. Part 6. Use in Practice of Accuracy Values" (GOST R ISO 5725-6-2002) and operational quality control of measurement results in accordance with the Recommendations [8], etc. This program shall establish deadlines and the individuals responsible for the development and review of schedules and monitoring plans, as well as for verification that the activities addressed in these schedules and plans are carried out.

10.3 The conduct of measurement activities for nuclear material control and accounting purposes shall be governed by the job description of the appropriate employee.

**Analysis:**

9 &10: These sections require the use of reference standards and development of a measurement quality control program

0746	Standard (Model) Programs and Methodologies for Testing Physical Protection Equipment	PP	(Not obtained)	1.2, 4.5, 4.5.2, 4.5.4	7	Minatom/Rosatom	Enacted
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**Citation:**

1.2 The Standard (Model) Programs and Methodologies establish the format (structure) for testing programs and methodologies for all types of physical protection system equipment, including its functional systems (alarm system, alarm calling system, access control and monitoring system, visual and electronic surveillance and situation assessment system, etc.)

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4.5.2 The tests will be conducted in the following situations while the physical protection system equipment is operating:

- During routine activities
- After maintenance and repairs
- During extension of service life

4.5.4 After maintenance or repair activities (replacement, adjustment, calibration, or any other changes due to repair) have been conducted, the physical protection equipment is tested to verify that the technical parameters of the components that were repaired comply with the requirements of the operating documentation.

**Analysis:**

All citations in this document support the conclusion that testing in the Russian Federation is of the operational and functional testing variety, but there is nothing to suggest that performance testing as understood by the U.S. is conducted.

0794	Methodological Recommendations Regarding Scheduled Maintenance Procedures for Physical Protection and Security Equipment	PP		4.5.9, 4.7.8	7	Minatom/Rosatom	Enacted
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**Citation:**

4.5.9 The following should be recorded in the Routine Maintenance Log (Appendix 3) using the form established at the nuclear site:

- Results of scheduled maintenance activities under Schedules 3 – 6
- Deficiencies identified and suggestions made during acceptance of the work by the supervisor and when testing the working condition of equipment
- Comments regarding the correction of deficiencies

Activities under Schedules 5 and 6 should also be documented in Physical Protection and Security Equipment Logs. Logs for scheduled activities and Physical Protection and Security Equipment Logs are maintained by the personnel to whom physical protection and security equipment is assigned.

4.7.8 All repairs shall be documented in the "Repair Log for Physical Protection and Security Equipment" (Appendix 5), as well as in the appropriate section of the log for that equipment.

**Analysis:**

Referred sections require to document all technical maintenance results, data about tec. maintenance results inspections, information about identified deficiencies and corrective measures.

0830	Methodology and Criteria for Assessing the Status of the Physical Protection System	PP		Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

Document provides criteria and methodology for evaluating the operational status of the Physical Protection System, but does not fully address performance testing activities as defined by the U.S.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	21 g) j)	4	RF Government	Enacted
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**Citation:**

- 21. To perform physical protection tasks, the management staff at the nuclear site (conjointly with the leadership of the appropriate military units and forces at sites guarded by the Russian Federation Ministry of Internal Affairs internal security troops or by site security forces affiliated with Russian Federation law enforcement agencies):
- g) Assesses the effectiveness of the physical protection system during its development (upgrade) and as necessary
- j) Conducts site-level monitoring of compliance with physical protection requirements

**Analysis:**

This document provides high level guidance for the need to assess effectiveness of PP Systems and to conduct site-level monitoring of compliance with requirements.

**6.3. Develop required documents to confirm that the system operates as designed, in accordance with regulations and site operating procedures, and equipment is utilized solely for its purpose. - Develop site specific reporting requirements including reports to share with the US. - Develop program to track and trend number and type of MPC&A incidents.**

Establishment of reporting requirements related to the performance assurance program will create a method for ensuring that identified deficiencies can be tracked and corrected. In this way, the performance assurance program will serve its intended purpose of eliminating deficiencies and improving overall MPC&A system operation.

**Analysis:**

There is no stipulation in Russian regulations for preparation of reports to be provided to the U.S.

MC&A - Regulations require procedures for self-assessments and investigation of anomalies, deficiencies and their corrective actions. There are documents covering reporting of anomalies, but not other MC&A status indicators. There are no specific reporting requirements or requirements for a tracking and trending program. There are documents on MC&A annual reporting under development that will further address this sub-element.

PP - Regulations require procedures for agency and site-level self-assessment and monitoring activities, and provide formats for information compilation and reporting based on the results of those activities.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	7.2.15, 7.2.16, 8.2	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

7.2.15 Special reports shall be compiled by the operating organization (organization) whenever the loss, theft, or unauthorized use of nuclear material has been revealed, when a deficit (excess) of nuclear material has been detected, and also whenever the established limits for inventory difference or statistically significant discrepancies between data from the shipping organization and the receiving organization have been exceeded.

Special reports are submitted to the appropriate agencies that manage the use of atomic energy and the agency that regulates the safe use of nuclear energy within 24 hours of establishing [any of] the facts specified above.

7.2.16 Special reports shall contain the following information:

- A description of the circumstances, events, and/or series of events associated with unauthorized use of the nuclear material
- Identification and definition of the nuclear material kind
- Initial data for determining the quantitative characteristics of the nuclear material
- The measures taken and the action plan to resolve the problems that have arisen

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

...

- Procedures for monitoring the status of nuclear material control and accounting activities within MBAs
- Procedures for investigating nuclear material control and accounting anomalies

...

**Analysis:**

7.2.15, 7.2.16 - These citations provide requirements for special reports to be submitted in the event of anomaly occurrence

8.2 - This section requires organizations to develop procedures for self-monitoring of the status of their MC&A program and investigation of anomalies.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.11.4	7	Minatom/Rosatom	Enacted
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**Citation:**

**4.11 Chapter on "Monitoring NM Accounting Status"**

4.11.4 It shall be specified that MC&A status in administrative units shall be monitored using approved instructions, methodologies, and regulations that include rules on the following:

- Verifying compliance with MC&A requirements in the administrative unit and in the MBA;
- Verifying the sequence in which nuclear material operations and technical procedures are to be performed and accounting results recorded;
- Inspecting accounting record and report maintenance;
- Reconciling (random reconciling) of data in accounting and reporting forms;
- Verifying the procedure for organizing and conducting a physical inventory and an NM balance close out;
- Verifying the procedure for using access control equipment;
- Verifying the presence of NM on site; random reconciling of NM accounting and actual inventory data;
- Verifying the presence and quality of measuring procedures and devices to be used in MC&A, including by having enterprise personnel take additional measurements of NM parameters at the request of the inspector;
- Verifying procedures and (or) methodologies for estimating NM losses;
- Monitoring access to NM, information, and equipment;
- Monitoring investigations into the causes and circumstances for MC&A anomalies and taking the appropriate measures;

**Analysis:**

This citation establishes requirements for internal monitoring of the status of MC&A to include identification and reporting of anomalies.

0032	General Requirements for Physical Protection Systems at Nuclear	PP	Minatom Order # 550	16.4	7	Minatom/Rosatom	Enacted
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Hazardous Facilities

**Citation:**

16.4 Monitoring the operation of physical protection at a potentially hazardous nuclear site is implemented at the enterprise level with the following objectives:

- Verify that the potentially hazardous nuclear site satisfies the requirements of the "Physical Protection Procedures," this document, as well as agency and site level regulations developed in accordance with these two documents;
- Assess the effectiveness of the PP system at the site as a whole, in its production areas, and for its objects of physical protection;
- Verify compliance of PP system structural components to relevant requirements;
- Develop and implement the measures needed to correct deficiencies disclosed when verifying the physical protection system.

**Analysis:**

The document mandates the use of compensatory measures to address PP system deficiencies.

0034	Provision on Agency Monitoring of PP System Status at Nuclear Hazardous Facilities	PP	Minatom Order # 309	5.7	7	Minatom/Rosatom	Enacted
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**Citation:**

No more than 15 days after receiving the approved inspection report, the administration at the potentially hazardous nuclear site shall develop a plan of measures to remedy identified deficiencies (criticisms) and to implement committee suggestions. Specific deadlines and those responsible for implementing the plan shall be indicated. The plan of measures shall be drawn up in three copies and approved by the enterprise director. Copy № 2 shall be forwarded to the Department of Information, Nuclear Material, and Nuclear Site Security; copy № 3—to the department having jurisdiction.

**Analysis:**

A corrective action plan based on agency inspections is defined in this document.

0248	Tamper Indicating Devices. Basic Technical Provisions	MC	OST 95 10557-2000	8.8, 8.8.4	7	Minatom/Rosatom	Enacted
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**Citation:**

8.8 Requirements for Establishing Administrative Monitoring of TID Program Performance

8.8.4 The findings shall be documented with notations regarding discovered deficiencies and corrective actions.

**Analysis:**

These sections establish the requirement for corrective actions resulting from deficiencies discovered during monitoring of the TID program.

0493	Guideline Process for Agency Inspections of PP Systems at Nuclear Sites	PP	(Not obtained)	Section 7	7	Minatom/Rosatom	Enacted
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**Citation:**

7 Developing Corrective Measures and Monitoring Their Implementation

7.1 After reviewing the agency inspection results, Federal Atomic Energy Agency management shall submit the report that has been approved by the head of the Directorate for Information, Nuclear Material, and Nuclear Site Security to the nuclear site.

Based on the approved report and within established deadlines, the administration of the nuclear site shall develop an Action Plan to eliminate deficiencies identified by the inspection team and to implement inspection team suggestions (Plan for Corrective Measures).

7.2 Procedures for developing the Plan for Corrective Measures (henceforth, the Plan) and for its approval by the appropriate departments at the nuclear site shall be determined by the nuclear site administration.

7.3 The Plan shall be prepared in the format appended to these Guidelines and shall be submitted for inspection to the Directorate for Information, Nuclear Material, and Nuclear Site Security and to the Directorate with jurisdiction over the nuclear site.

An excerpt from the Plan pertaining to security provided by internal security troop units shall be forwarded to the appropriate military unit of the Internal Security Troops of the Russian Federation Ministry of Internal Affairs.

7.4 In the event of disagreements regarding proposals for eliminating separate deficiencies or the deadlines for implementing such proposals, the Directorate for Information, Nuclear Material, and Nuclear Site Security (with the approval of the department with jurisdiction over the nuclear site) shall submit its comments to the administration of the nuclear site for subsequent revision of the Plan. The revised Plan shall be distributed as set forth in Para. 7.3.

7.5 Should the identified deficiencies significantly reduce the effectiveness of physical protection at a nuclear site, the site administration shall develop compensatory measures and implement them until the deficiencies are completely eliminated. The compensatory measures shall also be included in the Plan.

7.6 Implementation of the measures specified in the Plan shall be monitored by:

- Staff of the Directorate for Information, Nuclear Material, and Nuclear Site Security – based on reports submitted by the administration of the nuclear site before the deadlines for correcting deficiencies
- Agency inspection teams – during comprehensive, special, and unscheduled inspections of the status of physical protection at nuclear sites

In addition, implementation of measures specified in the Plan shall be monitored by the nuclear site administration and the command of the appropriate military unit of the Russian Federation Ministry of Internal Affairs internal security troops, within the scope of onsite inspections.

7.7 Monitoring results shall be documented in the form of agency inspection team reports or a letter to the Directorate for Information, Nuclear Material, and Nuclear Site Security (the agency monitoring component), as well as in a written form determined by the management of the nuclear site (the site monitoring component).

7.8 The results of Plan implementation (based on the phases or specific activities) must be reflected in the annual report of the nuclear site.

If specific activities in the Plan cannot be implemented during the calendar year for objective reasons (e.g., the deadlines for implementation of a number of Plan measures extend beyond the calendar year), the annual plan of the nuclear site shall reflect their progress.

If specific activities in the Plan cannot be implemented for objective reasons by the deadline, a justification shall be sent to all recipients of the Plan specifying the reasons for not meeting the deadline as well as a new deadline. Corrections shall be made to the appropriate paragraphs of the Plan only after the justification has been approved by the Directorate for Information, Nuclear Material, and Nuclear Site Security and the department with jurisdiction over the nuclear site.

7.9 The final report regarding Plan implementation that shall be submitted to the Directorate for Information, Nuclear Material, and Nuclear Site Security shall include the specific results of activities to eliminate identified deficiencies and to implement agency inspection team recommendations.

**Analysis:**

Section 7 of this document addresses requirements for the site to develop a corrective action plan, including tracking of the corrective actions.

0494	Guideline Process for Site Inspections of PP Systems at Nuclear Sites	PP	(Not obtained)	Section 1, 2, 3, 4, 5, 6	7	Minatom/Rosatom	Enacted
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**Citation:**

**1 General Provisions**

1.1 These "Guidelines for Organizing and Conducting Site Inspections of Physical Protection Systems at Nuclear Sites under the Jurisdiction of the Federal Atomic Energy Agency" (henceforth - Guidelines) define the standard program for site inspections of physical protection systems for nuclear material, nuclear facilities, and nuclear material storage points at nuclear sites under the jurisdiction of the Federal Atomic Energy Agency and at the nuclear sites of enterprises having agreements with the Federal Atomic Energy Agency for physical protection. The Guidelines also establish the procedures for planning, preparing, and conducting site inspections, as well as the methods and types of activities involved.

...

**2 Planning Site Inspections**

Describes the high-level planning for all types of site inspections and outlines the major elements:

- 2.1 Who is responsible for planning site inspections, and the basis for inspections
- 2.2 Describes the types of inspections (special, daily(regular), annual)
- 2.3 Describes who approves and is notified of inspection plans
- 2.4 Notification of departments/units to be inspected

**3 Preparing to Conduct Site Inspections**

This section describes the planning process for site level scheduled and unscheduled site-level inspections. It

includes establishing authority, planning, scheduling, team composition and team roles and responsibilities. The inspection plan will include:

- Goals and tasks
- Inspection timeframes
- A summarized list of activities, indicating deadlines and the individuals responsible (as well as issues and objects to be inspected)
- Inspection types and methods, necessary devices, instruments and fixtures
- The assignment of responsibilities among team members
- The persons responsible for preparing the various sections in the findings

The plan will also specify other issues.

**4 Standard Site Inspection Program**

Section 4 establishes the requirements for a comprehensive inspection. Sites will follow the specific requirements established for conducting a comprehensive inspection through agency monitoring; however, at the discretion of the site director this comprehensive inspection may be modified in scope and depth. This section identifies six areas to be evaluated during a comprehensive inspection: organization of PP activities; site PP documentation; PP personnel recruitment and training; administrative and technical measures; inspecting PP system components; and transfer of nuclear materials. The section provides detailed information on how to inspect these areas.

**5 The Organization of Site Inspections**

5.1 The various types of site inspection may involve the use of the same methods and types of activity used for agency inspections. However, there may be differences in the use of hardware and software due, on the one hand, to the level of detail involved in site inspections, and on the other hand, to the specific features of the physical protection and security system equipment used.

...

5.2 The organization of comprehensive and special scheduled inspections performed by site teams

...

5.3 Organizing individual daily and audit inspections

...

**6. Monitoring to Ensure the Correction of Identified Deficiencies**

The section discusses the procedure for developing a site corrective action plan based on the identified deficiencies found during a site inspection. If the deficiencies significantly reduce a PP system effectiveness then compensatory measures shall be put in place until the deficiencies are corrected.

The corrective action plan will then be implemented. Progress reports and monitoring of the plan implementation will be performed. When the corrective action plan is completed a written report will be generated to discuss the operation.

**Analysis:**

This document lays out all the aspects of site-level monitoring activities, including the monitoring of corrective actions taken to address identified deficiencies. DCN 0493, "Guidelines for Organizing and Conducting Agency Inspections of Physical Protection Systems at Nuclear Sites of the Federal Atomic Energy Agency," is referenced in this document and provides additional specific details regarding the content of the site monitoring plan.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	Section 21	4	RF Government	Enacted
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**Citation:**

21. Organizations handling nuclear material shall immediately report MC&A anomalies detected to the Rosatom Government Atomic Energy Corporation, to the federal executive branch agencies managing the use of atomic energy to which the organization is subordinate, and to regional agencies that regulate safety. The procedures for submitting information regarding the anomaly and the measures to identify its cause of the anomaly shall be established by the federal rules and regulations for governmental nuclear material control and accounting.

**Analysis:**

This regulation requires the reporting of MC&A anomalies.

0723	State System for Common Measurement Standards Nuclear Material Control	MC	GOST R 8 703-2010	Entire Document		Federal Agency on Technical Regulation and	Enacted
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And Accounting  
Measurement  
System General  
Provisions

Metrology

**Citation:**

*Entire Document*

**Analysis:**

The whole document because it refers to metrology of the equipment throughout the standard.

0735	Methodological Recommendations for Collecting, Processing, and Submitting Information to Government Corporation Rosatom Regarding the Physical Protection System Components at Nuclear Sites	PP	Table 1: FZ-3, FZ-9	7	Minatom/Rosatom	Enacted
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**Citation:**

Table 1: Purposes of Each Form Used to Gather Information

**Form №: FZ-3**

Form Title: Installing Physical protection and security equipment at the Nuclear Site  
 Purpose of the Form For the nuclear site: Planning the replacement of physical protection and security equipment at nuclear sites  
 Purpose of the Form For Rosatom: Identifying nuclear sites with obsolete physical protection and security equipment in order to perform resource planning for system upgrades. Planning within the agency for the production of physical protection and security equipment. Calculating special government corporation program performance indicators

Form №: FZ-9

Form Title: Physical Protection System Inspections at the Nuclear Site  
 Purpose of the Form For the nuclear site: Monitoring and analyzing the inspections performed, planning for the performance of these inspections, and monitoring the progress of steps taken to correct deficiencies identified during agency inspections, inspections by oversight organizations, as well as site level inspections  
 Purpose of the Form For Rosatom: Monitoring and analyzing the inspections performed, planning for the performance of these inspections, and monitoring the progress of steps taken to correct deficiencies identified during agency inspections, inspections by oversight organizations, as well as site level inspections. Calculating special government corporation program performance indicators

**Analysis:**

Forms 3 and 9, identified in table 1 of this document, require tracking of equipment life-cycle and replacement, and monitoring of corrective measures.

**7. MPC&A System configuration management**

**Configuration management is a process that identifies the functional and physical characteristics of a system in the earliest phase of its life-cycle, controls changes to those characteristics, and records and reports change processing and implementation. The goal of the process is to ensure that all proposed changes to the MPC&A System are properly reviewed and vetted, both to ensure that changes do not cause unintended negative impacts to the MPC&A System and to ensure that all affected parties are aware of the changes and make appropriate modifications to their activities and roles within the MPC&A system.**

**Analysis:**

Rosatom sites follow a configuration management process defined in ISO standards for both MC&A and PP. The documentary chain that directs the sites to follow the ISO standard is currently unclear, and further investigation to identify the documents may be necessary. Requirement for communicating changes in procedures and

regulations was identified in regulations. In addition, Rosatom indicated that, in practice, changes to the structure of MPC&A systems are also communicated to personnel who are impacted by them.

PP - PP regulations specify a requirement that changes be reviewed and approved by an agency expert commission on PP, but there are no clear requirements for a configuration management plan at the site level. RDP will consider supporting revision of DCN 0013.

MC&A - Elements of configuration control exist for certain aspects of MC&A functions such as MBA structure, measurement and automated accounting systems. Rosatom states that configuration control for other areas is provided by other facility documents, but those documents have not been provided to RDP. Citations establish baseline documentation for the MC&A program so configuration changes can be identified.

**7.1. Develop, approve and ensure that MPC&A personnel are familiarized with the Configuration Control Plan (or similar document). - Provide site level training for configuration management and the identification of configuration controlled items. - Develop a site configuration management plan.**

The configuration control process shall be described and documented so that participants in the process understand what is done, when, by whom.

**Analysis:**

MC&A - MC&A Regulations specify a few aspects of a configuration management program, but do not specifically require the development and approval of a site configuration management plan. Rosatom states that the overarching configuration control process for RF nuclear facilities provides equivalent procedures. Regulatory documentation for that process is not yet available for review.

PP - Rosatom sites follow a configuration management process defined in ISO 9000 series standards. The documentary chain that directs the sites to follow the ISO standard is currently unclear, and further investigation to identify the documents may be necessary. Each site does not have an actual, specific configuration management plan; however, because sites follow the ISO standard some consistency in the implementation of configuration management activities does result.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	4.1, 4.7, 8.2, 8.4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

**4 Nuclear Material Measurements**

4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

**8 Nuclear Material Control and Accounting in Organizations**

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- How nuclear material control and accounting activities are organized in MBAs and within the organization as a whole
- What nuclear material control and accounting policies and technical documents have been adopted within the organization
- The number of MBAs, their boundaries, and their structure
- What measurement methodologies and measuring instruments have been adopted within the organization for nuclear material control and accounting purposes
- Nuclear material access control equipment
- A list of accounting and reporting documents and [copies of] the forms to be used
- Procedures for monitoring the status of nuclear material control and accounting activities within MBAs
- Procedures for investigating nuclear material control and accounting anomalies
- Procedures for training employees (personnel) and granting them access to nuclear material control and accounting related work
- Deadlines for compiling ILs for MBAs and for the organization as a whole
- Procedures for conducting physical inventories

8.4 For each MBA, the manager of the organization shall develop and approve nuclear material control and accounting procedures that identify the following:

- KMPs, as well as the measurement methodologies and measuring instruments adopted for use
- Nuclear material access control equipment
- The nuclear material control and accounting procedures adopted for use in each MBA
- The procedures used to estimate nuclear material losses

**Analysis:**

These sections establish baseline documentation for the MC&A program so configuration changes can be identified.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	6.5	7	Minatom/Rosatom	Enacted
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**Citation:**

**6 Measurement System Elements**

6.5 Measurement Quality Assurance

6.5.1 General Requirements for Laboratories

6.5.1.1 Laboratories conducting measurements for MC&A purposes shall be accredited under the Gosstandart analysis laboratory (center) accreditation system as specified in [18].

6.5.1.2 A measurement status assessment is conducted as a preliminary phase before accreditation in the analysis laboratory (center) accreditation system. The measurement status assessment consists of a comprehensive inspection of the status of metrology support at the laboratory.

6.5.1.3 The measurement status assessment is performed as specified in OST 95 10398.

6.5.1.4 Based on the results of the measurement status assessment for the laboratory, a certificate is issued with an effective period of up to 5 years and an attachment indicating the area of attestation (list of items attested and parameters examined).

6.5.1.5 The Lead Metrology Department maintains an industry (agency) register and databank regarding the laboratories that have undergone measurement status assessment.

6.5.2 Accreditation of Laboratories

6.5.2.1 The measurement laboratories at Minatom enterprises that conduct measurements for MC&A purposes are accredited by the Lead Metrology Department, which is in turn accredited by Gosstandart of Russia as the agency for accrediting measurement laboratories in the analysis laboratory (center) accreditation system.

6.5.2.2 A laboratory's accreditation may be valid for no more than 5 years. The Lead Metrology Department establishes the specific period of validity during the accreditation.

6.5.2.3 Accreditation under the analysis laboratory (center) accreditation system is conducted as specified in [18].

6.5.2.4 Based on the accreditation results, Gosstandart of Russia will issue an accreditation certificate to the laboratory along with an attachment indicating the area of attestation (list of items attested and parameters examined).

6.5.2.6 [sic] The Lead Metrology Department sends the [accredited laboratory an accreditation certificate, approved passport, and a decision regarding the laboratory, after which the director of the accredited laboratory adopts the passport and the decision.

6.5.2.7 Audit inspections of accredited laboratories are conducted by the Lead Metrology Department or, at its behest, by the main or pilot organizations of the Minatom metrology department.

6.5.3 Accreditation of Metrology Departments

6.5.3.1 Minatom metrology departments are accredited to perform calibration certification of measuring instruments as specified in the industry (agency) accreditation schedule. The schedule is developed by the Lead Metrology Department once every 5 years, approved by Gosstandart, and adopted by Minatom management.

6.5.3.2 Accreditation to perform calibration certification of measuring instruments is conducted by an authorized government entity or industry (agency) accreditation center.

6.5.3.3 Minatom metrology departments are accredited to perform calibration certification of measuring instruments as specified in the industry (agency) accreditation schedule. The schedule is developed by the Lead Metrology Department once every 5 years, approved by Gosstandart, and adopted by Minatom management. [sic – duplication of 6.5.3.1.]

6.5.3.4 Metrology departments are accredited for technical competence in the area of measurements for MC&A purposes as specified in Appendix E.

6.5.4 Internal Measurement Quality Control

6.5.4.1 Indicators of measurement quality are monitored in order to ensure the required accuracy of measurement results during nuclear material control and accounting.

6.5.4.2 Internal quality control applies to measurement results obtained at the analysis laboratory and at KMPs in MBAs.

6.5.4.3 Internal monitoring of quality indicators is performed by assessing the compliance of the uncertainty characteristics (or those of uncertainty components) for the results of measurements conducted for control purposes with the uncertainty characteristics set forth in measurement methodologies.

6.5.4.4 Internal quality control entails the following forms of monitoring:

- Operational monitoring (of repeatability, reproducibility, and uncertainty)
- Statistical monitoring (statistical monitoring of samples for repeatability, reproducibility, and accuracy, periodic inspection of the quality of measurement procedures)

6.5.4.5 Internal operational quality control of measurement results is performed for the purpose of preventive inspection and serves as an operation measure in situations where the uncertainty of inspection measurements does not comply with control limits.

6.5.4.6 Internal statistical quality control is conducted in order to assess the quality of nuclear material measurements conducted over a certain period of time and to manage this quality effectively.

6.5.4.7 The procedures for conducting operational and statistical control and rules for processing their results comply with OST 95 10289.

6.5.5 Procedures for Organizing Measurement Exchange Programs between Laboratories

6.5.5.1 Measurement exchange programs between laboratories are used for the following purposes:

- To determine the ability of a laboratory to conduct measurements
- To establish effectiveness and a comparison of measurement methodologies under development
- To detect discrepancies between laboratories
- To detect problems at laboratories related to measurement accuracy

6.5.5.2 Measurement exchange programs between laboratories are conducted by a coordinator. The coordinator may be an agency for laboratory accreditation within the analysis laboratory (center) accreditation system (the Lead Metrology Department) or an organization or enterprise accredited as a coordinator.

6.5.5.3 The procedures for measurement exchange programs between laboratories comply with [19].

6.5.5.4 When organizing a measurement exchange program between laboratories, the coordinator develops program that corresponds to the objectives of a specific measurement quality inspection.

6.5.5.5 The exchange program shall contain the following information:

- Information regarding the coordinator and the laboratories participating in the measurement quality inspection program
- A description of the nature of the samples and the means used to obtain, process, inspect, and transport them
- A schedule for various preparatory and measurement stages
- Forms for submitting measurement results

6.5.5.6 Based on the results of the measurement exchange programs between laboratories, the coordinator issues a report that contains information as specified in [19], which will be distributed to the enterprises that participated; conclusions may also be drawn about the technical competence of the participants.

**Analysis:**

This section describe the process that controls the development and changes to measurement methodologies.

	Management						
	Structure in						
	Automated PP						
0030	Systems at	PP	Minatom	2.1.3, 3.1,	7	Minatom/Rosatom	Enacted
	Potentially		Order # 387	3.8			
	Hazardous Nuclear						
	Facilities						

**Citation:**

2.1.3 ... Organizational procedures and implementation of collaboration between the administration of the potentially hazardous nuclear site, its security service, elements and units of the internal security troops that provide for the security and defense of the site, and other relevant federal agencies during the design and modernization of the site PP system, during its normal and emergency operation, are also established by the document "Regulation on the Interface among Physical Protection Systems at Potentially Hazardous Nuclear Sites,"

as well as the plans for cooperation contained in the "Procedures..." ...

**3.1 Recommendations for building and expanding the automated systems within a PP system**

... Requirements that the vitality of the PP system be preserved in spite of sabotage or other unauthorized actions leads to the necessity of constructing distributed databases to go along with the distributed, decentralized organizational structures. Their distribution, the DB management and maintenance procedures, data structures, backup and alignment shall be established by standards documents for the respective categories of sites.

**3.8. Recommendations on the operation of automated PP systems**

The process of effectively operating and expanding automated PP systems is supported by compliance with Procedures and regulations regarding operational use, operational servicing, recovery and upgrading of automated systems.

In order to operate PP systems effectively, a set of standards documents must be developed for each category of site; these documents shall specify requirements for the performance of all necessary functions. This set of requirements shall reflect:

- Procedures for system upgrades and configuration changes;

**Analysis:**

This document is not required. It is likely that most Rosatom sites would follow these recommendations, but they are not required.

This document deals with Automated PPS, defined as: the combination of personnel and the equipment that automates their activities in applying information technologies to the performance of specific functions.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	1.2 11th bullet, 1.3	7	Minatom/Rosatom	Enacted
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**Citation:**

1.2 This document establishes:

- 11th bullet • Requirements for the design and modernization of physical protection systems;

1.3 The requirements for PP systems at specific potentially hazardous nuclear sites and their structural components and elements shall be established based on the General Requirements with due regard to the results of the potentially hazardous nuclear site vulnerability analysis, the category and specific operation of the PP system, and the assessment of PP system effectiveness, and shall be imposed during PP system creation, operation, and modernization.

**Analysis:**

Establishes baseline for configuration management.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	16	4	RF Government	Enacted
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**Citation:**

16. Nuclear material control and accounting at organizations handling nuclear material is conducted based on material balance areas and in accordance with the federal rules and regulations for governmental nuclear material control and accounting, as well as in accordance with policy and technical documents to be developed and adopted by these organizations in order to implement these federal rules and regulations.

The organizations establish material balance areas upon approval with the Rosatom Government Atomic Energy Corporation.

**Analysis:**

This article requires the Rosatom approval of any changes to the MBA structure at a site.

0722	Nuclear Material Control and Accounting Standard (Model) Quality Control Program for Nuclear Material	MC	OST 95 10598-2008	5.5, 6.2.5	7	Minatom/Rosatom	Enacted
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Measurements

**Citation:**

5.5 The measurement quality control program shall be reviewed, as necessary, in the following instances:

- When the organizational structure of the organization or a specific MBA has changed
- When new measuring instruments are deployed
- When new measurement methodologies are employed

The measurement quality control may be reviewed using the following procedure:

- At the request of the measurement quality control program manager, the administrative units or MBAs in which nuclear material measurements are performed compile reports regarding the operation of the material measurement quality control program; these reports are submitted to the manager of the measurement quality control program. These reports shall contain information regarding the types of audits conducted in the MBA, the number of audit measurements that were conducted over the intervening period, the number of negative results from internal quality control of measurement results, the cause of the negative results, the corrective actions that were taken, etc.
- The manager of the measurement quality control program analyzes the reports and convenes a meeting of individuals responsible for implementing the measurement quality control program at the level of administrative units (or MBAs) to discuss whether changes need to be made to the program and what changes, if any, are required. Revision of the measurement quality control program is conducted by its developers per instructions issued by the manager of the measurement quality control program.

6.2.5 The section shall identify the deadlines and procedures for reviewing and revising the Program per Para. 5.6 of this standard.

**Analysis:**

This regulation establishes the review requirements for the measurement quality control program.

3104	Automated Systems. Requirements to Document Content	MC, PP	RD 50-34.698-90	3.1, 4.13, 1.4, 2.8.5	6	Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

3.1. Description of the Organizational Structure

3.1.1. This document shall include the following sections:

- 1) Changes in the Organizational Structure of Facility Management;
- 2) Administrative unit Organization;
- 3) Reorganization of Existing Management Administrative Units.

3.1.2. Changes in the Organizational Structure of Facility Management shall include:

- 1) Design decisions and justification for changing the organizational structure of facility management;
- 2) A description of the changes in relationships among administrative units;

3.1.3. Administrative Unit Organization shall provide:

- 1) A description of the organizational structure and functions of administrative units to be created to support Automated System operation;
- 2) A description of the work requirement;
- 3) A list of employee categories and the number of permanent personnel.

3.1.4. Reorganization of Existing Management Administrative Units shall include a description of the changes, necessitated by the development of the Automated System, that must be made in each of the management administrative units within the existing organizational structure, in administrative unit functions, work requirements, and the composition of administrative unit personnel.

4.13. System Structural Diagram

This document shall indicate the basic functional components (structural components) defining the system or subsystem, their interfaces and purpose in the system or subsystem.

1.4. The developer shall define the content of documents developed during the preliminary design stages per GOST 34.601, and of administrative documents depending on the amount of information necessary and sufficient for further use of the documents. Appendices 1 and 2 provide the content of these documents.

2.8.5. The Certificate of Acceptance shall state the date on which the certificate of Automated System acceptance for commercial operation was signed and the surnames of the individuals who signed it.

**Analysis:**

These sections establish the requirements for the document describing the configuration of automated systems and the controls for changing the configuration.

3149	On Approval and Enactment of Federal Norms and Rules in the Area of Atomic Energy Use "Requirements to Organizing of Material Balance Areas"	MC	NP-081-07	3, 4	5	Minatom/Rosatom	Enacted
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**Citation:**

## 3. Requirements to MBA organization

## 3.1. MBAs shall be organized to enable the following:

Ensure physical inventory of nuclear materials with established frequency;

Ensure cessation of technological operations with nuclear materials for the period of physical inventory, including their shipment of MBA and receipt to MBA, except for the areas of separating and radio chemical processes using a continuous technology of NM processing.

3.2. When organizing an MBA, organizational and (or) technical measures shall be taken into consideration to exclude a potential transfer of nuclear materials out of the MBA by-passing key measurement points.

3.3. It is not allowed to keep nuclear materials accounted in the state control and accounting system along with defense nuclear materials [materials containing and capable of producing fissile (fissionable) nuclear substances of special properties, including those based on isotopic composition making them suitable for use in nuclear weapon or military nuclear installation designs, and fabricated based on special technologies and standards] in one MBA at the same time, unless there is an appropriate justification signed by Operator's director that it is technologically impossible to ensure such separate keeping.

3.4. MBA boundaries shall be organized not to allow the same nuclear material accounting unit to be present in more than one MBA.

3.5. One MBA for all nuclear materials shall be organized on a nuclear vessel.

3.6. The following shall be singled out as separate MBAs:

Areas of separating and radio chemistry processes that use a continuous technology of NM processing;

Fresh and (or) spent fuel storage facilities;

Organization's structural units, such as enterprise laboratories and reloading areas.

3.7. A person responsible for organizing of control and accounting of nuclear materials in an MBA shall be assigned for each MBA.

## 4. Requirements to MBA Documentation

4.1. A document "Structure and Description of Material Balance Areas" shall be developed at an enterprise and be approved by the enterprise director or an authorized person. MBA structure and description are allowed to be included into instructions on material control and accounting at the enterprise and in MBA approved by enterprise director and an authorized person.

MBA structure and description shall contain the following:

Description of MBA boundaries;

Categories and types of nuclear materials, their forms (accounting units or bulk-form), chemical forms (hexafluoride, dioxide, etc.) and physical forms (powder, solution, etc.) of nuclear materials present in the MBA;

Frequency of physical inventories;

List of key measurement points with identification of their purpose;

Description of nuclear materials locations in MBA;

Diagrams and description of NM transfer to MBA, within MBA and out of MBA, with specification of key measurement points;

Areas of potential loss of nuclear materials;

List of access control equipment used in MBA.

4.2. Information on formation of new MBAs or on changes in enterprise's MBA structure shall be sent by the enterprise to a federal executive authority of state safety regulation if nuclear energy was used 30 days after those changes were recorded in an established procedure.

**Analysis:**

This document requires notification to Rosatom that changes to material balance areas have been made.

**7.2. Establish Configuration Control Board and procedures. - Identify a site configuration control authority or board that will be responsible for reviewing proposed MPC&A system changes.**

A site-level entity that is responsible for reviewing and disseminating information about MPC&A system changes will ensure these activities are carried out in a manner that does not introduce weaknesses into the MPC&A system.

**Analysis:**

MC&A – Regulations do not specifically require establishing a configuration control board and procedures. Rosatom states that the overarching configuration control process for RF nuclear facilities likely provides equivalent

procedures. Regulatory documentation for that process is not yet available for review.

PP - Rosatom sites follow a configuration management process defined in ISO standards. The documentary chain that directs the sites to follow the ISO standard is currently unclear. Requirements have been identified in physical protection regulations that require approval of all changes to the physical protection system by an agency expert commission on PP. Additional research is required to determine how non-PP changes at facility are evaluated for their impact on PP. RDP will consider supporting revision of DCN 0013 covering this sub-element.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0013	Instructions for Developing Physical Protection Systems for Nuclear Materials, Nuclear Facilities and Nuclear Materials Storage Points. Principles for Organizing the Design Process	PP	RD 95 10544-99; Minatom Order # 538	6	7	Minatom/Rosatom	Enacted

**Citation:**

**6. EXPERT REVIEW PROCEDURE FOR SECTIONS OF THE PP SYSTEM DESIGN**

6.1 The PP system design section, which is included as part of facility construction design documentation, must undergo an expert review conducted by the government in accordance with the requirements of PДC {RDS} 11-201-95: "Instructions on the Procedure for Governmental Expert Reviews of Construction Designs." The differentiation in the expert review functions of Minatom and the Ministry of Construction of Russia shall be taken into account.

6.2 Before undergoing a governmental expert review, a special expert review commission shall examine the PP system design section. This commission shall be established by the Minatom Department of Information, Nuclear Material and Site Security and approved by order of the Minister.

6.3 The special expert review commission shall consist of independent experts selected from among the specialists at Minatom enterprises and organizations. Their authority shall extend to the following areas:

- Site security force organization;
- Nuclear material control and accounting;
- Security service organization;
- Information protection;
- Nuclear safety and radiation protection;
- Explosives and fire protection;
- Major building and structure construction design;
- Development of security hardware, etc.

6.4 The client shall submit the following materials for a special expert review of the PP system design section:

- The finding of government agencies and executive branch decisions regarding the location for the new construction of a potentially hazardous nuclear site (site selection);
- An explanatory note to the PP system design section;
- Vulnerability analysis materials.

6.5 The special expert review of the PP system design section shall include an examination of the following items:

- The construction site selection criteria, taking into account environmental and technical factors, the distance from potentially hazardous nuclear sites, the socio-economic conditions and state of criminal activity in the construction area (for new construction);
- The adequacy of design measures for the physical protection of a potentially hazardous nuclear site;
- The adequacy of adopted administrative, engineering and other PP decisions in light of the newest advances in domestic and foreign science and technology;
- The use of certified PP system equipment that complies with the laws of the Russian Federation.

6.6 A finding shall be compiled at the conclusion of the expert review. This finding shall be adopted by the chair of the expert review commission, sent to the client, and submitted for governmental expert review along with

construction design documentation for a potentially hazardous nuclear facility.

**Analysis:**

The document establishes the procedure for the creation of an independent special expert review commission to review and approve changes to the physical protection system at the site.

**7.3. Develop a system by which proposed configuration changes in MPC&A system are reviewed to verify that the system effectiveness has not degraded. - Develop and document the change control board process. - Provide site level configuration baseline documentation for all MPC&A system so configuration changes can be identified.**

There shall be a review and approval system that ensures changes are effectively managed and do not adversely impact other MPC&A elements.

**Analysis:**

MC&A - Regulations do not specifically require review of all proposed configuration changes to verify that system effectiveness will not degrade. Portions of this sub-element exist for MBA structure, measurement and automated accounting systems.

PP - Rosatom sites follow a configuration management process defined in ISO 9000 series standards. The documentary chain that directs the sites to follow the ISO standard is currently unclear. Requirements have been identified in physical protection regulations that require a process by which changes to the physical protection system are reviewed and approved.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	4.1, 4.2, 4.7, 8.2, 8.4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

**4 Nuclear Material Measurements**

4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.

4.2 Measurement methodologies shall be incorporated into individual site policy documents that shall be compiled in accordance with the requirements set forth in metrology standards.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- How nuclear material control and accounting activities are organized in MBAs and within the organization as a whole
- What nuclear material control and accounting policies and technical documents have been adopted within the organization
- The number of MBAs, their boundaries, and their structure
- What measurement methodologies and measuring instruments have been adopted within the organization for nuclear material control and accounting purposes
- Nuclear material access control equipment
- A list of accounting and reporting documents and [copies of] the forms to be used
- Procedures for monitoring the status of nuclear material control and accounting activities within MBAs
- Procedures for investigating nuclear material control and accounting anomalies
- Procedures for training employees (personnel) and granting them access to nuclear material control and accounting related work
- Deadlines for compiling ILs for MBAs and for the organization as a whole
- Procedures for conducting physical inventories

8.4 For each MBA, the manager of the organization shall develop and approve nuclear material control and accounting procedures that identify the following:

- KMPs, as well as the measurement methodologies and measuring instruments adopted for use
- Nuclear material access control equipment
- The nuclear material control and accounting procedures adopted for use in each MBA

- The procedures used to estimate nuclear material losses

**Analysis:**

These sections establish baseline documentation for the MC&A program so configuration changes can be identified.

0013	Instructions for Developing Physical Protection Systems for Nuclear Facilities and Nuclear Materials Storage Points. Principles for Organizing the Design Process	PP	RD 95 10544-99; Minatom Order # 538	6	7	Minatom/Rosatom	Enacted
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**Citation:**

**6. EXPERT REVIEW PROCEDURE FOR SECTIONS OF THE PP SYSTEM DESIGN**

6.1 The PP system design section, which is included as part of facility construction design documentation, must undergo an expert review conducted by the government in accordance with the requirements of PДC {RDS} 11-201-95: "Instructions on the Procedure for Governmental Expert Reviews of Construction Designs."

The differentiation in the expert review functions of Minatom and the Ministry of Construction of Russia shall be taken into account.

6.2 Before undergoing a governmental expert review, a special expert review commission shall examine the PP system design section. This commission shall be established by the Minatom Department of Information, Nuclear Material and Site Security and approved by order of the Minister.

6.3 The special expert review commission shall consist of independent experts selected from among the specialists at Minatom enterprises and organizations. Their authority shall extend to the following areas:

- Site security force organization;
- Nuclear material control and accounting;
- Security service organization;
- Information protection;
- Nuclear safety and radiation protection;
- Explosives and fire protection;
- Major building and structure construction design;
- Development of security hardware, etc.

6.4 The client shall submit the following materials for a special expert review of the PP system design section:

- The finding of government agencies and executive branch decisions regarding the location for the new construction of a potentially hazardous nuclear site (site selection);
- An explanatory note to the PP system design section;
- Vulnerability analysis materials.

6.5 The special expert review of the PP system design section shall include an examination of the following items:

- The construction site selection criteria, taking into account environmental and technical factors, the distance from potentially hazardous nuclear sites, the socio-economic conditions and state of criminal activity in the construction area (for new construction);
- The adequacy of design measures for the physical protection of a potentially hazardous nuclear site;
- The adequacy of adopted administrative, engineering and other PP decisions in light of the newest advances in domestic and foreign science and technology;
- The use of certified PP system equipment that complies with the laws of the Russian Federation.

6.6 A finding shall be compiled at the conclusion of the expert review. This finding shall be adopted by the chair of the expert review commission, sent to the client, and submitted for governmental expert review along with construction design documentation for a potentially hazardous nuclear facility.

**Analysis:**

The document establishes the procedure for the creation of an independent special expert review commission to review and approve changes to the physical protection system at the site.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	2.7, 2.8, 3.3.2, 9.2.7, 9.5.1, 9.5.2, 9.4.10	7	Minatom/Rosatom	Enacted
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**Citation:**

2.7 ... Both newly designed and modernized PP systems are subject to mandatory verification of compliance with the requirements of government and ministry regulations, including attestation with respect to information protection requirements and acceptance for use in accordance with procedures established by the inter-agency commission.

2.8 ...Ministry regulations are developed for the purpose of embodying and implementing the Procedures and other federal level regulations and this document. They specify the following:

- ...
- Procedures for the design and modernization of PP systems;
- ...
- Requirements for the constituent components of PP systems;
- ...
- Procedures and methodologies for assessing the effectiveness of PP systems;
- ...
- Requirements and recommendations regarding the management of PP systems;
- ...
- Procedures for conducting site management monitoring of activities to provide physical protection at their potentially hazardous nuclear site;
- ...

3.3.2 The physical protection system shall provide the required level of effectiveness, which is defined as the capability of the PP systems to withstand the actions of adversaries directed against NM, nuclear facilities, and other objects of physical protection with due consideration for the intruder profiles and list of threats identified during the vulnerability analysis phase for the specific potentially hazardous nuclear site. The PP system design principles are directed toward achieving PP system effectiveness.

9.2.7 Technical specifications for PP system creation (modernization) are developed for the purpose of generating and specifying in detail the Client's requirements for the PP system based on the conceptual design process, as well as for the purpose of identifying the procedures, composition, and content of PP system deployment activities. Their composition and content, as well as procedures for their approval and adoption, shall be determined as specified in the ministry regulation "Physical Protection Systems. Technical Specifications for the Creation (Upgrading) of PP Systems"

9.5.1 The quality of PP system creation and operation shall be confirmed by an assessment of its effectiveness. The PP system effectiveness assessment is an evaluation of the ability of the PP system to counter the actions of an adversary given the nature of the threats and intruder profiles established during the vulnerability analysis process.

9.5.2 The evaluation of PP system effectiveness may be determined experimentally (by a training exercise), analytically, or using computer modeling at various stages and phases in the creation of the PP system, as well as during its operation. Results of the PP system effectiveness evaluation are to be used to determine the manner in which the system may be improved.

9.4.10 Acceptance of the PP system by the Interdepartmental Commission includes:

- ...
- Establishing that PP system parameters and characteristics comply with the requirements in regulations and design documents;
- ...

**Analysis:**

This is the primary agency-level PP document for Rosatom. Section 9.2.7 mandates the use of the document, "Physical Protection Systems. Technical Specifications for the Creation (Upgrading) of PP Systems." Remaining sections require sites to ensure that any changes to the PP system to do not degrade the PP system.

0060	Ministry Methodological Recommendations - Standard Technical Specifications for Creating (Improving) PP Systems for Nuclear Hazardous	PP	(Not obtained)	3.1, 3.2, 3.10	7	Minatom/Rosatom	Enacted
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Facilities

**Citation:**

3.1. The draft physical protection system technical specification shall be developed by the security service at the potentially hazardous nuclear site in conjunction with other administrative units at the site that are participating in the development (modernization) of the PP system and with the involvement (if necessary) of specialized Minatom of Russia organizations and representatives from the Internal Security Troops of the Russian Federation Ministry of Internal Affairs (for potentially hazardous nuclear sites that are guarded by internal security troops). The necessity of involving specialized organizations in the development of the draft physical protection system technical specification shall be determined by the administration of the potentially hazardous nuclear site with due consideration for the results of the PP system conceptual design.

3.2. Technical specifications for PP systems shall be approved by the prime contractor (if one has been appointed) and, if funding has been provided from the federal budget, also by the main project manager appointed within Minatom of Russia for physical protection tasks. If necessary, the physical protection system technical specification shall be approved by the specialized organizations that will be contracted by the client to perform various phases of the PP system development (modernization) and by the commander of the Russian Federation Ministry of Internal Affairs Internal Security Troops (for potentially hazardous nuclear sites that are guarded by internal security troops). In order to limit the distribution of information regarding the PP system that is being developed (modernized), excerpts of the physical protection system technical specification that are relevant to them may be submitted to the contractors for approval.

3.10. Changes may not be made to a physical protection system technical specification after the PP system has been presented to the inter-agency (agency) commission for acceptance.

**Analysis:**

This is a methodological recommendations document, but its use is mandated in Order 550. Cited segments provide for approval of changes to the PP system during design and modernization, and prohibit changes outside the process.

0722	Nuclear Material Control and Accounting Standard (Model) Quality Control Program for Nuclear Material Measurements	MC	OST 95 10598-2008	5.5, 6.2.5	7	Minatom/Rosatom	Enacted
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**Citation:**

5.5 The measurement quality control program shall be reviewed, as necessary, in the following instances:

- When the organizational structure of the organization or a specific MBA has changed
- When new measuring instruments are deployed
- When new measurement methodologies are employed

The measurement quality control may be reviewed using the following procedure:

- At the request of the measurement quality control program manager, the administrative units or MBAs in which nuclear material measurements are performed compile reports regarding the operation of the material measurement quality control program; these reports are submitted to the manager of the measurement quality control program. These reports shall contain information regarding the types of audits conducted in the MBA, the number of audit measurements that were conducted over the intervening period, the number of negative results from internal quality control of measurement results, the cause of the negative results, the corrective actions that were taken, etc.
- The manager of the measurement quality control program analyzes the reports and convenes a meeting of individuals responsible for implementing the measurement quality control program at the level of administrative units (or MBAs) to discuss whether changes need to be made to the program and what changes, if any, are required. Revision of the measurement quality control program is conducted by its developers per instructions issued by the manager of the measurement quality control program.

6.2.5 The section shall identify the deadlines and procedures for reviewing and revising the Program per Para. 5.6 of this standard.

**Analysis:**

This regulation establishes the review requirements for the measurement quality control program.

Set of Standard

0727	(Model) Forms to Be Developed When Operating Physical Protection and Security Equipment and Procedures for Completing the Forms	PP	(Not obtained)	4.1.5	7	Minatom/Rosatom	Enacted
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**Citation:**

4.1.5 In the event there is a failure of the measurement equipment used during physical protection system equipment operations and it is impossible or does not make sense to repair the equipment, it may be replaced with similar equipment or with other measurement equipment that has metrology characteristics equal to those specified in the operating documentation. The replacement shall be approved by the Metrology Department at the organization that operates the physical protection system equipment and shall be reflected in the physical protection system equipment documentation (passport). The decision to replace failed measuring equipment is made by a commission established by the administration at the nuclear site (the organization operating the security system equipment).

**Analysis:**

The document requires coordination of each replacement of measurement instrument with facility's metrological service. Decision about replacement are made by special committee

3127	Russian Federation Law On Rosatom State Corporation for Atomic Energy	PP, MC	317-FZ	Article 8, Paragraph 4 and 5	3	RF Parliament	Enacted
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**Citation:**

**Article 8. Powers of The Corporation with Regard to Regulation within the field of competence**

4. Regulatory legal acts of The Corporation within the field of competence shall be issued in the form of orders, provisions and instructions that are mandatory for federal agencies of state power, agencies of state power of entities of the Russian Federation, and agencies of local self-administration of municipal structures, legal entities and individuals.

5. Regulatory legal acts of The Corporation shall be subject to registration and publication in the procedure established for state registration and publication of regulatory legal acts of federal agencies of the executive branch.

**Analysis:**

This establishes the requirements for issuance of MPC&A regulatory acts which is the baseline documents to check MPC&A configuration.

3149	On Approval and Enactment of Federal Norms and Rules in the Area of Atomic Energy Use "Requirements to Organizing of Material Balance Areas"	MC	NP-081-07	4.2	5	Minatom/Rosatom	Enacted
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**Citation:**

**4. Requirements to MBA Documentation**

4.2. Information on formation of new MBAs or on changes in enterprise's MBA structure shall be sent by the enterprise to a federal executive authority of state safety regulation if nuclear energy was used 30 days after those changes were recorded in an established procedure.

**Analysis:**

This document requires notification to Rosatom that changes to material balance areas have been made.

General Requirements for the Competence of	GOST R	Federal Agency on Technical
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3189	Testing and Calibration Laboratories	MC	ISO/IEC 17025-2006	4.3	Regulation and Metrology	Enacted
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**Citation:**

## 4.3 Document Management

## 4.3.1. General Information

A laboratory shall develop and maintain procedures for managing all documents that are part of the management system (whether developed by the laboratory itself or brought in from the outside), including such documents as industrial codes, standards, other regulations, testing and/or calibration methodologies, as well as drawings, software, technical specifications, instructions, and manuals.

NOTE № 1: In this context, the word "document" may designate policy statements, procedures, technical specifications, calibration tables, blueprints, written materials, posters, notes, reminder signs, software, drawings, building layouts, etc. They may exist in various media: hard copy or electronic, in digital, analog, photographic, or written form.

NOTE № 2: Data management regarding testing and calibration is described in Para. № 5.4.7; records management is described in Para. № 4.13.

## 4.3.2 Approving and Issuing Documents

4.3.2.1 Prior to distributing management system documents for use by laboratory employees, such documents shall be verified and approved by an authorized employee. An easily accessible "master list" or equivalent document control procedure shall be developed. This system shall contain the specific results of ongoing revisions and the status and distribution of documents within the management system, in order to prevent the use of documents that have become out of date or are no longer the current version.

## 4.3.2.2 Adopted procedures shall ensure the following:

- a) Official versions of all documents shall be available in all work areas where major activities essential to the effective operation of the laboratory are performed
- b) Documents are analyzed on a regular basis and revised as necessary in order to ensure their suitability and compliance with established requirements at all times
- c) Out of date or previous versions of documents are removed immediately from all locations where they have been issued or used, or their unintentional use is prevented in some other way
- d) Out of date documents that are archived for legal or informational purposes are marked in an appropriate manner

4.3.2.3 Management system documents developed by the laboratory itself shall have unique identifiers. Elements of such identification shall include the date of issue and/or a revision number, numbered pages, an indication of the total number of pages or the end of the document, and information regarding the organization that issued the document.

## 4.3.3 Changes to Documents

4.3.3.1 Changes to documents shall be analyzed and approved by the department that performed the original analysis, unless other individuals are specifically assigned to this task. Assigned employees shall have access to related initial information that served as the basis for the analysis and approval activities.

4.3.3.2 New or changed text shall be identified in the document or in appropriate appendices, if practical.

4.3.3.3 If the document management system at a laboratory allows hand written changes in anticipation of the latest [official] change to a document, procedures and authorizations to make such changes shall be specified. The changes shall be highlighted clearly, initialed, and dated. The reviewed document shall be re-issued officially as soon as this is practical.

4.3.3.4 Procedures shall be established for entering and managing changes to documents that are stored in computer systems.

**Analysis:**

This citation provides a document configuration management process for measurement laboratories.

**7.4. Develop a method of communicating changes in MPC&A system configuration to site personnel. - Disseminate configuration management plan to site personnel.**

Operations and MPC&A staff and management shall be informed when changes to MPC&A systems and operations are made that affect them. How and when changes are reviewed, approved, and implemented shall be communicated to the appropriate personnel. This communication process shall clearly stipulate who is responsible for implementing the changes and with whom the changes shall be coordinated.

**Analysis:**

MC&A - Citations were not found that require the development of a method of communicating changes in the MC&A system configuration to site personnel. The only communication of configuration changes that are specified in current MC&A regulations involve shutting down processing and movements prior to the performance of physical inventories.

PP - The regulations contain elements of a configuration control process. However, the elements are not organized in a way that demonstrates that configuration changes are communicated to site personnel.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	9.4	7	Minatom/Rosatom	Enacted

**Citation:**

**9.4 The PP system deployment phase.**

9.4.1 PP system deployment shall include the following phases:

- Preparing the potentially hazardous nuclear site for PP system deployment;
- Training PP system personnel;
- Assembling the physical protection equipment that has been delivered into the PP system
- Construction and installation of physical protection and security equipment;
- Set-up of physical protection and security equipment;
- Conducting preliminary tests of the set of physical protection and security equipment and/or its component parts;
- Conducting initial operation of the physical protection equipment;
- Conducting acceptance testing of physical protection and security equipment;
- Acceptance of the PP system by the Interdepartmental Commission.

9.4.2 Preparing the potentially hazardous nuclear site for deployment of the PP system shall include conducting the following activities to prepare the site administratively for deployment of the PP system:

- Establishing and refining protection systems and measures at the potentially hazardous nuclear site;
- Generating and refining the organizational and staffing structure of its security service and security force units at the potentially hazardous nuclear site;
- Selecting and clearing PP system personnel;
- Developing and approving draft site regulations regarding physical protection, as well as position descriptions and work assignments for PP system personnel.

9.4.3 Training PP system personnel includes:

- Providing instruction to PP system personnel;
- Presenting PP system personnel information about their position descriptions and work assignments, as well as relevant site regulations regarding physical protection;
- Verifying the capability of personnel to keep the PP system operational. Personnel training requirements are provided in Chapter Fifteen.

**Analysis:**

Section 9 of Order 550 deals with both development and modernization of PPS. The cited sections discuss the need to communicate changes to the personnel.

0757	Procedures for the Turnover of Physical Protection and Security Equipment to Security Forces	PP	10697-A-D1	2.2.1, 2.2.2, 2.2.7, 3.10	7	Minatom/Rosatom	Enacted
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**Citation:**

2.2.1 Prior to turning over the site to the security forces or whenever changes are made to the security system, including changes in the way security is provided (the performance of duties by guards and sentries), an inter-agency (agency ) committee determines on the basis of established standards the number of security force personnel required to perform the assigned duties.

2.2.2 Before the turnover of site security responsibilities and integrated physical protection and security equipment is accepted, arrangements shall be made to prepare all categories of security force personnel to perform their duties according to the integrated physical protection and security equipment to be used.

2.2.7 Changes to the security system at a site are implemented after all measures specified in the Reports of the Inter-Agency Committees regarding organization of its security and in other regulations have been completed and after all measures have been completed to train security force personnel to operate the physical protection and security equipment.

Establishing (changing) the security system at a nuclear site takes place after an effectiveness assessment of the physical protection system at the site has been carried out using the "Methodological Recommendations for Assessing the Effectiveness..." (adopted in 2004), taking into consideration the administrative and technical measures (changes) associated with turning over the newly constructed (renovated) integrated physical protection and security equipment system for routine operations.

When necessary, revisions are made or changes are entered into security plans (security and defense plans) at the nuclear site and into other administrative documentation in security force units and guard rooms at the site.

3.10 In the event that the administration at a secure nuclear site already in operation turns over a portion of the system (newly constructed, upgraded, repaired) to the security forces for their use, the procedures followed by the site administration will be similar to the procedures indicated above for the turnover of physical protection and security equipment.

**Analysis:**

2.2.1: Requires that, during transitions related to implementing/bringing on-line of new PP systems or components, an ad hoc committee examine and determine the number of security personnel required to meet security requirements under the new configuration.

2.2.2, 2.2.7: Citations require that all personnel be informed/trained regarding all procedures needed to utilize new equipment/systems, and stipulate that changes can only be implemented after all necessary training is completed. It also requires that changes be implemented after an effectiveness assessment is conducted.

3.10: Citation requires that same procedures be used for partial system changes as those used for full system implementations.

	Methodological Guidelines on Establishing Validity			3.3.1.3			
3162	Terms of Licenses for Activities in the Area of Nuclear Energy Use	MC, PP	RD-03-31-2008	Bullet 3, 3.3.1.5 Bullet 3	7	GAN/Rostekhnadzor	Enacted

**Citation:**

**3. STRUCTURE AND CONTENT OF LICENSING TERMS**

**3.3. Content of the Chapter "General Requirements and Conditions"**

**3.3.1. This chapter should include requirements and conditions obligating the licensee to:**

3.3.1.3. When implementing the specified type of activity, ensure:

- ...
- That overhauled (upgraded) safety-related systems (components) are commissioned only after licensing terms have been modified, all copies of operating documentation have been revised and/or amended accordingly and have been reviewed by personnel;
- ...

3.3.1.5. With respect to personnel:

- ...
- When enacting new or revising existing regulations, ensure that employees review new rules and regulations and are tested on them in accordance with their duties.

**Analysis:**

To comply with licensing requirements, sites are required to communicate changes to rules and regulations to site personnel and provide appropriate training.



# Key Issues Analysis - Russian Regulations

Русский

## 1. Two Person Rule

### Analysis:

Discussions confirmed that Category I & II SNM are only subject to TPR in a vital area and the use of the TPR is subject to discretion of facility management outside these areas (including internal areas, where both Cat I and II material may be stored). Application outside vital areas is based on vulnerability analysis and effectiveness assessment results. Rosatom stated that site level procedures elaborate TPR requirements in a manner that requires visual observation between the two persons. The RF agreed to consider the possibility of redefining of the TPR definition in the revisions of OPUK and Rosatom's Order 550 to clearly specify the need to maintain joint control over operations with nuclear materials.

### Description of Concern:

There is a basis for insider-threat concern related to this issue. Russian regulations do not require the use of the two-person rule anytime Category I & II materials are accessed or processed. Regulations do not require that persons performing the two-person rule be knowledgeable and capable of immediately detecting unauthorized activities. The current draft of OPUK improves regulatory guidance by introducing the two-person rule for internal areas, but it is in conflict with requirements in Decree 456.

Russian regulations allow for interpretation of the two-person rule requirement that will not provide sufficient detection of insider activities.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	NONE	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

### Citation:

There is no mention of two person rule in current OPUK.

### Analysis:

The federal rules and regulations establish the requirements for governmental control and accounting of nuclear material when produced, used, processed, stored, or transported. There is no language in this document that stipulates the application of the two person rule.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.2.5, 8.2.3.7	7	Minatom/Rosatom	Enacted
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### Citation:

3.2.5 Interdiction of unauthorized actions by an adversary is achieved by:

- Establishing the "rule of two (three)" when conducting activities in vital areas, checking vehicles leaving secure areas, containers and vessels being transported off-site, when buildings are opened, at guard shift turnover, and also in other instances requiring the work of groups of people in order to decrease the possibility of unauthorized actions;

8.2.3.7 The rule of two (three) must be applied when monitoring vehicles leaving the area and containers (packaging) being transported off-site.

### Analysis:

This document is the primary agency level PP document. This citation establishes the requirement for the application of the rule of two (three) at specific locations. It also cites the requirement to apply the rule of two (three) when monitoring vehicles and containers leaving a site.

Rules of Physical

3134	Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	31, 32	4	RF Government	Enacted
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**Citation:**

31. Access to vital areas is subject to the two-person rule, as are the operations conducted there.

32. The necessity of the two-person rule and the procedures for carrying it out when activities are conducted in categorized rooms outside of vital areas, as well as when inspecting vehicles carrying containers and tanks at access control points (posts) is determined by the management staff of the nuclear site. Site management makes this determination jointly with the leadership of the appropriate military units or forces when the nuclear site is guarded by internal security troops of the Russian Federation Ministry of Internal Affairs or site security forces of Russian Federation law enforcement agencies.

**Analysis:**

This document is the highest-level directive that establishes procedures for physical protection of nuclear material, nuclear facilities, and nuclear material storage points. These citations establish the requirements for TPR within the context of physical protection. The TPR is applied in vital areas. In the case of areas outside vital areas to include vehicles and containers at access control points, TPR is established when determined to be necessary by site management in conjunction with the commander of protective forces.

**2. Video Surveillance****Analysis:**

OPIK allows the use of video surveillance equipment to control access to nuclear material (section 3.4.1 and 3.4.3). OPIK (sections 8.2, 8.4) assigns responsibility to the facility manager for determining how video surveillance equipment will be used at the site and at the MBA level as part of the site's MC&A regulations. The physical security regulations address video surveillance primarily from the perspective of physical protection, not material surveillance as part of material control.

**Description of Concern:**

There is a basis for insider-threat concern related to this issue. OPIK allows for, but does not mandate, the use of video or photographic techniques as a detection/assessment mechanism for material surveillance. The physical security regulations address video surveillance primarily from the perspective of physical protection, not material surveillance as part of material control.

While video surveillance is permitted by OPIK for detection/assessment, there are no defined performance expectations nor is there a requirement to validate the effectiveness of the system(s) when used. US support of video surveillance systems should be supported only when deployed as an enhancement to other detection features/strategies.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPIK)	MC	NP-030-05	3.4.1, 3.4.3	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:****3 The Major Elements of Governmental Control Accounting of Nuclear Material**

3.4.1 Nuclear material control and accounting shall be supported by measures to store and/or confirm existing information regarding the material. These measures shall include administrative procedures and technical measures, [the use of] access control devices (and combinations of the above), and they shall provide continuous monitoring of access to the nuclear material

**3.4.3 Nuclear material surveillance systems**

Nuclear material surveillance systems include the following:

- Automated technical systems, devices (monitors to control the movement of nuclear material), employee (personnel) access into rooms, emergency alarms, and sensors that monitor the unauthorized opening of doors and hatches, etc.
- Technical systems and devices for video or photographic surveillance, including the capability to record events

**Analysis:**

The federal rules and regulations that establish the requirements for governmental control and accounting of nuclear material when produced, used, processed, stored, or transported.

3.4.1: This citation identifies the use of technical measures to confirm existing information regarding material. It also states that these measures shall provide continuous monitoring of access... .

3.4.3: This citation explicitly states that nuclear material surveillance systems include video or photographic surveillance.

0018	Concept of Information Security of PP Systems at Potentially Hazardous Nuclear Facilities	PP	Minatom Order # 227	1.3.2, 1.3.3	7	Minatom/Rosatom	Enacted
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**Citation:**

1.3.2 A PP system should provide a hierarchy of secure areas at a site depending on the categories of NM and potentially hazardous nuclear items used and the features of the nuclear facility and nuclear material storage point. These areas include protected, internal, vital, and local high-risk areas, as well as restricted access areas.

...

Internal and vital areas (individual buildings or structures within the protected area, an individual room or group of rooms within a building) are equipped with perimeter detection systems and video surveillance. Entries to buildings and rooms are equipped with automated access control systems which monitor access and with devices to detect NM, explosives, and metal objects.

...

1.3.3 ...

Control panels are equipped with computers which consolidate information from the following sources: security alarm, video surveillance, and personnel access control and monitoring devices and systems; NM, explosive, and metal object movement detection devices and systems; graphic displays of secure areas; and wire and radio communications with the security service, security forces, and Ministry of Internal Affairs, Federal Security Service, Ministry of Emergency Management, and Ministry of Defense agencies.

**Analysis:**

This document, "The Conceptual Design of Information Security (Conceptual Design) for Physical Protection (PP) Systems at Potentially Hazardous Nuclear Sites", is an agency level methodological recommendation that defines the aims, objectives and objects of information security.

1.3.2: This citation identifies areas where video surveillance would be used.

1.3.3: This citation identifies the technical means of control for video surveillance along with other physical protection components.

0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	6.5.4, 6.8 and 6.9	7	Minatom/Rosatom	Enacted
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**Citation:**

6.5.4 The surveillance and situation assessment system shall include the following components:

A visual and electronic surveillance system;

Equipment for sentries to perform the surveillance functions (binoculars, night vision devices, etc.).

When TV monitoring of the perimeters of protected areas is being set up, each TV camera shall be directly visible by at least one TV camera in an adjacent area.

Video information shall be transmitted by cable.

When in operation, the visual and electronic surveillance system shall support the following kinds of information delivery:

The ability to switch the active camera by hand from the control panel as well as automatically when the detection system is activated;

6.8 Requirements for equipping vehicular and railroad access control points (and inspection areas).

Access control points shall be equipped with:

...

A visual and electronic surveillance system;

...

6.9 Requirements for equipping inspection areas in vehicular access control points.

Inspection areas shall be equipped with:

- Permanently installed normal and emergency lighting to support inspection of vehicles (cars) from above, around and under, if necessary with portable lighting;

- Permanently installed or portable detectors to sense nuclear material, explosives, and metal objects (in the transportation equipment or carried by the escort);

- Visual and electronic surveillance system equipment.

- Sentry posts for the inspection area team shall be equipped with alarm-calling equipment and equipment to communicate with the guard commander.

#### Analysis:

This regulation, an agency level document, establishes the requirements for PP system design decisions as well as other requirements pertaining to PP systems during the development of pre-design and design documentation for PP systems at potentially hazardous nuclear sites. This citation specifically describes operational requirements for a video surveillance and assessment system.

0030	Management Structure in Automated PP Systems at Potentially Hazardous Nuclear Facilities	PP	Minatom Order # 387	2.1.2, 2.1.5	7	Minatom/Rosatom	Enacted
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#### Citation:

2.1.2. Providing for the effective operation of a PP system as a whole, of its constituent elements, and for their interface - which means, first and foremost, the actions to be taken by PP system personnel - requires resolution of issues related to the joint command of subsystems and components within the PP system, creating optimal decision making mechanisms, including real-time decisions.

Command within a PP system shall be directed toward:

...

- Using various methods to evaluate and clarify situations (through the use of video surveillance equipment, guard force response groups, etc.

...

2.1.5. For various types and categories of potentially hazardous nuclear sites a full range of physical protection hardware shall be provided, which includes:

...

- A surveillance and situation assessment system;

...

#### Analysis:

This agency level document establishes the management structure for automated physical protection systems at nuclear facilities. This citation identifies video surveillance as one of several methods within a physical protection system that can be used to evaluate and clarify situations.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.2, 7.5, 8.2.3	7	Minatom/Rosatom	Enacted
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#### Citation:

#### 3.2 Tasks of PP systems.

3.2.3 Timely detection of the commission or attempt to commit sabotage, NM theft, unauthorized access, carry or transport prohibited items on-site, or to disable physical protection equipment is achieved by:

- Organizing the guard force at access control points, at the perimeter of secure areas, and at individual sites;
- The use of guard signaling system whose detection equipment is situated on the perimeter of secure areas, buildings, structures, rooms, and which can be situated inside structures or rooms;
- The use of visual and electronic surveillance systems outside the perimeter of secure areas, access control points,

guarded buildings, structures, rooms, and the approaches to these areas;  
...

#### 7.5 Surveillance and situation assessment system.

7.5.1 The surveillance and situation assessment system is intended for remote surveillance of the approaches to secure areas for the purpose of assessing the current situation, observing the actions and movement of adversaries, coordinating the actions of PP system personnel, as well as archiving visual information.

7.5.2 The surveillance and situation assessment system shall include the following components:

- A visual and electronic surveillance system;
- Equipment for sentries to perform the surveillance functions (binoculars, night vision devices, etc.)

7.5.3 The visual and electronic surveillance system shall perform the following functions:

- Present necessary and sufficient information to the operator regarding the situation at the site and in its individual secure areas, buildings, structures, and rooms;
- Present information in order to assess the situation if it is discovered that unauthorized actions have been committed and provide visual confirmation of that fact;
- Display, record, and archive incoming information in the amount required for later analysis of any abnormal situations that have arisen;
- Ensure its operability under all operating environments specified in the technical standards documentation;
- Monitor system malfunctions (loss of video signal, opening up equipment, attempts to access communications links, etc.), inform the operator of such malfunctions, and archive the information.

7.5.4 The information presented to the operators of the main control panel (local control panels) using the visual and electronic surveillance system shall allow them to differentiate adversaries and animals within the field of vision.

#### 8.2.3 Internal areas.

8.2.3.2 Detection equipment and visual and electronic surveillance system shall be installed along the complete boundary of the internal area; where the perimeter does not coincide with the perimeter of a building (structure, room) it shall be equipped with fences and engineered barriers.

8.2.3.3. The perimeter of buildings and structures which are situated in a secure area shall also be equipped with detection equipment and a visual and electronic surveillance system; if necessary, entrances in these buildings and structures shall be hardened from an engineering standpoint so that they are equal in strength to the structural components of the buildings. The requirements of this subsection shall be implemented with due consideration for the requirements of subsection 8.2.3.2.

8.2.3.4 Access control points shall be outfitted with permanently installed equipment and personnel equipped with manual equipment to detect NM, explosive devices, and metal objects being carried or transported into an internal area.

In the event of no NM, NM-based products and/or nuclear facilities in a secure area, NM detection equipment need not be installed at the access control point.

8.2.3.8. All exits (entrances) into buildings, structures, and rooms located in an internal area shall be outfitted with detection equipment, a visual and electronic surveillance system, and access management equipment.

#### Analysis:

This document is the highest-level directive that establishes procedures for physical protection of nuclear material, nuclear facilities, and nuclear material storage points.

3.2.3: This citation establishes the requirement for video surveillance at exits for buildings, structures, and rooms.

7.5: This citation describes the operational purpose, components, and functions of a video and establishes the requirement for video surveillance at exits for buildings, structures, and rooms.

8.2.3: This citation establishes the requirements for location of video surveillance units.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	30	4	RF Government	Enacted
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#### Citation:

30. All entrances (exits) of categorized buildings, structures, and rooms are provided with detection, monitoring, and access control equipment, and, when necessary, surveillance and situation assessment equipment. Emergency exits provide unimpeded exits for personnel during emergencies.

#### Analysis:

This document is the highest-level directive that establishes procedures for physical protection of nuclear material, nuclear facilities, and nuclear material storage points. This citation establishes the requirement for video

surveillance at exits for buildings, structures, and rooms.

### 3. Radiation Portal Monitors

#### Analysis:

Russian regulations require the installation of radiation portal monitors at access control points at internal and vital area boundaries, and establish requirements for minimum detection levels to which RPMs must perform, as well as requirements for a testing schedule. Protected area entry control points must be equipped with stationary or portable nuclear material detection equipment. Performance testing activities are defined and required based on sensitive interagency procedures that are not available for U.S. review. Further discussion of performance testing requirements related to the RPMs will be conducted during the workshop planned for June 2010 in the U.S.

#### Description of Concern:

There is a basis for insider-threat concern related to this issue. Russian regulations require permanently installed nuclear material detection equipment at Access Control Points of Internal and Vital Areas (Category I and II material is stored and processed in these areas). The fact that Russian regulations addressing testing requirements are not available for US review means no conclusion can be reached regarding the effectiveness of their testing activities. Lack of an effective performance assurance program compounds this regulatory weakness.

The RF regulatory system differs from the US system in that it is prescriptive rather than performance-based. Because the RF system is not performance-based, there is no way to determine if RPMs are necessary in additional locations to ensure an adequate level of protection. In addition, the absence of requirements in the Russian regulations regarding testing for detection of the specific material in an area and the absence of a performance assurance program, including adversarial testing, limits the effectiveness of the RPM and reduces the probability of detecting SNM leaving the site.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0026	Nuclear Material Radiation Monitors - General Specifications	MC	№ 200-st	4, 5, 7, 8, 10	6	Minatom/Rosatom	Enacted

#### Citation:

4 Classification of Monitors - classified by the type of ionizing radiation they detect: Gamma monitors (γ); Neutron monitors (n); Combined monitors (gamma and neutron radiation) (γn). Monitors are categorized according to their design: Pedestrian (P); Transportation (automobile, railroad) (T); Portable (N) and Tables 1-6 categorize monitors based on a detection thresholds.

5 General Technical Requirements - Characteristics (detection threshold, false activation, reliability requirements, environmental conditions, design (installation) requirements, operating documents (references GOST 2.601),

7 Acceptance Procedures - NOTE: This section has an installation focus. Mass produced monitors shall undergo acceptance, periodic, routine and reliability testing, One-of-a-kind monitors shall undergo official acceptance testing pursuant to GOST 15.001, Monitors subject to mandatory certification shall undergo certification testing according to the Regulations for Certification Systems in which the monitors shall be certified.

8 Control Methods - General Testing Requirements (environmental conditions, test object specification (GOST 24812, GOST 24813), false Actuation rate for all three monitor types, determining the detection threshold

10 Operating Instructions - Information necessary for proper operation (use, shipping, storage and maintenance), primary standards or alternative sources, installation points and installation recommendation.

#### Analysis:

Document provides installation requirements, guidance for monitor location, calibration instructions, and identifies portal monitor types.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	7.13.3, 8.2.3.4, 8.2.3.8, 8.2.4.1	7	Minatom/Rosatom	Enacted
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#### Citation:

7.13.3 The equipment components of work stations for scheduled maintenance and repair work shall be determined by the operating manuals for the complex's equipment.

8.2.3.4 Access control points shall be outfitted with permanently installed equipment and personnel equipped with manual equipment to detect NM, explosive devices, and metal objects being carried or transported into an internal area.

8.2.3.8. All exits (entrances) into buildings, structures, and rooms located in an internal area shall be outfitted with detection equipment, a visual and electronic surveillance system, and access management equipment.

8.2.4.1 Requirements for outfitting vital areas with equipment coincide with the requirements set forth in Sections 8.2.3.1 - 8.2.3.8.

**Analysis:**

This document is Rosatom's agency-level general PP requirements, provides requirements for placement of monitors at access control points, particularly at vital and internal areas. Also dictates maintenance according to manufacturer specifications.

Paragraph 8.2.4.1 makes all requirements applicable to internal areas applicable to vital areas as well.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	Section 2: Terms and Definitions	4	RF Government	Enacted
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**Citation:**

Access control point (post) - a specially equipped place through which the passage of persons and vehicles is monitored and controlled in accordance with access control procedures

**Analysis:**

Provides high-level definition of access control points that specifies monitoring at those locations.

**4. Tamper Indication Devices**

**Analysis:**

Russian regulations state that TIDs are installed at locations where rooms, chambers, and compartments can be accessed, on containers and other equipment that contain nuclear material, and on items. Russian regulations also require application, accounting, control, and removal and destruction procedures. Russian Regulations do not currently require uniquely identifiable TIDs. The regulations allow the use of TIDs (lead or wax seals) which do not ensure high tampering resistance to unauthorized access. However, Rosatom has indicated that the final revision of OPUK will specify the use of unique TIDs for Category I and II material, as well as for shipment and long-term storage of the material. These TIDs will be required to conform to Russian national standards. Additionally, the definition of "individual identifier" has been added to draft OPUK. However, TIDs without unique identifiers are still allowed to be used on Category III and IV material.

**Description of Concern:**

There is a basis for insider-threat concern related to this issue. Current regulations do not require uniquely identified & numbered TIDs to assure TIDs cannot be duplicated. Whether this issue is resolved is dependent on the final version of OPUK. The U.S. will review OPUK when it is enacted to verify it includes the proposed language.

RF regulations do not require TIDs to be under surveillance to eliminate or reduce the opportunities for a single insider to manipulate a TID.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	3.4.2, 8.3	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

**3.4.2 Tamper indicating devices.**

3.4.2.1 TIDs are installed at locations where rooms, chambers, and compartments can be accessed, on containers and other equipment that have nuclear material, and on items.

3.4.2.2 The operability and physical condition of TIDs shall be inspected on a regular basis at a frequency

exceeding the frequency of physical inventories. The results of such inspections shall be documented in writing.  
 3.4.2.3 Random inspections of TIDs in an MBA must be performed in the periods between inventories. The requirement of establishing with a confidence level of 0.95 that at least 95% of the TIDs are in an appropriate condition shall be used when determining the size of the random sample.

3.4.2.4 The use and handling of TIDs within an organization (receipt, receipt inspection, storage, installation/removal, authenticity verification, and destruction of TIDs that have been replaced or that are defective) shall be conducted in accordance with the procedures (program) established by the operating organization.

8.3 The reliability level for information submitted to the nuclear material control and accounting system in MBAs regarding item identifiers, TID identifiers, and the physical location of items shall be not less than 99%.

**Analysis:**

Federal Rules and Regulations establish the requirements for the use of TIDs and for the reliability level of information regarding TID identifiers.

0248	Tamper Indicating Devices. Basic Technical Provisions	MC	OST 95 10557-2000	5, 6, 7, 8, 9	7	Minatom/Rosatom	Enacted
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**Citation:**

5. "Basic Requirements for Organizing TID Related Activities" establishes the requirements for organizational requirements at facilities, and the scope and purpose of the TID program at facilities.

6. "Requirements for TID Protected Objects" describes where and upon which objects TIDs may be used.

7. "Security Requirements for TID Protected Objects" describes the requirements for ensuring TIDs provide detection of unauthorized access to nuclear material.

8. "Requirements for the Use of Tamper Indicating Devices" describes the requirements affecting procurement, inspection, accounting, issuance, installation and removal, anomalies, disposal, auditing, and identifying TIDs.

9. "Requirements for the Structure, Content and Maintenance of Accounting and Reporting Forms and Databases regarding the use of Tamper Indicating Devices

**Analysis:**

This standard establishes the basic provisions regarding the organization and conduct of activities related to the use of tamper indicating devices (TIDs). Application of this standard is mandatory for organizations and legal entities of the Russian Federation Ministry of Atomic Energy authorized to use nuclear materials. This standard is expected to be replaced by GOST R 52326-2005.

3107	Sealing Devices.Accountancy, Control and Disposal	MC	GOST 52326-2005	1, 5, 6, 7	6	Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

1. Applicability -- This standard is applicable to sealing devices intended for sealing all types of objects. The standard establishes requirements for the control, accounting, and disposal of sealing devices for the purpose of ensuring that sealing devices are recorded and the procedures for handling them are controlled during all phases of their life cycle.

The standard is intended for enterprises and organizations that manufacture sealing devices or use them in their work.

5. Sealing Device Accounting Procedures

- Complete and reliable accounting data that makes it possible to identify the sealing devices
- Immediate updating of accounts
- Immediate search and sampling of sealing device data based on specific characteristics (criteria, identifying information)
- Storage of information for an established period of time
- Confidentiality [of the data] and security against unauthorized access to the system ([information] leaks, disclosures)

6. Sealing Device Control Procedures

- Administrative and technical control over the use and accounting for sealing devices
- Periodic inventory taking and sealing device balance closeout

– Control of sealing device [accounting] system operations

#### 7. Sealing device Cancellation and Disposal

##### Analysis:

This standard is applicable to sealing devices intended for sealing all types of objects. The standard establishes requirements for the control, accounting, and disposal of sealing devices for the purpose of ensuring that sealing devices are recorded and the procedures for handling them are controlled during all phases of their life cycle. The standard is intended for enterprises and organizations that manufacture sealing devices or use them in their work.

#### 5. Access Controls

##### Analysis:

The Russian regulations establish a graded approach regarding access controls for Protected, Internal, and Vital Areas, and provide guidance for construction of access control points and for assessing alarms at access control points. Russian regulations state that biometric access controls should be used at Vital Areas and rooms. Security of access control codes is ensured in accordance with regulations in the area of state secrets protection.

The current OPUK addresses access control requirements as applicable to MC&A. Specific requirements for the control of access to the MC&A systems are contained in regulations in the area of physical protection. The security requirements and access controls to computerized systems and measurement equipment locations are mostly contained in sensitive documents.

##### Description of Concern:

There is a basis for insider-threat concern related to this issue.

Requirements of access controls to MPC&A related systems and equipment are described in documents to which the US does not have access. This fact prevents the US from accessing the completeness and effectiveness of requirements in this area.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0004	Russian Federation Law On Measurement Uniformity	MC, PP	Law #4871-1	Article 9 Section 2	3	RF Parliament	Enacted

##### Citation:

##### Article 9. Requirements for Measuring Instruments.

2 The design of measuring instruments shall ensure that access to specific parts of the instruments (including software) is limited in order to prevent unauthorized adjustment or tampering, which could distort measurement results.

##### Analysis:

This citation provides requirements to limit access to measuring instruments to prevent unauthorized actions or tampering.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	2.2.5, 8.2 Bullet 5, 8.4 Bullet 2, Appendix 6	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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##### Citation:

#### 2 General Provisions

2.2.5 Access control devices that confirm the reliability of previous measurements of nuclear material quantitative characteristics and attribute indicators.

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- ...
- Nuclear material access control equipment
- ...

8.4 For each MBA, the manager of the organization shall develop and approve nuclear material control and

accounting procedures that identify the following:

- ...
- Nuclear material access control equipment
- ...

Appendix 6: "Probability of Detecting a Threshold Quantity Deficit (Excess) of Nuclear Material for Calculating the Size of a Confirmatory Measurement Sample," discusses use of access control devices.

**Analysis:**

This MC&A FNP-level document addresses access controls from the MC&A point of view, and is complimentary with the previously cited regs.

0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	4.4.1, 4.4.2, Section 4, 5, and 6 provide specific details regarding the construction and set-up of access control points. 6.5.3 and 6.5.4 address situation assessment.	7	Minatom/Rosatom	Enacted
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**Citation:**

4.4.1 Transport entrances shall be equipped with access control points to facilitate authorized access to (vehicle entry into) a potentially hazardous nuclear site.

4.4.2 At the point where they approach the vehicle access control point, roads leading to a vehicular access control point shall be built with a turning radius that makes it impossible to reach a speed sufficient to ram the main fence or vehicular gates. The sides of the roads on these segments shall be equipped with concrete structures that make it impossible to cross over them.

4.6 Requirements for the placement of access control points (for personnel and vehicles) on protected and internal area perimeters

4.6.1 Transport (if necessary) and personnel access control points shall be set up for individuals and vehicles, delivery or removal of materials, equipment, and documents on the perimeters of the main protected area and internal areas fences.

4.6.2 The locations of the personnel access control points on the perimeters of the protected and internal areas must be coordinated with the routes of public and special transport; their capacity must be adequate to handle the largest work shift.

4.6.3 Access control points for vehicles and trains must be equipped with appropriate inspection areas.

4.8 Determination of access control point capacity and the number of pedestrian and vehicular entrances The number of access control points necessary for personnel and cargo shall be governed by the size of the workforce and the volume of cargo shipments, i.e., vehicular and railroad cargo turnover. There shall be enough entrances to handle the largest shift in a period of time that ensures the requisite reliability in identifying personnel with minimal expenditures on equipment for the access control points, but without permitting any negative impact on production at the site.

6.5.3 The access control and management system at an access control point shall include equipment to detect the pedestrian (vehicular) transport of nuclear materials, explosives, and metallic objects. [These systems] together with access control and management systems may make up an integrated access control and intrusion detection system.

6.5.4 The surveillance and situation assessment system shall include the following components: A visual and electronic surveillance system; Equipment for sentries to perform the surveillance functions (binoculars, night vision devices, etc.). When TV monitoring of the perimeters of protected areas is being set up, each TV camera shall be directly visible by at least one TV camera in an adjacent area. Video information shall be transmitted by cable. When in operation, the visual and electronic surveillance system shall support the following kinds of

information delivery: The ability to switch the active camera by hand from the control panel as well as automatically when the detection system is activated;

**Analysis:**

This agency-level document provides specific details for the construction of access control points, including curvature of approach roads, etc., and surveillance requirements at access control points. Addresses internal access control points and those on the perimeter of the site.

0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	4.6, 6.2	7	Minatom/Rosatom	Enacted
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**Citation:**

4.6 PP Functions of Site Administration include: Develop, implement, and operate a permit system for the clearance of contractors and official visitors to view/access classified work, information, documents, and NM and facilities; organize off-site access procedures and support on-site access procedures; control access to production sites, buildings, structures, rooms where operations are performed with NM, and nuclear facilities according to the established permit system; and participate in inspections of sentry posts that have access control functions.

6.2 The major areas in the physical protection of the site that require cooperation between the site administration and security department with the security force include:

- Organizing and implementing off-site and on-site access control procedures

**Analysis:**

This regulation identifies site administration's obligation to establish an access control system.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	10.3.3, 10.3.2, 8.2.2.2, 8.2.2.4, 8.2.2.5, 8.2.2.7, 8.2.2.9, 8.2.3.4, 8.2.3.5, 8.2.3.6, 8.2.5.1, 7.4.8, 3.2.5	7	Minatom/Rosatom	Enacted
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**Citation:**

10.3.3 Requirements for the organization and operation of the access control and management system shall be governed by the "Instructions regarding access control procedures" and other documentation developed at the site that shall specify:

- The characteristics of the established access control system;
- Procedures for site personnel, security force units, individuals on temporary assignment, and visitors to access the premises of secure areas, restricted access areas, and classified rooms by passing through access control points;
- Procedures for vehicles delivering (receiving) nuclear material and items containing them or other material assets to access the premises of a site;
- Types and groups of badges, procedures for preparing and issuing them, the serial numbers encoded in the badges;
- Accounting and reporting procedures, badge storage procedures, seals and serial numbers;
- A description of the badges and a list of the serial numbers currently in use at the site;

10.3.2 The access control system shall be supported by the establishment and operational support of the access control and management system and continuous, uninterrupted security at the perimeter of secure areas, buildings, structures and rooms.

Section 8.2 references: These sections specify that access controls be implemented at Vital, Internal, and Protected areas, with portal monitors, verification of authorization of individuals to access, inspection of individuals and materials.

3.2.5 Interdiction of unauthorized actions by an adversary is achieved by:

- Security force personnel actions, and also (if necessary) external response forces (regional, federal) to prevent

unauthorized access to secure areas as specified in the plan for the security and defense of the potentially hazardous nuclear site and the procedures established in the regulations that govern the actions of the security force that reports to site management and the Russian Federation Ministry of Interior troops;

**Analysis:**

This agency-level document spells out a graded approach to access controls at Vital, Internal, and Protected areas, including screening of individuals passing through access control points, screening of their packages and belongings, (with metal, explosive, and SNM detectors), and a provision that unauthorized actions must be responded to. Addresses both internal access control points, and those on the perimeter of the site.

0710	Standard (Model) Form for a Site Level Policy Document (Regulation)	PP	(Not obtained)	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

This document establishes the recommended template for the content and style of a site's access control procedures.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	23, 39, 40, 41	4	RF Government	Enacted
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**Citation:**

23. The management staff of the nuclear site develops administrative measures... and adopts the following documents in accordance with established procedures:

a) Site policies regarding the access system, as well as access to objects of physical protection and information concerning the operation of the physical protection system (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)

...

c) Access control procedures

d) Site policies regarding onsite access control procedures

39. Access control points (posts) are placed along the perimeter of secure areas to organize the passage of persons and vehicles, taking into account the vehicular and pedestrian traffic and the amount of capacity required. Access control points (posts) are used to check the access rights and identification of persons and vehicles; to facilitate authorized access by nuclear site personnel, visitors, and persons on temporary assignment, as well as the detainment of intruders; and to prevent the unauthorized transit (by pedestrian or vehicle) of nuclear material, nuclear facilities, explosives, edged weapons, firearms, and other prohibited items. Access control points (posts) are equipped and/or outfitted to protect persons carrying out monitoring and badging duties against firearms. Vehicle access control points are also equipped with anti-ramming devices.

40. Individuals and the items in their possession are inspected when passing through access control points (posts). These inspections include the use of equipment to detect prohibited items.

41. The requirements for providing physical protection system equipment for the perimeter and access control points (posts) of a secure area and for categorized buildings, structures, and rooms are established in agency regulations for each specific site, taking into account the list of threats, the vulnerability analysis of the nuclear site, and the physical protection system effectiveness assessment, as well as the category of the nuclear site and the features of the secure areas established there.

**Analysis:**

Russian Federation Decree # 456 provides high-level requirement for the establishment of access controls.

3146	Procedures for the Physical Protection of Radiation Sources, Storage Points, and Radioactive	PP	NP-034-01	Appendix 2, line 3.2	5	GAN/Rostekhnadzor	Enacted
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## Substances

**Citation:**

Access control procedures must be implemented for CAT I, II, and III material.

**Analysis:**

FNP-level document, provides similar high-level requirement to that captured in Decree # 456, applies throughout Russia

**6. Chamber Security****Analysis:**

Current MPC&A regulations make reference to the application of TIDs to chambers (glove boxes, hot cells) in process locations. Discussions regarding video surveillance and two person rule indicate that site management is responsible for implementing a material access control program that would address chambers security controls. In addition, Rosatom indicated that radiation safety and sanitation requirements further enhance chambers controls.

**Description of Concern:**

Russia's lack of adequate security requirements for protecting in-process material is a problem that reduces the probability of detection of insider activity. In addition, the lack of language that specifies when TIDs and surveillance measures will be used on in-process materials further reduces the probability of detection. An Operations Monitoring Program that includes closed-circuit television systems to constantly monitor critical operations can provide an additional means of surveillance when deployed as an enhancement to other detection features.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	3.4.1, 3.4.2.1, 3.4.3, 8.2 Bullet 5, 8.4 Bullet 2	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:****3.4 Measures to control access to the nuclear material**

3.4.1 Nuclear material control and accounting shall be supported by measures to store and/or confirm existing information regarding the material. These measures shall include administrative procedures and technical measures, [the use of] access control devices (and combinations of the above), and they shall provide continuous monitoring of access to the nuclear material.

**3.4.2. Tamper indicating devices**

3.4.2.1. TIDs are installed at locations where rooms, chambers, and compartments can be accessed, on containers and other equipment that have nuclear material, and on items.

**3.4.3 Nuclear material surveillance systems**

Nuclear material surveillance systems include the following:

- Automated technical systems, devices (monitors to control the movement of nuclear material), employee (personnel) access into rooms, emergency alarms, and sensors that monitor the unauthorized opening of doors and hatches, etc.
- Technical systems and devices for video or photographic surveillance, including the capability to record events

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

...

- Nuclear material access control equipment

...

8.4 For each MBA, the manager of the organization shall develop and approve nuclear material control and accounting procedures that identify the following:

...

- Nuclear material access control equipment

...

**Analysis:**

The citations require measures to control access to nuclear material to include administrative procedures and technical measures and access control devices. TIDs are to be installed on chambers. Nuclear material surveillance measures are also required.

## 7. Inventory Differences

### Analysis:

There have been improvements made in the basic requirements in the new revision of OPUK as inventory difference control limits will be based on a percentage of the active inventory rather than book inventory. However, a difference between the U.S. and Russian practice will continue to exist until tracking, trending and cumulative inventory difference analysis are implemented. Implementation of this technology will add one more layer to protect against an insider utilizing this gap as a diversion path.

### Description of Concern:

There is a basis for insider-threat concern related to this issue. Rosatom Inspection Trending Reports indicate the need to revise procedures to determine inventory difference error and the evaluation of its significance (Rosatom 2008). Regulations need to specify methodologies that are acceptable for the calculation of the limit of error for inventory differences. Also, regulations do not require trending analysis of inventory differences to identify possible protracted theft activities.

Russian regulations permit inventory difference that could allow the loss/theft of large amounts of nuclear material within a single inventory cycle, and do not require trend analysis of inventory differences. This reduces the probability of detecting insider activities in a timely manner.

It is anticipated that the methodological recommendation being developed as a guideline for the implementation of OPUK will provide some direction to address this issue.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	6.4.1, 6.4.2, 6.3.3	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

### Citation:

6.4.1 The criterion for detecting anomalies within the nuclear material control and accounting system is a deficit (excess) of items.

6.4.2 If accounting measurements of a nuclear material were taken upon its production, receipt, processing, or shipment during a reporting period, or if such measurements were taken as part of a physical inventory, the criterion for detecting control and accounting anomalies for this material shall be the fact that the absolute value of the inventory difference exceeds three standard deviations of its uncertainty, or any of the following values (with a 0.95 confidence probability):

- 2 % of the book inventory of the nuclear material plus all increases in its quantity over the reporting period - for industrial nuclear facilities
- 3 % of this figure - for experimental and research nuclear facilities
- 3 kg - for plutonium and uranium-233 for Category One and Category Two MBAs
- 8 kg - for uranium-235 for Category One, Two, or Three MBAs
- 70 kg for uranium-235 - for uranium with enrichment < 20%

6.3.3 If the analysis of the nuclear material balance reveals no anomalies within the nuclear material control and accounting system as described in Para. 6.4 of these Rules, the documented quantity of nuclear material in the MBA shall be used as the quantity of nuclear material present in the MBA at the start of the next reporting period.

### Analysis:

The federal rules and regulations, otherwise known as OPUK, establish the requirements for governmental control and accounting of nuclear material when produced, used, processed, stored, or transported. OPUK, an FNP-level document, provides the regulatory content on inventory difference calculation. See citations to left for specifics.

It is anticipated that the methodological recommendation being developed as a guideline for the implementation of OPUK will provide some direction to address this issue.

## 8. Measurement Control

### Analysis:

DCN 0027 (OST 95 10571-2002. Nuclear Material Control and Accounting. Measurement System. General

Provisions) and DCN 0722 (OST 10598-2008 Nuclear Material Control and Accounting. Standard (Model) Quality Control Program for Nuclear Material Measurements) provide sound basis for comprehensive measurement and measurement quality control programs. The Measurement Quality Control Program provides oversight of the facility's measurements and ensures the quality of those measurements and is independent from operation.

**Description of Concern:**

No concerns.

[Note: Russian standards provide a sound basis for comprehensive measurement and measurement quality control programs. The Measurement Quality Control Program provides oversight of the facility's measurements and ensures the quality of those measurements and is independent from operations.]

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

**4 Nuclear Material Measurements**

4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.

4.2 Measurement methodologies shall be incorporated into individual site policy documents that shall be compiled in accordance with the requirements set forth in metrology standards.

4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible.

4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.

4.5 The list of measuring instruments used in the nuclear material measurement system shall contain the instrument name, type, and manufacturer's serial number.

4.6 Measuring instruments shall be inspected as specified in current regulations.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

**Analysis:**

The federal rules and regulations, otherwise known as OPUK, establish the requirements for governmental control and accounting of nuclear material when produced, used, processed, stored, or transported. OPUK, an FNP-level document, provides the regulatory content on inventory difference calculation. See citations to left for specifics. OPUK, an FNP-level document, provides the regulatory content on inventory difference calculation. See citations to left for specifics.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	6, 6.5	7	Minatom/Rosatom	Enacted
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**Citation:**

**6 Measurement System Elements**

The major elements of the MC&A measurement system are the following:

- Sampling
- Measurement methodologies
- Measuring instruments and auxiliary equipment
- Reference materials
- Measurement quality assurance
- Personnel

**6.5 Measurement Quality Assurance**

*(Entire Section)*

**Analysis:**

Ministry Standard establishing the general requirements for nuclear material control and accounting measurement systems, including measurement quality assurance. The requirements of this Standard are mandatory for Rosatom enterprises and organizations whose activity involves the use of nuclear material.

0722	Nuclear Material Control and Accounting Standard (Model) Quality Control Program for Nuclear Material Measurements	MC	OST 95 10598-2008	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

Entire Document

**Analysis:**

This agency standard (OST 95 10598-2008) has been adopted by Rosatom and sets the standards for a measurement quality control for MC&A measurements. It contains status monitoring, performance evaluation, maintenance, and calibration standards for measurements.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	10		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:****Measurement Quality Assurance**

10.1 Analysis laboratories that perform measurements within a nuclear material measurement system, shall comply with the requirements set forth in (GOST R ISO/IEC 17025) and shall be accredited in accordance with the procedures established in the GOST R 51000.4-96.

10.2 The organization shall develop and implement a measurement quality control program that contains the requirements for developing calibration schedules, review and re-attestation of measurement methodologies (methods) and reference standards, and an internal measurement stability monitoring program in accordance with the document entitled "Accuracy (Trueness and Precision) of Measurement Methods and Results. Part 6. Use in Practice of Accuracy Values" (GOST R ISO 5725-6-2002) and operational quality control of measurement results in accordance with the Recommendations [8], etc. This program shall establish deadlines and the individuals responsible for the development and review of schedules and monitoring plans, as well as for verification that the activities addressed in these schedules and plans are carried out.

10.3 The conduct of measurement activities for nuclear material control and accounting purposes shall be governed by the job description of the appropriate employee.

**Analysis:**

10: Requires development of a measurement quality control program

**9. Radioactive Waste Stream Controls****Analysis:**

A recently received FNP (DCN 3148 – NP-072-06 "Rules for Reclassifying Nuclear Material as Radioactive Waste") provides additional requirements on the handling of radioactive waste. Problems continue to exist in the determination of material in solid waste. Therefore RF is attempting to mitigate this gap by implementing a more stringent material surveillance, material control and measurement technologies equivalent to those performed in Europe and the US. "Access control equipment" applied to radioactive waste containers is the same as required for nuclear materials in the MBA (see article 3.9 of DCN 3148).

**Description of Concern:**

There is a basis for insider-threat concern related to this issue. Russian regulations do not require that all liquid, solid, and gaseous waste streams leaving an MBA must be monitored to detect the theft or diversion of SNM. In addition, the regulations do not require effectiveness testing of the protective measures regarding waste streams.

[Note: DCN 3148 – NP-072-06 “Rules for Reclassifying Nuclear Material as Radioactive Waste” is being revised and will add the following additional requirements:

1. Rosatom approval for material to be reclassified as waste
2. Require that measurements of waste be conducted within a specified reasonable time period, rather than letting containers sit unmeasured for extensive periods.
3. Identify specific additional requirements for control, including types of seals to be used.

The U.S. noted that 2PR is not an adequate control as it is currently defined in OPUK.]

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0001	On the Use of Atomic Energy	MC, PP	Law 170-FZ	Chapter 1, Chapter X Article 47	3	RF Parliament	Enacted

**Citation:**

Radioactive wastes - nuclear material and radioactive substances with no foreseen further use.

- Nuclear material - material containing or capable of breeding fissile (fissionable) nuclear substances;
  - Radioactive substances - substances that emit ionizing radiation, which are not classified as nuclear material;
- The owners of nuclear facilities, radiation sources, storage points, nuclear material, radioactive substances, and radioactive waste shall monitor their containment and proper use in accordance with this Federal Law, as well as other Russian Federation laws and statutes.

Article 47. Storage and Processing of Nuclear Material, Radioactive Substances and Radioactive Waste  
... Storage must be provided for radioactive waste as a preparatory phase for their processing or disposal. ...

**Analysis:**

Federal Law providing the legal grounds and principles for regulating the use of atomic energy and is aimed at protecting human health and lives, the environment, and property during the use of atomic energy.

Requires the owner of nuclear facilities to monitor their containment of radioactive waste.

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	3.1.2.1, 3.1.2.2, 8.4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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**Citation:**

3.1.2.1 Nuclear material contained in all products is subject to governmental control and accounting except the following:

- ...
- Nuclear material present in radioactive waste located in rad waste storage facilities
- ...

3.1.2.2 The following are subject to removal from governmental accounting:

- ...
- Nuclear material present in radioactive waste (when the radioactive waste is shipped from an MBA to a rad waste storage facility)
- ...

8.4 Nuclear material control and accounting procedures for each MBA shall be developed and adopted by the director of the organization or official authorized by the director. The procedures shall specify the following:

- ...
- Procedures for assessing losses of nuclear material, rad waste, discharges, and emissions
- ...

**Analysis:**

Specifies when radioactive waste is subject to removal from governmental accounting and requires procedures for assessing rad waste.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	7.4.8, 8.2.2.5, 8.2.2.8	7	Minatom/Rosatom	Enacted
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**Citation:**

7.4.8 The access control and management system at access control points shall include equipment that permits inspection of passing individuals and vehicles that may be carrying (transporting) prohibited items (weapons and other metal objects, nuclear or radioactive material, explosives, etc.).

8.2.2.5 Vehicle access control points shall be equipped with entrance and exit gates, as well as inspection pits, bridges, and mirrors or other equipment that permit examination of vehicles from all angles.

8.2.2.8 All vehicles exiting a secure area, as well as all containers (packaging) being transported, shall undergo mandatory verification using the rule of two (three) for purposes of detecting the unauthorized removal of NM.

**Analysis:**

These citations establish requirements for searching exiting vehicles for the unauthorized presence of nuclear material.

3147	Basic Nuclear Material Control and Accounting Rules for Radioactive Substances and Radioactive Waste at the Organization Level	MC	NP-067-05	2.1, 2.4.1, 3.1.10, 3.3.1, 3.5.1, 3.5.5-8	5	GAN/Rostekhnadzor	Enacted
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**Citation:**

2.1 Control and accounting data for radioactive substances and radioactive waste is used in the State System for Radioactive Substance and Radioactive Waste Accounting and Control.

2.4.1 Nuclear materials, if the quantity of these materials is less than the threshold quantities listed in Table 1. If these quantities equal or exceed the threshold quantities of nuclear materials presented in Table 1 (apart from sealed radioactive sources), they are accounted for within the State System for Nuclear Material Accounting and Control.

3.1.10 Losses of radioactive substances and radioactive waste shall be identified using measurements or calculation methods based on the results from preliminary measurements or experimental studies. The write-off of losses shall be documented (in the case of radioactive substances, they shall be recorded in the gain/loss log and in the case of radioactive waste - in the accounting log).

3.3.1 Radioactive substance and radioactive waste control and accounting shall be supported by measures to secure and/or confirm existing information regarding the radioactive substances and radioactive waste. These measures shall include administrative and technical measures, the use of TIDs, or combinations of these measures to ensure uninterrupted access control for radioactive substances and radioactive waste.

3.5.1 Transfers of radioactive substances and radioactive waste shall be accompanied by documentation from the shipper to the receiver, together with the passports for sealed radioactive sources, open radioactive sources, and radioactive waste.

3.5.5 When the receiver receives the radioactive substances and/or radioactive waste, the receiver shall, within three business days, verify that the data regarding the packaging and the radioactive substances and/or radioactive waste provided by the shipper is correct and shall perform confirmatory measurements on the radioactive substances and/or radioactive waste using a methodology approved by the shipper. If there are no discrepancies, the radioactive substances and/or radioactive waste can be provisionally accepted and entered into accounting.

3.5.6 The final acceptance of radioactive substances and/or radioactive waste and entry into accounting shall be completed within 10 days of receipt of the radioactive substances and/or radioactive waste and the passports (logbooks, certificates) for the substances/waste.

3.5.7 Final acceptance of the radioactive substances and/or radioactive waste shall be accompanied by the following measures:

- External examination and verification of the quantities and IDs of accounting items (containers), inspection of the TIDs (including inspection of the containers and seals), verification that the IDs of the containers, the seals and the locations of the seals match the data contained in the transmittal documentation).

- Confirmatory measurements of the radioactive substances and/or radioactive waste using methodologies implemented by the receiver

3.5.8 The data obtained from the measurements shall be documented. The following information shall be recorded: measurement equipment and methods used; measurement results; types and IDs of TIDs; date measurements were performed; last name of the individual performing the measurements.

**Analysis:**

The regulation provides accounting and control requirements for nuclear waste that is similar to the requirements for nuclear material. The requirements for receivers at radioactive waste facilities forces waste generators to measure and transfer their nuclear waste. Waste facilities are required to verify shipper's data within 3 days of receipt and report losses. This is more strict than DOE requirements.

3148	Rules for Reclassifying Nuclear Material as Radioactive Waste	MC	NP-072-06	Entire Document	7	GAN/Rostekhnadzor	Enacted
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**Citation:**

*(Entire Document)*

**Analysis:**

The document addresses how material is moved from the accounting system related to nuclear material to the accounting system related to radioactive waste, and discusses associated controls, as well.

**10. Control of Non-Radioactive Materials, Waste and Equipment****Analysis:**

Discussions on the regulatory citations for the movement of radioactive waste, access controls, video surveillance, radiation monitoring, TIDs revealed regulatory basis for monitoring the material leaving vital, internal, and protected areas to prevent the diversion or theft of nuclear material. These programs include the measurement program, the measurement quality control program, TID program, the two person rule, and radiation portal monitor implementation. These monitoring activities include janitorial waste, laundry, and construction materials.

**Description of Concern:**

There is a basis for insider-threat concern related to this issue.

The RF regulatory system contains requirements under many different regulations for a multifaceted material control program but has the following regulatory and implementation gaps:

1. Application of two-person rule is at the discretion of the facility management when Category I & II materials are accessed or processed outside a vital area;
2. Persons performing the two-person rule are not required to be knowledgeable and capable of immediately detecting unauthorized activities.
3. Specific nuclear material surveillance techniques are not identified;
4. All NM facilities do not have up-to-date measurement capabilities;
5. Approved ID calculation methodologies are not identified;
6. Trending analysis of IDs is not required; and
7. TIDs with unique identifiers are not required.

The regulations do not specifically address:

1. Monitoring or measuring of non-radioactive waste, equipment, and materials that is being removed from a NM facilities;
2. Control of non-radioactive waste, equipment, and materials after any monitoring or measuring and prior to removal;
3. TIDs for non-radioactive waste or materials containers and equipment; and
4. Procedures for removal of non-radioactive waste, equipment, and materials from NM facilities.

The absence of Russian regulations to specify requirements to monitor and control all materials exiting an internal or vital area increases the possibility of successful insider theft.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	3.4.1, 3.4.3, 4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:****3 The Major Elements of Governmental Control Accounting of Nuclear Material**

3.4.1 Nuclear material control and accounting shall be supported by measures to store and/or confirm existing information regarding the material. These measures shall include administrative procedures and technical measures, [the use of] access control devices (and combinations of the above), and they shall provide continuous monitoring of access to the nuclear material.

3.4.3 Nuclear material surveillance systems

Nuclear material surveillance systems include the following:

- Automated technical systems, devices (monitors to control the movement of nuclear material), employee (personnel) access into rooms, emergency alarms, and sensors that monitor the unauthorized opening of doors and hatches, etc.
- Technical systems and devices for video or photographic surveillance, including the capability to record events.

**4 Nuclear Material Measurements**

4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.

4.2 Measurement methodologies shall be incorporated into individual site policy documents that shall be compiled in accordance with the requirements set forth in metrology standards.

4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible.

4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.

4.5 The list of measuring instruments used in the nuclear material measurement system shall contain the instrument name, type, and manufacturer's serial number.

4.6 Measuring instruments shall be inspected as specified in current regulations.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	4.4.1, 4.4.2, Section 4, 5, and 6 provide specific details regarding the construction and set-up of access control points. 6.5.3 and 6.5.4 address situation assessment.	7	Minatom/Rosatom	Enacted
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**Citation:**

4.4.1 Transport entrances shall be equipped with access control points to facilitate authorized access to (vehicle entry into) a potentially hazardous nuclear site.

4.4.2 At the point where they approach the vehicle access control point, roads leading to a vehicular access control point shall be built with a turning radius that makes it impossible to reach a speed sufficient to ram the main fence or vehicular gates. The sides of the roads on these segments shall be equipped with concrete structures that make it impossible to cross over them.

4.6 Requirements for the placement of access control points (for personnel and vehicles) on protected and internal area perimeters

4.6.1 Transport (if necessary) and personnel access control points shall be set up for individuals and vehicles, delivery or removal of materials, equipment, and documents on the perimeters of the main protected area and internal areas fences.

4.6.2 The locations of the personnel access control points on the perimeters of the protected and internal areas must be coordinated with the routes of public and special transport; their capacity must be adequate to handle the largest work shift.

4.6.3 Access control points for vehicles and trains must be equipped with appropriate inspection areas.

4.8 Determination of access control point capacity and the number of pedestrian and vehicular entrances The number of access control points necessary for personnel and cargo shall be governed by the size of the workforce and the volume of cargo shipments, i.e., vehicular and railroad cargo turnover. There shall be enough entrances to handle the largest shift in a period of time that ensures the requisite reliability in identifying personnel with minimal expenditures on equipment for the access control points, but without permitting any negative impact on production at the site.

6.5.3 The access control and management system at an access control point shall include equipment to detect the pedestrian (vehicular) transport of nuclear materials, explosives, and metallic objects. [These systems] together with access control and management systems may make up an integrated access control and intrusion detection system.

6.5.4 The surveillance and situation assessment system shall include the following components: A visual and electronic surveillance system; Equipment for sentries to perform the surveillance functions (binoculars, night vision devices, etc.). When TV monitoring of the perimeters of protected areas is being set up, each TV camera shall be directly visible by at least one TV camera in an adjacent area. Video information shall be transmitted by cable. When in operation, the visual and electronic surveillance system shall support the following kinds of information delivery: The ability to switch the active camera by hand from the control panel as well as automatically when the detection system is activated;

**Analysis:**

This agency-level document provides specific details for the construction of access control points, including curvature of approach roads, etc., and surveillance requirements at access control points. Addresses internal access control points and those on the perimeter of the site.

				3.2.5, 7.4.8, 7.13.3, 8.2.2.5, 8.2.2.8, 8.2.3.4, 8.2.3.7, 8.2.3.8, 8.2.4.1			
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550		7	Minatom/Rosatom	Enacted

**Citation:**

3.2.5 Interdiction of unauthorized actions by an adversary is achieved by:

- Establishing the "rule of two (three)" when conducting activities in vital areas, checking vehicles leaving secure areas, containers and vessels being transported off-site, when buildings are opened, at guard shift turnover, and also in other instances requiring the work of groups of people in order to decrease the possibility of unauthorized actions;

7.4.8 The access control and management system at access control points shall include equipment that permits inspection of passing individuals and vehicles that may be carrying (transporting) prohibited items (weapons and other metal objects, nuclear or radioactive material, explosives, etc.).

7.13.3 The equipment components of work stations for scheduled maintenance and repair work shall be determined by the operating manuals for the complex's equipment.

8.2.2.5 Vehicle access control points shall be equipped with entrance and exit gates, as well as inspection pits, bridges, and mirrors or other equipment that permit examination of vehicles from all angles.

8.2.2.8 All vehicles exiting a secure area, as well as all containers (packaging) being transported, shall undergo mandatory verification using the rule of two (three) for purposes of detecting the unauthorized removal of NM.

8.2.3.4 Access control points shall be outfitted with permanently installed equipment and personnel equipped with manual equipment to detect NM, explosive devices, and metal objects being carried or transported into an internal area.

8.2.3.7 The rule of two (three) must be applied when monitoring vehicles leaving the area and containers (packaging) being transported off-site.

8.2.3.8. All exits (entrances) into buildings, structures, and rooms located in an internal area shall be outfitted with detection equipment, a visual and electronic surveillance system, and access management equipment.

8.2.4.1 Requirements for outfitting vital areas with equipment coincide with the requirements set forth in Sections 8.2.3.1 - 8.2.3.8.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	23, 30, 31, 32, 39, 40, 41	4	RF Government	Enacted
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**Citation:**

23. The management staff of the nuclear site develops administrative measures... and adopts the following documents in accordance with established procedures:

a) Site policies regarding the access system, as well as access to objects of physical protection and information concerning the operation of the physical protection system (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)

...

c) Access control procedures

d) Site policies regarding onsite access control procedures

30. All entrances (exits) of categorized buildings, structures, and rooms are provided with detection, monitoring, and access control equipment, and, when necessary, surveillance and situation assessment equipment. Emergency exits provide unimpeded exits for personnel during emergencies.

31. Access to vital areas is subject to the two-person rule, as are the operations conducted there.

32. The necessity of the two-person rule and the procedures for carrying it out when activities are conducted in categorized rooms outside of vital areas, as well as when inspecting vehicles carrying containers and tanks at access control points (posts) is determined by the management staff of the nuclear site. Site management makes this determination jointly with the leadership of the appropriate military units or forces when the nuclear site is guarded by internal security troops of the Russian Federation Ministry of Internal Affairs or site security forces of Russian Federation law enforcement agencies.

39. Access control points (posts) are placed along the perimeter of secure areas to organize the passage of persons and vehicles, taking into account the vehicular and pedestrian traffic and the amount of capacity required. Access control points (posts) are used to check the access rights and identification of persons and vehicles; to facilitate authorized access by nuclear site personnel, visitors, and persons on temporary assignment, as well as the detainment of intruders; and to prevent the unauthorized transit (by pedestrian or vehicle) of nuclear material, nuclear facilities, explosives, edged weapons, firearms, and other prohibited items. Access control points (posts) are equipped and/or outfitted to protect persons carrying out monitoring and badging duties against firearms. Vehicle access control points are also equipped with anti-ramming devices.

40. Individuals and the items in their possession are inspected when passing through access control points (posts). These inspections include the use of equipment to detect prohibited items.

41. The requirements for providing physical protection system equipment for the perimeter and access control points (posts) of a secure area and for categorized buildings, structures, and rooms are established in agency regulations for each specific site, taking into account the list of threats, the vulnerability analysis of the nuclear site, and the physical protection system effectiveness assessment, as well as the category of the nuclear site and the features of the secure areas established there.

3146	Procedures for the Physical Protection of Radiation Sources, Storage Points, and Radioactive Substances	PP	NP-034-01	Appendix 2, line 3.2	5	GAN/Rostekhnadzor	Enacted
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**Citation:**

Access control procedures must be implemented for CAT I, II, and III material.

**Analysis:**

FNP-level document, provides similar high-level requirement to that captured in Decree # 456, applies throughout Russia

**11. Emergency Evacuation Procedural Controls**

**Analysis:**

Decree 456, article 23, establishes the need for PP emergency planning documents. Rosatom states that site-level emergency response plans address controlling movement of evacuated staff, identifying rally points, ensuring that nuclear material is not diverted in the course of an emergency.

The draft OPUK in Section 6.4.4 addresses the taking of unscheduled physical inventories and includes the taking of this type of inventory after mitigation of emergency situations. Section 8.2 requires development of site-level procedures governing actions in case of emergencies and accidents.

**Description of Concern:**

There is a basis for insider-threat concern related to this issue.

Requirements of emergency evacuation procedure controls are described in documents to which the US does not have access. This fact prevents the US from accessing the completeness and effectiveness of requirements in this area.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	23 g)	4	RF Government	Enacted

**Citation:**

23. The management staff of the nuclear site develops administrative measures, issues physical protection policy documents (together with the leadership of the appropriate military units and forces at sites guarded by internal troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies), and adopts the following documents in accordance with established procedures:

...

g) Action plans for physical protection personnel and nuclear site personnel for routine and emergency situations

...

**Analysis:**

This citation requires sites to develop an action plan for emergency situations

**12. Emergency Exit Security Requirements****Analysis:**

Equipment requirements for emergency exits are articulated clearly in Rosatom's Order 550. The use of additional engineered barriers to facilitate the implementation of emergency evacuation procedures is a site-specific decision and occurs as necessary. There are no regulatory citations governing such decisions.

**Description of Concern:**

Rosatom indicated that regulations do not specifically direct or establish requirements to guide site-level plans to mitigate threats associated with an emergency evacuation or planned emergency exercise through the use of technical means, engineered barriers, or procedures designed to prevent uncontrolled movement of personnel or material during an evacuation.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	5.5.9, 5.7.2	7	Minatom/Rosatom	Enacted

**Citation:**

5.5.9 All emergency exits from buildings and structures containing classified rooms and exits from those rooms shall have remote-control locks that can be manually disabled to provide unimpeded evacuation of personnel in an

emergency.

5.7.2 Normal operation of access control points in normal and off-normal situations is ensured by selecting the optimal structural design and physical layout for access control points, as well as the use of protective structures and elements.

**Analysis:**

Emergency exits are locked but provide unimpeded egress when needed.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	8.2.2.10, 7.4.3	7	Minatom/Rosatom	Enacted
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**Citation:**

8.2.2.10 All emergency exits located in a secure area, including emergency exits from buildings and structure where NM and nuclear facilities are located, shall be locked, equipped with detection devices, and - in the event of an emergency situation - shall permit the unobstructed exit of people.

7.4.3 If no emergency exits are provided other than through the access control and management system devices, they shall satisfy the requirements established for emergency exits.

**Analysis:**

Agency-level documents establishing the presence of emergency exits.

0705	The Organization and Management of Rosatom Site Security Force Unit Operations	PP	(Not obtained)	6.1	7	Minatom/Rosatom	Enacted
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**Citation:**

6.1 Site security force duties and responsibilities consist in the aggregate of coordinated actions taken by management entities and site security force employees in conjunction with collaborating forces and equipment for the purpose of competently performing the duties that have been assigned to them. Site security force management entities administer duties in the following areas:

- Preparing site security forces and equipment to perform their duties
- Supervising the guard force protecting the secure site against unlawful acts
- Organizing the actions taken by site security forces in the event of an emergency at the secure site

**Analysis:**

Site security force has responsibility to act (in general) in emergency situations. The operations orders may provide the specific detail we seek, but those are not provided by the Russians due to sensitive nature of documents.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	30	4	RF Government	Enacted
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**Citation:**

30. All entrances (exits) of categorized buildings, structures, and rooms are provided with detection, monitoring, and access control equipment, and, when necessary, surveillance and situation assessment equipment. Emergency exits provide unimpeded exits for personnel during emergencies.

**Analysis:**

Defines entries/exits, emergency exits in the high-level document.

3146	Procedures for the Physical Protection of Radiation Sources, Storage Points, and Radioactive Substances	PP	NP-034-01	2.2.2.3	5	GAN/Rostekhnadzor	Enacted
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**Citation:**

2.2.2.3 ...

All emergency exits into classified rooms and buildings in which radiation sources, radioactive substances, and rad waste are located shall be locked, outfitted with detection equipment, and shall provide unimpeded exit for individuals in the event of an emergency.

**Analysis:**

This regulation establishes the requirements for the physical protection of radiation sources, storage points, and radioactive substances. This citation establishes the requirement for detection equipment at emergency exits in classified rooms and buildings.

**13. Window Restrictions in SNM Buildings****Analysis:**

RDP has agreed to language in the revision of Rosatom's Order 550 that will require the coverage of windows in buildings that contain nuclear material with locking grates that will prevent the passage of nuclear material through windows. Upon enactment of revised Rosatom's Order 550 this language will be verified.

**Description of Concern:**

There is a basis for insider-threat concern related to this issue. Russian regulations 456 and 550 do not address windows security for an insider. For new construction and renovation, Minatom Order 211 (PHYSICAL PROTECTION SYSTEMS FOR NUCLEAR MATERIALS AND FACILITIES-DESIGN REQUIREMENTS, dated 2001) stipulates that rooms that contain Category I and II with rollup to Category I material (Category A and B) shall be located on the first or ground floors, those rooms shall not have windows.

For existing facilities, Russian regulations do not address window openings as potential SNM diversion/theft pathways. Russian regulations allow for unsecured windows in categorized buildings, which can be exploited by an adversary.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	5.5, 5.12.3, 6.13.2	7	Minatom/Rosatom	Enacted

**Citation:****5.5 Requirements for buildings (structures) that house classified rooms.**

5.5.1 Structural components of site buildings and structures containing rooms assigned to category "A" or "B" shall be engineered to comply with the requirements and provisions of "Nuclear Power Rules and Regulations" {PiNAE} 5.6, and "Consideration of Natural and Human Actions Against a Potentially Hazardous Nuclear and Radiation Site" {PNAE G-05-035-94}; these structural components shall accepted in the design based on the intruder profile and vulnerability analysis for the specific site.

5.5.2 Multistory buildings should not be designed with category "A" or "B" rooms on the top floor or on the outside walls of the first and ground floors.

5.5.3 If, for production or other reasons, rooms classified as "A" or "B" shall be located on the first or ground floors, those rooms shall not have windows.

5.5.4 Windows in classified rooms on the second and higher floors next to fire escapes or other structures must have metal grates.

5.12.3 The lower floors of buildings (structures) whose exterior structures form the perimeter of an internal area, shall have window openings equipped with metal grates.

6.13.2 Windows potentially accessible to an adversary must be protected with metal grates and equipped with detection system (security alarms that trigger when the window is broken or opened).

**Analysis:**

This regulation, an agency level document, establishes the requirements for PP system design decisions as well as other requirements pertaining to PP systems during the development of pre-design and design documentation for PP systems at potentially hazardous nuclear sites. This citation specifically describes construction requirements for windows in categorized buildings with rooms.

0033	Methodological Recommendations for Vulnerability	PP	Minatom Order #	Section 5,	7	Minatom/Rosatom	Enacted
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**Citation:**

(During performance of the VA, the following will be considered:)

Windows: characteristics for each type:

- Type of glazing (single/double);
- Window frame material;
- Window dimensions (for double-glazed windows, specify separately for outer and inner frames);
- Dimensions of main window opening;
- Dimensions of ventilation panes and transoms;
- Presence of screens and gratings and their characteristics;
- Installation features (for example, how they are attached to the building);
  - Non-opening;
  - Opening outward/inward;
  - Screen material;
  - Maximum screen mesh;
  - Lock characteristics: mounted, built-in, key storage location.

**Analysis:**

This document indicates that window openings will be considered during performance of the a VA. The VA results should indicate appropriate measures addressing any insider threat issues that are identified.

**14. Nuclear Material Holdup****Analysis:**

The new revision of OPUK, article 6.1.5, that requires that the mass of nuclear material in holdup (depositions, accumulations) be determined based on measurements or computational methodologies, is a more appropriate citation. The previous version allowed for the holdup material to be added based only on estimates. This citation addresses the concerns about holdup.

**Description of Concern:**

There is a basis for insider-threat concern related to this issue. Current Russian regulations do not adequately address holdup requirements. They permit estimates for holdup as part of the inventory process, but do not require the estimates to be based on an analytical methodology. Draft OPUK requires holdup to be based on measurements or analytical methodology.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	6.1.3	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

6.1.3 Physical inventory procedures shall be based on the following:

- Preparing the MBA for the physical inventory
- Compiling an IL and PIL and inspecting accounting documents
- Verifying that the IL matches accounting data
- Inspecting the physical condition of the access control devices
- Accounting and confirmatory measurements of the quantity of nuclear material actually present, taking the measurement uncertainty into consideration
- Estimating the amount of holdup and its uncertainty
- Establishing the inventory difference and its uncertainty for each nuclear material

**Analysis:**

This citation outlines procedures for conducting a physical inventory. While it allows for "estimating the amount of holdup and its uncertainty", it does not identify how the estimate is to be made, the use of measurement techniques or the acceptable level of uncertainty.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	6.2.1.3	7	Minatom/Rosatom	Enacted
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**Citation:**

6.2.1.3 When measurements cannot be taken for control and accounting purposes, procedures may be used instead to calculate NM quantities; i.e., for determining the amount of holdup in process equipment.

**Analysis:**

Unlike the US DOE Manual, this citation does not identify what constitutes the procedure. Technically justifiable estimates are not identified.

**15. Delay Requirements for Unauthorized Access to Nuclear Material During Inter-site Transportation**

**Analysis:**

Decree 456 and Rosatom's Order 550 both contain language regarding the level of delay required from physical protection systems during transport of Category I and II nuclear material. Order 550 specifically states an unequivocal requirement that delay be sufficient to allow for arrival of a response force. PP activities for transportation must be based on a VA. However, there is no mandatory requirement to use overpacks during inter-site transport of nuclear materials. Without overpacks, the physical security system may not be capable of providing a sufficient level of delay to adequately address the threat. Rosatom stated that completion of draft regulations addressing VA for transportation of nuclear material will allow the problem to be addressed more effectively, including the possibility of establishing technical specifications for overpacks to be used on particular shipping routes based on the revised VA process.

**Description of Concern:**

Without overpacks, the physical security system is not capable of providing a sufficient level of delay to adequately address the threat, or meet the regulatory requirement to "be capable of delaying adversaries until a response force can arrive."

Rosatom stated that this issue has cost considerations – using overpacks increases the cost of shipments. They recognize that some managers may decide not to use an overpack simply based on cost rather than the security considerations.

Rosatom also indicated they were anxious for the document on Transportation VAs to be completed that they hope that will resolve the issue of cost vs. security. U.S. is working with Eleron to develop this regulation but it is unclear how this will resolve this issue.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	12.1.3, 12.1.4, 12.1.5, 12.1.6, 12.3.1, 12.3.2, 12.3.3, 12.3.4, 12.3.5, 12.3.6, 12.5.1, 12.5.2	7	Minatom/Rosatom	Enacted

**Citation:**

12.1.3 The physical protection [system] for NM in transit shall be capable of delaying adversaries until the response force can arrive and informing the services and federal executive branch agencies responsible for ensuring the physical protection of NM transportation if unauthorized actions against the NM or the vehicle transporting it are discovered or if any other emergency situation arises.

12.1.4 The major organizational requirements for physical security when transporting all categories of NM are established by the Procedures;

The physical protection level for transporting NM shall be commensurate with the category assigned to the NM that are being transported. This chapter presents the general requirements that are mandatory for all types of transported NM. The specific requirements for ensuring the physical protection of various categories of NM using various means of transport are defined in a separate document.

Requirements for transporting nuclear warheads and their components that have a security classification, as well as other special cargo, is stipulated by a regulation approved at the Federal level.

12.1.5 Physical protection of NM in transit shall include protection against theft, sabotage, and other unauthorized actions.

Physical protection equipment shall provide information transmission to the shipper and receiver of NM and to Minatom of Russia control points in a timely manner regarding:

- Deviations from the established route;
- Damage or breakdown;
- Accidents;
- Unauthorized activities.

12.1.6 Physical protection for the transportation of NM shall consist of the following components:

- Organizational measures;
- Physical protection and security equipment;
- Actions of the security forces and emergency response team.

12.3.1 Physical protection and security equipment shall provide the following capabilities for the transportation of NM:

- Detection of unauthorized actions;
- Preventing unauthorized access;
- Detainment (delay) of intrusion by adversaries;
- Communications and control.

12.3.2 Physical protection and security equipment consist of the following functional systems for transit operations:

- Alarm signals;
- Alarm-calling signals;
- Access control and management;
- Situation surveillance and assessment;
- Real time communication and notification;
- Telecommunications;
- Information protection;
- Electrical power.

Physical protection and security equipment for transit operations shall also include:

- Control panel(s);
- Physical barriers;
- Response equipment;
- Locks and seals.

12.3.3 Provisions in addition to the requirements for physical protection and security equipment set forth in Chapter Seven of this document shall ensure:

- That the progress of an intruder is delayed by concealed components which use sound, light, electromagnetic pulses, smokescreens and other methods to temporarily incapacitate or impede the progress of the intruder;
- That at least two channels, including a channel with two-way radio communications between escort security personnel and the driver, shall be compatible with the radio equipment used when transporting the material, shall have an output to the automated phone network to communicate during an emergency with the organizations involved in the physical protection system, and shall also transmit the coordinates of the transportation vehicle and any emergency situation to emergency response forces;
- The collection and archival of information regarding the actuation of equipment, actions taken at the control panel of the cargo escort and security force, and the exact location of the vehicle throughout its route;

12.3.4 During the transportation of NM, transportation vehicles, protective shipping devices, containers and packaging shall be designed so as to be considered physical barriers. In addition, elements such as reinforced cargo areas, doors, and grates, as well as locking devices and bolt/seal combination devices may be specially developed and installed on vehicles in order to prevent or hinder an adversary from gaining access to the vehicle cargo areas and unloading NM packages from them;

12.3.5 Locks shall provide for authorized access to the freight compartment according to the two/three person rule, providing an additional impediment to an intruder attempting to access the transported NM;

12.3.6 Seals shall provide the ability to detect tampering in relation to a protected object (the inside of the vehicle's freight compartment), and shall require special tools for their removal.

12.5.1 Organizational and engineering measures for physically protecting NM in-transit must be implemented within the framework of an automated transportation security management system. Minatom of Russia regulations establish the procedure for deploying the automated transportation security system and the types of shipments for which it is applicable.

12.5.2 The automated transportation security management system designed to be placed within the mode of transportation (the automated transportation subsystem) shall perform the following main functions:

- ...
- Activate devices to impede the intruder
- ...

#### **Analysis:**

This is the agency-level document establishing PP requirements. 12.1.3: This statement does provide an unequivocal requirement that delay be sufficient to allow for arrival of a response force.

Establishes guidance for the protection of NM in transport by redirection to the Procedures (a.k.a. Decree 456 referenced in section 1.5).

12.1.4: Decree 456 establishes the requirement that a VA be performed in transportation activities.

12.1.5, 12.1.6: This citation identifies categories of unauthorized activities that require attention.

12.3.1, 12.3.2: General Physical Protection requirements for transportation.

General Physical Protection requirements for transportation.

12.3.3: Identifies additional tools for delaying adversaries.

This document is the primary agency level PP document.

12.3.4: This citation identifies the requirement that containers and protective shipping devices (overpacks) serve as physical barriers to "prevent or hinder" adversary access to the material.

12.3.5: Requires use of locks.

12.3.6: Requires use of seals. The identification of "Special tools" is not elaborated and requires greater definition.

12.5.1, 12.5.2: Requires use of an automated transportation security system.

0184	Instructions for Conducting Inspections of Nuclear Physical Protection During Shipment	PP	RD-08-25- 2001	III.4 Article 30, 31	7	GAN/Rostekhnadzor	Enacted
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**Citation:**

30. The following shall be subject to verification in the course of the inspection:

- Outfitting transportation equipment with physical barriers impeding unauthorized penetration into the cargo compartments;
- The use of protective shipping devices for transporting category I and II NM that assure the protection of these materials against firearms;
- The condition and serviceability of detection and surveillance equipment on transportation equipment;
- The condition and serviceability of data acquisition and processing systems;
- The condition and serviceability of the guard calling system and communications and lighting equipment.

31. The physical barriers shall be inspected by rounds conducted by a Gosatomnadzor of Russia inspector, accompanied by the commander of the military guard escorting the special cargo (NM) and by a representative of the command of the Internal Security Troops of the Russian Federation Ministry of Internal Affairs, and by means of visual examination; and the PP physical security equipment shall be inspected additionally for wear.

**Analysis:**

30.: Establishes the inspection requirement for transportation equipment.

31.: Establishes the inspection requirement for transportation equipment (barriers).

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	2, 20, 56, 60, 61, 69	4	RF Government	Enacted
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**Citation:**

2. Physical protection - activities related to the use of atomic energy that are intended to prevent sabotage and theft of nuclear material, nuclear facilities, and nuclear material storage points.

Physical barrier - A physical impediment that delays the intrusion of an adversary into secure areas and points of vulnerability and delays access to nuclear material.

Nuclear facility - a structure or complex (nuclear vessels and other water transport, space and aviation vehicles, and other transportation or transportable equipment) containing a nuclear reactor; structures and complexes containing commercial, experimental, or research reactors or critical and subcritical nuclear test facilities; structures, complexes, ranges, facilities, and devices containing nuclear charges; and other structures and complexes containing nuclear material or facilities for processing, using, reprocessing, and shipping (transporting) nuclear material.

20. The objectives of physical protection at a nuclear site are as follows:

- a) To prevent unauthorized actions
- b) To detect unauthorized actions in a timely manner
- c) To impede (delay) the entry (progress) of an adversary
- d) To respond to unauthorized actions and neutralize adversaries in order to interdict the unauthorized actions

56. The tasks associated with physical protection for nuclear material and nuclear facilities during their shipment and transport are consistent with the physical protection tasks for a nuclear site specified in Para. 20.

60. A shipment (transportation) vulnerability analysis and a physical protection effectiveness assessment are performed when organizing the shipment and transportation process.

61. The owner of the transportation vehicles (carrier):

- a) Provides vehicles that are specially equipped and in good working order
- b) Provides the vehicles with physical protection and security equipment as specified in the established requirements
- c) Provides highly qualified drivers and teams or crews who have been specially trained and granted the appropriate clearance

69. Security and escort services are provided for inter-site shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials in accordance with the established requirements.

For inter-site shipment and transport, packaging containing Category I or II nuclear material and nuclear facilities based on these materials is sealed prior to shipment and placed in an armored compartment of the transport vehicle or in an overpack, if the transportation package does not comply with physical protection requirements applicable to an overpack.

For inter-site shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials, equipment must be provided to support communications among escort personnel, security personnel, and the driver, as well as between the vehicle and the transportation control center (central control point) and between the shipper and receiver.

During the process of inter-site shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials, including during stops, escort personnel and cargo guards conduct periodic inspections of the seals (if present) and locks.

#### **Analysis:**

2.: Definitions of technical terms

This document contains the major organizational requirements for physical protection during transportation. 20, 56: It establishes delay as one of the 4 objectives of PP during transportation.

This document contains the major organizational requirements for physical protection during transportation. It provides the direction for conducting VA's (however, no requirement to mitigate identified deficiencies were found) and the equipment and personnel requirements to protect NM during transport.

60, 61, 69: The citation establishes the requirement for use of an overpack or equivalent during intersite transportation.

#### **16. Requirements for PIDAS Boundaries**

##### **Analysis:**

The Russian regulations provide a high level of detail regarding requirements for the equivalent of a PIDAS. Russian regulations require an exclusion area to be established along the boundary of protected areas, within which all Category I, II, and III material must be stored. This differs from the U.S. model, where only Cat I and II material is used within the PIDAS boundary.

##### **Description of Concern:**

Building a PIDAS to protect only Cat III material, in the US view, is an unnecessary use of resources that could be better utilized to perform other MPC&A activities that would provide a higher degree of protection to Cat I and II

materials.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	4.5	7	Minatom/Rosatom	Enacted

**Citation:**

4.5 Requirements for equipping the perimeters of secure areas

4.5.1 Equipment at a protected area perimeter shall include the construction of at least two physical barriers.

4.5.1.1 The main fence shall be as straight as possible without unnecessary curves or turns.

Neither the outside nor the inside of the perimeter of the main fence shall adjoin buildings, structures, additions, equipment or material storage areas or stands of trees. This strip shall be planned to be visible and accessible to security unit vehicles and armored equipment.

4.5.1.2 Exclusion areas shall be designed with due regard to the requirements of current Ministry of Internal Affairs regulations.

The exclusion area shall lie along the perimeter of the site and be equipped with physical barriers and physical protection system equipment to detect and delay an adversary for as long as necessary. The exclusion area shall also be equipped with a buffer zone, and a paved path or security road shall run between the internal fence of the area and the main fence for security patrols and personnel servicing the physical protection system equipment. Stanchions and area control panels holding communications equipment and alarm-calling signals shall be installed along the patrol path.

If necessary, observation towers equipped with communications equipment and alarm-calling signals may be installed on the perimeter.

4.5.1.3 Gates (passageways) shall be provided in the main and secondary fences on the perimeter of the protected area for mobile details and security units.

4.5.2 Disposition of additional elements on the protected area perimeter

4.5.2.1 Warning signs reading "Exclusion area. No admittance." shall be posted along the entire perimeter on the outside and inside fence to mark the outer boundaries of the protected area.

4.5.2.2 Within the protected area, a security road running along the exclusion area must be provided to support security force actions involving vehicles and armored equipment to neutralize adversaries.

The facility's internal road network as provided on the general arrangement drawing to support normal facility operation may be used as security roads. The network shall have side roads and approaches to the prohibited zone. Security roads shall be wide enough and be paved.

**Analysis:**

This regulation is the design requirements document for a nuclear facility. The citation addresses requirements for perimeters of secure areas, similar to the content of Order 550

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.2.2, 3.2.3, 3.3.5.2, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.5.1, 6.5.2, 6.5.4, 7.2.1, 7.2.2, 7.3.1, 7.3.2, 7.3.3, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.11.1, 7.11.2, 7.11.3, 7.11.4, 7.11.5, 8.2.2.1, 8.2.2.2, 8.2.2.3, 8.2.2.4, 8.2.2.5, 8.2.2.7, 8.2.2.8	7	Minatom/Rosatom	Enacted
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**Citation:**

3.2.2 Preventing unauthorized actions and providing authorized access is achieved by:

- Equipping the perimeter of secure areas with physical protection and security equipment;

3.2.3 Timely detection of the commission or attempt to commit sabotage, NM theft, unauthorized access, carry or transport prohibited items on-site, or to disable physical protection equipment is achieved by:

- Organizing the guard force at access control points, at the perimeter of secure areas, and at individual sites;
- The use of guard signaling system whose detection equipment is situated on the perimeter of secure areas, buildings, structures, rooms, and which can be situated inside structures or rooms;
- The use of visual and electronic surveillance systems outside the perimeter of secure areas, access control points, guarded buildings, structures, rooms, and the approaches to these areas;

### **3 Goals, Tasks, and Design Principles of Physical Protection Systems at Potentially Hazardous Nuclear Sites.**

#### **3.3 General design principles of PP systems.**

##### **3.3.5 The principle of equally strong protection**

3.3.5.2 PP system shall provide equally strong protection at the entire secure area perimeter (for the specific category of room or group of rooms), including monitored entrances and/or access control points.

6.4.1 Physical protection and security equipment systems are intended for engineering and technical support in order to achieve the goals and perform the tasks of the PP system. The full complement of physical protection and security equipment includes:

- Engineered barriers;
- Physical protection equipment.

6.4.2 Physical protection system physical protection and security equipment shall perform the following tasks:

- Providing uninterrupted real-time management of the PP system;
- Supporting the established personnel access control system at the potentially hazardous nuclear site;
- Impeding the actions of adversaries attempting unauthorized access to secure areas, buildings, structures, and rooms;
- Issuing alarm signals to PP system control points about attempted and successful instances of unauthorized access;
- Determining the direction of an adversary's movements at the perimeter of the protected area (to or from the site), and the time and place the unauthorized access occurred;
- Creating favorable conditions for the security force to perform its combat duties and to facilitate the actions of back up groups of guards in detaining the adversary;
- Providing remote surveillance of secure area perimeters, secure buildings, rooms, and structures, and assessing their status;
- Supporting the maneuverability of forces and equipment as the guard force carries out its duties;
- Identifying the boundaries of secure and monitored areas;
- Recording (documenting) alarms received from physical protection equipment, orders and control instructions issued by management units and reports by PP system personnel;
- Protecting PP system personnel when making rounds of the control rooms, control access points, and guard posts and performing tasks related to the interdiction of unauthorized actions and detaining individuals who participate in them.

6.4.3 Physical protection engineered barriers consist of engineered structures, elements, and physical barriers used in the PP systems of fixed and mobile potentially hazardous nuclear sites for the purpose of increasing PP system effectiveness and creating the conditions for the security force to perform its duties. Physical protection engineered barriers include:

- Physical barriers;
- Engineered equipment at the perimeter of secure areas and at guard posts including:
  - Buffer zones;
  - Security detail pathway (guard roadway);
  - Pathway for the physical protection equipment specialist;
  - Pathway for the guard dog trainer;
  - Engineered structures and elements for the guard dog posts;
  - Observation towers, guard huts and booths;
  - Direction signs, demarcation signs, warning signs;
  - Drainage system (drain pipes, gutters, waterspouts, ditches);
  - Defensive structures for the guards;
  - Braking area equipment, duty area equipment for sentries on railroad platforms;
  - Engineered equipment for access control points and posts with access control functions in secure building, structures, and rooms.

6.4.4 Physical barriers are intended to impede the entry of individuals and vehicles onto the site (exit from the site) outside access control points, delaying (slowing) the progress of an adversary, limiting or eliminating the possibility of committing other unauthorized actions, as well as observing the production areas outside secure areas. Physical barriers include:

- Construction elements at the potentially hazardous nuclear site (walls, ceilings, gates, doors, etc.);
- Fences (the main fence around the site, interior and exterior fences around the exclusion area, fences around

secure areas);

- Engineered barriers;
- Equipment to reinforce doors, windows, utility penetrations;
- NM transportation and storage casks;
- Anti-ramming devices (fixed and portable);
- Equipment to protect main control panel and local control panel operators, sentries, and access control point personnel from gunfire and sudden attack.

If required, physical protection system physical barriers may include:

- Remote controlled delaying equipment;
- Protective shipping devices;
- Protective equipment for bodies of water;
- Other physical impediments.

6.5.1 Physical protection equipment is intended for the technical support of actions to provide physical protection for the potentially hazardous nuclear site and the NM, nuclear facilities, and NM storage points located (operated) on the site.

6.5.2 Physical protection equipment shall perform the following tasks:

- Acquisition, processing, analysis, and monitoring of all information received from physical protection equipment;
- Supporting real time alarm assessment;
- Generation and transmission of reports (predetermined signals) to security force personnel, response teams, and PP system management units;
- Information exchange between the main control room and local control panels, as well as between control points and control panels for other safety systems at the potentially hazardous nuclear site;
- Sending control signals to remote controlled physical barriers and PP system operations support equipment;
- Monitoring the status and operability of physical protection and security equipment;
- Monitoring the actions and location of personnel working with NM and nuclear facilities;
- Storing and distributing information regarding the operation of the PP system, attempts to defeat it or to commit unauthorized actions against protected objects of protection or the physical protection and security equipment itself.

6.5.4 The following main structural elements (functional systems) shall be identified within the physical protection equipment:

- Alarm signals;
- Alarm-calling signals;
- Access control and management;
- Situation surveillance and assessment;

7.2.1 The security alarm system is intended for detecting attempts or the commission of unauthorized actions; it shall inform PP system personnel and other functional subsystems within the PP system of such events so that they may take adequate actions, and also automatically issue the appropriate control instructions to mechanisms and remote controlled physical barriers.

7.2.2 The security alarm system shall perform the following functions:

- Detect unauthorized access to secure areas, buildings, structures, and rooms;
- Issue alarm signals to security personnel and/or security service personnel regarding the activation of detection equipment and record this event as it happened;
- Maintain an archive of all events that have occurred in the system, recording all required information so that it can be identified unambiguously at a later time (device type and number, event type and cause, beginning date and time, etc.)
- Eliminate any possibility that [premises] may be placed under guard or [the PP system] may be deactivated without being monitored.
- Implement functions for placing detection equipment (or a detection equipment group) under control (remove from control);

7.3.1 Alarm-calling signals are intended for emergency calls to the security force immediate response units, for providing information that unauthorized actions have been committed, for issuing the "duress" signal, as well as for monitoring guard survivability and patrol passage through pre-assigned routes.

7.3.2 Alarm-calling signals shall provide [perform] the following:

- Inform PP system personnel regarding the activation of alarm-calling signal devices;
- Determine the location of the call;
- Concealed installation and easy access to calling devices;
- Impossibility of disabling the alarm-calling signal devices;
- Signals from alarm-calling signal devices that are distinguishable from the signals of the guard calling system;
- Monitor the survivability of control panel personnel, sentries and their controllers at their posts (using equipment or organizational measures).

Information sent to central control panels and local control panels from alarm-calling signal devices shall have priority over signals sent from other physical protection equipment.

7.3.3 When selecting alarm-calling signal devices and installation locations the following must be taken into

account:

- Acknowledged threats and intruder profiles;
- Probable adversary routes of movement;
- Methods for committing unauthorized actions;
- The protection of PP system personnel and site employees from the impact of threats;
- Alarm-calling signal device reliability;
- Protection from environmental factors.

7.5.1 The surveillance and situation assessment system is intended for remote surveillance of the approaches to secure areas for the purpose of assessing the current situation, observing the actions and movement of adversaries, coordinating the actions of PP system personnel, as well as archiving visual information.

7.5.2 The surveillance and situation assessment system shall include the following components:

- A visual and electronic surveillance system;
- Equipment for sentries to perform the surveillance functions (binoculars, night vision devices, etc.).

7.5.3 The visual and electronic surveillance system shall perform the following functions:

- Present necessary and sufficient information to the operator regarding the situation at the site and in its individual secure areas, buildings, structures, and rooms;
- Present information in order to assess the situation if it is discovered that unauthorized actions have been committed and provide visual confirmation of that fact;
- Display, record, and archive incoming information in the amount required for later analysis of any abnormal situations that have arisen;
- Ensure its operability under all operating environments specified in the technical standards documentation;
- Monitor system malfunctions (loss of video signal, opening up equipment, attempts to access communications links, etc.), inform the operator of such malfunctions, and archive the information.

7.5.4 The information presented to the operators of the main control panel (local control panels) using the visual and electronic surveillance system shall allow them to differentiate adversaries and animals within the field of vision.

7.11.1 Fences around sites are intended to prevent passage of people and vehicles to (from) the site, except through access control points, and also to restrict or eliminate the possibility of observing the production area from outside of the secure area. Fences shall be constructed around the perimeter of the secure area.

The fences must meet the following requirements:

Sufficient height and depth in the ground to satisfy the site's access conditions and make it difficult to get over them;

- Simple structure, high strength and durability;
- The absence of devices (assemblies, components) that make it easier to get over the fences;
- Right angles and a minimum number of breaks;
- Optimal construction and operation from a cost-benefit standpoint.

7.11.2 Engineered barriers are equipment and structures installed or erected on near approaches to the secure area, and on approaches to vital centers, buildings, and structures of a secure site in order to hamper an adversary's movement and create favorable conditions for his detention by reserve guard groups within the exclusion area or on approaches to vital centers, buildings, and structures.

Barriers are divided into permanent and portable, antipersonnel and anti-vehicle.

The design of barriers must satisfy the following requirements:

- Impede adversaries' action and detain them for the time necessary for physical protection forces to act;
- Restrict the adversary's use of expedient means;
- Be repairable;
- Not prevent the normal operation of detection devices;
- Provide conditions for inspection of vehicles and safe performance of operational duties by the personnel.

7.11.3 A strip of land the surface of which, in its natural state or after special preparation, shows tracks and preserves them for a long time is called a buffer zone.

The following requirements are imposed on the buffer zone:

- Constant provision of tracking conditions;
- Continuity around the site's whole perimeter;
- Sufficient width to rule out jumping across it;
- The absence of objects in it what would facilitate getting across it without leaving tracks;
- The possibility of using mechanized equipment to prepare it over its whole course.

Buffer zones may be artificial or natural. In places where it is not possible to set up a plowed or natural buffer zone (rocky ground, swamp, wetland with a high water table, steep slopes), additional non-explosive engineered barriers shall be set up over the whole width of the exclusion area. In places where railroads, highways, and dirt roads cross the exclusion area, raised buffer zones must be provided.

7.11.4 As a rule, the on-site road network must be used for the movement of military details in vehicles, and also special roads (security roads), which may be built in the exclusion area or outside of it, regardless of the width of the exclusion area.

Security roads must lie outside the zone of action of detection equipment and have a minimum number of intersections with existing roads and railroads on the sites. They shall be equipped with the State Traffic Safety Inspection road signs.

Wide spots in the road shall be constructed for turning and passing oncoming vehicles. Their width and spacing shall be determined by the local conditions.

A security-detail pathway is intended for convenient movement of military details. It shall be constructed along the buffer zone if there is no security road or if the security road is too far away to allow visual observation of the buffer zone. The security-detail pathway may be a graded (ungraded) dirt path, boardwalk, or paved with asphalt, concrete, or reinforced concrete. Security-detail pathways, except for boardwalks, shall be provided with drainage ditches along their whole length.

A pathway for the physical protection equipment specialist shall be constructed alongside the main fence and is intended for movement of military personnel along it when servicing the linear part of detection devices and other physical protection equipment located on the main fence.

A pathway for the guard-dog trainer shall be laid out in the exclusion area on land cleared of underbrush, deadwood, high vegetation, and other objects that hamper movement; and boardwalks or bridges shall be constructed across boggy places, creeks, rivers, and gullies.

7.11.5 Post engineered equipment includes observation towers, guard huts and booths, enclosures in the form of barriers around places where sentries perform their duties and at access control rooms, warning, demarcation and direction signs, security and defense structures, barrier planks on braking areas, specially equipped and enclosed places for sentries to perform their duties on a platform (guardrails, stairways), and also devices for guard dog posts.

Observation towers may be constructed to increase the field of vision and provide sentries with a better view of the exclusion area and approaches to the site. The height of the tower and the place where it is set up shall be determined depending on the local relief, the configuration of the exclusion area, and other local conditions.

Towers shall be equipped with SOS and alarm systems, and, in individual cases, with backup panels for the physical protection equipment of secure areas, a loudspeaker, observation equipment, and controllable searchlights. The components of the tower equipment shall be established by a document from the Ministry of Internal Affairs or by the design specifications.

The tower design must protect the sentry from small-arms fire.

Observation towers may be made of wood, metal, or pre-cast concrete.

Guard booths shall be set up at access control points or in the exclusion area and are intended for placement of SOS and alarm systems in them, and compartments with badges for motor-vehicle drivers and coworkers accompanying vehicles (cargo), and frames with samples of badges, signatures and seal impressions, and guard uniforms.

The dimensions and types of guard booths shall be determined by the design organization; and at existing sites, if necessary, by their security service and the military-unit command.

To warn that passage into the exclusion area is forbidden, warning signs shall be posted along its fence line with the inscription "Exclusion area. Passage of people (vehicles) forbidden (closed)." In individual cases, there may be a warning sign with the inscription "No Trespassing." The inscription shall be in Russian and, if necessary, in Russian and the appropriate national language.

Warning signs shall be posted on the exclusion area's exterior and interior fences, using the existing fence posts or separate posts. Warning signs shall be posted without fail at bend (corners) of the exclusion area, and gates into the exclusion area.

Direction signs shall be posted to mark the boundaries of alarm sections of the exclusion area.

Guard dog posts shall be set up for security at the potentially hazardous nuclear site. For this purpose, block posts, free-roaming posts, and chained posts shall be provided in the exclusion area.

Warning signs shall be posted on the exclusion area's exterior and interior fences, using the existing fence posts or separate posts. Warning signs shall be posted without fail at bend (corners) of the exclusion area, and gates into the exclusion area.

8.2.2.1 An exclusion area is established along the boundary (perimeter) of a protected area. An exclusion area is a specially equipped strip of land and shall be outfitted with:

- Physical barriers including the main fence around the site, interior and exterior fences around the exclusion area, and engineered barriers; The total number of physical barriers shall be no less than two;
- At least two types of detection equipment operating on different physical properties; Detection equipment shall be located in such a manner that their detection zones overlap and there are not unmonitored sectors ("dead zones");
- A visual and electronic surveillance system;
- A wire telephone communication system and an alarm calling system device;
- A buffer zone;
- Buffer zone lighting;
- A guard roadway (security detail pathway);
- Defensive structures;
- Guard huts and booths, observation towers;
- Direction signs, demarcation signs, warning signs;
- Shelters for the guards and security detachments;
- Drainage system (drain pipes, gutters, waterspouts, ditches);
- Engineered structures and elements for the guard dog posts.

Additional requirements for equipping protected areas and for their components are established in the appropriate regulations.

8.2.2.2 Approaches (roads, local areas) to the perimeter and/or access control point of a protected area that vehicles might break through shall be equipped with anti-ramming devices, structures, trenches, anti-ramming walls, concrete blocks, etc., and the roadbed shall make it impossible to attain break through speed (it shall have depressions and sharp turns, etc.).

8.2.2.3 The areas adjacent to the borders of protected areas shall be cleared of underbrush and trees shall be cut down in order to eliminate the possibility of using them to get past the perimeter.

All perimeter sections shall be accessible for surveillance by PP system personnel. If there is no visual and electronic surveillance system or it is not possible to install it [in a particular area] appropriate compensatory measures shall be taken (surveillance posts shall be erected). Sentries at such posts shall be equipped with surveillance equipment, telephone or radio communications equipment, alarm calling system devices, and equipment to monitor personnel survivability.

8.2.2.4 Access control for people passing through access control points shall be carried out using full-height double door corridor or blocking access devices that will reliably detain individuals without access privileges or those trying to carry prohibited items through them.

8.2.2.5 Vehicle access control points shall be equipped with entrance and exit gates, as well as inspection pits, bridges, and mirrors or other equipment that permit examination of vehicles from all angles.

8.2.2.7 Operations personnel at access control points shall have at their disposal equipment (stationary or portable) for inspecting personnel, individuals on temporary assignment, and visitors to the potentially hazardous nuclear site to determine if they are carrying NM, explosive devices, or metal objects. Such individuals and their personal items may be inspected.

8.2.2.8 All vehicles exiting a secure area, as well as all containers (packaging) being transported, shall undergo mandatory verification using the rule of two (three) for purposes of detecting the unauthorized removal of NM.

#### **Analysis:**

3.2.2, 3.2.3: General principals for perimeter intrusion detection and assessment.

3.3.5.2: Identifies the implementation of the Defense in Depth concept with respect to PIDAS requirements.

6.4.1, 6.4.2: Defines requirements for the engineering of PPS equipment, subsystems and systems.

6.4.3: Defines requirements for PPS barriers.

6.4.4: Establishes the requirements for delay at the perimeter.

6.5.1, 6.5.2, 6.5.4: Identifies technical goals of PP equipment including the PIDAS.

7.2.1, 7.2.2: Defines requirements for an alarm system.

7.3.1, 7.3.2, 7.3.3: Defines requirements for an alarm system.

7.5.1, 7.5.2, 7.5.3, 7.5.4: Defines requirements for an situation and assessment systems.

7.11.1: Defines requirements for PIDAS fencing.

7.11.2: Defines design requirements for barriers and general barrier placement requirements.

7.11.3: This citation addresses the attributes and requirements of a buffer zone as it is applied to a site for protective proposes.

7.11.4: This citation addresses the attributes and requirements of security posts.

7.11.5: This citation addresses the attributes and requirements of a buffer zone as it is applied to a site for

protective proposes.

8.2.2.1: Order 550, establishes requirements for equipping the exclusion area at the boundary.

8.2.2.2, 8.2.2.3, 8.2.2.4: Order 550, provides additional requirements for exclusion area, including removal of debris, surveillance requirements

8.2.2.5: Defines vehicle access control requirements at the PIDAS.

8.2.2.7: Defines personnel access control requirements at the PIDAS.

8.2.2.8: Defines vehicle access control requirements at the PIDAS.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	III. 30, 34, 2, CH III. 38, 39, 41	4	RF Government	Enacted
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**Citation:**

30. All entrances (exits) of categorized buildings, structures, and rooms are provided with detection, monitoring, and access control equipment, and, when necessary, surveillance and situation assessment equipment. Emergency exits provide unimpeded exits for personnel during emergencies.

34. Physical protection and security system equipment consists of the components and devices included in the following major functional systems:

- a) Guard-signaling
- b) Alarm calling
- c) Access control and management
- d) Optical-electrical surveillance and situation assessment

2. ...

Vital area - an area, situated within an internal area, surrounded by physical barriers and under continuous guard and surveillance, access to which is limited and monitored

...

Secure area perimeter - the boundary of a secure area that is equipped with physical barriers and access control points (posts)

...

38. The perimeter of secure areas is provided with physical protection and security equipment to detect unauthorized actions, summon rapid response forces in emergencies, provide information for situation assessments, and delay the progress of the adversary to objects of physical protection.

At the most likely points of vehicular entry into a secure area by an adversary, measures are taken to eliminate or substantially complicate such an intrusion (installing anti-ramming devices, etc.).

39. Access control points (posts) are placed along the perimeter of secure areas to organize the passage of persons and vehicles, taking into account the vehicular and pedestrian traffic and the amount of capacity required.

Access control points (posts) are used to check the access rights and identification of persons and vehicles; to facilitate authorized access by nuclear site personnel, visitors, and persons on temporary assignment, as well as the detainment of intruders; and to prevent the unauthorized transit (by pedestrian or vehicle) of nuclear material, nuclear facilities, explosives, edged weapons, firearms, and other prohibited items.

Access control points (posts) are equipped and/or outfitted to protect persons carrying out monitoring and badging duties against firearms. Vehicle access control points are also equipped with anti-ramming devices.

41. The requirements for providing physical protection system equipment for the perimeter and access control points (posts) of a secure area and for categorized buildings, structures, and rooms are established in agency regulations for each specific site, taking into account the list of threats, the vulnerability analysis of the nuclear site, and the physical protection system effectiveness assessment, as well as the category of the nuclear site and the features of the secure areas established there.

**Analysis:**

III. 30, 34: Defines general requirements for access control points.

2, CH III. 38, 39, 41: Provides definition of requirements to be applied to entrances and exits from/to protected areas. Also requires equipping the parameters with security equipment.

**17. Differences in U.S. and Russian Approaches to Accountability Measurements****Analysis:**

When developing new MC&A regulations, Rosatom uses forthcoming version of OPUK as a guidance document.

**Description of Concern:**

The existing version of OPUK contains a requirement for accounting measurements (Russian terminology) and states that "nuclear material accounting shall be based on measurements of quantitative characteristics of the material..."

Based on review of the current regulations the language in the DOE order and in OPUK are equivalent.

Rosatom also indicated that when sites are developing site-level measurement documents, the requirements in the new OPUK are being captured.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	Terms and Definitions, 2.2.6, 2.2.8, 4, 6.4.2, 6.4.3	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:****Terms and Definitions**

...

Accounting Measurement - measurement of the quantitative characteristics of nuclear material or products, the results of which are entered into accounting documents.

...

2.2.6 Nuclear material accounting shall be based on measurements of quantitative characteristics of the material. It is permissible to:

- Use the results of previous measurements of nuclear material quantitative characteristics if their reliability is confirmed by the appropriate status of the access control devices that have been applied or by the appropriate confirmatory measurements
- The use of experimental studies or of analytical methods (methodologies) based on the results of preliminary measurements

2.2.8 Physical inventories shall be conducted in order to establish the amount of nuclear material actually present in an MBA. Accounting data, attribute indicators, and measurements of the quantitative characteristics of the nuclear material are performed as part of the physical inventory process. Upon completion of a physical inventory, the nuclear material balance shall be established for each nuclear material; in addition, the inventory difference and its uncertainty shall be determined for each nuclear material.

6.4.2 If accounting measurements of a nuclear material were taken upon its production, receipt, processing, or shipment during a reporting period, or if such measurements were taken as part of a physical inventory, the criterion for detecting control and accounting anomalies for this material shall be the fact that the absolute value of the inventory difference exceeds three standard deviations of its uncertainty, or any of the following values (with a 0.95 confidence probability):

- 2 % of the book inventory of the nuclear material plus all increases in its quantity over the reporting period - for industrial nuclear facilities
- 3 % of this figure - for experimental and research nuclear facilities
- 3 kg - for plutonium and uranium-233 for Category One and Category Two MBAs
- 8 kg - for uranium-235 for Category One, Two, or Three MBAs

- 70 kg for uranium-235 - for uranium with enrichment < 20%

#### 4 Nuclear Material Measurements

4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.

4.2 Measurement methodologies shall be incorporated into individual site policy documents that shall be compiled in accordance with the requirements set forth in metrology standards.

4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible.

4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.

4.5 The list of measuring instruments used in the nuclear material measurement system shall contain the instrument name, type, and manufacturer's serial number.

4.6 Measuring instruments shall be inspected as specified in current regulations.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

6.4.3 If accounting measurements were not taken for a nuclear material during a reporting period or during an inventory, but the accuracy of previous accounting measurements was preserved by the use of access control equipment, any decision that there are no nuclear material control and accounting anomalies shall be based on the results of random confirmatory measurements, the scope of which shall be determined by a special methodology utilizing two parameters: the threshold quantities of nuclear materials and the probability of detecting threshold quantities of a material deficit (excess).

The threshold quantities for Categories One, Two, and Three are:

- 3 kg - for plutonium, uranium-233

- 8 kg - for uranium-235

The threshold quantity for uranium with enrichment < 20% (Category Four) shall be 70 kg of uranium-235.

The probability of detecting threshold quantities of a nuclear material deficit (excess) used when calculating the size of the random sample for confirmatory measurements is presented in Appendix 6.

### 18. Russian Requirements for Confirmation Measurements

#### Analysis:

When developing new MC&A regulations, Rosatom uses forthcoming version of OPUK as a guidance document

#### Description of Concern:

The current and draft versions of OPUK define confirmatory measurements as those measurements that confirm all or some of an item's quantitative characteristics and/or attributes. In addition, the types of confirmatory measurements conducted, as well as their scope, are identified in documentation generated by the organization that conducts these measurements.

The requirements for confirmatory measurements are adequately addressed in the Russian regulations and are comparable to those of the US DOE. This does not appear to be a regulatory gap.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	Terms and Definitions, 2.2.6, 5.1.3, 5.1.4, 5.1.5, 5.2, 5.2.1, 6.1.3, 6.1.7, 6.1.8, 6.4.3	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

#### Citation:

#### Terms and Definitions

...

Confirmatory Measurement - Measurements whose results are used to confirm all or some quantitative characteristics and/or attributes of nuclear material, items, or products.

...

2.2.6 Nuclear material accounting shall be based on measurements of quantitative characteristics of the material. It is permissible to:

- Use the results of previous measurements of nuclear material quantitative characteristics if their reliability is confirmed by the appropriate status of the access control devices that have been applied or by the appropriate confirmatory measurements
- The use of experimental studies or of analytical methods (methodologies) based on the results of preliminary measurements

5.1.3 The following procedures shall be carried out when nuclear material is transferred:

- Inspection of the exterior and verification of the number of items (containers), inspection of the TIDs that have been applied to the transportation equipment and/or nuclear material containers (including inspection of the containers and seals, and verification that the location of each container and the identifiers for the containers and seals match the data in the shipping documentation)
- Confirmatory measurements of nuclear material parameters and the gross weight of the nuclear material containers

5.1.4 The types of confirmatory measurements conducted, as well as their scope, are identified in documentation generated by the organization that conducts these measurements and are based on the following information:

- Type of shipment (between MBAs within a single organization, between organizations, export/import)
- Kinds of nuclear material
- Quantity of nuclear material
- Kinds of products
- Types of vessels and TIDs
- Measurement uncertainty

5.1.5 Measurement data obtained during receipt (shipping) inspections shall be documented in writing. Information shall be provided regarding the measurement methods and measuring instruments that were used, the measurement results and measurement uncertainty, the KMP in which the measurements were performed, the types of TIDs and their identifiers, the date these measurements were performed, and the name of the individual who performed the measurements.

5.2 Documenting nuclear material receipts and shipments

5.2.1 Within three (3) days of receiving any nuclear material, the receiving organization shall verify the attribute indicators of the nuclear material vessels and perform confirmatory measurements. Absent any discrepancies, the nuclear material shall be accepted preliminarily and entered into account.

6.1.3 Physical inventory procedures shall be based on the following:

- Preparing the MBA for the physical inventory
- Compiling an IL and PIL and inspecting accounting documents
- Verifying that the IL matches accounting data
- Inspecting the physical condition of the access control devices
- Accounting and confirmatory measurements of the quantity of nuclear material actually present, taking the measurement uncertainty into consideration
- Estimating the amount of holdup and its uncertainty
- Establishing the inventory difference and its uncertainty for each nuclear material.

6.1.7 The extent to which confirmatory measurements are used shall be established depending on the scope and results obtained from inspecting the access control devices, based on the probability of detecting a threshold quantity deficit (excess) for each nuclear material specified in Para. 6.4.3 of these Rules. A statistically significant difference between accounting and confirmatory measurements of the quantitative parameters of nuclear material, items, or products shall be established using a confidence probability of 0.99.

6.1.8 In the event a statistically significant difference between accounting and confirmatory measurements is established, management at the operating organization shall be informed and the cause of the difference determined.

6.4.3 If accounting measurements were not taken for a nuclear material during a reporting period or during an inventory, but the accuracy of previous accounting measurements was preserved by the use of access control equipment, any decision that there are no nuclear material control and accounting anomalies shall be based on the results of random confirmatory measurements, the scope of which shall be determined by a special methodology utilizing two parameters: the threshold quantities of nuclear materials and the probability of detecting threshold quantities of a material deficit (excess).

The threshold quantities for Categories One, Two, and Three are:

3 kg - for plutonium, uranium-233  
8 kg - for uranium-235

The threshold quantity for uranium with enrichment < 20% (Category Four) shall be 70 kg of uranium-235. The probability of detecting threshold quantities of a nuclear material deficit (excess) used when calculating the size of the random sample for confirmatory measurements is presented in Appendix 6.

**Analysis:**

5.1.3-5.2.1: This citation covers the requirements regarding confirmatory measurements in preparation of shipping NM.

6.1.7, 6.1.8: Citation provides the extent for use of confirmatory measurements and reporting requirements when discrepancies are found.

0027	Measurement Systems General Provisions	MC	OST 95 10571-2002	6.2.2.5, 6.2.2.6, 6.2.2.7	7	Minatom/Rosatom	Enacted
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**Citation:**

6.2.2.5 Confirmatory measurements of parameters shall be taken during NM physical inventories and movements.

6.2.2.6 The methods used for confirmatory measurements shall ensure that the presence or absence of a certain quantitative characteristic of the material can be ascertained. As a rule, nondestructive analysis shall be used for confirmatory measurements.

6.2.2.7 The MC&A measurement methodologies are used to:

- Measure nuclear material mass
- Measure other quantitative characteristics of nuclear material (enrichment, isotopic composition, nuclear material content, and others)

A list of the primary destructive and non-destructive assay methods used within the MC&A measurement system is provided in Appendix B.

**Analysis:**

6.2.2.5, 6.2.2.6: This citation provides the general requirements for using confirmatory measurements and the methods used to conduct confirmatory measurements.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	4.5, 4.6, 4.7		Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

4.5 Accounting and confirmatory measurements are conducted in a nuclear material measurement system.

4.6 When nuclear material is transferred between organizations or between MBAs in the same organization, confirmatory measurements of the gross mass of the nuclear material containers shall be carried out, along with a visual inspection and verification of the quantity of accountable items, inspection of the TIDs applied to the transportation equipment and/or the nuclear material containers.

4.7 When physical inventories are conducted, the number of confirmatory measurements shall be determined depending upon the number of times access control devices are employed and the results of their inspection, based upon the probability of detecting a shortage (excess) of the threshold quantity of each nuclear material included in the Rules [2].

**Analysis:**

Documents the need and requirements for confirmatory measurements

**19. Measurements for Physical Inventories**

**Analysis:**

When developing new MC&A regulations, Rosatom uses forthcoming version of OPUK as a guidance document

**Description of Concern:**

The Russian requirements contain many references to the measurement of accountable nuclear material. Key

measurement points must be identified to establish the facility's inventory process. The physical inventory portion of the current version of OPUK requires the development of procedures for accounting and confirmation measurements as a part of the process. The scope of the confirmation measurements is based on the extent to which material control measures are used during the inventory period. The OPUK revision contains the same requirements.

Adequate regulatory requirements exist for the completion of physical inventory measurements.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	Terms and Definitions, 2.2.8, 3.3, 3.3.1, 3.3.2, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 5.1.3, 5.1.4, 5.1.5, 5.2.1, 5.2.2, 5.2.3, 5.3, 6.1.2, 6.1.3, 6.1.4, 6.1.5, 6.1.6, 6.1.7, 6.1.8	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

Nuclear Material Measurement System - the aggregate of organizational measures and nuclear material measuring instruments that make it possible to obtain data based on measurements performed regarding: the quantity and the element and isotopic content of the nuclear material located and produced in an MBA or of the material that is received in/shipped from an MBA; the amount of nuclear material actually present in an MBA when conducting a physical inventory; the uncertainty of each measured value for the nuclear material in an MBA.

2.2.8 Physical inventories shall be conducted in order to establish the amount of nuclear material actually present in an MBA. Accounting data, attribute indicators, and measurements of the quantitative characteristics of the nuclear material are performed as part of the physical inventory process. Upon completion of a physical inventory, the nuclear material balance shall be established for each nuclear material; in addition, the inventory difference and its uncertainty shall be determined for each nuclear material.

**3.3 Material balance areas and key measurement points**

3.3.1 The following requirements must be taken into consideration when establishing MBAs:

- The mass of the nuclear material received at or shipped from an MBA shall be determined using measured characteristics of the nuclear material (except for instances where the use of analytical methods is permitted), a complete recount and identification of items and containers holding nuclear material, data contained in shipping documentation, or the passport data for the material
- Administrative units within the organization such as plant laboratories, storage and cargo transfer areas, as well as nuclear material areas requiring special forms of information protection, shall be set up as individual MBAs.

3.3.2 KMPs shall be established within MBAs. Measurement methodologies and measuring instruments shall be used to measure the content, mass, isotopic composition, and other quantitative characteristics or to verify the attribute indicators of the nuclear material.

KMP shall be selected in an MBA in a way that ensures measurement of material streams and the quantity of nuclear material actually present in the MBA.

**4. Nuclear Material Measurements**

4.1 A program shall be developed for each MBA that includes a list of KMPs, measurement methodologies, equipment, sampling procedures, information regarding the frequency with which measurements are taken, the measurement precision that is required, and the forms and deadlines for submitting measurement reports. This program shall be approved by the manager of the organization in which the MBA is a part. The program shall be reviewed at least once every five years.

4.2 Measurement methodologies shall be incorporated into individual site policy documents that shall be compiled in accordance with the requirements set forth in metrology standards.

4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the

requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible.

4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.

4.5 The list of measuring instruments used in the nuclear material measurement system shall contain the instrument name, type, and manufacturer's serial number.

4.6 Measuring instruments shall be inspected as specified in current regulations.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

5.1.3 The following procedures shall be carried out when nuclear material is transferred:

- Inspection of the exterior and verification of the number of items (containers), in-section of the TIDs that have been applied to the transportation equipment and/or nuclear material containers (including inspection of the containers and seals, and verification that the location of each container and the identifiers for the containers and seals match the data in the shipping documentation)

- Confirmatory measurements of nuclear material parameters and the gross weight of the nuclear material containers

5.1.4 The types of confirmatory measurements conducted, as well as their scope, are identified in documentation generated by the organization that conducts these measurements and are based on the following information:

- Type of shipment (between MBAs within a single organization, between organizations, export/import)
- Kinds of nuclear material
- Quantity of nuclear material
- Kinds of products
- Types of vessels and TIDs
- Measurement uncertainty

5.1.5 Measurement data obtained during receipt (shipping) inspections shall be documented in writing. Information shall be provided regarding the measurement methods and measuring instruments that were used, the measurement results and measurement uncertainty, the KMP in which the measurements were performed, the types of TIDs and their identifiers, the date these measurements were performed, and the name of the individual who performed the measurements.

## 5.2 Documenting nuclear material receipts and shipments

5.2.1 Within three (3) days of receiving any nuclear material, the receiving organization shall verify the attribute indicators of the nuclear material vessels and perform confirmatory measurements. Absent any discrepancies, the nuclear material shall be accepted preliminarily and entered into account.

Final receipt of the nuclear material and entering it into account shall occur no later than ten (10) days from receipt of the nuclear material and their passports (specifications, certificates).

5.2.2 When nuclear material is shipped, the shipping organization removes the material from account after it has received a nuclear material certificate of receipt duly filled out by the receiving organization in accordance with established procedures or a bill of lading with the notarized signature of an authorized representative of the receiving organization.

5.2.3 The receiving organization enters data regarding the nuclear material that has been received into its accounting documents. Data regarding the nuclear material that has been shipped is entered by the shipping organization into its accounting documents.

## 5.3 Assessing discrepancies between shipper and receiver data

Discrepancies between shipper and receiver data regarding the mass of nuclear material that has been transferred are defined as the difference between the mass values shown by the shipping organization (passport data) and the mass values obtained by the receiving organization as the result of measurements. If the results agree (the discrepancy between shipper and receiver data lies within the interval representing a 0.99 confidence probability, taking into consideration the uncertainty of the measurements conducted by the shipper and receiver), the receiving organization shall use the shipping organization data when entering the nuclear material into account.

## 6. Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference

6.1.2 Physical inventory procedures shall be employed in accordance with current operating organization methods and instructions.

6.1.3 Physical inventory procedures shall be based on the following:

- Preparing the MBA for the physical inventory
- Compiling an IL and PIL and inspecting accounting documents
- Verifying that the IL matches accounting data
- Inspecting the physical condition of the access control devices
- Accounting and confirmatory measurements of the quantity of nuclear material actually present, taking the

measurement uncertainty into consideration

- Estimating the amount of holdup and its uncertainty
- Establishing the inventory difference and its uncertainty for each nuclear material

6.1.4 The quantity of nuclear material present in each MBA shall be determined by measuring the quantity and composition of the nuclear material at KMPS; it should be monitored by conducting operational (near-real time) accounting and audits to verify the presence of nuclear material items based on attribute indicators, regular reconciliation of accounting and reporting forms; and it should be verified by conducting physical inventories. Operational accounting shall include procedures that are carried out during process operations in support of nuclear material control and accounting activities. Physical inventories shall culminate in a balance closeout for each nuclear material in the MBA over the reporting period, determining the inventory difference and its uncertainty, followed by a statistical analysis of the ID significance as specified in the requirements set forth in Para. 6.4.1 and 6.4.2 of these Rules. ...

6.1.5 The mass of each nuclear material shall be determined. The mass and the measurement uncertainty for a 0.95 confidence probability shall be documented.

6.1.6 Values for nuclear material mass that were determined at an earlier date may be used when performing accounting procedures (conducting physical inventories, transferring nuclear materials, etc.) only in those instances where the reliability of these data can be confirmed from the time they were established to the time they are used by verifying the appropriate physical condition of the access control devices employed and/or confirmed during the implementation of accounting procedures through measurement of the quantitative parameters of the nuclear material and/or the attribute indicators of the material.

6.1.7 The extent to which confirmatory measurements are used shall be established depending on the scope and results obtained from inspecting the access control devices, based on the probability of detecting a threshold quantity deficit (excess) for each nuclear material specified in Para. 6.4.3 of these Rules. A statistically significant difference between accounting and confirmatory measurements of the quantitative parameters of nuclear material, items, or products shall be established using a confidence probability of 0.99.

6.1.8 In the event a statistically significant difference between accounting and confirmatory measurements is established, management at the operating organization shall be informed and the cause of the difference determined.

				4, 8.1, .3,			
	Physical Inventory of		OST 95	8.4, 8.5,			
0010	Nuclear Material	MC	10560-2001	8.6, 8.7,	7	Minatom/Rosatom	Enacted
	Procedures		(Minatom	8.8, 8.9,			
			Order # 80)	8.10, 8.11,			
				8.12, 9.3			

#### Citation:

#### 4 Types of Nuclear Material Physical Inventories

4.1 Physical inventories may be scheduled (with a defined frequency) or unscheduled:

- Scheduled inventories are performed periodically, according to the frequency established in 6.2 and 6.3
- Unscheduled inventories are conducted under the circumstances specified in 6.5

During scheduled physical inventories the actual quantity of all kinds of nuclear material located in the MBA is determined (including nuclear material acquired for temporary use).

During unscheduled physical inventories, the actual quantity of specific kinds of nuclear material or the actual quantity of nuclear material in part of an MBA (for some or all types of nuclear material) may be determined.

4.2 In addition to physical inventories in MBAs, inspections of accounting data and audit inspections of the presence of nuclear material and objects containing nuclear material may be conducted during the reporting period. The schedule, scope, and procedures for conducting nuclear material audit inspections are defined by the enterprise itself and should be reflected in the appropriate enterprise regulatory documents.

#### 8 Obtaining Information during Physical Inventories

8.1 The information obtained as a result of the physical inventory must be based on the results of measurements of the composition and quantity of nuclear material, with the exception of cases where the use of calculation methods (methodologies) to determine their parameters is permitted.

8.3 During nuclear material physical inventories, the following characteristics are measured:

- a) Inspection of the external accounting characteristics of accountable items
  - 1) The presence of accountable items with their appropriate identifiers (serial number, barcode, schematic notation, etc.)
  - 2) Location
  - 3) Package integrity
  - 4) TID integrity
- b) Verification that accountable items are present and correspond to accounting data through measurement using non-destructive analysis methods
- c) Verification of the presence of bulk-form nuclear material using methodologies currently in force at the

enterprise

8.4 Measurements conducted under 8.3(a) are generally performed for all accountable items in an MBA. The scope of confirmatory measurements under 8.3(b) depends on technical and technological capabilities; these measurements may also be taken using random statistical sampling.

The actual scope of measurements conducted under 8.3(a) and (b) is established in enterprise regulations.

8.5 During sampling measurements under 8.3(b), the sample may be taken randomly or using specific attribute indicators; in the case of random sampling, the accountable items selected for measurement are determined using a special methodology (see Appendix A).

The calculation methodology and results are documented in accordance with GOST R 1.5.

When sampling accountable items by attribute indicators, selection is performed based on the length of time the item has been stored, the urgency of inspection for security reasons, etc.

8.6 Random sampling methods are used for accountable items of the same type. In this case, the size of the random sample should ensure the specified confidence probability for the detection of an MC&A anomaly.

8.7 The size of a random sample taken from a group of accountable items necessary to ensure a specified confidence probability of detection that does not exceed the number of defective accountable items in the system is determined using a methodology adopted for the specific MBA.

"Defective accountable items" here means accountable items with characteristics that do not correspond to accounting data.

8.8 Measurements taken under 8.3(a) are accepted as confirmation of attribute indicators, provided that:

- Accountable items containing nuclear material are in the locations indicated in accounting documentation
- There is no exterior damage to accountable items
- TIDs have not been compromised
- The information contained in barcodes coincides with the corresponding information in accounting documentation

8.9 If during confirmatory measurements taken under 8.3(b) and (c) the difference in the values of the measured quantitative characteristics obtained from confirmatory and accounting measurements does not exceed three standard uncertainties, then the passport value of the characteristic is accepted. Otherwise, the discrepancy is analyzed and investigated, and accounting measurements are taken for the nuclear material.

8.10 The inventory difference for the reporting period is defined for each type of nuclear material using the formula:

$$ID = KK - DK = KK - (NK + UV - UM) \text{ (Formula 1)}$$

where:

KK is the actual quantity of nuclear material present in the MBA, determined based on the results of the physical inventory

DK is the book inventory of nuclear material in the MBA when the inventory begins

NK is the quantity of nuclear material present in the MBA, determined and documented at the beginning of the current reporting period

UV is the determined and documented increase in the quantity of the given nuclear material in the MBA for the current reporting period, resulting from all deliveries and production

UM is the determined and documented decrease in the quantity of the given nuclear material in the MBA for the current reporting period, resulting from all shipments out of the MBA, nuclear conversion, and losses

The value for UM includes production losses, which are determined on the basis of measurements and/or calculations using current methodologies.

The value for the inventory difference is presented in whatever unit of measurement is accepted for the given nuclear material.

8.11 The combined standard uncertainty of the inventory difference is found by taking the standard uncertainty of all values included in the ID expression, in accordance with enterprise regulations.

It is permitted to use a combined standard uncertainty based on ID values from previous inventories, provided that the process operations have not changed and that the ID uncertainty is less than the combined standard uncertainty calculated using the standard uncertainty of measured values.

8.12 If several groups of accountable items containing nuclear material in the MBA have not undergone any movement or conversion during the reporting period, and the reliability of the results of previous accounting measurements was ensured through the use of access control equipment, then the contribution of those accountable items to the combined standard uncertainty of the inventory difference is equal to zero.

9.3 If, during the reporting period preceding the current inventory, accounting measurements were taken for a certain nuclear material during its production, acquisition, processing, or shipping, or if measurements were taken during the inventory, then the criterion for detecting an anomaly in the use of that nuclear material is whether the absolute value of the inventory difference exceeds any of the following values, with a confidence probability of 0.99:

- The expanded uncertainty of the inventory difference
- 0.2 % of the total registered quantity of the nuclear material and all quantity values obtained during the reporting period (for industrial nuclear facilities)
- 3 % of the same value (for experimental industrial nuclear facilities and nuclear research facilities)
- The allowable limits for nuclear material loss as specified in enterprise regulations

**Analysis:**

Part 4: of this citation provide the basic description of the types of physical inventories.

8.1: This part of the citation provides the methodology for performing a physical inventory.

8.3-8.12: This part of the citation provides the methodology for performing a physical inventory.

0723	State System for Common Measurement Standards Nuclear Material Control And Accounting Measurement System General Provisions	MC	GOST R 8 703-2010	Entire Document	Federal Agency on Technical Regulation and Metrology	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

The whole document because it refers to metrology of the equipment throughout the standard.

**20. Performance Testing Program****Analysis:**

There are no documents available to the U.S. that require the establishment of a comprehensive performance testing program for either MC&A or PP.

**Description of Concern:**

U.S. and Rosatom are still struggling to come to a mutual definition of "performance testing". Rosatom insists that they have performance testing requirements for PP in sensitive documents that match the U.S. description. Until a common definition is agreed to the U.S. will not be able to propose a PP regulation on "Performance Testing". Performance testing of MC&A as required in the U.S. is not specified in the RF regulations. RDP will propose developing a regulation on an MC&A performance testing program.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	3.4.2.2, 3.4.2.3, 4.3, 4.4, 4.6, 4.7, 8.2, 8.3, 10	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

3.4.2.2 The operability and physical condition of TIDs shall be inspected on a regular basis at a frequency exceeding the frequency of physical inventories. The results of such inspections shall be documented in writing.

3.4.2.3 Random inspections of TIDs in an MBA must be performed in the periods between inventories. The requirement of establishing with a confidence level of 0.95 that at least 95% of the TIDs are in an appropriate condition shall be used when determining the size of the random sample.

4.3 Measurement methodologies shall successfully pass metrology certification for compliance with the requirements set forth in the area of standardization. Precision indices for the measurement methodologies in the nuclear material measurement system shall approach recommended international target values as closely as possible

4.4 Reference materials used to calibrate measuring instruments and to verify that measurement results are correct shall successfully pass metrology certification for compliance with the requirements set forth in metrology standards and shall bear an attestation seal that indicates the product name, type, attested value, and its uncertainty.

4.6 Measuring instruments shall be inspected as specified in current regulations.

4.7 Every organization shall develop and implement a measurement quality control program within its nuclear material measurement system.

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- Procedures for monitoring the status of nuclear material control and accounting activities within MBAs

8.3 The reliability level for information submitted to the nuclear material control and accounting system in MBAs

regarding item identifiers, TID identifiers, and the physical location of items shall be not less than 99%.

### **10 Requirements for Employees (Personnel) Who Conduct Nuclear Material Control and Accounting Activities**

10.1 Employees (personnel) who conduct nuclear material control and accounting activities shall complete training on how to perform these procedures in specialized courses organized within the framework of the nuclear material control and accounting system. In addition, they shall undergo regular testing in accordance with procedures established by the organization.

10.2 The frequency of testing personnel on their knowledge of nuclear material control and accounting procedures for various categories of employees (personnel) shall be established by the manager of the organization. Testing shall be conducted no less than once every three (3) years.

#### **Analysis:**

These sections describe the need to develop procedures for a performance assessment program for the status of the MC&A program and the skill level of MC&A personnel. Performance criteria for TIDs and measurement methods are also identified.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.11	7	Minatom/Rosatom	Enacted
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#### **Citation:**

4.11 Chapter on "Monitoring NM Accounting Status"

4.11.1 This chapter shall specify that NM status, presence, and transfer shall be monitored by administrative units authorized to do so (the methodology verification group, nuclear safety group, chief engineer's office, security service, etc., in accordance with the regulations of [each] administrative unit) on the organizational structure level specified in Section 4.3.7.

4.11.2 The following basic principles and procedures for monitoring MC&A status at the enterprise shall be established:

- NM control shall be an integral part of all NM activities;
- NM control shall be carried out on a regular basis;
- Nuclear material shall be controlled from the time it is produced, throughout the entire life (production) cycle until it is used for its intended purpose, ending when it is transferred to the appropriate radioactive substance (radwaste) nuclear material storage points;
- Compliance with rules and regulations in the enterprise MC&A system shall be monitored;

4.11.3 The following shall be established:

- Administrative units and individuals that shall perform monitoring functions at all levels of the enterprise MC&A system;
- Requirements for the position duties and responsibilities of these individuals.
- The necessity and regulation of real time NM transfer monitoring by the appropriate enterprise administrative units;
- The frequency of verification depending on NM category in the MBA;
- The frequency of administrative verification;
- The frequency of investigating committee verification of MC&A status;
- Procedures and measures to be used during control of nuclear material accounting, storage, and use according to established rules and standards.

4.11.4 It shall be specified that MC&A status in administrative units shall be monitored using approved instructions, methodologies, and regulations that include rules on the following:

- Verifying compliance with MC&A requirements in the administrative unit and in the MBA;
- Verifying the sequence in which nuclear material operations and technical procedures are to be performed and accounting results recorded;
- Inspecting accounting record and report maintenance;
- Reconciling (random reconciling) of data in accounting and reporting forms;
- Verifying the procedure for organizing and conducting a physical inventory and an NM balance close out;
- Verifying the procedure for using access control equipment;
- Verifying the presence of NM on site; random reconciling of NM accounting and actual inventory data;
- Verifying the presence and quality of measuring procedures and devices to be used in MC&A, including by having enterprise personnel take additional measurements of NM parameters at the request of the inspector;
- Verifying procedures and (or) methodologies for estimating NM losses;
- Monitoring access to NM, information, and equipment;
- Monitoring investigations into the causes and circumstances for MC&A anomalies and taking the appropriate measures;

4.11.5 This chapter shall specify that the procedures for monitoring information security are defined in a separate administrative unit regulation. A reference to that document shall be provided.

#### **Analysis:**

This document establishes comprehensive requirements for internal monitoring of the status of all aspects of MC&A.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.3.8.2	7	Minatom/Rosatom	Enacted
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**Citation:**

3.3.8.2 In order to determine the effectiveness of the PP system and resolve interface issues drills shall be conducted regularly as well as analyses of the effectiveness of the PP system using analytical and other methods. Results of the of effectiveness analyses are to be used for improving the PP system.

**Analysis:**

The citation directs sites to use drills and analysis to evaluate effectiveness of the PPS and use the results of those activities to improve the PPS.

0034	Provision on Agency Monitoring of PP System Status at Nuclear Hazardous Facilities	PP	Minatom Order # 309	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

This document provides requirements for agency-level activities, but NOT for site-level activities.

**Analysis:**

This document provides a hierarchy of inspection activities. This document provides for agency-level activities. Included here to show the redundancy/overlap of inspection activities.

0248	Tamper Indicating Devices. Basic Technical Provisions	MC	OST 95 10557-2000	5.3, 5.7, 8.6, 8.8	7	Minatom/Rosatom	Enacted
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**Citation:**

5.3 The enterprise TID program must include the following sections:

-- The methods for and frequency of inspecting installed TIDs

5.7 To help ensure its effectiveness, the enterprise TID program shall include requirements for organizing periodic and unscheduled inspections arranged by the enterprise administration. The frequency of scheduled inspections shall be determined by the enterprise administration depending on the category of the protected objects. For containers of category-1 and -2 nuclear materials located in internal and vital secured areas scheduled inspections are conducted once a year. All other objects should be inspected once every two years.

8.6 Requirements for Methods and Frequency of TID Checks

8.6.1 TID identification is mandatory in the following cases:

- Immediately following TID installation
- When reinstalling a TID
- When removing a TID
- Upon arrival of an (accountable) item at an MBA
- When an accountable item is sent out of an MBA
- When taking physical inventories of nuclear materials
- When taking confirmatory measurements
- When an (accountable) item is dispatched from an MBA for use and returned to the storage area
- During an inspection by a higher level organizations and during internal administrative audits.

8.6.2 TID related anomalies include:

- TID disappearance
- TID failure
- TID damage
- Incorrect TID installation
- TIDs that fail proper identification
- Mismatch of the TID type
- Mismatch of TID manufacturer's technical specifications.

8.6.3 TID identification shall be performed in conjunction with the inspection of a TID protected object.

#### 8.8 Requirements for Establishing Administrative Monitoring of TID Program Performance

8.8.1 The TID program performance review in the enterprise subunits shall be carried out while conducting the periodic spot checks organized by the enterprise administration.

8.8.2 A committee of enterprise staff shall perform spot checks at the direction of enterprise management.

8.8.3 During the spot check compliance with the design specifications and regulatory requirements for TID use shall be evaluated.

8.8.4 The findings shall be documented with notations regarding discovered deficiencies and corrective actions.

8.8.5 By decision of the committee, a check may be performed:

- For all TIDs installed in a given control area and/or MBA
- Using statistical sampling of installed TIDs.

TIDs installed on containers containing NM must be checked without exception.

8.8.6 Spot checks and TID program performance evaluations may be performed in combination with nuclear material physical inventory.

#### Analysis:

These sections define the requirements for an extensive monitoring program for TIDs that will supply the information to determine if the error rate in the TID program is below the maximum acceptable level defined in OPUK.

0493	Guideline Process for Agency Inspections of PP Systems at Nuclear Sites	PP	(Not obtained)	Section 3 of Appendix 4	7	Minatom/Rosatom	Enacted
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#### Citation:

This section provides list of activities to be conducted during inspections, including review of documentation, random testing to ID dead zones in use of detection equipment (3.3.5), response force reaction (3.3.10), etc. (Note: DCN 494 refers to the appendices of this document, making them applicable to site-level activities.)

#### Analysis:

This appendix provides the list of activities to be conducted during the inspections, including response force reaction times and use of random testing to identify dead zones in use of detection equipment.

The entire document applies to agency inspections.

0494	Guideline Process for Site Inspections of PP Systems at Nuclear Sites	PP	(Not obtained)	Section 1, 2, 3, 4, 5	7	Minatom/Rosatom	Enacted
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#### Citation:

##### 1 General Provisions

1.1 These "Guidelines for Organizing and Conducting Site Inspections of Physical Protection Systems at Nuclear Sites under the Jurisdiction of the Federal Atomic Energy Agency" (henceforth - Guidelines) define the standard program for site inspections of physical protection systems for nuclear material, nuclear facilities, and nuclear material storage points at nuclear sites under the jurisdiction of the Federal Atomic Energy Agency and at the nuclear sites of enterprises having agreements with the Federal Atomic Energy Agency for physical protection. The Guidelines also establish the procedures for planning, preparing, and conducting site inspections, as well as the methods and types of activities involved.

...

##### 2 Planning Site Inspections

Describes the high-level planning for all types of site inspections and outlines the major elements:

- 2.1 Who is responsible for planning site inspections, and the basis for inspections
- 2.2 Describes the types of inspections (special, daily(regular), annual)
- 2.3 Describes who approves and is notified of inspection plans
- 2.4 Notification of departments/units to be inspected

##### 3 Preparing to Conduct Site Inspections

This section describes the planning process for site level scheduled and unscheduled site-level inspections. It includes establishing authority, planning, scheduling, team composition and team roles and responsibilities. The inspection plan will include:

- Goals and tasks
- Inspection timeframes
- A summarized list of activities, indicating deadlines and the individuals responsible (as well as issues and objects

to be inspected)

- Inspection types and methods, necessary devices, instruments and fixtures
- The assignment of responsibilities among team members
- The persons responsible for preparing the various sections in the findings

The plan will also specify other issues.

**4 Standard Site Inspection Program**

Section 4 establishes the requirements for a comprehensive inspection. Sites will follow the specific requirements established for conducting a comprehensive inspection through agency monitoring; however, at the discretion of the site director this comprehensive inspection may be modified in scope and depth. This section identifies six areas to be evaluated during a comprehensive inspection: organization of PP activities; site PP documentation; PP personnel recruitment and training; administrative and technical measures; inspecting PP system components; and transfer of nuclear materials. The section provides detailed information on how to inspect these areas.

**5 The Organization of Site Inspections**

5.1 The various types of site inspection may involve the use of the same methods and types of activity used for agency inspections. However, there may be differences in the use of hardware and software due, on the one hand, to the level of detail involved in site inspections, and on the other hand, to the specific features of the physical protection and security system equipment used.

...

5.2 The organization of comprehensive and special scheduled inspections performed by site teams

...

5.3 Organizing individual daily and audit inspections

...

**Analysis:**

The entire document describes the process for site inspections including the methods used such as performance-type tests.

	Standard (Model) Programs and Methodologies for Testing Physical Protection Equipment	PP	(Not obtained)	1.2, 4.5, 4.5.2, 4.5.4	7	Minatom/Rosatom	Enacted
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**Citation:**

1.2 The Standard (Model) Programs and Methodologies establish the format (structure) for testing programs and methodologies for all types of physical protection equipment, including its functional systems (alarm system, alarm calling system, access control and monitoring system, visual and electronic surveillance and situation assessment system, etc.)

4.5 Organization of Operational Testing for the Physical Protection System Equipment

4.5.2 The tests will be conducted in the following situations while the physical protection system equipment is operating:

- During routine activities
- After maintenance and repairs
- During extension of service life

4.5.4 After maintenance or repair activities (replacement, adjustment, calibration, or any other changes due to repair) have been conducted, the physical protection equipment is tested to verify that the technical parameters of the components that were repaired comply with the requirements of the operating documentation.

**Analysis:**

All citations in this document support the conclusion that testing in the Russian Federation is of the operational and functional testing variety, but there is nothing to suggest that performance testing as understood by the U.S. is conducted.

0830	Methodology and Criteria for Assessing the Status of the Physical Protection System	PP		Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

Document provides criteria and methodology for evaluating the operational status of the Physical Protection System, but does not fully address performance testing activities as defined by the U.S.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	21 g) j)	4	RF Government	Enacted
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**Citation:**

21. To perform physical protection tasks, the management staff at the nuclear site (conjointly with the leadership of the appropriate military units and forces at sites guarded by the Russian Federation Ministry of Internal Affairs internal security troops or by site security forces affiliated with Russian Federation law enforcement agencies):  
 g) Assesses the effectiveness of the physical protection system during its development (upgrade) and as necessary  
 j) Conducts site-level monitoring of compliance with physical protection requirements

**Analysis:**

This document provides high level guidance for the need to assess effectiveness of PP Systems and to conduct site-level monitoring of compliance with requirements.

**21. Agency Level (Rosatom Corporation) Oversight****Analysis:**

Currently, there is a requirement in Decree 352 for the approval by Rosatom of the facility's MBA structure. Regarding physical protection, paragraph 41 in Decree 456 addresses Agency approval of the site-level decisions related to PPS hardware and equipment. There are limited requirements for Rosatom approval of site-level procedures.

**Description of Concern:**

There are limited formal processes to obtain Rosatom concurrence or approval of MC&A, PP, or other programs directly responsible for the protection of nuclear materials. There are several protection topics left to the discretion of the facility manager.

The absence of agency-level approval of site-level procedures potentially allows for implementation of inadequate procedures that will not be identified for significant periods between formal inspections.

The intent of this element is to introduce "checks and balances" into the Russian regulatory system. An approval of MC&A and PP procedures above the facility manager level would provide some oversight to the decisions being made at the site level.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	9	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:****9 Ministry (Agency) Monitoring of Governmental Control and Accounting of Nuclear Material**

9.1 Procedures for implementing ministry (agency) monitoring of governmental control and accounting of nuclear material; for communications between the representatives of agencies and organizations, on the one hand, and [site] officials and employees (personnel); and procedures for conducting audit inspections shall be established in the ministry (agency) regulation regarding nuclear material control and accounting. A report shall be generated after each inspection.

9.2 The frequency of ministry (agency) level inspections of organizations shall be no less than once every five (5) years.

9.3 The agency that manages the use of atomic energy shall conduct unscheduled inspections, as required, of the status of nuclear material control and accounting activities within organizations under its jurisdiction. The manager of the organization [to be inspected] will be informed no later than five (5) days prior to the start of the inspection.

9.4 Agency monitoring activities shall include the following:

- Monitoring how accounting and reporting documents are maintained
- Verifying compliance with nuclear material control and accounting requirements in MBAs and organizations
- Reconciling the data in accounting and reporting documents
- Inspecting the procedures used to conduct physical inventories and close out the nuclear material balance
- Inspecting procedures for using access control equipment
- Verifying the actual presence of nuclear material at designated locations

- Verifying the availability and the quality of the measurement methodologies and measuring instruments have been adopted for nuclear material control and accounting purposes, including by having employees (personnel) at the organization carry out additional measurements of nuclear material parameters
- Inspecting procedures for estimating nuclear material losses
- Monitoring how organizations investigate the causes and circumstances surrounding nuclear material control and accounting anomalies and how they take appropriate [corrective] measures

**Analysis:**

OPUK, Section 9, provides the requirements for Rosatom oversight through the corporation level oversight program. The program addresses all aspects of the MC&A program including documentation, compliance with MC&A requirements, physical inventories, etc.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	4 e), 11 m) n), 16 last sentence	4	RF Government	Enacted
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**Citation:**

4 The State System for Nuclear Material Accounting and Control includes the following:

...

e) Monitoring and oversight of the status of nuclear material control and accounting

11. The Rosatom Government Atomic Energy Corporation performs the following within the scope of its authority:

...

m) Monitoring the status and operation of the State System for Nuclear Material Accounting and Control in the Russian Federation irrespective of the form of ownership of the nuclear material

n) Monitoring the handling of nuclear material

...

16. ...

The organizations establish material balance areas upon approval with the Rosatom Government Atomic Energy Corporation.

**Analysis:**

4 e), 11 m) n) - Citations provide high level requirements for Rosatom to monitor and provide oversight of nuclear accounting and control at NM facilities.

16. last sentence - Citation requires Rosatom approval for MBA structure

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	41	4	RF Government	Enacted
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**Citation:**

41. The requirements for providing physical protection system equipment for the perimeter and access control points (posts) of a secure area and for categorized buildings, structures, and rooms are established in agency regulations for each specific site, taking into account the list of threats, the vulnerability analysis of the nuclear site, and the physical protection system effectiveness assessment, as well as the category of the nuclear site and the features of the secure areas established there.

**Analysis:**

Rosatom indicated that this citation, which requires agency regulations that address hardware and physical configuration at each specific site, implicitly requires that documents prepared at the site level that address these issues must be approved by Rosatom management. Rosatom further stated that this is, in practice, an approval process for these site-level documents.

**22. MC&A anomalies. Investigation procedure****Analysis:**

The recent revision of Decree 352 contains requirements to immediately report MC&A anomalies to Rosatom, and Minatom Order #333r specifies the need for sites/facilities to establish the process for the evaluation of anomalous

conditions. The current OPUK only requires Organizations to establish procedures for investigating nuclear material control and accounting anomalies and provides only a description of what constitutes an anomaly. However, the new OPUK will contain the requirements for reporting anomalies to Rosatom, development of corrective action plans, and tracking those corrective actions to completion. With the issuance of the new OPUK, this element will be adequately addressed.

There is classified Rosatom's regulation defining requirements to special reporting in case of anomalies.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	Terms and Definitions, 2.2.9, 5.4.1, 5.4.2, 6.3.4, 6.4.1, 6.4.2, 6.4.3, 8.2 bullet 8	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

#### Citation:

##### Terms and Definitions

Nuclear Material Control and Accounting Anomaly [аномалия в учете и контроле ядерных материалов]—nuclear material deficit (excess); mistakes in accounting or reporting documents; damage or failure of the nuclear material access control equipment; violation of procedures related to the production, use, or transfer of nuclear materials.

## 2 General Provisions

### 2.2 Principles of governmental control and accounting of nuclear material

2.2.9 Conclusions regarding [the existence of] a nuclear material deficit or excess or, conversely, the absence of any nuclear material control and accounting anomalies shall be based on the determination of the quantity of nuclear material actually present, as well as by comparing the inventory difference value obtained with its permissible value for each MBA.

## 5 Procedures for Transferring Nuclear Material

### 5.4 Actions taken when a nuclear material control and accounting anomaly is discovered

5.4.1 When a statistically significant discrepancy has been discovered, based on a 0.99 confidence probability for data from both the shipping organization and the receiving organization, steps shall be taken to determine the cause of the discrepancy.

5.4.2 If the statistically significant discrepancy between data from the shipping organization and the receiving organization is confirmed, the receiving organization must compile a special report and send that report to the ministry (agency) level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, the federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and the agency that regulates the safe use of nuclear energy.

## 6.0 Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference

### 6.3 Organizing physical inventories

6.3.4 If the inventory taking establishes any anomalies within the nuclear material control and accounting system, the individual in charge of conducting the inventory in the affected MBA shall immediately apprise the inventory team lead of this fact. A special investigation shall be carried out to determine the causes of the anomalies; the quantity of nuclear material actually present in the MBA shall be determined and documented.

### 6.4 Criteria for Detecting Nuclear Material Control and Accounting Anomalies

6.4.1 The criterion for detecting anomalies within the nuclear material control and accounting system is a deficit (excess) of items.

6.4.2 If accounting measurements of a nuclear material were taken upon its production, receipt, processing, or shipment during a reporting period, or if such measurements were taken as part of a physical inventory, the criterion for detecting control and accounting anomalies for this material shall be the fact that the absolute value of the inventory difference exceeds three standard deviations of its uncertainty, or any of the following values (with a 0.95 confidence probability):

- 2 % of the book inventory of the nuclear material plus all increases in its quantity over the reporting period – for industrial nuclear facilities
- 3 % of this figure – for experimental and research nuclear facilities
- 3 kg – for plutonium and uranium-233 for Category One and Category Two MBAs
- 8 kg – for uranium-235 for Category One, Two, or Three MBAs
- 70 kg for uranium-235 – for uranium with enrichment < 20%

6.4.3 If accounting measurements were not taken for a nuclear material during a reporting period or during an inventory, but the accuracy of previous accounting measurements was preserved by the use of access control equipment, any decision that there are no nuclear material control and accounting anomalies shall be based on the

results of random confirmatory measurements, the scope of which shall be determined by a special methodology utilizing two parameters: the threshold quantities of nuclear materials and the probability of detecting threshold quantities of a material deficit (excess).

The threshold quantities for Categories One, Two, and Three are:

3 kg – for plutonium, uranium-233

8 kg – for uranium-235

The threshold quantity for uranium with enrichment < 20% (Category Four) shall be 70 kg of uranium-235.

The probability of detecting threshold quantities of a nuclear material deficit (excess) used when calculating the size of the random sample for confirmatory measurements is presented in Appendix 6."

#### 8 Nuclear Material Control and Accounting in Organizations

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

...

– Procedures for investigating nuclear material control and accounting anomalies

...

#### Analysis:

The OPUK definition of anomaly provides a specific list of four occurrences that are considered anomalies. In fact, any unusual occurrence should be considered an anomaly and warrant investigation. There is no established system of reporting and investigating anomalies, with the exception of those associated with shipper/receiver differences. For evaluation of inventory differences, the anomaly criterion may be strengthened by a more stringent requirement in the upcoming OPUK revision.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.3.12, 4.11.4 bullet 11	7	Minatom/Rosatom	Enacted
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#### Citation:

#### 4 Chapter Contents

#### 4.3 Chapter on "Organization of NM Control And Accounting"

4.3.12 This chapter shall specify that instructions shall be developed at the enterprise in case anomalies occur in NM control and accounting; these instructions shall contain a list of possible anomalous situations, procedures for investigating and resolving anomalous situations, procedures for notifying and submitting reports to administrative agencies on the use of atomic energy and to government regulatory agencies for the safe use of atomic energy.

#### 4.11 Chapter on "Monitoring NM Accounting Status"

4.11.4 It shall be specified that MC&A status in administrative units shall be monitored using approved instructions, methodologies, and regulations that include rules on the following:

...

- Monitoring investigations into the causes and circumstances for MC&A anomalies and taking the appropriate measures;

#### Analysis:

This document contains a requirement that procedures for reporting and investigating anomalies be developed.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree N° 352	21	4	RF Government	Enacted
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#### Citation:

#### V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material

21. Organizations handling nuclear material shall immediately report MC&A anomalies detected to the Rosatom Government Atomic Energy Corporation, to the federal executive branch agencies managing the use of atomic energy to which the organization is subordinate, and to regional agencies that regulate safety. The procedures for submitting information regarding the anomaly and the measures to identify its cause of the anomaly shall be established by the federal rules and regulations for governmental nuclear material control and accounting.

#### Analysis:

Anomaly reporting requirements in this document are more stringent than those in OPUK because they dictate that all anomalies be reported, not just those associated with shipper/receiver differences.

#### 23. Procedure for SNM balance closing

**Analysis:**

The regulations require site-level physical inventory procedures which include SNM balance closing. The regulations also have numerous specific requirements for the SNM balance closing. The model provision and standard require the analysis of physical inventory results

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	2.2.8, 2.2.9, 6.1.1 bullet 3, 6.1.3 bullet 2 and 3, 6.1.4, 6.1.5, 6.3.2, 6.3.3, 7.1.1, 7.2.3, 7.2.7-7.2.11, 7.2.14, 8.2 bullet 11	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:****2 General Provisions****2.2 Principles of governmental control and accounting of nuclear material**

2.2.8 Physical inventories shall be conducted in order to establish the amount of nuclear material actually present in an MBA. Accounting data, attribute indicators, and measurements of the quantitative characteristics of the nuclear material are performed as part of the physical inventory process. Upon completion of a physical inventory, the nuclear material balance shall be established for each nuclear material; in addition, the inventory difference and its uncertainty shall be determined for each nuclear material.

2.2.9 Conclusions regarding [the existence of] a nuclear material deficit or excess or, conversely, the absence of any nuclear material control and accounting anomalies shall be based on the determination of the quantity of nuclear material actually present, as well as by comparing the inventory difference value obtained with its permissible value for each MBA.

**6.0 Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference****6.1 General requirements**

6.1.1 Physical inventories shall be conducted for the following purposes:

...

– Calculating the material balance, determining the inventory difference and its uncertainty

...

6.1.3 Physical inventory procedures shall be based on the following:

...

– Compiling an IL and PIL and inspecting accounting documents

– Verifying that the IL matches accounting data

...

6.1.4 The quantity of nuclear material present in each MBA shall be determined by measuring the quantity and composition of the nuclear material at KMPs; it should be monitored by conducting operational (near-real time) accounting and audits to verify the presence of nuclear material items based on attribute indicators, regular reconciliation of accounting and reporting forms; and it should be verified by conducting physical inventories. Operational accounting shall include procedures that are carried out during process operations in support of nuclear material control and accounting activities. Physical inventories shall culminate in a balance closeout for each nuclear material in the MBA over the reporting period, determining the inventory difference and its uncertainty, followed by a statistical analysis of the ID significance as specified in the requirements set forth in Paras. 6.4.1 and 6.4.2 of these Rules.

The inventory difference for a specific material in an MBA is determined using the following equation:

$$IP = KK * DK = KK * UV + UM * NK$$

where:

KK is the amount of nuclear material actually present in the MBA, determined as the result of a physical inventory

DK is the nuclear material book inventory in the MBA at the start of the inventory taking

UV is the recorded increase of nuclear material quantity in the MBA for a given reporting period resulting from all shipments and production, etc.

UM is the recorded decrease of nuclear material quantity in the MBA for a given reporting period resulting from all shipments out of the MBA, nuclear conversion, and losses, etc.

NK is the quantity of nuclear material present in the MBA, determined and recorded at the beginning of the given reporting period

6.1.5 The mass of each nuclear material shall be determined. The mass and the measurement uncertainty for a 0.95 confidence probability shall be documented.

### 6.3 Organizing physical inventories

6.3.2 Upon completion of the physical inventory, the inventory team shall compile a report; the nuclear material balance is established for each nuclear material; the inventory difference and its uncertainty are determined for each nuclear material; accounting forms are filled out; and the MBR and PIL are compiled and approved.

6.3.3 If the analysis of the nuclear material balance reveals no anomalies within the nuclear material control and accounting system as described in Para. 6.4 of these Rules, the documented quantity of nuclear material in the MBA shall be used as the quantity of nuclear material present in the MBA at the start of the next reporting period.

## 7 Accounting and Reporting Documents. Advance Notices

### 7.1 Accounting documents

7.1.1 Accounting documents shall be maintained for each MBA; these documents shall contain data on each nuclear material kind [present in the MBA], including:

- The quantity of material in the MBA
- Changes in the quantity of material in the MBA

### 7.2 Reporting documents

7.2.3 ICRs, ILs, and PILs shall be compiled at the MBA level and at the organization level. These reports shall contain information regarding the actual quantity of nuclear material and its movement between MBAs or between organizations.

7.2.7 Material balance reports shall be prepared based on the results of the physical inventories conducted within MBAs.

7.2.8 MBA material balance reports shall reflect the following information for each nuclear material in the form of separate entries:

- The initial book inventory
- Increases and/or decreases in the quantity of nuclear material over the reporting period
- The ending quantity of nuclear material actually present [in the MBA] as established by a physical inventory
- The inventory difference and its uncertainty

7.2.9 Organization material balance reports shall indicate the nuclear material balance based on the quantity of nuclear material actually present [in the organization] as established in the course of a physical inventory.

7.2.10 Organization material balance reports shall reflect the following information for each nuclear material in the form of separate entries:

- The initial book inventory
- The final book inventory and the ending quantity of nuclear material actually present [in the organization] as established by a physical inventory

7.2.11 If comparison of the ending quantity of nuclear material actually present and the IL final book inventory of material present reveals an anomaly, the required documents confirming the justification for accepting the quantity of nuclear material actually present as the initial [book inventory] for the next reporting period.

7.2.14 MBA MBRs and PILs shall be submitted by the individual in charge of control and accounting in the MBA to the nuclear material accounting office within the organization within 15 days of determining the quantity of nuclear material actually present [in the MBA].

## 8 Nuclear Material Control and Accounting in Organizations

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

...

- Procedures for conducting physical inventories

### Analysis:

The regulation requires site-level physical inventory procedures which include SNM balance closing. The regulations also have numerous specific requirements for the SNM balance closing.

0010	Physical Inventory of Nuclear Material Procedures	MC	OST 95 10560-2001 (Minatom Order # 80)	Entire Document	7	Minatom/Rosatom	Enacted
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### Citation:

*Entire Document*

### Analysis:

This standard establishes the general requirements for preparing and conducting physical inventories as well as the requirements for analyzing the results.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.7	7	Minatom/Rosatom	Enacted
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**Citation:****4 Chapter Contents**

4.7 Chapter on "NM Physical Inventory"

4.7.1 This chapter shall state that the preparation, conduct, analysis, and filling out reports for NM physical inventories at the enterprise shall be performed as specified in the regulation [6] listed in the bibliography.

4.7.2 Physical inventory requirements that are characteristic of the enterprise, such as the scope of measurements, the required confirmatory measurement accuracy, the requirements for allowable inventory difference, etc. shall be reviewed.

**Analysis:**

Document states that each site will have its own ID calculation methodology. Sites are required to cover this issue in a site-level regulation on MC&A.

**24. Requirements for establishing MBAs****Analysis:**

Russian regulations provide an adequate set of requirements for defining MBAs.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	Terms and Definitions, 3.3.1, 6.1.1 bullet 1, 6.1.4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:**

Material Balance Area (MBA) [зона баланса материалов (ЗБМ)]—a physically and administratively established area within a nuclear facility or nuclear material storage point for the control and accounting of nuclear material in which the quantity of nuclear material is calculated for an established period of time and the movement of nuclear material into/out of the area is established on the basis of measurements.

**3 The Major Elements of Governmental Control Accounting of Nuclear Material**

3.3 Material balance areas and key measurement points

3.3.1 The following requirements must be taken into consideration when establishing MBAs:

- The mass of the nuclear material received at or shipped from an MBA shall be determined using measured characteristics of the nuclear material (except for instances where the use of analytical methods is permitted), a complete recount and identification of items and containers holding nuclear material, data contained in shipping documentation, or the passport data for the material
- Administrative units within the organization such as plant laboratories, storage and cargo transfer areas, as well as nuclear material areas requiring special forms of information protection, shall be set up as individual MBAs.

**6.0 Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference****6.1 General requirements**

6.1.1 Physical inventories shall be conducted for the following purposes:

- Determining the quantity of nuclear material actual present in MBAs

...

6.1.4 The quantity of nuclear material present in each MBA shall be determined by measuring the quantity and composition of the nuclear material at KMPs; it should be monitored by conducting operational (near-real time) accounting and audits to verify the presence of nuclear material items based on attribute indicators, regular reconciliation of accounting and reporting forms; and it should be verified by conducting physical inventories. Operational accounting shall include procedures that are carried out during process operations in support of nuclear material control and accounting activities. Physical inventories shall culminate in a balance closeout for each nuclear material in the MBA over the reporting period, determining the inventory difference and its uncertainty, followed by a statistical analysis of the ID significance as specified in the requirements set forth in Paras. 6.4.1 and 6.4.2 of these Rules.

The inventory difference for a specific material in an MBA is determined using the following equation:

$$IP = KK * DK = KK * UB + UM * HK$$

$$\{IR = KK * DK = KK * UV + UM * NK\}$$

where:

KK is the amount of nuclear material actually present in the MBA, determined as the result of a physical inventory

DK is the nuclear material book inventory in the MBA at the start of the inventory taking

UV is the recorded increase of nuclear material quantity in the MBA for a given reporting period resulting from all shipments and production, etc.

UM is the recorded decrease of nuclear material quantity in the MBA for a given reporting period resulting from all shipments out of the MBA, nuclear conversion, and losses, etc.

NK is the quantity of nuclear material present in the MBA, determined and recorded at the beginning of the given reporting period

**Analysis:**

Terms and Definitions: This provides a definition of a MBA that provides the most basic requirements for establishing an MBA.

3.3.1: This provides a few high-level criteria that must be considered when establishing MBAs.

6.1.1 bullet 1, 6.1.4: Although this is not presented as a requirement, an enterprise must be able to measure the total quantity and composition of material in an MBA. This establishes a requirement for consideration when establishing an MBA.

0011	Methodological Recommendations for Organizing Material Balance Areas	MC	Minatom Order # 154-r	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

This is a methodological document that contains recommendations for the procedures, basic criteria, and requirements for establishing nuclear material balance areas

0160	Nuclear Materials Control and Accounting Rules for Research Reactors, Critical and Subcritical Test Facilities	MC	PKU-IR00	4.2	7	Minatom/Rosatom	Enacted
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**Citation:**

**4. ORGANIZING NUCLEAR MATERIAL CONTROL AND ACCOUNTING**

4.2. Establishing Material Balance Areas (MBAs) and Key Measurement Points (KMPs)

4.2.1. The following principles shall be used as guidelines in establishing MBA boundaries and structure:

- MBAs shall have explicit physical boundaries that have been established administratively;
- The boundary of one MBA shall not intersect the boundaries of other MBAs;
- MBAs and KMPs shall be established to ensure that nuclear material quantities are measured when nuclear material arrives at or is shipped from an MBA and that nuclear material physical inventories are performed with a frequency appropriate to the category of nuclear material in the MBA.

4.2.2. All areas of a research facility can usually be assigned to one MBA:

- Fresh fuel storage areas;
- Areas where activities involving fresh fuel are performed;
- The research unit itself (research reactor, critical test stand, subcritical test stand);
- Room(s) with experimental equipment containing nuclear material;
- Spent fuel and refueling pools;
- Spent fuel storage areas;
- Hot cells.

4.2.3. If this is impossible, it is preferable that areas in which nuclear material are handled and which are part of a single process cycle be included in the same MBA.

4.2.4. Key measurement points (KMPs) shall be established at a research facility to determine the nuclear material inventory in an MBA.

4.2.5. For each product (batch), the research facility nuclear material control and accounting instructions shall assign equipment and methods for accounting and confirmatory measurements (or other method of determination) of nuclear material quantities when products are transferred from/to an MBA and during physical inventories and real-time accounting of bulk material.

4.2.6. One individual in each MBA shall be made responsible for nuclear material control and accounting.

4.2.7. The management of a research facility shall establish the MBAs and KMPs at that facility with the approval of

the operating organization's administration as documented in "The Structure of MBAs and KMPs at a Research Facility" which shall state:

- MBA boundaries;
- The nuclear material in each MBA and its category;
- Key measurement points;
- The arrangement for moving nuclear material between MBAs and KMPs;
- The physical inventory frequency;
- The justification for the allowable inventory difference, if the research facility handles bulk nuclear material (as specified in section 3.2.9 of these Rules).

**Analysis:**

This regulation establishes the requirements for defining MBAs in nuclear reactors.

0169	Requirements for Establishing Material Balance Areas at Nuclear Facilities and Nuclear Material Storage Points	MC	NP-025-2000	Entire Document	5	GAN/Rostekhnadzor	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

This regulation establishes the requirements for defining MBAs in nuclear facilities besides reactors.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	Terms and Definitions, 16	4	RF Government	Enacted
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**Citation:**

Material balance area—a physically and administratively established area within a nuclear facility or nuclear material storage point for nuclear material control and accounting, in which the quantity of nuclear material is determined by measurements each time nuclear material is moved into/out of the area, and the nuclear material balance is calculated for an established period of time

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

16. Nuclear material control and accounting at organizations handling nuclear material is conducted based on material balance areas and in accordance with the federal rules and regulations for governmental nuclear material control and accounting, as well as in accordance with policy and technical documents to be developed and adopted by these organizations in order to implement these federal rules and regulations.

The organizations establish material balance areas upon approval with the Rosatom Government Atomic Energy Corporation.

**Analysis:**

Terms and Definitions: This provides a more detailed definition of MBAs and establishes, indirectly, more requirements that MBAs must meet.

16: Requires MBAs to be organized based upon federal regulations.

3149	On Approval and Enactment of Federal Norms and Rules in the Area of Atomic Energy Use "Requirements to Organizing of Material Balance Areas"	MC	NP-081-07	Entire Document	5	Minatom/Rosatom	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

The FNP establishes requirements for MBAs containing nuclear materials or special non-nuclear materials

## 25. Entering SNM into accounting records

### Analysis:

The regulations specify:

- the material types that must be entered into accounting,
- quantity thresholds for entering material into accounting,
- the situations when material is entered into accounting,

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	2.2.1, 2.2.6, 3.1.2, 3.1.3, 5.2.1, 7.1.2, 8.4 bullet 3, Appendix 1	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

### Citation:

#### 2 General Provisions

##### 2.2 Principles of governmental control and accounting of nuclear material

2.2.1 Nuclear material shall be subject to governmental control and accounting beginning with the minimum quantities established by these Rules.

2.2.6 Nuclear material accounting shall be based on measurements of quantitative characteristics of the material. It is permissible to:

- Use the results of previous measurements of nuclear material quantitative characteristics if their reliability is confirmed by the appropriate status of the access control devices that have been applied or by the appropriate confirmatory measurements
- The use of experimental studies or of analytical methods (methodologies) based on the results of preliminary measurements

#### 3 The Major Elements of Governmental Control Accounting of Nuclear Material

##### 3.1 Nuclear material subject to governmental control and accounting

3.1.2 Entering nuclear material into governmental accounting and removing it from governmental accounting

3.1.2.1 Nuclear material contained in all products is subject to governmental control and accounting except the following:

- Uranium present in the ore or intermediate products processed at mining and metallurgy enterprises\*
- Thorium present in the ore or intermediate products processed at mining and metallurgy enterprises\*\*
- Nuclear material present in sealed sources of ionizing radiation
- Depleted uranium present in the protective containers of packing sets for transportation, radiation heads of gamma flaw detectors, irradiation heads of radiotherapy equipment, transport charge exchange containers and other similar specific products used for radiation protection during the transport or storage of radioactive substances
- Neptunium-237, americium-241, americium-243, and californium-252 in irradiated products, as well as americium-241 in plutonium based products\*\*\*
- Lithium-6 if its presence in lithium does not exceed 7.5% atomic
- Deuterium present in hydrogen based materials if the relative isotopic content of the deuterium does not exceed 10% atomic
- Nuclear material present in radioactive waste located in radwaste storage facilities

3.1.2.2 The following are subject to removal from governmental accounting:

- Nuclear material used in the manufacture of components of nuclear armaments, nuclear warheads, and their constituent elements
- Nuclear material used in the manufacture of sealed sources of ionizing radiation (when these items are shipped from an MBA to a consumer)
- Depleted uranium present in the protective containers of packing sets for transportation, radiation heads of gamma flaw detectors, irradiation heads of radiotherapy equipment, transport charge exchange containers and other similar specific products used for radiation protection during the transport or storage of radioactive substances (when these items are shipped as final products from an MBA to a consumer)
- Nuclear material present in radioactive waste (when the radioactive waste is shipped from an MBA to a radwaste storage facility)

3.1.2.3 Nuclear material shall be entered into account at an MBA upon their production or receipt from another MBA in the same organization or an MBA at a different organization.

3.1.2.4 Plutonium that is formed in products that have been irradiated in a nuclear reactor shall be entered into governmental accounting after these products have been removed from the reactor. At the same time, the uranium and uranium-235 burnup in the reactor shall be removed from accounting.

3.1.2.5 Nuclear material shall be removed from accounting in an MBA after it has been sent to another MBA in the same organization or an MBA at a different organization.

3.1.2.6 The nuclear material present in products obtained from the dismantlement of nuclear war-heads, nuclear armaments, and their constituent elements shall be entered into account when these products are designated for peaceful uses.

3.1.3 Quantitative criteria for entering nuclear material into governmental accounting

3.1.3.1 Nuclear material in use by an organization at a nuclear facility or located in a nuclear material storage point, as well as material received or shipped by the organization, shall be subject to governmental control and accounting if its mass is equal to or greater than the minimum quantity indicated in Appendix 1 within any 12-month period.

If an organization has an aggregate of nuclear material or products containing a mixture of nuclear material, these Rules shall extend to this material if it exceeds any one of the minimum quantities of nuclear material presented in Appendix 1.

3.1.3.2 The mass values for each nuclear material shall be entered into reporting documents to the last significant digit shown for that nuclear material in Appendix 1.

## 5 Procedures for Transferring Nuclear Material

### 5.2 Documenting nuclear material receipts and shipments

5.2.1 Within three (3) days of receiving any nuclear material, the receiving organization shall verify the attribute indicators of the nuclear material vessels and perform confirmatory measurements. Absent any discrepancies, the nuclear material shall be accepted preliminarily and entered into account.

Final receipt of the nuclear material and entering it into account shall occur no later than ten (10) days from receipt of the nuclear material and their passports (specifications, certificates).

## 7 Accounting and Reporting Documents. Advance Notices

### 7.1 Accounting documents

7.1.2 Accounting documents shall reflect all changes in the quantity of material for each batch, the characteristics of the batch, and initial batch preparation data. Dates on which changes in the quantity of nuclear material occurred shall be indicated, along with the shipping organization MBA and the receiving organization MBA.

## 8 Nuclear Material Control and Accounting in Organizations

8.4 For each MBA, the manager of the organization shall develop and approve nuclear material control and accounting procedures that identify the following:

...

– The nuclear material control and accounting procedures adopted for use in each MBA

...

## Appendix 1

Minimum Quantities of Nuclear Materials Subject to Government Control and Accounting

### Analysis:

The citations from this regulation specify:

- the material types that must be entered into accounting,
- quantity thresholds for entering material into accounting,
- the situations when material is entered into accounting,
- The basis for the material values to be entered into accounting;
- the requirement for site-level NM accounting procedures.

## 26. Removing SNM from accounting records

### Analysis:

The regulations specify:

- the material forms and compositions that are not subject to accounting,
- quantity thresholds for entering material into accounting,
- the situations when material is removed from accounting,
- The basis for the values of material losses to be entered into accounting;
- the requirement for site-level NM accounting procedures.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	3.1.2, 5.2.2, 7.1.2, 8.4 bullet 3, 8.5	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

### Citation:

### **3 The Major Elements of Governmental Control Accounting of Nuclear Material**

#### **3.1 Nuclear material subject to governmental control and accounting**

3.1.2 Entering nuclear material into governmental accounting and removing it from governmental accounting

3.1.2.1 Nuclear material contained in all products is subject to governmental control and accounting except the following:

- Uranium present in the ore or intermediate products processed at mining and metallurgy enterprises\*
- Thorium present in the ore or intermediate products processed at mining and metallurgy enterprises\*\*
- Nuclear material present in sealed sources of ionizing radiation
- Depleted uranium present in the protective containers of packing sets for transportation, radiation heads of gamma flaw detectors, irradiation heads of radiotherapy equipment, transport charge exchange containers and other similar specific products used for radiation protection during the transport or storage of radioactive substances
- Neptunium-237, americium-241, americium-243, and californium-252 in irradiated products, as well as americium-241 in plutonium based products\*\*\*
- Lithium-6 if its presence in lithium does not exceed 7.5% atomic
- Deuterium present in hydrogen based materials if the relative isotopic content of the deuterium does not exceed 10% atomic
- Nuclear material present in radioactive waste located in radwaste storage facilities

3.1.2.2 The following are subject to removal from governmental accounting:

- Nuclear material used in the manufacture of components of nuclear armaments, nuclear warheads, and their constituent elements
- Nuclear material used in the manufacture of sealed sources of ionizing radiation (when these items are shipped from an MBA to a consumer)
- Depleted uranium present in the protective containers of packing sets for transportation, radiation heads of gamma flaw detectors, irradiation heads of radiotherapy equipment, transport charge exchange containers and other similar specific products used for radiation protection during the transport or storage of radioactive substances (when these items are shipped as final products from an MBA to a consumer)
- Nuclear material present in radioactive waste (when the radioactive waste is shipped from an MBA to a radwaste storage facility)

3.1.2.3 Nuclear material shall be entered into account at an MBA upon their production or receipt from another MBA in the same organization or an MBA at a different organization.

3.1.2.4 Plutonium that is formed in products that have been irradiated in a nuclear reactor shall be entered into governmental accounting after these products have been removed from the reactor. At the same time, the uranium and uranium-235 burnup in the reactor shall be removed from accounting.

3.1.2.5 Nuclear material shall be removed from accounting in an MBA after it has been sent to another MBA in the same organization or an MBA at a different organization.

3.1.2.6 The nuclear material present in products obtained from the dismantlement of nuclear war-heads, nuclear armaments, and their constituent elements shall be entered into account when these products are designated for peaceful uses.

### **5 Procedures for Transferring Nuclear Material**

#### **5.2 Documenting nuclear material receipts and shipments**

5.2.2 When nuclear material is shipped, the shipping organization removes the material from account after it has received a nuclear material certificate of receipt duly filled out by the receiving organization in accordance with established procedures or a bill of lading with the notarized signature of an authorized representative of the receiving organization.

### **7 Accounting and Reporting Documents. Advance Notices**

#### **7.1 Accounting documents**

7.1.2 Accounting documents shall reflect all changes in the quantity of material for each batch, the characteristics of the batch, and initial batch preparation data. Dates on which changes in the quantity of nuclear material occurred shall be indicated, along with the shipping organization MBA and the receiving organization MBA.

### **8 Nuclear Material Control and Accounting in Organizations**

8.4 For each MBA, the manager of the organization shall develop and approve nuclear material control and accounting procedures that identify the following:

...

- The nuclear material control and accounting procedures adopted for use in each MBA

...

8.5 All nuclear material losses shall be established through measurement or analysis based on previous measurements or experimental research. The maximum permissible value for nuclear material losses shall be approved by the agency that manages the use of atomic energy.

#### **Analysis:**

The citations from this regulation specify:

- the material forms and compositions that are not subject to accounting,

- quantity thresholds for entering material into accounting,
- the situations when material is removed from accounting,
- The basis for the values of material losses to be entered into accounting;
- the requirement for site-level NM accounting procedures.

## 27. Procedures governing internal transfers of nuclear materials at a nuclear facility

### Analysis:

The Law on the use of Atomic Energy Nuclear requires that nuclear material and radioactive substances shall be shipped in accordance with special procedures and the current OPUK requires the notifications, documentation, measurements, the evaluation of shipper receiver differences required to complete such a transaction. This element is properly addressed.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0001	On the Use of Atomic Energy	MC, PP	Law 170-FZ	Article 3 Bullet 1, Article 4 Bullet 2 and 3, Article 44, Article 45, Article 50	3	RF Parliament	Enacted

### Citation:

#### Section I General Provisions

Article 3 Objects to Which This Federal Law Is Applicable

The objects to which this Federal Law is applicable are as follows:

- Nuclear facilities – structures and complexes with nuclear reactors, including: nuclear power stations; ships and other watercraft; spacecraft and aircraft; transport vehicles and transportable equipment; structures and complexes with industrial, experimental, and research nuclear reactors; critical and subcritical nuclear test facilities; structures, complexes, test ranges, facilities, and devices with nuclear charges for peaceful uses; and other structures, complexes, and facilities that contain nuclear material for the production, use, processing, or shipment of nuclear fuel and nuclear material.

...

Article 4 Types of Activity Related to the Use of Atomic Energy

This Federal Law extends to the following types of activity related to the use of atomic energy:

...

- The development, production, testing, shipment, storage, dismantling, use, or handling of nuclear charges for peaceful purposes
- The handling of nuclear material and radioactive substances, including when prospecting and extracting minerals that contain such material or substances, as well as during the production, use, processing, shipment, or storage of nuclear material and radioactive substances

...

#### Section X The Handling of Nuclear Material, Radioactive Substances, and Radioactive Waste

Article 44 Federal Government Policies Regarding the Handling of Nuclear Material, Radioactive Substances, and Radioactive Waste

Federal government policies regarding the handling of nuclear material, radioactive substances, and radioactive waste shall provide a comprehensive solution to issues regarding standards for their purchase, formation, use, physical protection, release, accounting and record keeping, shipment, and storage.

Federal government policies regarding the handling of nuclear material, radioactive substances, and radioactive waste are established by this Federal Law and other laws that regulate activities related to the handling of nuclear material, radioactive substances, and radioactive waste.

Article 45 Shipment of Nuclear Material and Radioactive Substances

Nuclear material and radioactive substances shall be shipped in accordance with special procedures, the rules for shipping hazardous cargo, the rules and regulations regarding the use of atomic energy, and the laws of the Russian Federation regarding protection of the environment.

The rules for shipping nuclear material and radioactive substances shall specify the rights, responsibilities, and legal liability of the shipper, freight forwarder, and receiver; safety measures; physical protection; the system of approved measures to prevent events and accidents when nuclear material and radioactive substances are transported; the requirements for packaging, labeling, and transportation equipment; measures to isolate and mitigate the effects of possible accidents when these substances and materials are shipped. The rules for shipping nuclear material and radioactive substances shall address all possible types of vehicles.

The freight forwarder that handles the nuclear material and radioactive substances shall have a permit (license) to conduct activities related to the use of atomic energy issued by the appropriate government agency that regulates

safety.

Foreign organizations that have the appropriate permits (licenses) to conduct activities related to the use of atomic energy issued by federal executive branch agencies or the Government Atomic Energy Corporation Rosatom may transport (ship) nuclear material along international maritime and aviation routes. (Part Four [of this Article] was amended by Federal Law № 318-FZ, dated 01 December 2007)

### **Section XI Physical Protection for Nuclear Facilities, Radiation Sources, Storage Points, Nuclear Material, and Radioactive Substances**

Article 50 Requirements to Provide Physical Protection for Nuclear Facilities, Radiation Sources, Storage Points, Nuclear Material, and Radioactive Substances

Requirements for providing physical protection for nuclear facilities, radiation sources, storage points, nuclear material, and radioactive substances are established in the rules and regulations regarding the use of atomic energy.

Physical protection for nuclear facilities, radiation sources, storage points, nuclear material, and radioactive substances shall be provided in accordance with Russian Federation obligations under international agreements regarding the use of atomic energy to which the Russian Federation is signatory.

The operation of nuclear facilities, radiation sources, or storage points, as well as the conduct of any activities related to the use of nuclear material or radioactive substances in any form and at any stage in their production, use, processing, shipment, or storage is prohibited unless measures have been taken to comply with the physical protection requirements for these sites engaged in the use of atomic energy.

#### **Analysis:**

These sections provide an adequate description of the internal transfer process and its requirements

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	5.1, 5.2, 5.3, 6.1.6, 7.3, 8.7, 8.8	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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#### **Citation:**

##### **5 Procedures for Transferring Nuclear Material**

###### 5.1 General requirements

5.1.1 The following documents shall be generated when nuclear material is to be transferred:

- An advance notice signed by the manager of the shipping organization
- Gain/loss logs and shipping documentation

5.1.2 Shipping documentation shall contain data regarding the nuclear material container (seal types and identifiers, gross weight of the container, and other required data). Information regarding the material being shipped (passport data) shall be included in documents that accompany the cargo or that have been sent by express mail.

5.1.3 The following procedures shall be carried out when nuclear material is transferred:

- Inspection of the exterior and verification of the number of items (containers), inspection of the TIDs that have been applied to the transportation equipment and/or nuclear material containers (including inspection of the containers and seals, and verification that the location of each container and the identifiers for the containers and seals match the data in the shipping documentation)
- Confirmatory measurements of nuclear material parameters and the gross weight of the nuclear material containers

5.1.4 The types of confirmatory measurements conducted, as well as their scope, are identified in documentation generated by the organization that conducts these measurements and are based on the following information:

- Type of shipment (between MBAs within a single organization, between organizations, export/import)
- Kinds of nuclear material
- Quantity of nuclear material
- Kinds of products
- Types of vessels and TIDs
- Measurement uncertainty

5.1.5 Measurement data obtained during receipt (shipping) inspections shall be documented in writing. Information shall be provided regarding the measurement methods and measuring instruments that were used, the measurement results and measurement uncertainty, the KMP in which the measurements were performed, the types of TIDs and their identifiers, the date these measurements were performed, and the name of the individual who performed the measurements.

###### 5.2 Documenting nuclear material receipts and shipments

5.2.1 Within three (3) days of receiving any nuclear material, the receiving organization shall verify the attribute indicators of the nuclear material vessels and perform confirmatory measurements. Absent any discrepancies, the nuclear material shall be accepted preliminarily and entered into account.

Final receipt of the nuclear material and entering it into account shall occur no later than ten (10) days from receipt of the nuclear material and their passports (specifications, certificates).

5.2.2 When nuclear material is shipped, the shipping organization removes the material from account after it has received a nuclear material certificate of receipt duly filled out by the receiving organization in accordance with established procedures or a bill of lading with the notarized signature of an authorized representative of the

receiving organization.

5.2.3 The receiving organization enters data regarding the nuclear material that has been received into its accounting documents. Data regarding the nuclear material that has been shipped is entered by the shipping organization into its accounting documents.

#### 5.3 Assessing discrepancies between shipper and receiver data

Discrepancies between shipper and receiver data regarding the mass of nuclear material that has been transferred are defined as the difference between the mass values shown by the shipping organization (passport data) and the mass values obtained by the receiving organization as the result of measurements. If the results agree (the discrepancy between shipper and receiver data lies within the interval representing a 0.99 confidence probability,\* taking into consideration the uncertainty of the measurements conducted by the shipper and receiver), the receiving organization shall use the shipping organization data when entering the nuclear material into account.

### 6.0 Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference

#### 6.1 General requirements

6.1.6 Values for nuclear material mass that were determined at an earlier date may be used when performing accounting procedures (conducting physical inventories, transferring nuclear materials, etc.) only in those instances where the reliability of these data can be confirmed from the time they were established to the time they are used by verifying the appropriate physical condition of the access control devices employed and/or confirmed during the implementation of accounting procedures through measurement of the quantitative parameters of the nuclear material and/or the attribute indicators of the material.

### 7 Accounting and Reporting Documents. Advance Notices

#### 7.3 System of advance notices regarding nuclear material transfers

7.3.1 When nuclear material is shipped between organizations, at least ten (10) days prior to the anticipated date the nuclear material is to be shipped, the shipping organization shall send an advance notice regarding the nuclear material shipment to the receiving organization, the federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and to the administrative unit within the agency that regulates the safe use of nuclear energy that provides oversight of the governmental system for nuclear material control and accounting at the shipping organization.

7.3.2 In the event of an unscheduled shipment resulting from a special order issued by the appropriate executive branch agencies, notices shall be sent no later than three days after the shipping date has been established.

7.3.3 After receiving nuclear material in situations described in Paras. 7.3.1 and 7.3.2 of these Rules and entering the material into account, the receiving organization shall send receipt confirmation to the shipping organization, federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and to the administrative unit within the agency that regulates the safe use of nuclear energy that provides oversight of the governmental system for nuclear material control and accounting at the receiving organization.

### 8 Nuclear Material Control and Accounting in Organizations

8.7 Transfer of nuclear material from one material custodian to other individuals shall be documented in writing.

8.8 The transfer of in-process nuclear material from one process operation to another or from one shift to another shall be documented in writing.

#### Analysis:

5.1 - Addresses the general requirements for all transfers of nuclear material

5.2 - Addresses the documentation requirements for all types on nuclear material transfers

5.3 - Addresses the assessing of discrepancies between shipper and receiver data.

6.1.6 - Addresses the use of previously measured values in the transfer of material.

8.7 - Addresses the requirement for the documentation of transfers from one NM custodian to another

8.8 - Addresses the requirement to document in-process material when transferred or at shift change

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.3.3, 4.3.5 Bullet 17, 4.3.8 Bullet 4, 4.5.4 Bullet 7 and 8, 4.6.1 Bullet 4 and 6, 4.8, 4.11.1, 4.11.2, 4.11.3 Bullet 3, 4.12.2 Bullet 2 and 6, Appendix 6.4 and 8	7	Minatom/Rosatom	Enacted
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**Citation:****4 Chapter Contents****4.3 Chapter on "Organization of NM Control And Accounting"**

4.3.3 Diagrams showing how NM is handled at the enterprise shall be presented, including NM transfers between MBAs.

4.3.5 A description of each MBA shall be presented in this chapter of the Regulation or in a separate document entitled "Instructions for NM control and accounting in MBAs" and shall contain the following information:

...

- Threats to use material not for its designated purpose.

4.3.8 This chapter shall present the main elements of MC&A system activities at the enterprise:

...

- Monitoring NM use and transfer;

...

**4.5 Chapter on the "System of Accounting and Reporting Documents"**

4.5.4 It shall be specified that accounting documents shall be prepared and maintained while conducting the following activities with NM:

...

- Transfer of NM within an MBA, between MBAs, and between administrative units;
- Transfer of nuclear material between enterprises.

**4.6 Chapter on "NM Control and Accounting during Real-Time NM Accounting"**

4.6.1 This chapter shall specify that real time NM accounting is maintained at all stages of the production process, and is established as specified in technical documents (technical processes, instructions, guidelines) that shall contain the following:

...

- The recording procedure and the list of parameters for products in equipment (vessels) that shall facilitate control of the presence, movement and conversion of nuclear material during production processes and product transfers;

...

- The transfer (movement) of NM or a batch of products or items containing NM from one technician to another;

...

**4.8 Chapter on "Control and Accounting during NM Transfers"**

4.8.1 This chapter shall review the procedures and kinds of activities performed during NM transfers.

4.8.2 The necessity, type, scope, and timeframe for measurements of all types of NM transfers shall be established.

4.8.3 The deadline for entering NM into account after its arrival or manufacture shall be specified.

4.8.4 This chapter shall contain the following specific information on the NM receipt (shipment) process:

- Documents that are the basis for NM receipt (shipment);
- Procedures for receipt and shipping control;
- The time, scope and place where NM accounting characteristics are to be measured (custodians, key measurement points, procedures);
- Allowable difference between shipper data and receiver data.
- Organizing a course of action upon the detection of discrepancies;
- Procedures for entering NM into account and removing it from account; the responsible individuals and their actions; confirmatory operations;
- Procedures for sending and receiving NM receipt (shipment) notices (deadlines, responsible individuals, distribution list);
- The procedure for transferring nuclear material to the radioactive waste category;
- The procedure for writing off irretrievable losses.

**4.11 Chapter on "Monitoring NM Accounting Status"**

4.11.1 This chapter shall specify that NM status, presence, and transfer shall be monitored by administrative units authorized to do so (the methodology verification group, nuclear safety group, chief engineer's office, security service, etc., in accordance with the regulations of [each] administrative unit) on the organizational structure level specified in Section 4.3.7.

4.11.2 The following basic principles and procedures for monitoring MC&A status at the enterprise shall be established:

- NM control shall be an integral part of all NM activities;
- NM control shall be carried out on a regular basis;
- Nuclear material shall be controlled from the time it is produced, throughout the entire life (production) cycle until it is used for its intended purpose, ending when it is transferred to the appropriate radioactive substance (radwaste) nuclear material storage points;
- Compliance with rules and regulations in the enterprise MC&A system shall be monitored;

4.11.3 The following shall be established:

- ...
- The necessity and regulation of real time NM transfer monitoring by the appropriate enterprise administrative units;
- ...

4.12 Chapter on "Personnel Training for Nuclear Material Control and Accounting Activities"

4.12.2 It shall be specified that personnel training (in-service training) shall encompass the following disciplines:

- ...
- Methodology for inventory-taking and NM transfers;
- ...
- Equipment for monitoring and surveillance of NM presence and transfer;
- ...

## Appendix

### (Recommended)

#### Enterprise Regulation Contents

6.4. Control and accounting during NM transfers

6.4.1. Organization and procedures for NM transfers (between technicians, MBAs, facilities, organizations, and import-export)

6.4.2. Scope and types of product measurements

6.4.3. Anomaly types and procedures for their investigation and resolution

6.4.4. Control and accounting during NM transport

8. MONITORING ACCOUNTING STATUS AND NM PRESENCE AND TRANSFER

8.1. Principles for organizing NM control

8.2. Procedures for verifying MC&A status in MBAs and at the enterprise as a whole

8.3. Monitoring NM access

8.4. NM surveillance

8.5. Monitoring NM information access

8.6. Monitoring measuring instrument access

8.7. Monitoring access to equipment for transferring or processing NM

8.8. NM control and accounting in the event of an accident or emergency situation

#### Analysis:

These citations set out the requirements for the documentation and training procedures for internal transfers

#### 28. Procedure governing shipments of nuclear materials from one nuclear facility to another. Shipper-receiver difference.

#### Analysis:

The Law on the use of Atomic Energy Nuclear requires that nuclear material and radioactive substances shall be shipped in accordance with special procedures and the current OPUK requires the notifications, documentation, measurements, the evaluation of shipper receiver differences required to complete such a transaction. This element is properly addressed.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0001	On the Use of Atomic Energy	MC, PP	Law 170-FZ	Article 3 Bullet 1, Article 4 Bullet 2 and 3, Article 44, Article 45, Article 50	3	RF Parliament	Enacted

#### Citation:

##### Section I General Provisions

Article 3 Objects to Which This Federal Law Is Applicable

The objects to which this Federal Law is applicable are as follows:

- Nuclear facilities – structures and complexes with nuclear reactors, including: nuclear power stations; ships and other watercraft; spacecraft and aircraft; transport vehicles and transportable equipment; structures and complexes with industrial, experimental, and research nuclear reactors; critical and subcritical nuclear test facilities; structures, complexes, test ranges, facilities, and devices with nuclear charges for peaceful uses; and other structures, complexes, and facilities that contain nuclear material for the production, use, processing, or shipment of nuclear fuel and nuclear material.

...

#### Article 4 Types of Activity Related to the Use of Atomic Energy

This Federal Law extends to the following types of activity related to the use of atomic energy:

...

- The development, production, testing, shipment, storage, dismantling, use, or handling of nuclear charges for peaceful purposes
- The handling of nuclear material and radioactive substances, including when prospecting and extracting minerals that contain such material or substances, as well as during the production, use, processing, shipment, or storage of nuclear material and radioactive substances

...

### Section X The Handling of Nuclear Material, Radioactive Substances, and Radioactive Waste

#### Article 44 Federal Government Policies Regarding the Handling of Nuclear Material, Radioactive Substances, and Radioactive Waste

Federal government policies regarding the handling of nuclear material, radioactive substances, and radioactive waste shall provide a comprehensive solution to issues regarding standards for their purchase, formation, use, physical protection, release, accounting and record keeping, shipment, and storage.

Federal government policies regarding the handling of nuclear material, radioactive substances, and radioactive waste are established by this Federal Law and other laws that regulate activities related to the handling of nuclear material, radioactive substances, and radioactive waste.

#### Article 45 Shipment of Nuclear Material and Radioactive Substances

Nuclear material and radioactive substances shall be shipped in accordance with special procedures, the rules for shipping hazardous cargo, the rules and regulations regarding the use of atomic energy, and the laws of the Russian Federation regarding protection of the environment.

The rules for shipping nuclear material and radioactive substances shall specify the rights, responsibilities, and legal liability of the shipper, freight forwarder, and receiver; safety measures; physical protection; the system of approved measures to prevent events and accidents when nuclear material and radioactive substances are transported; the requirements for packaging, labeling, and transportation equipment; measures to isolate and mitigate the effects of possible accidents when these substances and materials are shipped. The rules for shipping nuclear material and radioactive substances shall address all possible types of vehicles.

The freight forwarder that handles the nuclear material and radioactive substances shall have a permit (license) to conduct activities related to the use of atomic energy issued by the appropriate government agency that regulates safety.

Foreign organizations that have the appropriate permits (licenses) to conduct activities related to the use of atomic energy issued by federal executive branch agencies or the Government Atomic Energy Corporation Rosatom may transport (ship) nuclear material along international maritime and aviation routes. (Part Four [of this Article] was amended by Federal Law № 318-FZ, dated 01 December 2007)

### Section XI Physical Protection for Nuclear Facilities, Radiation Sources, Storage Points, Nuclear Material, and Radioactive Substances

#### Article 50 Requirements to Provide Physical Protection for Nuclear Facilities, Radiation Sources, Storage Points, Nuclear Material, and Radioactive Substances

Requirements for providing physical protection for nuclear facilities, radiation sources, storage points, nuclear material, and radioactive substances are established in the rules and regulations regarding the use of atomic energy.

Physical protection for nuclear facilities, radiation sources, storage points, nuclear material, and radioactive substances shall be provided in accordance with Russian Federation obligations under international agreements regarding the use of atomic energy to which the Russian Federation is signatory.

The operation of nuclear facilities, radiation sources, or storage points, as well as the conduct of any activities related to the use of nuclear material or radioactive substances in any form and at any stage in their production, use, processing, shipment, or storage is prohibited unless measures have been taken to comply with the physical protection requirements for these sites engaged in the use of atomic energy.

#### Analysis:

These sections provide an adequate description of the transfer process

0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	5.1, 5.2, 5.3, 6.1.6, 7.3	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted
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#### Citation:

##### 5 Procedures for Transferring Nuclear Material

##### 5.1 General requirements

##### 5.1.1 The following documents shall be generated when nuclear material is to be transferred:

- An advance notice signed by the manager of the shipping organization
- Gain/loss logs and shipping documentation

5.1.2 Shipping documentation shall contain data regarding the nuclear material container (seal types and identifiers, gross weight of the container, and other required data). Information regarding the material being shipped (passport data) shall be included in documents that accompany the cargo or that have been sent by express mail.

5.1.3 The following procedures shall be carried out when nuclear material is transferred:

- Inspection of the exterior and verification of the number of items (containers), inspection of the TIDs that have been applied to the transportation equipment and/or nuclear material containers (including inspection of the containers and seals, and verification that the location of each container and the identifiers for the containers and seals match the data in the shipping documentation)
- Confirmatory measurements of nuclear material parameters and the gross weight of the nuclear material containers

5.1.4 The types of confirmatory measurements conducted, as well as their scope, are identified in documentation generated by the organization that conducts these measurements and are based on the following information:

- Type of shipment (between MBAs within a single organization, between organizations, export/import)
- Kinds of nuclear material
- Quantity of nuclear material
- Kinds of products
- Types of vessels and TIDs
- Measurement uncertainty

5.1.5 Measurement data obtained during receipt (shipping) inspections shall be documented in writing. Information shall be provided regarding the measurement methods and measuring instruments that were used, the measurement results and measurement uncertainty, the KMP in which the measurements were performed, the types of TIDs and their identifiers, the date these measurements were performed, and the name of the individual who performed the measurements.

5.2 Documenting nuclear material receipts and shipments

5.2.1 Within three (3) days of receiving any nuclear material, the receiving organization shall verify the attribute indicators of the nuclear material vessels and perform confirmatory measurements. Absent any discrepancies, the nuclear material shall be accepted preliminarily and entered into account.

Final receipt of the nuclear material and entering it into account shall occur no later than ten (10) days from receipt of the nuclear material and their passports (specifications, certificates).

5.2.2 When nuclear material is shipped, the shipping organization removes the material from account after it has received a nuclear material certificate of receipt duly filled out by the receiving organization in accordance with established procedures or a bill of lading with the notarized signature of an authorized representative of the receiving organization.

5.2.3 The receiving organization enters data regarding the nuclear material that has been received into its accounting documents. Data regarding the nuclear material that has been shipped is entered by the shipping organization into its accounting documents.

5.3 Assessing discrepancies between shipper and receiver data

Discrepancies between shipper and receiver data regarding the mass of nuclear material that has been transferred are defined as the difference between the mass values shown by the shipping organization (passport data) and the mass values obtained by the receiving organization as the result of measurements. If the results agree (the discrepancy between shipper and receiver data lies within the interval representing a 0.99 confidence probability,\* taking into consideration the uncertainty of the measurements conducted by the shipper and receiver), the receiving organization shall use the shipping organization data when entering the nuclear material into account.

## **6.0 Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference**

6.1 General requirements

6.1.6 Values for nuclear material mass that were determined at an earlier date may be used when performing accounting procedures (conducting physical inventories, transferring nuclear materials, etc.) only in those instances where the reliability of these data can be confirmed from the time they were established to the time they are used by verifying the appropriate physical condition of the access control devices employed and/or confirmed during the implementation of accounting procedures through measurement of the quantitative parameters of the nuclear material and/or the attribute indicators of the material.

## **7 Accounting and Reporting Documents. Advance Notices**

7.3 System of advance notices regarding nuclear material transfers

7.3.1 When nuclear material is shipped between organizations, at least ten (10) days prior to the anticipated date the nuclear material is to be shipped, the shipping organization shall send an advance notice regarding the nuclear material shipment to the receiving organization, the federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and to the administrative unit within the agency that regulates the safe use of nuclear energy that provides oversight of the governmental system for nuclear material control and accounting at the shipping organization.

7.3.2 In the event of an unscheduled shipment resulting from a special order issued by the appropriate executive branch agencies, notices shall be sent no later than three days after the shipping date has been established.

7.3.3 After receiving nuclear material in situations described in Paras. 7.3.1 and 7.3.2 of these Rules and entering the material into account, the receiving organization shall send receipt confirmation to the shipping organization, federal level agency that manages the use of atomic energy and implements nuclear material control and

accounting activities, and to the administrative unit within the agency that regulates the safe use of nuclear energy that provides oversight of the governmental system for nuclear material control and accounting at the receiving organization.

**Analysis:**

- 5.1 - Addresses the general requirements for all transfers of nuclear material
- 5.2 - Addresses the documentation requirements for all types on nuclear material transfers
- 5.3 - Addresses the assessing of discrepancies between shipper and receiver data.
- 6.1.6 - Addresses the use of previously measured values in the transfer of material.
- 7.3 - Specifies the requirements for advance notification when material is transferred between organizations

				4.3.3, 4.3.5 Bullet 17, 4.3.8 Bullet 4, 4.5.4 Bullet 7 and 8, 4.6.1 Bullet 4 and 6, 4.8, 4.11.1, 4.11.2, 4.11.3 Bullet 3, 4.12.2 Bullet 2 and 6, Appendix 6.4 and 8			
0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r		7	Minatom/Rosatom	Enacted

**Citation:**

**4 Chapter Contents**

**4.3 Chapter on "Organization of NM Control And Accounting"**

4.3.3 Diagrams showing how NM is handled at the enterprise shall be presented, including NM transfers between MBAs.

4.3.5 A description of each MBA shall be presented in this chapter of the Regulation or in a separate document entitled "Instructions for NM control and accounting in MBAs" and shall contain the following information:

...

- Threats to use material not for its designated purpose.

4.3.8 This chapter shall present the main elements of MC&A system activities at the enterprise:

...

- Monitoring NM use and transfer;

...

**4.5 Chapter on the "System of Accounting and Reporting Documents"**

4.5.4 It shall be specified that accounting documents shall be prepared and maintained while conducting the following activities with NM:

...

- Transfer of NM within an MBA, between MBAs, and between administrative units;
- Transfer of nuclear material between enterprises.

**4.6 Chapter on "NM Control and Accounting during Real-Time NM Accounting"**

4.6.1 This chapter shall specify that real time NM accounting is maintained at all stages of the production process, and is established as specified in technical documents (technical processes, instructions, guidelines) that shall contain the following:

...

- The recording procedure and the list of parameters for products in equipment (vessels) that shall facilitate control of the presence, movement and conversion of nuclear material during production processes and product transfers;

...

- The transfer (movement) of NM or a batch of products or items containing NM from one technician to another;

...

**4.8 Chapter on "Control and Accounting during NM Transfers"**

4.8.1 This chapter shall review the procedures and kinds of activities performed during NM transfers.

4.8.2 The necessity, type, scope, and timeframe for measurements of all types of NM transfers shall be established.

4.8.3 The deadline for entering NM into account after its arrival or manufacture shall be specified.

4.8.4 This chapter shall contain the following specific information on the NM receipt (shipment) process:

- Documents that are the basis for NM receipt (shipment);
- Procedures for receipt and shipping control;
- The time, scope and place where NM accounting characteristics are to be measured (custodians, key measurement points, procedures);
- Allowable difference between shipper data and receiver data.
- Organizing a course of action upon the detection of discrepancies;
- Procedures for entering NM into account and removing it from account; the responsible individuals and their actions; confirmatory operations;
- Procedures for sending and receiving NM receipt (shipment) notices (deadlines, responsible individuals, distribution list);
- The procedure for transferring nuclear material to the radioactive waste category;
- The procedure for writing off irretrievable losses.

#### **4.11 Chapter on "Monitoring NM Accounting Status"**

4.11.1 This chapter shall specify that NM status, presence, and transfer shall be monitored by administrative units authorized to do so (the methodology verification group, nuclear safety group, chief engineer's office, security service, etc., in accordance with the regulations of [each] administrative unit) on the organizational structure level specified in Section 4.3.7.

4.11.2 The following basic principles and procedures for monitoring MC&A status at the enterprise shall be established:

- NM control shall be an integral part of all NM activities;
- NM control shall be carried out on a regular basis;
- Nuclear material shall be controlled from the time it is produced, throughout the entire life (production) cycle until it is used for its intended purpose, ending when it is transferred to the appropriate radioactive substance (radwaste) nuclear material storage points;
- Compliance with rules and regulations in the enterprise MC&A system shall be monitored;

4.11.3 The following shall be established:

...

- The necessity and regulation of real time NM transfer monitoring by the appropriate enterprise administrative units;

...

#### **4.12 Chapter on "Personnel Training for Nuclear Material Control and Accounting Activities"**

4.12.2 It shall be specified that personnel training (in-service training) shall encompass the following disciplines:

...

- Methodology for inventory-taking and NM transfers;

...

- Equipment for monitoring and surveillance of NM presence and transfer;

...

### **Appendix (Recommended)**

#### **Enterprise Regulation Contents**

6.4. Control and accounting during NM transfers

6.4.1. Organization and procedures for NM transfers (between technicians, MBAs, facilities, organizations, and import-export)

6.4.2. Scope and types of product measurements

6.4.3. Anomaly types and procedures for their investigation and resolution

6.4.4. Control and accounting during NM transport

8. MONITORING ACCOUNTING STATUS AND NM PRESENCE AND TRANSFER

8.1. Principles for organizing NM control

8.2. Procedures for verifying MC&A status in MBAs and at the enterprise as a whole

8.3. Monitoring NM access

8.4. NM surveillance

8.5. Monitoring NM information access

8.6. Monitoring measuring instrument access

8.7. Monitoring access to equipment for transferring or processing NM

8.8. NM control and accounting in the event of an accident or emergency situation

#### **Analysis:**

These citations set out the requirements for the documentation and training procedures for external transfers

#### **29. MC&A accuracy norms**

#### **Analysis:**

Minatom Order #333r describes the need for organizations to establish physical inventory requirements that are characteristic of the enterprise including the accuracy requirements that must be reviewed for the confirmatory measurements, the allowable inventory difference, etc. In addition to the principles of governmental control and accounting, accuracy criteria for TIDs, material location, measurements and nuclear material transfers are also required by OPUK. This element is adequately addressed.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	2.2.8, 2.2.9, 5.3, 5.4, 6.1.3, 6.1.4, 6.1.5, 6.1.6, 6.1.7, 6.1.8, 6.4.3, Appendix 6, 8.3	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

#### Citation:

#### 2 General Provisions

##### 2.2 Principles of governmental control and accounting of nuclear material

2.2.8 Physical inventories shall be conducted in order to establish the amount of nuclear material actually present in an MBA. Accounting data, attribute indicators, and measurements of the quantitative characteristics of the nuclear material are performed as part of the physical inventory process. Upon completion of a physical inventory, the nuclear material balance shall be established for each nuclear material; in addition, the inventory difference and its uncertainty shall be determined for each nuclear material.

2.2.9 Conclusions regarding [the existence of] a nuclear material deficit or excess or, conversely, the absence of any nuclear material control and accounting anomalies shall be based on the determination of the quantity of nuclear material actually present, as well as by comparing the inventory difference value obtained with its permissible value for each MBA.

#### 5 Procedures for Transferring Nuclear Material

##### 5.3 Assessing discrepancies between shipper and receiver data

Discrepancies between shipper and receiver data regarding the mass of nuclear material that has been transferred are defined as the difference between the mass values shown by the shipping organization (passport data) and the mass values obtained by the receiving organization as the result of measurements. If the results agree (the discrepancy between shipper and receiver data lies within the interval representing a 0.99 confidence probability, taking into consideration the uncertainty of the measurements conducted by the shipper and receiver), the receiving organization shall use the shipping organization data when entering the nuclear material into account.

##### 5.4 Actions taken when a nuclear material control and accounting anomaly is discovered

5.4.1 When a statistically significant discrepancy has been discovered, based on a 0.99 confidence probability for data from both the shipping organization and the receiving organization, steps shall be taken to determine the cause of the discrepancy.

5.4.2 If the statistically significant discrepancy between data from the shipping organization and the receiving organization is confirmed, the receiving organization must compile a special report and send that report to the ministry (agency) level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, the federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and the agency that regulates the safe use of nuclear energy.

#### 6.0 Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference

##### 6.1 General requirements

6.1.3 Physical inventory procedures shall be based on the following:

- Preparing the MBA for the physical inventory
- Compiling an IL and PIL and inspecting accounting documents
- Verifying that the IL matches accounting data
- Inspecting the physical condition of the access control devices
- Accounting and confirmatory measurements of the quantity of nuclear material actually present, taking the measurement uncertainty into consideration
- Estimating the amount of holdup and its uncertainty
- Establishing the inventory difference and its uncertainty for each nuclear material

6.1.4 The quantity of nuclear material present in each MBA shall be determined by measuring the quantity and composition of the nuclear material at KMPs; it should be monitored by conducting operational (near-real time) accounting and audits to verify the presence of nuclear material items based on attribute indicators, regular reconciliation of accounting and reporting forms; and it should be verified by conducting physical inventories. Operational accounting shall include procedures that are carried out during process operations in support of nuclear material control and accounting activities. Physical inventories shall culminate in a balance closeout for each nuclear material in the MBA over the reporting period, determining the inventory difference and its uncertainty,

followed by a statistical analysis of the ID significance as specified in the requirements set forth in Paras. 6.4.1 and 6.4.2 of these Rules.

The inventory difference for a specific material in an MBA is determined using the following equation:

$$IP = KK * DK = KK * UB + UM * HK$$

$$\{IR = KK * DK = KK * UV + UM * NK\}$$

where:

KK is the amount of nuclear material actually present in the MBA, determined as the result of a physical inventory  
DK is the nuclear material book inventory in the MBA at the start of the inventory taking

UV is the recorded increase of nuclear material quantity in the MBA for a given reporting period resulting from all shipments and production, etc.

UM is the recorded decrease of nuclear material quantity in the MBA for a given reporting period resulting from all shipments out of the MBA, nuclear conversion, and losses, etc.

NK is the quantity of nuclear material present in the MBA, determined and recorded at the beginning of the given reporting period

6.1.5 The mass of each nuclear material shall be determined. The mass and the measurement uncertainty for a 0.95 confidence probability shall be documented.

6.1.6 Values for nuclear material mass that were determined at an earlier date may be used when performing accounting procedures (conducting physical inventories, transferring nuclear materials, etc.) only in those instances where the reliability of these data can be confirmed from the time they were established to the time they are used by verifying the appropriate physical condition of the access control devices employed and/or confirmed during the implementation of accounting procedures through measurement of the quantitative parameters of the nuclear material and/or the attribute indicators of the material.

6.1.7 The extent to which confirmatory measurements are used shall be established depending on the scope and results obtained from inspecting the access control devices, based on the probability of detecting a threshold quantity deficit (excess) for each nuclear material specified in Para. 6.4.3 of these Rules. A statistically significant difference between accounting and confirmatory measurements of the quantitative parameters of nuclear material, items, or products shall be established using a confidence probability of 0.99.

6.1.8 In the event a statistically significant difference between accounting and confirmatory measurements is established, management at the operating organization shall be informed and the cause of the difference determined.

## **6.0 Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference**

### **6.4 Criteria for Detecting Nuclear Material Control and Accounting Anomalies**

6.4.3 If accounting measurements were not taken for a nuclear material during a reporting period or during an inventory, but the accuracy of previous accounting measurements was preserved by the use of access control equipment, any decision that there are no nuclear material control and accounting anomalies shall be based on the results of random confirmatory measurements, the scope of which shall be determined by a special methodology utilizing two parameters: the threshold quantities of nuclear materials and the probability of detecting threshold quantities of a material deficit (excess).

The threshold quantities for Categories One, Two, and Three are:

3 kg – for plutonium, uranium-233

8 kg – for uranium-235

The threshold quantity for uranium with enrichment < 20% (Category Four) shall be 70 kg of uranium-235.

The probability of detecting threshold quantities of a nuclear material deficit (excess) used when calculating the size of the random sample for confirmatory measurements is presented in Appendix 6.

Appendix 6

Probability of Detecting a Threshold Quantity Deficit (Excess) of Nuclear Material  
for Calculating the Size of a Confirmatory Measurement Sample.

## **8.0 Nuclear Material Control and Accounting in Organizations**

8.3 The reliability level for information submitted to the nuclear material control and accounting system in MBAs regarding item identifiers, TID identifiers, and the physical location of items shall be not less than 99%.

### **Analysis:**

2.2.8, 2.2.9: These citations require a facility to establish baseline nuclear material inventory values through physical inventories and measurements.

5.3, 5.4: This citation establishes the confidence probability for shipper/receiver data when shipping between facilities.

6.1.3-6.1.8: These citations require a facility to establish physical inventory procedures to verify that physical inventories match book inventory. This citation also requires a facility to establish the mass of each nuclear material and document measurement uncertainties.

6.4.3, Appendix 6: This citation establishes criteria for detecting nuclear material control and accounting anomalies

8.3: This citation requires a facility to have 99% confidence in their nuclear material accounting records.

Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	4.7.2	7	Minatom/Rosatom	Enacted
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**Citation:****4 Chapter Contents****4.7 Chapter on "NM Physical Inventory"**

4.7.2 Physical inventory requirements that are characteristic of the enterprise, such as the scope of measurements, the required confirmatory measurement accuracy, the requirements for allowable inventory difference, etc. shall be reviewed.

**Analysis:**

This citation requires development of physical inventory procedures that detail the scope of measurements, confirmatory measurement accuracy and allowable inventory differences.

**30. Site-level system of accounting records and reports****Analysis:**

Decree 352 describes the required documentation to establish the Site level system of accounting records and reports. OPUK sets the requirements for accounting and reporting documents, the required forms, management approval of MBA level procedures, documenting nuclear material transfers, transfer of in process material from one operation to another or one shift to another, and the monitoring of this documentation. This element is adequately addressed.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	7, 8.2 Bullet 6, 8.4 Bullet 3, 8.7, 8.8, 9.4 bullet 1, 3, 4 and 7	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

**Citation:****7 Accounting and Reporting Documents. Advance Notices****7.1 Accounting documents**

7.1.1 Accounting documents shall be maintained for each MBA; these documents shall contain data on each nuclear material kind [present in the MBA], including:

- The quantity of material in the MBA
- Changes in the quantity of material in the MBA

7.1.2 Accounting documents shall reflect all changes in the quantity of material for each batch, the characteristics of the batch, and initial batch preparation data. Dates on which changes in the quantity of nuclear material occurred shall be indicated, along with the shipping organization MBA and the receiving organization MBA.

7.1.3 The data used to determine the quantitative and qualitative changes to nuclear material in an MBA—including results from the calibration, inspection, and qualification of measuring instruments, sample selection data and analysis results, measurement quality control results, and the random uncertainty and bias of measurements—shall be reflected in the appropriate documents.

**7.2 Reporting documents**

7.2.1 Every organization shall create and actively maintain the following reporting documents, which shall be based on accounting documents:

- Inventory change reports
- Material balance reports
- Inventory listings
- Physical inventory listings
- Special reports

7.2.2 The organization submits reporting documents on a regular schedule approved in advance to the agency that manages the use of atomic energy [within the ministry] to which it reports, and also to the federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities.

7.2.3 ICRs, ILs, and PILs shall be compiled at the MBA level and at the organization level. These reports shall contain information regarding the actual quantity of nuclear material and its movement between MBAs or between organizations.

7.2.4 MBA level ICRs shall be submitted to the office within the organization that routinely carries out nuclear material accounting activities immediately after each event associated with a change in nuclear material quantity, or monthly on all the changes in nuclear material quantity that have occurred over that period, but not later than the 15th day in the month immediately following the month in which these changes occurred.

7.2.5 Organization level ICRs shall be submitted quarterly and shall contain data on all the changes in nuclear

material quantity that have occurred over that period.

7.2.6 When no changes in the inventory quantity of nuclear material have occurred in the MBAs at the organization during a reporting period, the organization shall submit a report using the official form filled out in accordance with established procedures and indicating that there have been no changes in the inventory quantity of nuclear material over the reporting period.

7.2.7 Material balance reports shall be prepared based on the results of the physical inventories conducted within MBAs.

7.2.8 MBA material balance reports shall reflect the following information for each nuclear material in the form of separate entries:

- The initial book inventory
- Increases and/or decreases in the quantity of nuclear material over the reporting period
- The ending quantity of nuclear material actually present [in the MBA] as established by a physical inventory
- The inventory difference and its uncertainty

7.2.9 Organization material balance reports shall indicate the nuclear material balance based on the quantity of nuclear material actually present [in the organization] as established in the course of a physical inventory.

7.2.10 Organization material balance reports shall reflect the following information for each nuclear material in the form of separate entries:

- The initial book inventory
- The final book inventory and the ending quantity of nuclear material actually present [in the organization] as established by a physical inventory

7.2.11 If comparison of the ending quantity of nuclear material actually present and the IL final book inventory of material present reveals an anomaly, the required documents confirming the justification for accepting the quantity of nuclear material actually present as the initial [book inventory] for the next reporting period.

7.2.12 A PIL for the end of the reporting period shall be compiled at the same time the material balance report is compiled.

7.2.13 The MBA PIL shall be compiled on the [end] date of the physical inventory in the form of a sequenced list for each material kind and material batch; the PIL shall indicate the identification and other characteristics of each nuclear material batch and nuclear material kind separately.

7.2.14 MBA MBRs and PILs shall be submitted by the individual in charge of control and accounting in the MBA to the nuclear material accounting office within the organization within 15 days of determining the quantity of nuclear material actually present [in the MBA].

7.2.15 Special reports shall be compiled by the operating organization (organization) whenever the loss, theft, or unauthorized use of nuclear material has been revealed, when a deficit (excess) of nuclear material has been detected, and also whenever the established limits for inventory difference or statistically significant discrepancies between data from the shipping organization and the receiving organization have been exceeded.

Special reports are submitted to the appropriate agencies that manage the use of atomic energy and the agency that regulates the safe use of nuclear energy within 24 hours of establishing [any of] the facts specified above.

7.2.16 Special reports shall contain the following information:

- A description of the circumstances, events, and/or series of events associated with unauthorized use of the nuclear material
- Identification and definition of the nuclear material kind
- Initial data for determining the quantitative characteristics of the nuclear material
- The measures taken and the action plan to resolve the problems that have arisen

7.2.17 Upon request, organization reporting documents regarding its MBAs are submitted by the organization to the agency that regulates the safe use of nuclear energy and provides oversight of the governmental system for nuclear material control and accounting (or to one of its regional offices).

7.3 System of advance notices regarding nuclear material transfers

7.3.1 When nuclear material is shipped between organizations, at least ten (10) days prior to the anticipated date the nuclear material is to be shipped, the shipping organization shall send an advance notice regarding the nuclear material shipment to the receiving organization, the federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and to the administrative unit within the agency that regulates the safe use of nuclear energy that provides oversight of the governmental system for nuclear material control and accounting at the shipping organization.

7.3.2 In the event of an unscheduled shipment resulting from a special order issued by the appropriate executive branch agencies, notices shall be sent no later than three days after the shipping date has been established.

7.3.3 After receiving nuclear material in situations described in Paras. 7.3.1 and 7.3.2 of these Rules and entering the material into account, the receiving organization shall send receipt confirmation to the shipping organization, federal level agency that manages the use of atomic energy and implements nuclear material control and accounting activities, and to the administrative unit within the agency that regulates the safe use of nuclear energy that provides oversight of the governmental system for nuclear material control and accounting at the receiving organization.

## **8 Nuclear Material Control and Accounting in Organizations**

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

...

- A list of accounting and reporting documents and [copies of] the forms to be used

...

8.4 For each MBA, the manager of the organization shall develop and approve nuclear material control and accounting procedures that identify the following:

...

- The nuclear material control and accounting procedures adopted for use in each MBA

...

8.7 Transfer of nuclear material from one material custodian to other individuals shall be documented in writing.

8.8 The transfer of in-process nuclear material from one process operation to another or from one shift to another shall be documented in writing.

### **9 Ministry (Agency) Monitoring of Governmental Control and Accounting of Nuclear Material**

9.4 Agency monitoring activities shall include the following:

- Monitoring how accounting and reporting documents are maintained

...

- Reconciling the data in accounting and reporting documents
- Inspecting the procedures used to conduct physical inventories and close out the nuclear material balance

...

- Verifying the availability and the quality of the measurement methodologies and measuring instruments have been adopted for nuclear material control and accounting purposes, including by having employees (personnel) at the organization carry out additional measurements of nuclear material parameters

...

#### **Analysis:**

Section 7 of OPUK establishes requirements for maintaining accounting documents at a nuclear facility.

8.2 Bullet 6: This citation requires the manager of an organization to establish a list of accounting and reporting documents and forms to be used at the facility.

8.4 Bullet 3: This citation requires organization manager to develop and approve nuclear material control and accounting procedures that identify nuclear material control and accounting procedures for each MBA.

8.7: This citation requires written chain of custody for nuclear material.

8.8: This citation requires written chain of custody for in-process nuclear material.

9.4 bullet 1, 3, 4 and 7: This citation requires agency level monitoring of accounting and reporting documents, reconciliation of accounting and reporting documents, inspection of procedures used to conduct physical inventories and nuclear material balance closures and verification of measurement procedures.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	Entire Document	7	Minatom/Rosatom	Enacted
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#### **Citation:**

*Entire Document*

#### **Analysis:**

This Standard Regulation establishes general requirements for the structure, style, content, and format of the "Minatom of Russia Enterprise Regulation on Nuclear Material Control and Accounting." This appears to be the format guide for Material Control and Accountability at facilities within the Russian Federation.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	Entire Document	4	RF Government	Enacted
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#### **Citation:**

*Entire Document*

#### **Analysis:**

This Regulation has been developed to establish the organization of the State System for Nuclear Material Accounting and Control and procedures for control and accounting of nuclear material that must be carried out by

all legal entities, irrespective of their organizational or legal status, involved in the production, use, processing, storage, transportation and movement of nuclear material.

### 31. Reporting SNM data to the Federal level. Reconciliation of the data in the reports.

#### Analysis:

Russian regulations describe what reports must be submitted to the FIS, the format and timing of submission. Procedures for reconciliation of information are currently being updated. A temporary procedure is in place in the meantime.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	7.2	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

#### Citation:

#### 7 Accounting and Reporting Documents. Advance Notices

#### 7.2 Reporting documents

*Entire Section*

#### Analysis:

OPUK provides a list of reports and timing requirements for their sumittal to the FIS.

0506	Reporting Forms for Governmental Nuclear Material Control and Accounting and the Procedure and Schedule for their Submission (for SIL (Summarized Inventory Listing) and SICR (Summarized Inventory Change Report))	MC	Minatom Order # 464	Entire Document	7	Minatom/Rosatom	Enacted
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#### Citation:

*Entire Document*

#### Analysis:

This document establishes the procedure for submitting the nuclear material inventory data of organization material balance areas (MBAs) to the Automated Federal Information System.

### 32. Evaluation of inventory difference error

#### Analysis:

Rosatom Inspection Trending Reports indicate the need to revise procedures to determine inventory difference error and the evaluation of its significance (Rosatom 2008). Existing regulations do not specify methodologies that are acceptable for the calculation of the limit of error for inventory difference.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	Terms and Definitions, 2.2.8, 6.1.1 Bullet 3, 6.1.3 Bullet 7, 6.1.4, 6.3.2, 6.4.2	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

#### Citation:

Inventory Difference (ID) [инвентаризационная разница (ИР)]—the difference between physical inventory and book inventory of nuclear material.

## 2 General Provisions

### 2.2 Principles of governmental control and accounting of nuclear material

2.2.8 Physical inventories shall be conducted in order to establish the amount of nuclear material actually present in an MBA. Accounting data, attribute indicators, and measurements of the quantitative characteristics of the nuclear material are performed as part of the physical inventory process. Upon completion of a physical inventory, the nuclear material balance shall be established for each nuclear material; in addition, the inventory difference and its uncertainty shall be determined for each nuclear material.

## 6.0 Physical Inventories, Material Balance Closeout, Estimating the Inventory Difference

### 6.1 General requirements

6.1.1 Physical inventories shall be conducted for the following purposes:

...

– Calculating the material balance, determining the inventory difference and its uncertainty

...

6.1.3 Physical inventory procedures shall be based on the following:

...

– Establishing the inventory difference and its uncertainty for each nuclear material

6.1.4 The quantity of nuclear material present in each MBA shall be determined by measuring the quantity and composition of the nuclear material at KMPS; it should be monitored by conducting operational (near-real time) accounting and audits to verify the presence of nuclear material items based on attribute indicators, regular reconciliation of accounting and reporting forms; and it should be verified by conducting physical inventories. Operational accounting shall include procedures that are carried out during process operations in support of nuclear material control and accounting activities. Physical inventories shall culminate in a balance closeout for each nuclear material in the MBA over the reporting period, determining the inventory difference and its uncertainty, followed by a statistical analysis of the ID significance as specified in the requirements set forth in Paras. 6.4.1 and 6.4.2 of these Rules.

The inventory difference for a specific material in an MBA is determined using the following equation:

$$IP = KK * DK = KK * UB + UM * HK$$

$$\{IR = KK * DK = KK * UV + UM * NK\}$$

where:

KK is the amount of nuclear material actually present in the MBA, determined as the result of a physical inventory

DK is the nuclear material book inventory in the MBA at the start of the inventory taking

UV is the recorded increase of nuclear material quantity in the MBA for a given reporting period resulting from all shipments and production, etc.

UM is the recorded decrease of nuclear material quantity in the MBA for a given reporting period resulting from all shipments out of the MBA, nuclear conversion, and losses, etc.

NK is the quantity of nuclear material present in the MBA, determined and recorded at the beginning of the given reporting period

### 6.3 Organizing physical inventories

6.3.2 Upon completion of the physical inventory, the inventory team shall compile a report; the nuclear material balance is established for each nuclear material; the inventory difference and its uncertainty are determined for each nuclear material; accounting forms are filled out; and the MBR and PIL are compiled and approved.

### 6.4 Criteria for Detecting Nuclear Material Control and Accounting Anomalies

6.4.2 If accounting measurements of a nuclear material were taken upon its production, receipt, processing, or shipment during a reporting period, or if such measurements were taken as part of a physical inventory, the criterion for detecting control and accounting anomalies for this material shall be the fact that the absolute value of the inventory difference exceeds three standard deviations of its uncertainty, or any of the following values (with a 0.95 confidence probability):

– 2 % of the book inventory of the nuclear material plus all increases in its quantity over the reporting period – for industrial nuclear facilities

– 3 % of this figure – for experimental and research nuclear facilities

– 3 kg – for plutonium and uranium-233 for Category One and Category Two MBAs

– 8 kg – for uranium-235 for Category One, Two, or Three MBAs

– 70 kg for uranium-235 – for uranium with enrichment < 20%

### Analysis:

Rosatom Inspection Trending Reports indicate the need to revise procedures to determine inventory difference error and the evaluation of its significance (Rosatom 2008). Existing regulations do not specify methodologies that are acceptable for the calculation of the limit of error for inventory difference.

There is an apparent mistake in Para. 6.1.4. That section refers to Paras. 6.4.1 and 6.4.2 for the specification of statistical analysis of ID significance. Para. 6.4.1 deals with missing or surplus items and has no statistical implications.

0706	Regulation on the State System for Nuclear Material Accounting and Control	MC	Decree № 352	9 g), 19	4	RF Government	Enacted
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**Citation:**

**III Governmental Nuclear Material Control and Accounting**

9. The minimum quantity of nuclear material within an organization subject to governmental control and accounting is established by federal rules and regulations for governmental control and accounting, which establish the following:

...

g) Procedural requirements for calculating the nuclear material balance and determining the allowable inventory difference

...

**V Nuclear Material Control and Accounting at Organizations Handling Nuclear Material**

19. The actual quantity, qualitative composition, and status of nuclear material located in material balance areas shall be determined during nuclear material physical inventories.

The procedures for organizing and conducting nuclear material physical inventories, as well as the frequency and scope of the inventories, shall be established by organizations handling nuclear material in accordance with the federal rules and regulations for governmental nuclear material control and accounting. These shall be based on the technological process, equipping the material balance area with physical protection and security equipment, and implementing access control measures and equipment for this material.

A nuclear material balance shall be performed based on the nuclear material physical inventory results in each material balance area, and an MBA material balance report shall be generated, which the director of the organization will approve. The material balance report for the MBA shall contain information regarding the actual and recorded quantities of nuclear material, the inventory difference, and its uncertainty.

**Analysis:**

Rosatom Inspection Trending Reports indicate the need to revise procedures to determine inventory difference error and the evaluation of its significance (Rosatom 2008). Existing regulations do not specify methodologies that are acceptable for the calculation of the limit of error for inventory difference.

**33. Procedure for establishing protected areas, internal areas and vital areas**

**Analysis:**

Requirements are present that mandate the establishment of secure areas (protected, internal, and vital areas) depending on the location and operation of NM, nuclear facilities, and other objects of physical protection in production areas at the potentially hazardous nuclear site, in order to provide "defense-in-depth." Regulations also appear to provide a methodology for categorization, though that methodology is not available to the U.S. In addition, when redesigning or re-equipping an existing site, the zonal principle for constructing the physical protection system must be employed.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	3.1, 4.3.1, 4.3.2, 4.3.3, 4.3.4	7	Minatom/Rosatom	Enacted

**Citation:**

**3 PRINCIPLES FOR CATEGORIZING ROOMS IN BUILDINGS AND STRUCTURES AT A POTENTIALLY HAZARDOUS NUCLEAR SITE**

3.1 The following secure areas shall be designated in accordance with the zonal principle for PP system design at potentially hazardous nuclear sites: protected area, internal area, and vital area.

Secure areas shall be determined based on the categorization of objects of physical protection that may be located within. Principles and procedures for categorizing objects of physical protection are specified in the "Regulation on the General Requirements for Physical Protection Systems at Minatom of Russia Potentially Hazardous Nuclear Sites."

As specified in the requirements and provisions of this regulation, objects of physical protection that have been assigned to the appropriate category ("A" [A], "B" [Б], "C" [В], "D" [Г], or "E" [Д]) may be located in the following

secure areas:

Protected areas [may contain] objects of physical protection assigned to categories "D" (with additional security boundaries) and "E";

Internal areas [may contain] objects of physical protection assigned to categories "B" (with additional security boundaries), "C," "D," and "E";

Vital areas [may contain] objects of physical protection assigned to categories "A" and "B," as well as objects assigned to other categories, if necessary.

#### **4 GENERAL SITE PLAN REQUIREMENTS FOR A POTENTIALLY HAZARDOUS NUCLEAR SITE**

##### **4.3 Requirements for siting main process buildings and structures, ancillary and other facilities.**

4.3.1 When redesigning or re-equipping an existing site, the zonal principle for constructing the physical protection system shall be employed.

Secure areas (protected, internal, and vital areas) shall be established depending on the location and operation of NM, nuclear facilities, and other objects of physical protection in production areas at the potentially hazardous nuclear site, in order to provide "defense-in-depth."

4.3.2 When designing a new potentially hazardous nuclear site, buildings and structures that have categorized rooms should be situated as far as possible from the perimeter of the protected area and to the extent possible shall be located in a compact group (block), taking coverage by other buildings and structures into account.

4.3.3 The local perimeter within the protected area may be equipped to serve as the primary fence of the internal area, where buildings and structures containing rooms assigned to categories no higher than B are located. The walls of buildings and structures may also serve as internal area boundaries.

The disposition of buildings and structures within the internal area is the same as their disposition would be in the protected area: The higher the categories assigned to rooms in these buildings, the closer they should be to the center so that the more important facilities are concealed by those that are less important.

4.3.4 Buildings and structures that have rooms assigned to category "A" shall be located in a compact group (block) at the greatest distance possible from the internal area boundary. Where necessary, an additional local perimeter may be established to create a vital area. Vital areas may also be established within individual buildings and structures, in which case the walls, ceiling and floor of the categorized room shall serve as the border of the secure area.

#### **Analysis:**

3.1: Establishes requirements for categorizing rooms, buildings and structures.

4: Describes procedures for site planning requirements

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	1.2 bullet 6, 3.3.4.2, 3.3.4.3, 4.4.13, 4.6.7	7	Minatom/Rosatom	Enacted
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#### **Citation:**

##### **1 General Provisions.**

1.2 This document establishes:

...

- Criteria and procedures for categorizing potentially hazardous nuclear sites and objects of physical protection;

...

##### **3 Goals, Tasks, and Design Principles of Physical Protection Systems at Potentially Hazardous Nuclear Sites.**

##### **3.3 General design principles of PP systems.**

##### **3.3.4 The principle of zonal design.**

3.3.4.2 One must identify at a potentially hazardous nuclear site both the areas in which nuclear facilities are located and/or nuclear material is stored and/or activities are conducted involving nuclear material (protected, internal, and vital areas) and areas that contain no nuclear material or nuclear facilities, but where access is limited because components that are vital to the site or its safety systems are located there (restricted access areas).

3.3.4.3 Objects of physical protection shall be located in secure areas appropriate to their assigned category. When organizing zones at a site, physical protection shall be intensified as one proceeds from the perimeter to the center of the site, i.e., towards the protected objects of physical protection. If the process of assessing the effectiveness of the PP system reveals that the existing secure areas are inadequate for neutralizing potential threats, additional secure areas (boundaries) may be established within the existing area or the objects of physical protection may be moved to other secure areas.

Requirements for categorizing and locating objects of physical protection in appropriate secure areas are identified in Chapter Four of this document.

##### **4 The Categorization of Potentially Hazardous Nuclear Sites.**

##### **4.4 The categorization of objects of physical protection and conditions for their location in secure areas.**

4.4.13 An object of physical protection is categorized based on the existing categorization criterion or set of criteria. Objects of physical protection shall be located in secure areas appropriate to their assigned category. Categories assigned to objects of physical protection and requirements for installing such objects in the appropriate secure area are presented in the following table.

Table

Category Object of physical protection characteristics Secure area where object of physical protection shall be placed

A {A} 1 Object of physical protection meets no less than two of the following criteria, one of which is the NM category:

- NM – Category I;
- Security classification – vital {OB};
- Effects of unauthorized actions – Category I.

2 Significant quantity of direct use NM. Vital area with additional physical security boundaries (if required)

B {B} 1 Object of physical protection meets one of the following criteria:

- NM – Category I or Category II with potential accumulation to Category I;
- Security classification – vital [OB];
- Effects of unauthorized actions – Category I.

2 Object of physical protection meets no less than two of the following criteria, one of which is the NM category:

- NM – Category II;
- Security classification – top secret [CC];
- Effects of unauthorized actions – Category II. Vital area or internal area with additional physical security boundaries

C {C} The object of physical protection has one of the following criteria:

- NM – Category II;
- Security classification – top secret [CC];
- Effects of unauthorized actions – Category II. Internal Area

D {D} The object of physical protection has one of the following criteria:

- NM – Category III;
- Security classification – secret [S];
- Effects of unauthorized actions – Category III. Internal Area or Protected Area with additional physical protection boundaries established

E {E} NM not categorized as I, II, or III and other objects of physical protection not deemed category A – E. Protected Area

#### 4.6 Procedures for Categorizing Potentially Hazardous Nuclear Sites

4.6.7 It is mandatory that the rooms in which objects of physical protection are to be located undergo categorization using the procedures established by the potentially hazardous nuclear site administration in order to present source data for the creation and modernization of PP systems. The need and procedures for categorizing buildings and structures is determined by the site administration with due consideration for the specific characteristics of the potentially hazardous nuclear site, its secure areas, and the location of its objects of physical protection.

#### Analysis:

1.2: General provision of the document

3.3.4.2: Requirement to identify security areas and areas that have vital equipment

3.3.4.3: Requirement for use of security areas for protection of objects of physical protection and the use of increased levels of protection boundaries (security areas) if needed

4.4.13: Table in the document contains the characteristics of Objects of physical protection and the required security area used for protection (Vital, Internal, or Protected)

4.6.7: Establishes the requirement for categorization of rooms to provide data for the creation and modernization of PP systems

0715	Methodological Recommendations for Categorizing Objects of Physical Protection and Nuclear Sites	PP	(Not obtained)	3.1-3.3, 6.1.6, Appendix F	7	Minatom/Rosatom	Enacted
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#### Citation:

### 3 General Provisions

3.1 Objects of physical protection, rooms in which objects of physical protection are located, and nuclear sites as a whole are categorized for the purpose of differentiating the requirements for their physical protection and ensuring the adequacy of physical protection systems against known threats and intruder profiles. The administrative and technical measures for ensuring physical protection of specific objects of physical protection, rooms, buildings, structures, and industrial areas at nuclear sites, as well as the organization of security at nuclear facilities as a whole, depend on their established categories.

3.2 These Recommendations specify procedures for categorizing objects of physical protection and nuclear sites as established by the document "Procedures for the Physical Protection of Nuclear Material, Nuclear Facilities, and Nuclear Material Storage Points" [1].

3.3 Categorization conducted at nuclear sites as a whole in order to differentiate physical protection requirements includes:

- Categorizing objects of physical protection
- Categorizing rooms
- Categorizing (if necessary) buildings, structures, and industrial sites
- Categorizing nuclear sites as a whole

Categorizing objects of physical protection, in turn, includes:

- Categorizing nuclear material constituting objects of physical protection or in the composition of objects of physical protection
- Categorizing possible consequences of unauthorized actions if threats to objects of physical protection are carried out (henceforth, categorizing consequences of unauthorized actions)

Categorizing the consequences of unauthorized actions is determined on the basis of an evaluation of the magnitude of the consequences of unauthorized actions carried out against objects of physical protection (henceforth, magnitude of the consequences of unauthorized actions), in accordance with Section 5 of these Recommendations.

6.1.6 Based on the application of the above listed parameters or a combination of the parameters to objects of physical protection, 5 categories are established (A-E) [1]. Depending on the category of an object of physical protection and the features of nuclear facilities and nuclear site storage facilities, appropriate secure areas (protected, internal, and vital areas) and limited access areas are identified and documented in writing. For nuclear plants, procedures for identifying secure areas may be carried out in accordance with Appendix F.

To differentiate the requirements for objects of physical protection in each category of objects of physical protection, a protection level is established for each specific object of physical protection as specified by the requirements for the appropriate secure area. The categories of objects of physical protection and the requirements for housing objects of physical protection in appropriate secure areas and limited access areas are provided in Appendix 3 to Physical Protection Procedures [1].

The necessity of organizing additional physical protection borders in secure areas and requirements for them are determined when designing (upgrading) physical protection systems based on the assessment of its effectiveness.

#### Appendix F - Procedures for Identifying Secure Areas at Nuclear Plants

Appendix F, which is present in the adopted version of the document, was not included in the version sent to PNNL.

#### Analysis:

3.1-3.3: Text establishes the requirement to categorize rooms, buildings, structures, and areas to differentiate requirements for physical protection

6.1.6: Text requires the identification and documentation of Protected, Internal, and Vital areas depending on the category of the object of physical protection and features of the nuclear facility

Appendix F: Title implies procedures for establishing security areas

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	2, 21, 27, 28, 29, 43, Appendix 3	4	RF Government	Enacted
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#### Citation:

2. These Procedures use the following terms based on their accompanying definitions:

...

Internal area – an area, situated within a protected area, surrounded by physical barriers and under continuous guard and surveillance, access to which is limited and monitored

...

Protected area – an area within a nuclear site surrounded by physical barriers and under continuous guard and

surveillance, access to which is limited and monitored

...

Vital area – an area, situated within an internal area, surrounded by physical barriers and under continuous guard and surveillance, access to which is limited and monitored

...

### III. Organization and Implementation of Physical Protection at Nuclear Sites

21. To perform physical protection tasks, the management staff at the nuclear site (conjointly with the leadership of the appropriate military units and forces at sites guarded by the Russian Federation Ministry of Internal Affairs internal security troops or by site security forces affiliated with Russian Federation law enforcement agencies):

- a) Conducts a vulnerability analysis
- b) Assesses the consequences of unauthorized actions involving the objects of physical protection
- c) Categorizes objects of physical protection, rooms (buildings and structures when necessary), and the nuclear site itself
- d) Establishes secure areas and restricted access areas; determines the locations of objects of physical protection in the appropriate area, building, structure, and room
- e) Establishes a security system for the nuclear site
- f) Develops requirements for the physical protection system based on the requirements set forth in these Procedures and in other regulatory and legal documents
- g) Assesses the effectiveness of the physical protection system during its development (upgrade) and as necessary
- h) Develops documents regarding the administration and provision of physical protection at the nuclear site
- i) Operates the physical protection system, including physical protection and security equipment
- j) Conducts site-level monitoring of compliance with physical protection requirements

27. The areas in which objects of physical protection are placed is based on the following factors:

- a) The nuclear material category
- b) The security classification assigned to the objects of physical protection in the regulations of federal executive branch agencies
- c) The category of the consequence of unauthorized actions involving the objects of physical protection

28. Secure and restricted access areas at a nuclear site are designated and documented according to the siting requirements for objects of physical protection presented in Appendix 3.

When establishing secure areas, vital areas are situated within internal areas, which in turn are located within protected areas.

29. Within nuclear sites, rooms containing objects of physical protection are categorized, as are, when necessary, buildings and structures. The category of a room, building, and structure is based on the highest category of the nuclear material located there and/or the nuclear material within the nuclear facilities located there, taking into account its security classification.

43. Nuclear sites are categorized to determine whether they must be guarded by internal security troops of the Russian Federation Ministry of Internal Affairs.

The procedures for categorizing a nuclear site are established in federal rules and regulations for physical protection, taking into account the category of objects requiring physical protection and the areas in which they are located.

### APPENDIX 3

#### To Procedures for the Physical Protection of Nuclear Material, Nuclear Sites, and Nuclear Material Storage Points

##### Requirements for Siting Objects of Physical Protection at a Nuclear Site

Category	Characteristics of the Object of Physical Protection	Area Where the Object of Physical Protection Is Sited
A	At least two of the following are true: <ul style="list-style-type: none"> <li>• Category I nuclear material</li> <li>• Security classification – vital</li> <li>• Category I consequence of unauthorized actions Vital area provided with additional physical protection and security equipment (if necessary)</li> </ul>	Same as above
B	At least one of the following is true: <ul style="list-style-type: none"> <li>• Category I or Category II (with possible buildup to Category I) nuclear material</li> <li>• Security classification – vital</li> <li>• Category I consequence of unauthorized actions Vital or internal area provided with additional physical protection and security equipment (if necessary)</li> </ul>	Same as above
C	At least two of the following are true: <ul style="list-style-type: none"> <li>• Category II nuclear material</li> <li>• Security classification – top secret</li> <li>• Category II consequence of unauthorized actions Vital or internal area provided with additional physical protection and security equipment (if necessary)</li> </ul>	Same as above

A At least two of the following are true:

- Category I nuclear material
- Security classification – vital
- Category I consequence of unauthorized actions Vital area provided with additional physical protection and security equipment (if necessary)

A Significant quantity of direct use nuclear material Same as above

B At least one of the following is true:

- Category I or Category II (with possible buildup to Category I) nuclear material
- Security classification – vital
- Category I consequence of unauthorized actions Vital or internal area provided with additional physical protection and security equipment (if necessary)

B At least two of the following are true:

- Category II nuclear material
- Security classification – top secret
- Category II consequence of unauthorized actions Vital or internal area provided with additional physical protection and security equipment (if necessary)

C At least one of the following is true:

- Category II nuclear material

- Security classification – top secret
  - Category II consequence of unauthorized actions Internal area
- D At least one of the following is true:
- Category III nuclear material
  - Security classification – secret
  - Category III consequence of unauthorized actions Protected area or protected area outfitted with additional physical protection and security equipment, or (if necessary)
- E Other objects of physical protection Restricted access area
- Notes: 1. When siting an object of physical protection, consider the quantity of nuclear material and its potential use to fabricate an explosive nuclear device or its components.
2. The quantity of nuclear material sufficient to fabricate an explosive nuclear device is a significant quantity of nuclear material.
3. Direct use nuclear material is nuclear material that can be used to fabricate an explosive nuclear device or its components:
- a) Without additional processing
  - b) Without conversion or enrichment but requiring insignificant additional chemical or physical processing
4. The necessity of additional physical protection and security equipment and corresponding requirements is dictated by the physical protection system effectiveness assessment that is conducted when the system is being developed (upgraded).

**Analysis:**

2: Text provides definitions of Internal Area, Protected Area, and Vital Area

21: Requirement for site management staff and leadership of military units to establish secure areas and restricted access areas.

27-29: Establishes criteria for placement of object of physical protection into areas

43: Requires categorization to determine need for protection by internal security troops

Appendix 3: Table contains the requirements for protection of Objects of Physical Protection with Security Areas

**34. Procedure for on-site transportation of nuclear materials****Analysis:**

Requirements exist that mandate the development of procedures for the on-site transportation of nuclear material. Requirements for the organization and operation of the access control and management system must be governed by the "Instructions regarding access control procedures" and other documentation developed at the site that shall specify:

- Procedures for vehicles delivering (receiving) nuclear material and items containing them or other material assets to access the premises of a site.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	10.3.3 bullet 3, 12.1.4	7	Minatom/Rosatom	Enacted

**Citation:****10 Organizational Requirements for the Operation of Physical Protection Systems and for Planning Physical Protection Activities.****10.3 Organizational and planning requirements for the operation of off-site and on-site access control procedures**

10.3.3 Requirements for the organization and operation of the access control and management system shall be governed by the "Instructions regarding access control procedures" and other documentation developed at the site that shall specify:

...

- Procedures for vehicles delivering (receiving) nuclear material and items containing them or other material assets to access the premises of a site;

...

**12 Physical Protection Requirements for Transporting Nuclear Material.****12.1 General Provisions.**

12.1.4 The major organizational requirements for physical security when transporting all categories of NM are established by the Procedures;

The physical protection level for transporting NM shall be commensurate with the category assigned to the NM

that are being transported. This chapter presents the general requirements that are mandatory for all types of transported NM. The specific requirements for ensuring the physical protection of various categories of NM using various means of transport are defined in a separate document.

Requirements for transporting nuclear warheads and their components that have a security classification, as well as other special cargo, is stipulated by a regulation approved at the Federal level

**Analysis:**

10.3.3 bullet 3: Establishes procedures for the access control requirements for vehicles delivering or receiving nuclear materials.

12.1.4: This section (12) of the document is titled "Physical Protection Requirements for Transporting Nuclear Material" and contains requirements for transportation of all types of NM but points out that specific requirements are contained in another, unspecified, document.

0184	Instructions for Conducting Inspections of Nuclear Physical Protection During Shipment	PP	RD-08-25-2001	Entire Document	7	GAN/Rostekhnadzor	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

Whole document regards inspections of protection elements of nuclear material transportation

3133	On Transport Security	MC, PP	№ 16-FZ	Article 5, Paragraph 1-2, Article 9, Paragraph 1, Entire Document	3	RF Parliament	Enacted
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**Citation:**

**Article 5 Vulnerability Analysis of Transportation Infrastructure Sites and Transportation Equipment With Regard to Illegal Interference**

1 The procedures for conducting a vulnerability analysis for transportation infrastructure sites and transportation equipment are to be established by the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of transportation; these procedures are to be approved by the federal executive branch security agency of the Russian Federation and by the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of internal affairs.

2 The vulnerability analysis for transportation infrastructure sites and transportation equipment is to be conducted by specialized transportation security organizations, organizations and departments within the federal executive branch security agency of the Russian Federation, and by the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of internal affairs, taking into consideration transportation security requirements on the basis of a public tariff agreement established by the federal executive branch agency authorized to implement legal control with regard to government regulation of prices (tariffs) for goods (services) and to monitor their use.

**Article 9 Planning and Implementing Measures To Provide Transportation Security for Transportation Infrastructure Sites and Transportation Equipment**

1 On the basis of the results from the vulnerability analysis for transportation infrastructure sites and transportation equipment, the transportation infrastructure entities are to develop plans to provide transportation security for transportation infrastructure sites and transportation equipment. These plans are to establish a system of transportation security measures. The procedures for developing these plans are to be established by the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of transportation and approved by the federal executive branch security agency of the Russian Federation and the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of internal affairs.

**Entire Document**

**Analysis:**

Article 5, Paragraph 1-2: Vulnerability Analysis of Transportation Infrastructure Sites and Transportation Equipment

With Regard to Illegal Interference

Article 9, Paragraph 1: Implementing Measures To Provide Transportation Security for Transportation Infrastructure Sites and Transportation Equipment

Whole document regards requirements for transportation security

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	64	4	RF Government	Enacted
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**Citation:**

**IV. General Requirements for Organizing the Physical Protection of Nuclear Material and Nuclear Facilities during Shipment and Transportation**

64. International transport of nuclear material and nuclear facilities is permitted only if the shipping and receiving nations, as well as any other nations whose territory will be crossed, comply with the requirements set forth in the Convention on Physical Protection of Nuclear Material.

Physical protection requirements for inter-site shipment and transport are established in federal regulatory and legal documents.

Physical protection requirements for onsite shipment and transport are established in agency regulations.

Physical protection requirements for transportation and shipment beyond the boundaries of a nuclear site within a closed administrative area are established by the site management staff based on the results of a vulnerability analysis and physical protection system effectiveness assessment. The requirements must be at least as stringent as the requirements for onsite shipment and transport.

**Analysis:**

This section establishes the requirements for on-site shipments and shipments between sites but within a closed administrative area

**35. Procedure for off-site shipments of nuclear facilities**

**Analysis:**

There are clear requirements that address the subject of procedures for Off-site Shipments of Nuclear Facilities.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	12.1.3, 12.1.5, 12.1.6, 12.3.3	7	Minatom/Rosatom	Enacted

**Citation:**

**12 Physical Protection Requirements for Transporting Nuclear Material.**

**12.1 General Provisions.**

12.1.3 The physical protection [system] for NM in transit shall be capable of delaying adversaries until the response force can arrive and informing the services and federal executive branch agencies responsible for ensuring the physical protection of NM transportation if unauthorized actions against the NM or the vehicle transporting it are discovered or if any other emergency situation arises.

12.1.5 Physical protection of NM in transit shall include protection against theft, sabotage, and other unauthorized actions.

Physical protection equipment shall provide information transmission to the shipper and receiver of NM and to Minatom of Russia control points in a timely manner regarding:

- Deviations from the established route;
- Damage or breakdown;
- Accidents;
- Unauthorized activities.

12.1.6 Physical protection for the transportation of NM shall consist of the following components:

- Organizational measures;
- Physical protection and security equipment;
- Actions of the security forces and emergency response team.

### 12.3 Physical protection and security equipment.

12.3.3 Provisions in addition to the requirements for physical protection and security equipment set forth in Chapter Seven of this document shall ensure:

- That the progress of an intruder is delayed by concealed components which use sound, light, electromagnetic pulses, smokescreens and other methods to temporarily incapacitate or impede the progress of the intruder;
- That at least two channels, including a channel with two-way radio communications between escort security personnel and the driver, shall be compatible with the radio equipment used when transporting the material, shall have an output to the automated phone network to communicate during an emergency with the organizations involved in the physical protection system, and shall also transmit the coordinates of the transportation vehicle and any emergency situation to emergency response forces;
- The collection and archival of information regarding the actuation of equipment, actions taken at the control panel of the cargo escort and security force, and the exact location of the vehicle throughout its route;

#### Analysis:

12.1.3, 12.1.5: This Rosatom Order establishes basic requirements for transport of nuclear material. The citations included here are representative of the section's content. There is no prescriptive requirement for use of overpacks for shipment of Cat I and II material.

12.1.6, 12.3.3: This Rosatom Order establishes basic requirements for transport of nuclear material. The citations included here are representative of the section's content. There is no prescriptive requirement for use of overpacks for shipment of Cat I and II material.

0184	Instructions for Conducting Inspections of Nuclear Physical Protection During Shipment	PP	RD-08-25-2001	Entire Document	7	GAN/Rostekhnadzor	Enacted
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#### Citation:

*Entire Document*

#### Analysis:

Whole document regards inspections of protection elements of nuclear material transportation

0701	General Regulation for the Physical Protection, Control, and Accounting of Nuclear Material Used in Defense Nuclear Power Production Facilities	MC, PP	GKLI.1704-006-2008	10.3	7		Enacted
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#### Citation:

### 10 Requirements for Performing Nuclear Material Protection, Control, and Accounting Activities During On-Site Transfers and Transportation

10.3 The major requirements for on-site nuclear material transfers are as follows:

- Written authorization from head of the nuclear site
- The presence of site level procedures for nuclear material transfers
- Preparation of nuclear material for transfer (outgoing checks, TIDs affixed, accompanying documents included)

The major requirements for off-site transfers are as follows:

- Documented authorization for the transfer of the nuclear material (applications compiled within Rosatom)
- Documented authorization for shipment
- Presence of shipment notifications

#### Analysis:

On-site transfers for MC&A

3126	On the Governmental Agency Responsible for Nuclear Safety and Radiation Protection During the Transportation of Nuclear Materials,	MC, PP	RF Government Decree #	Entire Document	4	RF Government	Enacted
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Radioactive  
Substances, and  
Items Containing  
Them 204

**Citation:**

*Entire Document*

**Analysis:**

This regulation defines the goals and functions of the government agency responsible for nuclear safety and radiation protection during the transportation of nuclear materials, radioactive substances, and items containing them

3133	On Transport Security	MC, PP	№ 16-FZ	Entire Document	3	RF Parliament	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

Whole document regards requirements for transportation security

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	2,6, 8, 10, 11, 12, 13, 14, Section IV	4	RF Government	Enacted
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**Citation:**

2. These Procedures use the following terms based on their accompanying definitions:

...

Permit – authorization granted in accordance with established procedures for the use of specific types of transport packages or for the shipment or transportation of specific kinds of nuclear material and nuclear facilities

...

Nuclear material transport – moving nuclear material using any type of transportation equipment, including loading and unloading it, from a point of departure at a nuclear facility (nuclear material storage point) belonging to the shipper to a point of destination at a nuclear facility (nuclear material storage point) belonging to the receiver  
International transportation of nuclear material – the shipment of nuclear material by any mode of transport beyond the borders of the nation where the cargo originated, beginning with its departure from the nuclear facility of the shipper in one nation and ending with its arrival at the nuclear facility of the receiver another nation, and including shipment through third countries

...

**II. Governmental Physical Protection System****6. Within the scope of the governmental physical protection system, federal executive branch agencies perform the following within the limits of their authority:**

- a) Comply with international commitments under the Convention on the Physical Protection of Nuclear Material, as well as with intergovernmental and interagency agreements
- b) Organize and coordinate physical protection activities at the appropriate nuclear sites
- c) Work with the other relevant federal executive branch agencies to organize the shipment or transportation of nuclear material and nuclear facilities and to provide physical protection
- d) Develop and adopt physical protection regulations that are consistent with the requirements set forth in these Procedures and in other regulatory and legal documents regarding physical protection
- e) Participate in developing federal rules and regulations regarding physical protection
- f) Develop (participate in developing) a list of major threats to potentially hazardous nuclear and radiation sites and standard (model) intruder profiles (henceforth, list of threats)
- g) Decide which nuclear sites are suitable for handling nuclear material and for operating nuclear facilities and nuclear material storage points, as well as whether they are capable, independently or with other organizations, of developing, upgrading, and operating a physical protection system
- h) Develop agency-level scientific and technical programs for physical protection, including work plans
- i) Protect information regarding the organization and operation of physical protection systems
- j) Help investigative agencies uncover crimes related to unauthorized actions involving nuclear material, nuclear facilities, and nuclear material storage points

- k) Provide funding for physical protection
- l) Implement international cooperation in the area of physical protection
- m) Monitor the organization and status of physical protection at nuclear sites
- n) Define the procedures for establishing and upgrading physical protection systems in accordance with the requirements set forth in these Procedures

**8. Within the scope of its authority, the Russian Federation Ministry of Defense:**

- a) Guards subordinate nuclear sites; guards and escorts nuclear material and nuclear facilities during shipment and transport, with the exception of spent nuclear fuel
- b) Participates in providing security during emergencies at the nuclear sites under the jurisdiction of other federal executive branch agencies
- c) Implements government oversight of physical protection at nuclear sites that execute orders in the interests of the Russian Federation Ministry of Defense (at federal government unitary enterprises subordinate to the Russian Federation Ministry of Defense, the Federal Agency for Atomic Energy, the Federal Agency for Industry, Federal Agency for Science and Innovation, and at organizations that are not government owned)
- d) In accordance with established procedure, and with the approval of the relevant federal executive branch agencies, develops and adopts regulatory and legal documents regarding security at subordinate nuclear sites, as well as security during the transportation of nuclear facilities and nuclear material being handled at subordinate nuclear sites
- e) Implements measures to prevent and interdict acts of sabotage and the theft of nuclear facilities and nuclear material, as well as illegal trafficking in nuclear material

**10. Within the scope of its authority, the Federal Security Service of the Russian Federation:**

- a) Performs background investigations of individuals for clearance to information constituting a state secret, in order to determine whether they may work with nuclear material and at nuclear facilities and nuclear material storage points
- b) Conducts investigations to identify, prevent, interdict, and expose crimes involving sabotage and theft of nuclear facilities and nuclear material, as well as illegal trafficking in nuclear material
- c) Participates in ensuring the safe shipment and transportation of nuclear material and nuclear facilities; participates in physical protection at nuclear sites during daily operations (henceforth, routine situations) and emergencies
- d) Participates in the development of regulatory and legal documents regarding physical protection

**11. Within the scope of its authority, the Russian Federation Ministry of Transportation:**

- a) Regulates special shipments
- b) Cooperates with the relevant federal executive branch agencies for the physical protection of special shipments
- c) Participates in drawing up agreements that regulate special shipments on international railroads

**12. Within the scope of its authority, the Federal Agency for Rail Transportation:**

- a) Develops agency regulatory and legal documents governing special shipments
- b) Approves tactical and technical requirements and task orders for the design of rolling stock and other equipment (excluding transportation packages) for special shipments

**13. Within the scope of its authority, the Federal Agency for Marine and River Transportation:**

- a) Provides physical protection for nuclear material and nuclear facilities at nuclear sites and organizations under its jurisdiction; coordinates and regulates the activities it performs, as well as the shipment and transportation of nuclear material and nuclear facilities via water transport
- b) At the instruction of the Russian Federation Ministry of Transportation, participates in the development of regulatory and legal documents regarding physical protection for nuclear material and nuclear facilities at sites and organizations under its jurisdiction; coordinates and regulates the activities it implements, as well as the shipment and transportation of nuclear material and nuclear facilities
- c) Complies with international and Russian requirements regarding the shipment and transportation of nuclear material by sea and river transport

**14. Within the scope of its authority, The Federal Customs Service:**

- a) Provides priority handling of customs documents for nuclear material and nuclear facilities crossing the customs border of the Russian Federation
- b) Takes administrative and technical measures to interdict the illegal transfer of nuclear material and nuclear facilities across the customs border of the Russian Federation
- c) Conjointly with the relevant federal executive branch agencies, provides physical protection for nuclear material and nuclear facilities identified when their illegal transfer across the customs border of the Russian Federation has been interdicted

**IV. General Requirements for Organizing the Physical Protection of Nuclear Material and Nuclear Facilities during Shipment and Transportation**

Entire Section

**Analysis:**

2: This section includes terms and definitions for required permits, domestic and international transport

6, 8, 10: Section defines the responsibilities of several federal agencies and Ministries for transportation of material

11, 12: Section defines the responsibilities of several federal agencies and Ministries for transportation of material

13, 14: Section defines the responsibilities of several federal agencies and Ministries for transportation of material

Section IV: Whole section (sub-sections 52-78) defines the requirements for protection of nuclear materials in transit. Sub-section 69 references the use of overpacks

3151	Adoption of Procedures for the Physical Protection of Nuclear Material, Nuclear Facilities, and Nuclear Material Storage Points	PP	456	63, 64, 69-73	4	RF Government	Enacted
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**Citation:**

**IV. General Requirements for Organizing the Physical Protection of Nuclear Material and Nuclear Facilities during Shipment and Transportation**

63. The shipment and transportation of nuclear material and nuclear facilities is divided into the following types:

- a) International transport
- b) Inter-site shipment and transport
- c) Onsite shipment and transport (shipment and transport within and between separate areas at a nuclear site)

64. International transport of nuclear material and nuclear facilities is permitted only if the shipping and receiving nations, as well as any other nations whose territory will be crossed, comply with the requirements set forth in the Convention on Physical Protection of Nuclear Material.

Physical protection requirements for inter-site shipment and transport are established in federal regulatory and legal documents.

Physical protection requirements for onsite shipment and transport are established in agency regulations.

Physical protection requirements for transportation and shipment beyond the boundaries of a nuclear site within a closed administrative area are established by the site management staff based on the results of a vulnerability analysis and physical protection system effectiveness assessment. The requirements must be at least as stringent as the requirements for onsite shipment and transport.

69. Security and escort services are provided for inter-site shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials in accordance with the established requirements.

For inter-site shipment and transport, packaging containing Category I or II nuclear material and nuclear facilities based on these materials is sealed prior to shipment and placed in an armored compartment of the transport vehicle or in an overpack, if the transportation package does not comply with physical protection requirements applicable to an overpack.

For inter-site shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials, equipment must be provided to support communications among escort personnel, security personnel, and the driver, as well as between the vehicle and the transportation control center (central control point) and between the shipper and receiver.

During the process of inter-site shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials, including during stops, escort personnel and cargo guards conduct periodic inspections of the seals (if present) and locks.

70. Inter-site rail shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials is implemented using special railcars or specially designated railcars.

For inter-site shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials, escort and security personnel are located in compartments separate from the compartments containing nuclear material and nuclear facilities or in separate, specifically equipped railcars. The train also contains armed escort railcars.

71. Inter-site shipment and transport of nuclear material and nuclear facilities by road is conducted using specially equipped cargo vehicles.

For inter-site shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials, security personnel are present in each cargo vehicle. Convoys are escorted by a vehicle carrying security personnel. Escort and security personnel are provided with protection against small arms fire. Convoys with Category I or II nuclear material and nuclear facilities based on these materials are escorted by vehicles from the Highway Patrol Service of the Highway Safety Inspection Office of the Russian Ministry of Internal Affairs.

If shipment or transport cannot be completed in a single day, arrangements are made in advance for overnight stops at points approved by the director of the shipping organization and the commander (leader) of the military unit (force) guarding the cargo.

The same persons who guard the nuclear material, nuclear facilities, and transport vehicles during shipment or

transport are also responsible for guarding them during stops.

In accordance with established procedure, each cargo vehicle is issued a special pass that grants it the right to pass without inspection of its cargo, travel log, or registration, as well as without governmental vehicle inspections.

72. Inter-site sea and river shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials is implemented using a specially equipped vessel. The nuclear material and nuclear facilities are placed in separate secure compartments that are locked and sealed.

73. Inter-site air shipment and transport of Category I or II nuclear material and nuclear facilities based on these materials is implemented using specially prepared aircraft, on which the nuclear material and nuclear facilities constitute the sole cargo.

**Analysis:**

63, 64: high level description and requirements for international and inter-site transportation.

69-73: Deals with all aspects of off-site transportation; road, rail, river and sea and air. Good description of PP forces, overpacks, etc.

**36. Vulnerability Analysis**

**Analysis:**

Sites are required to analyze conditions, all areas of activity at the site, materials, internal and external security threats, and to conduct a VA. The VA must be performed according to the procedures established in the inter-agency or agency regulatory and legal documents (based on the threat list). The VA methodology is well described in DCN 0033, "Physical Protection Systems. Methodological Recommendations for Vulnerability Analysis of Potentially Hazardous Nuclear Sites." Currently, model documents are being developed that will further refine the VA process for Rosatom, as well as for the other participating organizations.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	4.1, 4.2	7	Minatom/Rosatom	Enacted

**Citation:**

**4 Major Physical Protection Functions of the Administration at the Potentially Hazardous Nuclear Site and Its Security Department**

**To ensure that NM, nuclear facilities, and NM storage points are reliably protected, the administration at the potentially hazardous nuclear site and its security department shall take the following measures:**

4.1 Study all areas of activity at the site; analyze materials on current conditions in the area where the site is located; identify and specify the internal and external security threats to the site and the points of vulnerability for nuclear facilities and NM storage points, based on the standard security threats presented in ministry regulations; conduct a site vulnerability analysis; allocate NM by its category; and identify the channels through which information may be leaked and predict where they may occur.

4.2 Based on the standard external adversary and insider profiles presented in ministry regulations, develop or specify an intruder profile for the site PPS that reflects the specific conditions where the site is located and its operational characteristics.

**Analysis:**

4.1: The citation requires sites to analyze conditions, systems and threats at the site, and to conduct a VA.

4.2: The citation requires sites to develop an intruder (adversary) profile for their site.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.3.2, 4.4.6, 5.1, 5.2, 8.2.5.1	7	Minatom/Rosatom	Enacted
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**Citation:**

**3 Goals, Tasks, and Design Principles of Physical Protection Systems at Potentially Hazardous Nuclear Sites.**

**3.3 General design principles of PP systems.**

3.3.2 The physical protection system shall provide the required level of effectiveness, which is defined as the capability of the PP systems to withstand the actions of adversaries directed against NM, nuclear facilities, and

other objects of physical protection with due consideration for the intruder profiles and list of threats identified during the vulnerability analysis phase for the specific potentially hazardous nuclear site. The PP system design principles are directed toward achieving PP system effectiveness.

#### 4 The Categorization of Potentially Hazardous Nuclear Sites.

##### 4.4 The categorization of objects of physical protection and conditions for their location in secure areas.

4.4.6 The category of the consequences of unauthorized actions is determined by an assessment of the scope of the consequences of unauthorized actions [that may be committed] during the realization of internal and external threats (identified during the vulnerability analysis) to the potentially hazardous nuclear site, the points of vulnerability at nuclear facilities, NM storage points, and technological processes with which the NM are used and stored.

#### 5 Vulnerability Analysis of Potentially Hazardous Nuclear Sites.

5.1 A vulnerability analysis of a potentially hazardous nuclear site is conducted for the purpose of identifying specific internal and external threats and [estimating] the likelihood of methods for bringing them about, as well as identifying the points of vulnerability at nuclear facilities, NM storage points, and technological processes with which the NM are used and stored, for subsequent creation of an effective physical protection system (PP system) based on the results of this analysis.

5.2 The vulnerability analysis of a potentially hazardous nuclear site is based on the general threats to potentially hazardous nuclear sites and the general intruder profile established at the ministry level.

The general threats to potentially hazardous nuclear sites and the general intruder profile are set forth in the ministry level document "Physical Protection Systems. Methodological Recommendations Regarding Vulnerability Analyses for Potentially Hazardous Nuclear Sites."

In addition, a series of internal and external intruder profiles is being established at the ministry level; these will be dependent on the type of potentially hazardous nuclear site, its category, and the specific characteristics of the technological processes with which the NM are used and stored. Minatom of Russia will implement these profiles through ministry wide orders and directives.

5.4 The procedures and conditions for conducting a vulnerability analysis of a potentially hazardous nuclear site are specified in the ministry level document "Physical Protection Systems. Methodological Recommendations Regarding Vulnerability Analyses for Potentially Hazardous Nuclear Sites" [7].

Vulnerability analyses are conducted for all potentially hazardous nuclear sites currently operating—i.e., enterprises and organizations in the nuclear complex that conduct activities related to the production, use, storage, or reclamation of nuclear material, and also for all sites currently being designed or modernized that will engage in these activities; the frequency with which such analyses are to be conducted will be defined in Minatom of Russia regulations.

#### 8 Requirements for Secure Areas.

##### 8.2 General requirements for equipping secure areas.

##### 8.2.5 Restricted access areas.

8.2.5.1 Restricted access areas shall be outfitted with physical protection and security equipment appropriate to the importance of the components, devices, and equipment, etc. that is located within it. Requirements for outfitting restricted access areas shall be governed by regulations including the regulations on secret operations and information protection. These may be modified when the site vulnerability analysis is conducted.

#### Analysis:

3.3.2: PP effectiveness is based upon the list of threats identified during the VA

4.4.6: Categorization of consequences is based upon the results of the VA

5.1: VA's are conducted to identify internal/ external threat methods as well as identifying points of vulnerability

5.2: VA's are based upon the general threats as established at the ministry level.

5.4: VA's are conducted for all currently operational facilities as well as all sites being designed.

8.2.5.1: Applies to modifications to restricted areas that may be performed during the generation of a VA.

0033	Methodological Recommendations for Vulnerability Assessments at Potentially Hazardous Nuclear Facilities	PP	Minatom Order # 167-r	1.2, 1.3, 1.8, 4	7	Minatom/Rosatom	Enacted
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#### Citation:

## 1 General Provisions

1.2 The principal aim of vulnerability analysis is to determine the internal and external threats and their possible implementations, intruder profiles, and to discover points of vulnerability in the nuclear facility or nuclear material storage point, and procedures for the use and storage of nuclear material \* so that the results can later be used to develop an effective physical protection system (PP system).

1.3 The objective of these Methodological Recommendations is to ensure a uniform methodological approach to identifying threats related to NM, nuclear facilities, and NM storage points, to establishing intruder profiles and locating points of vulnerability based on general threats to potentially hazardous nuclear sites, general intruder profiles, and the procedure for identifying points of vulnerability at nuclear facilities as set forth in these Methodological Recommendations.

1.8 A vulnerability analysis shall be performed for all operational potentially hazardous nuclear sites, including when the PPS is upgraded or the site is re-equipped, as well as during the creation or modernization of potentially hazardous nuclear sites that are under construction or undergoing renovation.

Regulations of the Russian Ministry of Atomic Energy shall determine the intervals at which vulnerability analyses will be performed at operational potentially hazardous nuclear sites.

Additionally, the administration of a potentially hazardous nuclear site shall perform a vulnerability analysis in the following instances:

- A change in the threat at the federal and regional levels as determined by duly authorized agencies;
- A change in the external threat at the local level or the internal threat;
- A change in the operating conditions of the nuclear facility, production methodology, the use and storage of NM, or equipment status;
- Renovation of a potentially hazardous nuclear site (including the nuclear facilities, NM storage points, buildings, structures, or rooms located there, as well as repairs performed at the site).

The administration of a potentially hazardous nuclear site may also perform vulnerability analyses at other times at its own initiative.

## 4 Principal Phases of a Vulnerability Analysis

4.1 The principal phases of vulnerability analysis are:

- Creating a working group to perform the analysis;
- Developing a plan or program for the analysis;
- Gathering information for the analysis;
- Describing the potentially hazardous nuclear site;
- Identifying points of vulnerability at the nuclear facility and NM storage points;
- Identifying threats;
- Developing an intruder profile;
- Documenting results.

4.2 A vulnerability analysis requires that a working group be formed, drawing upon the following specialists:

- Specialists from analysis divisions in the security service;
- Specialists in the design of potentially hazardous nuclear sites and PP systems;
- Specialists in the technology of potentially hazardous nuclear sites;
- Specialists in information protection, physical protection, or in nuclear, radiation, technical, technological or fire safety, as well as in NM control and accounting.

The makeup of the group and the selection of its leader shall be subject to approval by order of the manager of the potentially hazardous nuclear site. This order shall also define the objectives of the working group and set a deadline for completing the vulnerability analysis.

4.3 The working group shall act pursuant to the developed plan or program of the vulnerability analysis, which shall be approved by the manager of the potentially hazardous nuclear site and include specific objects of analysis, participants and responsible parties, and terms and conditions for performance of work.

4.4 In order to perform a vulnerability analysis, the working group must collect necessary information in the following principal areas:

- Geographic, natural, topological, ethnic, and cultural features of the area around the site and of its infrastructure;
- Principal characteristics of the site, as well as nuclear material and radioactive waste produced, used, and stored there;
- Operating features of nuclear facilities, nuclear material and waste storage points, process lines, and processes;
- Types and characteristics of potential threats and methods of implementation at the atomic energy site being analyzed;
- Description of personnel and their authority to work with NM, nuclear facilities, and PP systems.

The following methods may be used when collecting information for a vulnerability analysis:

- Document analysis;
- Interviews of site specialists;
- Visual inspection on trips to the site.

The following documents shall be provided to the working group:

- Plans or schematics of the potentially hazardous nuclear site, specifying the location of NM storage points, nuclear facilities, and vital equipment;
- The previous vulnerability analyses;
- Statements and reports issued by commissions charged with verifying the security and physical protection of the

potentially hazardous nuclear site;

- The regulation governing the badging system and the authorization system for admittance or access to NM, nuclear facilities, and NM storage points;
- Information security instructions;
- Other documents.

4.5 The description of a potentially hazardous nuclear site and the identification of objects of physical protection shall be based on information received and may constitute the first part of a written report on the results of the vulnerability analysis. The principal aim in describing the site must be to identify all locations where nuclear material is produced, used, or stored. In addition, the questions set forth in Section 5 of this document must be addressed.

4.6 The presence, characteristics, and location of NM at a site shall be presented in a diagram of the site and as a table, in which the weight of the NM, its isotope content, form, irradiation status, and other characteristics shall be reflected:

Item No. Building and Room No. Category 1 NM Category 2 NM Category 3 NM Remarks

4.7 Potential threats shall be identified with respect to each specific object of physical protection and presented in tabular form.

Conclusions regarding potential threats and the crime level around the site using atomic energy must be formulated based on the information provided to the working group by the regional offices of the Federal Security Service of Russia and the Russian Federation Ministry of Internal Affairs.

4.8 By compiling the logical diagrams set forth in Appendix 1 of this document, members of the working group shall identify points of vulnerability at a nuclear facility or storage point that could be subject to sabotage, as well as physical protection system components whose defeat would give an adversary the greatest probability of committing theft of nuclear material or sabotage.

#### Analysis:

1.2: States the aim of a VA.

1.3: Objective of VA's

1.8: Rosatom requirements for conducting a VA, intervals to conduct a VA and changes that require conducting a VA

4: Discusses all aspects of the generation of a VA.

0042	Instructions for the Conceptual Design of Physical Protection Systems at Potentially Hazardous Nuclear Sites	PP	BOA 297922-A-D	3.4, 5.2.2	7	Minatom/Rosatom	Enacted
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#### Citation:

##### 3. General Provisions

3.4. Materials from the vulnerability analysis and categorization of the potentially hazardous nuclear site conducted in accordance with /Reference 3/ and industry document "Physical Protection Systems. Methodological Recommendations Regarding Vulnerability Analyses for Potentially Hazardous Nuclear Sites" /Reference 4/, shall be used as initial data for developing the PP system conceptual design.

##### 5.The Pre-Design Survey of a Potentially Hazardous Nuclear Site and its Physical Protection Systems

5.2. Familiarization with Site Documents regarding Physical Protection

5.2.2. Results from the vulnerability analysis, site categorization and previous assessments of PP system effectiveness shall be reviewed in order to obtain required information regarding the following:

- The site, its type and category, the geographic location and particular circumstances of activities, and the production processes;
- The list containing the points of vulnerability, objects of physical protection, and classified rooms (buildings, structures);
- The list of potential threats, the probable ways in which they may be implemented, and the intruder profile.

#### Analysis:

3.4, 5.2.2: Conceptual design criteria for PP based upon VAs.

0715	Methodological Recommendations for Categorizing Objects	PP	(Not	4.2.2	7	Minatom/Rosatom	Enacted
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of Physical Protection and Nuclear Sites obtained)

**Citation:**

**4 Collecting and Analyzing Information for Categorization**

**4.2 Analyzing Threats and Identifying Hazard Factors**

4.2.2 Threats related to the unauthorized actions of insiders and outsiders are determined during the nuclear site vulnerability analysis based on the following:

- Sources of threats
- Adversary profiles, including a description of several types of insiders and outsiders
- List of vulnerabilities and objects of physical protection
- Probably methods for carrying out threats as they relate to objects of physical protection

**Analysis:**

Analyzing Threats

0752	Administrative Procedures for the Design of Physical Protection Systems	PP	GKLI.1704-005-2008	7.6	7	Minpromtorg	Enacted
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**Citation:**

**7 Specific Features of the Design Process When Physical Protection Systems at Nuclear Sites Are Upgraded or Outfitted With New Equipment**

7.6 Procedures and methodologies are established by inter-agency or jointly approved agency regulations when conducting the vulnerability analysis, assessing the effectiveness of the physical protection system, and preparing the conceptual designs, taking into consideration when vessels (ships) and watercraft with nuclear reactors and nuclear service vessels from other federal executive branch agencies are located within secure areas (bodies of water) of physical protection systems at nuclear sites [13], [19], [22].

**Analysis:**

Includes vessels and watercraft with nuclear reactors and nuclear service vessels.

3133	On Transport Security	MC, PP	№ 16-FZ	Article 5, Paragraph 1-2, Article 5, Paragraph 3-4, Article 9, Paragraph 1	3	RF Parliament	Enacted
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**Citation:**

**Article 5 Vulnerability Analysis of Transportation Infrastructure Sites and Transportation Equipment With Regard to Illegal Interference**

1 The procedures for conducting a vulnerability analysis for transportation infrastructure sites and transportation equipment are to be established by the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of transportation; these procedures are to be approved by the federal executive branch security agency of the Russian Federation and by the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of internal affairs.

2 The vulnerability analysis for transportation infrastructure sites and transportation equipment is to be conducted by specialized transportation security organizations, organizations and departments within the federal executive branch security agency of the Russian Federation, and by the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of internal affairs, taking into consideration transportation security requirements on the basis of a public tariff agreement established by the federal executive branch agency authorized to implement legal control with regard to government regulation of prices (tariffs) for goods (services) and to monitor their use.

3 The information set forth in the plans for the transportation security of transportation infrastructure sites and transportation equipment constitutes limited access information. The information contained in the plans for the transportation security of transportation infrastructure sites and transportation equipment indicated in Articles 2 and 4 of this Federal Law constitutes a state secret.

4 The plans for the transportation security of transportation infrastructure sites and transportation equipment are to be implemented by the transportation infrastructure entities; in cases established by Russian Federation legislation, they are to be implemented by the transportation infrastructure entities in conjunction with the federal executive branch agencies or local government agencies, or exclusively by the federal executive branch agencies.

### **Article 9 Planning and Implementing Measures To Provide Transportation Security for Transportation Infrastructure Sites and Transportation Equipment**

1 On the basis of the results from the vulnerability analysis for transportation infrastructure sites and transportation equipment, the transportation infrastructure entities are to develop plans to provide transportation security for transportation infrastructure sites and transportation equipment. These plans are to establish a system of transportation security measures. The procedures for developing these plans are to be established by the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of transportation and approved by the federal executive branch security agency of the Russian Federation and the federal executive branch agency that develops government policy and provides legislative and regulatory control in the area of internal affairs.

#### **Analysis:**

Article 5, Paragraph 1-2: Vulnerability Analysis of Transportation Infrastructure Sites and Transportation Equipment With Regard to Illegal Interference

Article 5, Paragraph 3-4: The citation addresses the requirement for VA results to be approved and the information to be considered a "State Secret."

Article 9, Paragraph 1: Implementing Measures To Provide Transportation Security for Transportation Infrastructure Sites and Transportation Equipment

	Adoption of Procedures for the Physical Protection of							
3151	Nuclear Material, Nuclear Facilities, and Nuclear Material Storage Points	PP	456	17, 41, 60	4		RF Government	Enacted

#### **Citation:**

##### **II. Governmental Physical Protection System**

17. The management staff of nuclear sites supports the development, upgrade, and operation of the site physical protection system. Nuclear sites guarded by internal security troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies implement these activities jointly with the leaders of the appropriate military units or forces and, if necessary, with specialized organizations hired for this purpose.

The potential threats and adversaries for each nuclear site are identified in the vulnerability analysis, which is performed according to the procedures established in the inter-agency or agency regulatory and legal documents (based on the threat list).

##### **III. Organization and Implementation of Physical Protection at Nuclear Sites**

41. The requirements for providing physical protection system equipment for the perimeter and access control points (posts) of a secure area and for categorized buildings, structures, and rooms are established in agency regulations for each specific site, taking into account the list of threats, the vulnerability analysis of the nuclear site, and the physical protection system effectiveness assessment, as well as the category of the nuclear site and the features of the secure areas established there.

##### **IV. General Requirements for Organizing the Physical Protection of Nuclear Material and Nuclear Facilities during Shipment and Transportation**

60. Nuclear site management, conjointly with the command staff of the units guarding nuclear material and nuclear facilities during their shipment and transport, establishes the primary and secondary routes, stopping points, procedures for transferring nuclear material and nuclear facilities at the designated destinations, and procedures for providing progress reports, which are approved with the applicable federal executive branch agencies.

A shipment (transportation) vulnerability analysis and a physical protection effectiveness assessment are performed when organizing the shipment and transportation process.

The procedures for the shipment and transportation vulnerability analysis are established in interagency or agency regulations.

#### **Analysis:**

17: Site management requirements for identifying potential threats and adversaries through the VA process.

41: PP requirements for perimeter and access control of secure areas based upon VAs

60: Site management and guard command staff requirements for transportation of material based upon a VA.

### 37. Effectiveness Evaluation

#### Analysis:

An agency-level document exists that lays out the procedure for conducting effectiveness evaluations, and use of effectiveness evaluations is discussed with regard to ensuring the adequacy of physical protection systems. A potential gap exists here, in that effectiveness evaluation is often discussed as an activity equivalent to performance testing. At this time, RDP considers that to be inaccurate. While the effectiveness evaluation process is defined in the regulations, it may not adequately, in the absence of true performance testing, ensure the PP system is sufficiently robust.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.3.2, 9.5.2	7	Minatom/Rosatom	Enacted

#### Citation:

**3 Goals, Tasks, and Design Principles of Physical Protection Systems at Potentially Hazardous Nuclear Sites.**

#### 3.3 General design principles of PP systems.

3.3.2 The physical protection system shall provide the required level of effectiveness, which is defined as the capability of the PP systems to withstand the actions of adversaries directed against NM, nuclear facilities, and other objects of physical protection with due consideration for the intruder profiles and list of threats identified during the vulnerability analysis phase for the specific potentially hazardous nuclear site. The PP system design principles are directed toward achieving PP system effectiveness.

#### 9 Procedures for the Creation and Modernization of PP Systems.

#### 9.5 Assessing the Effectiveness of Physical Protection Systems.

9.5.2 The evaluation of PP system effectiveness may be determined experimentally (by a training exercise), analytically, or using computer modeling at various stages and phases in the creation of the PP system, as well as during its operation. Results of the PP system effectiveness evaluation are to be used to determine the manner in which the system may be improved.

#### Analysis:

3.3.2: PP effectiveness is based upon the list of threats identified during the VA

9.5.2: Methods of evaluating effectiveness

0039	Methodological Recommendations for Assessing the Effectiveness of Physical Protection Systems	PP	BOA 297922-A-D1	1.3.1, 1.3.5, 1.3.6		Minatom/Rosatom	Enacted
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#### Citation:

#### 1. GENERAL PROVISIONS

#### 1.3. Goal and Tasks of PP System Effectiveness Evaluation

1.3.1. The effectiveness of a physical protection system entails its ability to withstand adversary actions against the nuclear material at a site, nuclear facilities, and other vulnerable areas and objects of physical protection with respect to the threats and adversary models identified during the site vulnerability analysis. To ensure the necessary PP system effectiveness requires monitoring and analyzing system performance of its physical protection tasks and determining ways to increase its effectiveness or maintain its effectiveness at the required level.

1.3.5. Effectiveness evaluation tasks are:

- Identifying elements of the physical protection system whose deactivation gives an adversary the maximum opportunity to steal nuclear material or commit sabotage;
- Reviewing and identifying scenarios that give an adversary the maximum opportunity to steal nuclear material or commit sabotage;
- Identifying vulnerable areas in the PP system that meet the formal requirements of regulatory documents;
- Analyzing the causes of PP system vulnerabilities;
- Assessing the likelihood that security forces, responding to an alarm activated by an external or internal threat,

will interdict specific adversary actions;

- Choosing the optimum design approaches during PP system development and upgrading;
- Preparing proposals to the site administration and site security command (management) to improve the PP system and its individual structural elements, including the decision to optimize security force tactics.

1.3.6. PP system effectiveness must be evaluated at the design stage of developing and modernizing PP systems and at the stage of PP system implementation. The phases in the stages of developing and modernizing PP systems, during which the effectiveness assessment shall be conducted, shall be established in the technical specifications on developing (or modernizing) PP systems and, if necessary, in the technical specifications on design. The MR specify a quantitative effectiveness factor that may be used during PP system development and modernization to compare competing PP systems, as well as to justify modernizing and ways of modernizing PP systems in operation. The effectiveness factors of the existing and the proposed systems are to be compared.

**Analysis:**

1.3.1: Provides definition and maintenance of PP system effectiveness.

1.3.5: Identifies the tasks that comprise the EE process.

1.3.6: Discusses the evaluation stages of system effectiveness

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	36, 51	4	RF Government	Enacted
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**Citation:**

**III. Organization and Implementation of Physical Protection at Nuclear Sites**

36. The task order for the development (upgrade) of a physical protection system is based on a vulnerability analysis of the nuclear site and a physical protection system effectiveness assessment.

The procedures for the physical protection system effectiveness assessment are established in agency regulations.

51. In exceptional circumstances when it is impossible for a nuclear site to comply in full with the physical protection requirements set forth in these Procedures and agency regulations developed thereof, the management staff of the nuclear site (together with the leadership of the appropriate military units and forces at sites guarded by internal troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies) must adopt compensatory administrative and technical measures. The adequacy of these measures is confirmed by a physical protection system effectiveness assessment and is approved by the federal executive branch agency managing (coordinating) the activities of the nuclear site, as well as by the Russian Federation Ministry of Internal Affairs, if necessary.

**Analysis:**

36: Effectiveness assessments are established in agency regulations

51: Evaluating the adequacy of compensatory measures through effectiveness assessments

**38. Requirements for physical barriers in PPS**

**Analysis:**

There are clear requirements for the design, construction, and maintenance of physical barriers in PPS.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	3.2.4 bullet 1, 3.3.5.2, 6.4.4, 7.11	7	Minatom/Rosatom	Enacted

**Citation:**

**3 Goals, Tasks, and Design Principles of Physical Protection Systems at Potentially Hazardous Nuclear Sites.**

**3.2 Tasks of PP systems.**

3.2.4 Delaying (slowing) the progress of an adversary to the location where sabotage or NM theft [may be] committed is achieved by:

- Erecting physical barriers along possible adversary penetration routes to locations where sabotage or NM theft [may be] committed that make it possible to delay the adversary for a period of time sufficient for security force personnel to arrive;

...

### **3.3 General design principles of PP systems.**

#### **3.3.5 The principle of equally strong protection**

3.3.5.2 PP system shall provide equally strong protection at the entire secure area perimeter (for the specific category of room or group of rooms), including monitored entrances and/or access control points.

## **6 The Structure of Physical Protection Systems.**

### **6.4 Physical protection and security equipment.**

6.4.3 Physical protection engineered barriers consist of engineered structures, elements, and physical barriers used in the PP systems of fixed and mobile potentially hazardous nuclear sites for the purpose of increasing PP system effectiveness and creating the conditions for the security force to perform its duties. Physical protection engineered barriers include:

- Physical barriers;
- Engineered equipment at the perimeter of secure areas and at guard posts including:
  - Buffer zones;
  - Security detail pathway (guard roadway);
  - Pathway for the physical protection equipment specialist;
  - Pathway for the guard dog trainer;
  - Engineered structures and elements for the guard dog posts;
  - Observation towers, guard huts and booths;
  - Direction signs, demarcation signs, warning signs;
  - Drainage system (drain pipes, gutters, waterspouts, ditches);

• Defensive structures for the guards;

• Braking area equipment, duty area equipment for sentries on railroad platforms;

• Engineered equipment for access control points and posts with access control functions in secure building, structures, and rooms.

6.4.4 Physical barriers are intended to impede the entry of individuals and vehicles onto the site (exit from the site) outside access control points, delaying (slowing) the progress of an adversary, limiting or eliminating the possibility of committing other unauthorized actions, as well as observing the production areas outside secure areas. Physical barriers include:

- Construction elements at the potentially hazardous nuclear site (walls, ceilings, gates, doors, etc.);
- Fences (the main fence around the site, interior and exterior fences around the exclusion area, fences around secure areas);
- Engineered barriers;
- Equipment to reinforce doors, windows, utility penetrations;
- NM transportation and storage casks;
- Anti-ramming devices (fixed and portable);
- Equipment to protect main control panel and local control panel operators, sentries, and access control point personnel from gunfire and sudden attack.

If required, physical protection system physical barriers may include:

- Remote controlled delaying equipment;
- Protective shipping devices;
- Protective equipment for bodies of water;
- Other physical impediments.

## **7 Requirements for Physical Protection and Security Equipment Components and Constituents.**

### **7.11 Requirements for physical protection engineered barriers.**

7.11.1 Fences around sites are intended to prevent passage of people and vehicles to (from) the site, except through access control points, and also to restrict or eliminate the possibility of observing the production area from outside of the secure area. Fences shall be constructed around the perimeter of the secure area.

The fences must meet the following requirements:

- Sufficient height and depth in the ground to satisfy the site's access conditions and make it difficult to get over them;
- Simple structure, high strength and durability;
- The absence of devices (assemblies, components) that make it easier to get over the fences;
- Right angles and a minimum number of breaks;
- Optimal construction and operation from a cost-benefit standpoint.

7.11.2 Engineered barriers are equipment and structures installed or erected on near approaches to the secure area, and on approaches to vital centers, buildings, and structures of a secure site in order to hamper an adversary's movement and create favorable conditions for his detention by reserve guard groups within the exclusion area or on approaches to vital centers, buildings, and structures.

Barriers are divided into permanent and portable, antipersonnel and antivehicle.

The design of barriers must satisfy the following requirements:

- Impede adversaries' action and detain them for the time necessary for physical protection forces to act;
- Restrict the adversary's use of expedient means;
- Be repairable;
- Not prevent the normal operation of detection devices;
- Provide conditions for inspection of vehicles and safe performance of operational duties by the personnel.

7.11.3 A strip of land the surface of which, in its natural state or after special preparation, shows tracks and preserves them for a long time is called a buffer zone.

The following requirements are imposed on the buffer zone:

- Constant provision of tracking conditions;
- Continuity around the site's whole perimeter;
- Sufficient width to rule out jumping across it;
- The absence of objects in it what would facilitate getting across it without leaving tracks;
- The possibility of using mechanized equipment to prepare it over its whole course.

Buffer zones may be artificial or natural. In places where it is not possible to set up a plowed or natural buffer zone (rocky ground, swamp, wetland with a high water table, steep slopes), additional non-explosive engineered barriers shall be set up over the whole width of the exclusion area. In places where railroads, highways, and dirt roads cross the exclusion area, raised buffer zones must be provided.

7.11.4 As a rule, the on-site road network must be used for the movement of military details in vehicles, and also special roads (security roads), which may be built in the exclusion area or outside of it, regardless of the width of the exclusion area.

Security roads must lie outside the zone of action of detection equipment and have a minimum number of intersections with existing roads and railroads on the sites. They shall be equipped with the State Traffic Safety Inspection road signs.

Wide spots in the road shall be constructed for turning and passing oncoming vehicles. Their width and spacing shall be determined by the local conditions.

A security-detail pathway is intended for convenient movement of military details. It shall be constructed along the buffer zone if there is no security road or if the security road is too far away to allow visual observation of the buffer zone. The security-detail pathway may be a graded (ungraded) dirt path, boardwalk, or paved with asphalt, concrete, or reinforced concrete. Security-detail pathways, except for boardwalks, shall be provided with drainage ditches along their whole length.

A pathway for the physical protection equipment specialist shall be constructed alongside the main fence and is intended for movement of military personnel along it when servicing the linear part of detection devices and other physical protection equipment located on the main fence.

A pathway for the guard-dog trainer shall be laid out in the exclusion area on land cleared of underbrush, deadwood, high vegetation, and other objects that hamper movement; and boardwalks or bridges shall be constructed across boggy places, creeks, rivers, and gullies.

7.11.5 Post engineered equipment includes observation towers, guard huts and booths, enclosures in the form of barriers around places where sentries perform their duties and at access control rooms, warning, demarcation and direction signs, security and defense structures, barrier planks on braking areas, specially equipped and enclosed places for sentries to perform their duties on a platform (guardrails, stairways), and also devices for guard dog posts.

Observation towers may be constructed to increase the field of vision and provide sentries with a better view of the exclusion area and approaches to the site. The height of the tower and the place where it is set up shall be determined depending on the local relief, the configuration of the exclusion area, and other local conditions.

Towers shall be equipped with SOS and alarm systems, and, in individual cases, with backup panels for the physical protection equipment of secure areas, a loudspeaker, observation equipment, and controllable searchlights. The components of the tower equipment shall be established by a document from the Ministry of Internal Affairs or by the design specifications.

The tower design must protect the sentry from small-arms fire.

Observation towers may be made of wood, metal, or pre-cast concrete.

Guard booths shall be set up at access control points or in the exclusion area and are intended for placement of SOS and alarm systems in them, and compartments with badges for motor-vehicle drivers and coworkers accompanying vehicles (cargo), and frames with samples of badges, signatures and seal impressions, and guard uniforms.

The dimensions and types of guard booths shall be determined by the design organization; and at existing sites, if necessary, by their security service and the military-unit command.

To warn that passage into the exclusion area is forbidden, warning signs shall be posted along its fence line with the inscription "Exclusion area. Passage of people (vehicles) forbidden (closed)." In individual cases, there may be a warning sign with the inscription "No Trespassing." The inscription shall be in Russian and, if necessary, in Russian and the appropriate national language.

Warning signs shall be posted on the exclusion area's exterior and interior fences, using the existing fence posts or separate posts. Warning signs shall be posted without fail at bend (corners) of the exclusion area, and gates into the exclusion area.

Direction signs shall be posted to mark the boundaries of alarm sections of the exclusion area.

Guard dog posts shall be set up for security at the potentially hazardous nuclear site. For this purpose, block posts, free-roaming posts, and chained posts shall be provided in the exclusion area.

7.11.6 To defend the site and protect security personnel from means of mass destruction, shelters shall be

constructed for guards (outposts), and defensive structures shall be set up near posts and guard rooms. Shelters and defensive structures shall be constructed by contracting organizations at the site's expense.

Defensive structures shall be set up:

- Around the perimeter of the site, conforming to the local relief and the perimeter's configuration, with duties organized by the operational watch method, and in the area of each post by the setting out sentries at the posts;
- At pedestrian, vehicle, and rail access control points;
- At secure buildings (structures) or groups of buildings;
- At guard rooms (outposts).

At urban sites that do not have sufficient width of the exclusion area, defensive structures do not have to be set up in peacetime. Reference cards for missing defensive structures and firing points in secure buildings, and calculations for setting them up shall be made out at all sites. The cards and calculations shall be stored in the military staff headquarters.

Defensive structures shall be constructed of standard reinforced-concrete elements, monolithic reinforced-concrete, or metalwork.

Defensive structures shall be equipped with communication systems, inside-locking covers, ladders, observation and firing platforms, and embrasures with shutters that close.

Shelters to protect sentries from radioactive irradiation and highly toxic substances in the case of an accident at a secure site may be built on the ground.

To protect the guard (outpost) personnel from weapons of mass destruction and highly toxic substances, a shelter of the proper class shall be erected, depending on the protection category of the site and the population center according to the civil defense plan.

Shelters intended for the site's workers can be used to shelter the guard (outpost) personnel. In this case, the areas provided shall be separated by permanent or movable chain-link partitions, and duplicate keys to the shelter shall be stored in a case sealed by the site administration with the officer of the guard (outpost).

There must be equipment in the shelter providing for fulfillment of the field control panel's functions for the respective secure zone.

#### Analysis:

3.2.4 bullet 1: Purpose of the establishment of physical barriers at a site.

3.3.5.2: requires "equally strong protection" at the entire perimeter.

6.4.3: Describes what engineered physical barriers include.

6.4.4: Describes what physical barriers that impede an adversary's entry can consist of.

7.11: Discusses all aspects of engineered barriers.

0039	Methodological Recommendations for Assessing the Effectiveness of Physical Protection Systems	PP	BOA 297922-A- D1	1.3.8 bullet 6, 1.4.3 bullet 2, 2.3.1 bullet 5	Minatom/Rosatom	Enacted
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#### Citation:

##### 1. GENERAL PROVISIONS

##### 1.3. Goal and Tasks of PP System Effectiveness Evaluation

1.3.8. Grounds for an effectiveness evaluation during scheduled changes to a site PP system include:

...

- A change in the structure and makeup of physical protection equipment and/or physical barriers.

##### 1.4. PP Effectiveness Factors

1.4.3. The following factors shall be taken into account in an effectiveness evaluation:

...

- The time during which an adversary is delayed by physical barriers;

...

##### 2. BASIC STEPS IN A PHYSICAL PROTECTION EFFECTIVENESS EVALUATION AT A POTENTIALLY HAZARDOUS NUCLEAR SITE

##### 2.3. Source Data

2.3.1. The following basic source data are necessary to evaluate site PP system effectiveness:

...

- A description of the structure and makeup of physical protection equipment and physical barriers with their basic performance data for each PP area and each site and PP system vulnerable area;

...

**Analysis:**

1.3.8 bullet 6: requires an effectiveness evaluation following changes to physical barriers

1.4.3 bullet 2: requires the delay time provided by barriers to be considered during the conduct of an effectiveness evaluation

2.3.1 bullet 5: requires the structure of physical barriers to be evaluated

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	33	4	RF Government	Enacted
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**Citation:****III. Organization and Implementation of Physical Protection at Nuclear Sites**

33. The engineered barriers within a physical protection system are its physical barriers, guard posts, and the engineering equipment located in secure areas and the guard posts. Physical barriers include the structural components of the nuclear site (walls, ceilings, gates, and doors), specially designed structures (fencing, anti-rammung devices, grates, hardened doors, and containers), and other physical (including natural) obstacles.

**Analysis:**

Discusses construction and design of barriers.

**39. Calculation of the required numerical strength of PPS and MCA personnel****Analysis:**

No specific set of requirements were located that address the calculation of the required numerical strength of PPS and MC&A personnel. However, there is a requirement for the number of personnel involved in the operation of the site to be considered when categorizing potentially hazardous nuclear sites. MVD and agency Pro-Force staffing levels are based on certain prescribed requirements that are not available to the US, and the upcoming OPUK revision will require the establishment of an MC&A Unit.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	Appendix, 5.3.1	7	Minatom/Rosatom	Enacted

**Citation:****Appendix (Recommended)****Enterprise Regulation Contents****5.3. MC&A system administrative organization**

5.3.1. Enterprise MC&A system organization (structure, personnel, and the distribution of responsibilities, rights, and obligations)

**Analysis:**

Discusses administration of MC&A Personnel

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	4.6.3 Bullet 5	7	Minatom/Rosatom	Enacted
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**Citation:****4 The Categorization of Potentially Hazardous Nuclear Sites.****4.6 Procedures for Categorizing Potentially Hazardous Nuclear Sites**

4.6.3 The following additional factors and characteristics of the site shall be considered when categorizing potentially hazardous nuclear sites:

- The specific nature of the ways in which the NM are used, produced, processed, stored, and/or transported, including the physical and chemical state of the NM;
- The types and characteristics of the nuclear facilities operated at the potentially hazardous nuclear site;

- The structure of the site;
- The operating mode of the site;
- The number of personnel involved in the operation of the site;
- The proximity of other hazardous sites, major population centers, national borders, etc;
- The conditions under which the site is operated (natural surroundings, industrial interference, etc.);
- Other specific characteristics of the site that influence the imposition of requirements for PP systems.

**Analysis:**

Discusses overall site manpower required for categorization.

0037	On the Adoption of Regulation on Minatom of Russian Site Security Forces	PP	RF Government Decree # 139	4	4	RF Government	Enacted
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**Citation:**

4 Site security forces constitute an aggregate of management entities, manpower, and equipment, which are intended to protect secure sites from unlawful actions; they consist of the following:

- [Para. repealed by Russian Federation Government Decree № 49, dated 01 February 2005]
- The site security force management entity (henceforth, management entity)
- Site security force units that provide protection at the sites

**Analysis:**

Discusses composition of site security forces.

0705	The Organization and Management of Rosatom Site Security Force Unit Operations	PP	(Not obtained)	4.4; 4.13; Appendix 1, 21	7	Minatom/Rosatom	Enacted
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**Citation:**

4.4 The Federal Atomic Energy Agency performs the following actions:

...

- Approves the organization structure and staffing levels for the security force units that provide protection to sites

...

4.13 The following shall be identified when establishing protection systems:

...

- Required staffing for the site security force units
- The number of guard units (patrols) and their staffing

...

Appendix 1. List of Laws, Regulations, and Other Documents Governing the Actions of Site Security Force Units

...

21 Guidelines for Establishing Standard Staffing Levels for Security Force Personnel at Enterprises and Organizations within the Russian Federation Ministry of Atomic Energy (adopted within Minatom of Russia by Order № 154, dated 21 March 2001) (revision of this document taking into consideration the supplements to Russian Federation Government Decrees № 49, dated 01 February 2005, and № 57, dated 01 February 2006, is planned)

...

**Analysis:**

The citations assign responsibility for determining staffing levels, and reference a methodological recommendation that specifically addresses the determination of agency pro-force staffing levels

0705	The Organization and Management of Rosatom Site Security Force Unit Operations	PP	(Not obtained)	4.1	7	Minatom/Rosatom	Enacted
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**Citation:****4 The Organization of Site Security Force Units**

4.1 The site security forces encompass the aggregate of management entities, forces, and equipment, established

by Federal executive branch agencies, whose function is to protect secure sites from unlawful actions; a site security force consists of the following:

- The site security force management entity
- Site security force units that provide protection to sites

**Analysis:**

Discusses composition of site security forces.

3151	Adoption of Procedures for the Physical Protection of Nuclear Material, Nuclear Facilities, and Nuclear Material Storage Points	PP	456	7 c)	4	RF Government	Enacted
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**Citation:**

**II. Governmental Physical Protection System**

**7. Within the scope of its authority, the Federal Agency for Atomic Energy:**

c) Provides site security forces to guard subordinate nuclear sites, nuclear material, nuclear facilities, and storage points, as well as to escort nuclear material being shipped or transported

**Analysis:**

Discusses responsibility for providing site security forces.

**40. Categorization of nuclear materials and premises and nuclear objects**

**Analysis:**

Clear requirements were located that mandate the categorization of nuclear materials and premises at nuclear facilities, as were methodologies and guidance for carrying it out.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	3	7	Minatom/Rosatom	Enacted

**Citation:**

**3 PRINCIPLES FOR CATEGORIZING ROOMS IN BUILDINGS AND STRUCTURES AT A POTENTIALLY HAZARDOUS NUCLEAR SITE**

3.1 The following secure areas shall be designated in accordance with the zonal principle for PP system design at potentially hazardous nuclear sites: protected area, internal area, and vital area.

Secure areas shall be determined based on the categorization of objects of physical protection that may be located within. Principles and procedures for categorizing objects of physical protection are specified in the "Regulation on the General Requirements for Physical Protection Systems at Minatom of Russia Potentially Hazardous Nuclear Sites."

As specified in the requirements and provisions of this regulation, objects of physical protection that have been assigned to the appropriate category ("A" [A], "B" [Б], "C" [В], "D" [Г], or "E" [Д]) may be located in the following secure areas:

Protected areas [may contain] objects of physical protection assigned to categories "D" (with additional security boundaries) and "E";

Internal areas [may contain] objects of physical protection assigned to categories "B" (with additional security boundaries), "C," "D," and "E";

Vital areas [may contain] objects of physical protection assigned to categories "A" and "B," as well as objects assigned to other categories, if necessary.

3.2 The level of measures planned to ensure physical protection of rooms that contain NM, nuclear facilities, and other objects of physical protection shall be determined by the category assigned to these rooms.

3.3 The category assigned to rooms shall be established as the maximum category assigned to the objects of physical protection located therein, taking into consideration the total quantity of such objects and the results of a vulnerability analysis.

3.4 Rooms may be categorized in one of three ways: "A," "B," or "C," while complying with the following categorization principles and criteria.

3.4.1 Category "A" should include rooms that contain objects of physical protection assigned to categories "A" and "B." Buildings and structures containing rooms assigned to category "A" shall be placed in the vital area (or internal

area with additional physical security boundaries).

3.4.2 Category "B" should include rooms that contain objects of physical protection assigned to category "B." Buildings and structures containing rooms assigned to category "B" shall be placed in internal areas (in special cases in the vital area) at the site.

3.4.3 Category "C" should include rooms that contain objects of physical protection assigned to category "D."

This category also includes rooms housing security system components and systems that monitor personnel and public radiation protection and rooms that do not fall into categories "A" or "B." Buildings and structures containing rooms assigned to category "C" may be placed in protected areas, using the principle for placing the highest ranking buildings (structures) the greatest distance possible from the main perimeter fence.

3.5 A list of the categories assigned to rooms shall be included in initial data for developing site PP system design decisions.

#### Analysis:

This section addresses principles for categorizing rooms and building at sites as part of the PPS design process.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	4	7	Minatom/Rosatom	Enacted
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#### Citation:

##### 4 The Categorization of Potentially Hazardous Nuclear Sites.

*Entire Section*

#### Analysis:

This section contains the criteria and process for categorizing NM and sites.

0042	Instructions for the Conceptual Design of Physical Protection Systems at Potentially Hazardous Nuclear Sites	PP	BOA 297922-A-D	6.3.1, 6.3.2	7	Minatom/Rosatom	Enacted
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#### Citation:

##### 6. The Development and Selection of Physical Protection System Structural Alternative(s)

##### 6.3. Identifying (Changing) Secure Areas at the Potentially Hazardous Nuclear Site

6.3.1. During PP system development (modernization) at a potentially hazardous nuclear site, secure areas shall be identified and established, and the secure area where each object of physical protection will be located shall be identified based on the specific nature of the nuclear facilities, the NM categories at the site, and the other objects of physical protection. Several alternatives may be proposed during the identification of secure areas.

6.3.2. The following secure areas shall be created in accordance with applicable requirements /References 1 and 3/:

- Protected areas;
- Internal areas;
- Vital areas.

In addition, areas subject to restricted access shall be identified at the potentially hazardous nuclear site; these areas are called restricted access areas.

If the process of assessing the effectiveness of the PP system reveals that the existing secure areas are inadequate for neutralizing potential threats, additional secure areas (boundaries) may be established.

Objects of physical protection shall be located in secure areas appropriate to their assigned category. When organizing zones at a site, physical protection shall be intensified as one proceeds from the perimeter to the center of the site, i.e., towards the protected objects of physical protection.

#### Analysis:

6.3.1: Citation required the category to be considered for protection measures design

6.3.2: Citation requires object of physical protection to be located in secure areas (defined in the section as Protected , Internal, Vital, and Restricted Access Areas) appropriate to their category

00715	Methodological Recommendations for Categorizing Objects of Physical Protection and Nuclear Sites	PP	(Not obtained)	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:***Entire Document***Analysis:**

The document "Methodological Recommendations for Categorizing Objects of Physical Protection and Nuclear Sites" (henceforth, Recommendations) establishes the methodological approaches that are recommended when categorizing objects of physical protection (including the consequences of unauthorized actions directed at the objects), rooms (buildings, structures), industrial sites with objects of physical protection, and nuclear sites under the jurisdiction of Rosatom. Section 6, in particular, addresses categorization of nuclear sites, rooms, and buildings.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	Appendix 3, 21 c), 21 d), 28, 29, 43	4	RF Government	Enacted
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**Citation:**

## APPENDIX 3

To Procedures for the Physical Protection of Nuclear Material, Nuclear Sites, and Nuclear Material Storage Points Requirements for Siting Objects of Physical Protection at a Nuclear Site

Category Characteristics of the Object of Physical Protection Area Where the Object of Physical Protection Is Sited

A At least two of the following are true:

- Category I nuclear material
- Security classification – vital
- Category I consequence of unauthorized actions Vital area provided with additional physical protection and security equipment (if necessary)

A Significant quantity of direct use nuclear material Same as above

B At least one of the following is true:

- Category I or Category II (with possible buildup to Category I) nuclear material
- Security classification – vital
- Category I consequence of unauthorized actions Vital or internal area provided with additional physical protection and security equipment (if necessary)

B At least two of the following are true:

- Category II nuclear material
- Security classification – top secret
- Category II consequence of unauthorized actions Vital or internal area provided with additional physical protection and security equipment (if necessary)

C At least one of the following is true:

- Category II nuclear material
- Security classification – top secret
- Category II consequence of unauthorized actions Internal area

D At least one of the following is true:

- Category III nuclear material
- Security classification – secret
- Category III consequence of unauthorized actions Protected area or protected area outfitted with additional physical protection and security equipment, or (if necessary)

E Other objects of physical protection Restricted access area

Notes: 1. When siting an object of physical protection, consider the quantity of nuclear material and its potential use to fabricate an explosive nuclear device or its components.

2. The quantity of nuclear material sufficient to fabricate an explosive nuclear device is a significant quantity of nuclear material.

3. Direct use nuclear material is nuclear material that can be used to fabricate an explosive nuclear device or its components:

- a) Without additional processing
- b) Without conversion or enrichment but requiring insignificant additional chemical or physical processing

4. The necessity of additional physical protection and security equipment and corresponding requirements is dictated by the physical protection system effectiveness assessment that is conducted when the system is being developed (upgraded).

**III. Organization and Implementation of Physical Protection at Nuclear Sites**

21. To perform physical protection tasks, the management staff at the nuclear site (conjointly with the leadership of the appropriate military units and forces at sites guarded by the Russian Federation Ministry of Internal Affairs

internal security troops or by site security forces affiliated with Russian Federation law enforcement agencies):

...

c) Categorizes objects of physical protection, rooms (buildings and structures when necessary), and the nuclear site itself

d) Establishes secure areas and restricted access areas; determines the locations of objects of physical protection in the appropriate area, building, structure, and room

...

28. Secure and restricted access areas at a nuclear site are designated and documented according to the siting requirements for objects of physical protection presented in Appendix 3.

When establishing secure areas, vital areas are situated within internal areas, which in turn are located within protected areas.

29. Within nuclear sites, rooms containing objects of physical protection are categorized, as are, when necessary, buildings and structures. The category of a room, building, and structure is based on the highest category of the nuclear material located there and/or the nuclear material within the nuclear facilities located there, taking into account its security classification.

43. Nuclear sites are categorized to determine whether they must be guarded by internal security troops of the Russian Federation Ministry of Internal Affairs.

The procedures for categorizing a nuclear site are established in federal rules and regulations for physical protection, taking into account the category of objects requiring physical protection and the areas in which they are located.

#### Analysis:

Appendix 3: The text in Appendix 3 is in a "table" that precludes it being directly inserted into this spreadsheet. Seven "categories" are described (e.g., A, B, C), the "Characteristics of the Object of Physical Protection" are listed for each category, in addition to the "Area Where the Object of Physical Protection Is Sited."

21 c): The citation addresses the requirement for the management staff at the nuclear facility to categorize objects of physical protection, rooms (buildings and structures when necessary), and the nuclear site itself

21 d): The citation addresses the requirement for the management staff at the nuclear facility to establish secure areas and restricted access areas, and determine the locations of objects of physical protection in the appropriate area, building, structure, and room

28: The citation addresses the siting requirements of secure & restricted access areas to be in accordance with the requirements listed in Appendix 3.

43: The citation addresses the requirement for the nuclear sites to adhere to the procedures for categorizing a nuclear site that are established in federal rules and regulations for physical protection.

29: The citation addresses the requirement for the characterization of nuclear facilities to be in accordance with the nuclear material located there.

#### 41. Requirements for site-level documentation

##### Analysis:

Clear requirements for site-level documentation of plans and procedures relative to physical protection systems and MC&A activities.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0009	Basic Federal Rules for MCA (OPUK)	MC	NP-030-05	7.1.1, 7.1.2, 7.1.3, 7.2.1, 8.2, 8.4	5	Minatom/Rosatom GAN/Rostekhnadzor	Enacted

##### Citation:

#### 7 Accounting and Reporting Documents. Advance Notices

##### 7.1 Accounting documents

7.1.1 Accounting documents shall be maintained for each MBA; these documents shall contain data on each nuclear material kind [present in the MBA], including:

- The quantity of material in the MBA
- Changes in the quantity of material in the MBA

7.1.2 Accounting documents shall reflect all changes in the quantity of material for each batch, the characteristics of the batch, and initial batch preparation data. Dates on which changes in the quantity of nuclear material occurred shall be indicated, along with the shipping organization MBA and the receiving organization MBA.

7.1.3 The data used to determine the quantitative and qualitative changes to nuclear material in an MBA—including results from the calibration, inspection, and qualification of measuring instruments, sample selection data and

analysis results, measurement quality control results, and the random uncertainty and bias of measurements—shall be reflected in the appropriate documents.

## 7.2 Reporting documents

7.2.1 Every organization shall create and actively maintain the following reporting documents, which shall be based on accounting documents:

- Inventory change reports
- Material balance reports
- Inventory listings
- Physical inventory listings
- Special reports

## 8 Nuclear Material Control and Accounting in Organizations

8.2 The manager of the organization shall develop and approve the site policy document (procedure) for nuclear material control and accounting, which shall identify the following:

- How nuclear material control and accounting activities are organized in MBAs and within the organization as a whole
- What nuclear material control and accounting policies and technical documents have been adopted within the organization
- The number of MBAs, their boundaries, and their structure
- What measurement methodologies and measuring instruments have been adopted within the organization for nuclear material control and accounting purposes
- Nuclear material access control equipment
- A list of accounting and reporting documents and [copies of] the forms to be used
- Procedures for monitoring the status of nuclear material control and accounting activities within MBAs
- Procedures for investigating nuclear material control and accounting anomalies
- Procedures for training employees (personnel) and granting them access to nuclear material control and accounting related work
- Deadlines for compiling ILs for MBAs and for the organization as a whole
- Procedures for conducting physical inventories

8.4 For each MBA, the manager of the organization shall develop and approve nuclear material control and accounting procedures that identify the following:

- KMPs, as well as the measurement methodologies and measuring instruments adopted for use
- Nuclear material access control equipment
- The nuclear material control and accounting procedures adopted for use in each MBA
- The procedures used to estimate nuclear material losses

### Analysis:

7.1.1: OPUK requires accounting documents for each MBA

7.1.2: OPUK requires the accounting documents to reflect changes to material

7.1.3: OPUK requires the documentation of changes to material, to include a reference to the data used to determine the change to the material

7.2.1: OPUK requires organizations to actively maintain MC&A reporting documents

8.2: OPUK requires the manager of the organization to maintain documentation (procedures) that address various MC&A activities

8.4: OPUK requires the manager of the organization to develop and approve nuclear material control and accounting procedures for each MBA

0029	Provision on Interaction of PP Systems at Nuclear Hazardous Facilities of RF Minatom	PP	Minatom Order # 387; attachment 1	4.10, 4.19, 6.3	7	Minatom/Rosatom	Enacted
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### Citation:

#### 4 Major Physical Protection Functions of the Administration at the Potentially Hazardous Nuclear Site and Its Security Department

To ensure that NM, nuclear facilities, and NM storage points are reliably protected, the administration at the potentially hazardous nuclear site and its security department shall take the following measures:

4.10 With the approval from the relevant parties, develop site-level regulations, work plans, measures, plans to coordinate the actions of the site administration, security department, personnel, and security forces with regional internal affairs agencies, the Russian Federal Security Service, and professional emergency rescue units of the RF

Ministry of Emergency Management during normal operations and in emergencies; also develop physical protection proposals intended for parent and cooperating agencies.

4.19 If the site has agency security forces, it implements the separate functions of the military units (forces) of the RF MVD internal security troops in protecting specific site areas as established in the "Report of the Interagency Committee on the Organization of Site Security" and Minatom of Russia regulations on site security forces. The specific functions of the administration at the potentially hazardous nuclear site and its security department, including site security forces (if applicable), are established in the procedural documents of each potentially hazardous nuclear site based on the administrative structure of the site and its specific operational features.

#### **6 Coordinating Operations Performed by the Administration at the Potentially Hazardous Nuclear Site and Its Security Department with the Security Forces**

6.3 The procedures for cooperation are set forth in the plans for cooperation among the administration, security department, security forces, and personnel of the potentially hazardous nuclear site during routine and emergency situations. They are also set forth in the plans for the cooperation between the site administration, security department, and security forces with internal affairs agencies and the Russian Federal Security Service during routine and emergency situations, as well as with professional emergency rescue units of the RF Ministry of Emergency Management during emergency situations.

#### **Analysis:**

4.10: Citation requires co-operation on planning for Physical Protection Systems at Potentially Hazardous Nuclear Sites

4.19: Citation specifies that procedural documents be developed at the site.

6.3: Citation specifies that procedural documents be developed at the site.

0031	Model Provision on MCA for Minatom Enterprises	MC	Minatom Order #333-r	Entire Document	7	Minatom/Rosatom	Enacted
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#### **Citation:**

*Entire Document*

#### **Analysis:**

Establishes requirements for sites to develop and maintain site-level MC&A documentation.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	6.3.3, 6.3.4, 10.3.3, 10.3.5, 11.6.2	7	Minatom/Rosatom	Enacted
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#### **Citation:**

#### **6 The Structure of Physical Protection Systems.**

#### **6.3 Organizational and technical measures.**

6.3.3 PPS organizational measures include development of site level regulations that take into consideration of the nature of PPS operations at a specific potentially hazardous nuclear facility, including the site category, the organizational and staffing structure of its security service and security force units, its physical protection equipment, the specific nature of its secure areas, and other specific characteristics of the site.

6.3.4 The list of major site level regulations to be developed by the units that provide management in the PP system are specified in the requirements of the Procedures and regulations issued by Minatom of Russia and the Russian Federation Ministry of the Interior that govern requirements for PP systems and the organization of site security.

These regulations include:

- A regulation regarding the authorization system for clearances and access to NM, nuclear facilities, NM storage points, and information regarding operation of their PP systems;
- Instructions regarding access control procedures [off-site];
- A regulation regarding the on-site site security system;
- A regulation regarding the security service;
- A regulation regarding the security force that reports to site management;
- A security and defense plan for the potentially hazardous nuclear site;
- Plans for cooperation among the site administration, security service, security force units, and personnel at the potentially hazardous nuclear site in normal and emergency situations;

- Plans for cooperation of the site administration, security service, security force units at the potentially hazardous nuclear site and agencies of the Russian Federation Ministry of the Interior and the Federal Security Service of Russia in normal and emergency situations;
  - Plans for verifying the technical status and operability of physical protection and security equipment.
- Site level regulations shall update the requirements of federal and ministry level standards documents regarding physical protection taking into account the organizational structure and special characteristics of operations at the potentially hazardous nuclear site, without contradicting the federal and ministry level standards documents.

## **10 Organizational Requirements for the Operation of Physical Protection Systems and for Planning Physical Protection Activities.**

### **10.3 Organizational and planning requirements for the operation of off-site and on-site access control procedures**

10.3.3 Requirements for the organization and operation of the access control and management system shall be governed by the "Instructions regarding access control procedures" and other documentation developed at the site that shall specify:

- The characteristics of the established access control system;
- Procedures for site personnel, security force units, individuals on temporary assignment, and visitors to access the premises of secure areas, restricted access areas, and classified rooms by passing through access control points;
- Procedures for vehicles delivering (receiving) nuclear material and items containing them or other material assets to access the premises of a site;
- Types and groups of badges, procedures for preparing and issuing them, the serial numbers encoded in the badges;
- Accounting and reporting procedures, badge storage procedures, seals and serial numbers;
- A description of the badges and a list of the serial numbers currently in use at the site;
- The duties of the administration, the security service and security force units, and directors of administrative units of the potentially hazardous nuclear site to support the access control system;
- The duties of administrative personnel in the security service and security force units regarding the implementation of the badging system, and response procedures in normal and emergency situations.

10.3.5 Organizational requirements for on-site access control procedures shall be governed by a Regulation developed at the potentially hazardous nuclear site that specifies the following:

- Compliance with the on-site daily work routine by the site personnel and security force personnel, as well as persons on temporary assignment and visitors;
- Security of the site premises, buildings, structures and rooms in which nuclear material or items containing them are being extracted, (re)processed, used or stored;
- Concealment of the physical locations of nuclear material and items containing them;
- Conduct of informational sessions with personnel who work directly with nuclear material and/or items containing them to explain their responsibility for the containment and integrity of the material and products;
- Support of the established procedure for using documentation containing information about the nuclear material and items containing them, the security systems, including the PP system, and also containing the locations where nuclear material and items containing them are used, stored and (re)processed, and the dates and routes of their movement;
- Implementing fire safety rules and regulations;
- Monitoring compliance with the requirements of the on-site access control procedures.

## **11 Requirements for physical protection and security equipment operation.**

### **11.6 Plans for the operation of physical protection and security equipment.**

11.6.2 Plans shall include the following measures:

- Maintenance;
- Organizing repair and storage;
- Provide logistical support for operations;
- Gathering, calculating and analyzing data on the invulnerability to jamming and the operational reliability of PP system equipment;
- Industrial safety;
- Monitoring operational organization and status.

#### **Analysis:**

6.3.3, 6.3.4: This document is the primary agency-level PP document for Rosatom. The document provides a list of specific documents/regulations to be prepared by the site.

10.3.3: This document is the primary agency-level PP document for Rosatom. This citation addresses the content of the site-level document that addresses "off-site" access control procedures.

10.3.5: This document is the primary agency-level PP document for Rosatom. This citation addresses the content of the site-level document that addresses "on-site" access control procedures.

11.6.2: The cited sections provide the requirements for content of the PP equipment operations plan.

0710	Standard (Model) Form for a Site Level Policy Document (Regulation)	PP	(Not obtained)	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

This document is a "Model Form for a Site Level Policy Document Regarding On-Site Access Control Procedures" that defines the organization and content of the site-level document.

0721	Set of Standard (Model) Documents Regarding the Deployment of Physical Protection Systems and Recommendations for Completing the Forms	PP	(Not obtained)	2.4.3, 2.4.4	7	Minatom/Rosatom	Enacted
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**Citation:**

**2 Administrative Procedures**

**2.4 Developing Site Level Documents Regarding Physical Protection**

2.4.3 Major site level documents include:

- A policy regarding the system for clearances and access to objects of physical protection, and information regarding operation of their physical protection systems
- A policy regarding the security service
- Instructions regarding access control procedures [off-site]
- A policy regarding on-site access procedures
- A policy regarding site security force units
- The nuclear site security plan
- The response plans for physical protection personnel and nuclear site personnel during normal operations and in emergencies
- A plan for cooperation between the nuclear site and military units (departments) of the Russian Federation Ministry of Internal Affairs internal security troops with internal affairs agencies and agencies of the Russian Federation Federal Security Service during normal operations and in emergencies
- A plan to check the technical condition and operability of physical protection and security equipment
- A plan for modernizing the physical protection system.

2.4.4 The following documents shall be developed (revised) at the site in order to supplement (expand) major documents during preparation of the nuclear site for physical protection system deployment:

- Documents regarding physical protection system deployment as specified by these Methodological Recommendations
- Documents for organizing initial (requal) and in-service training of physical protection personnel
- Documents for organizing physical protection and security equipment operation
- Documents for organizing cooperation between health physics, radiation monitoring, and nuclear material control and accounting departments
- Other documents developed and enacted at the discretion of the nuclear site management

**Analysis:**

2.4.3, 2.4.4: This document provides templates for preparing the site-level documents. Templates are, strictly speaking, optional.

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	23	4	RF Government	Enacted
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**Citation:****III. Organization and Implementation of Physical Protection at Nuclear Sites**

23. The management staff of the nuclear site develops administrative measures, issues physical protection policy documents (together with the leadership of the appropriate military units and forces at sites guarded by internal troops of the Russian Federation Ministry of Internal Affairs or by site security forces affiliated with Russian Federation law enforcement agencies), and adopts the following documents in accordance with established procedures:

- a) Site policies regarding the access system, as well as access to objects of physical protection and information concerning the operation of the physical protection system (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)
- b) Site policies regarding the security service (developed and enacted by nuclear site management without the participation of the leadership of the relevant military units or forces)
- c) Access control procedures
- d) Site policies regarding onsite access control procedures
- e) Site policies regarding the site security forces
- f) The nuclear site security plan
- g) Action plans for physical protection personnel and nuclear site personnel for routine and emergency situations
- h) A plan for the cooperation of nuclear site managers and the leaders of the Russian Federation Ministry of Internal Affairs internal security troops (forces) with Russian Federation law enforcement agencies and offices of the Federal Security Service of the Russian Federation during routine and emergency situations
- i) A plan for inspecting the status and performance of physical protection and security system equipment
- j) A plan for upgrading the physical protection system

**Analysis:**

This document provides the high-level guidance for development of site-specific regulations.

**42. PPS design****Analysis:**

There are clear requirements that address the subject of PPS design.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	6	7	Minatom/Rosatom	Enacted

**Citation:****6 PHYSICAL PROTECTION EQUIPMENT SELECTION AND SITING REQUIREMENTS**

*Entire Section*

**Analysis:**

The section discusses the types of PPS equipment that must be selected and the criteria upon which selection should be based.

0032	General Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	7	7	Minatom/Rosatom	Enacted
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**Citation:****7 Requirements for Physical Protection and Security Equipment Components and Constituents.**

*Entire Section*

**Analysis:**

This chapter shall present the requirements for various types of physical protection equipment, including security alarm systems, alarms, access control equipment, surveillance/situation assessment, emergency communications, telecoms, power supply, control panels, and engineered barriers. Their tactical characteristics and list of functions shall be set forth in the appropriate federal and ministry level standards documents.

Ministry  
Methodological  
Recommendations -

0060	Standard Technical Specifications for Creating (Improving) PP Systems for Nuclear Hazardous Facilities	PP	(Not obtained)	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

This document is the Ministry of Atomic Energy, Standard technical Specification for the Development of PPS and Nuclear Sites

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	34, 42	4	RF Government	Enacted
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**Citation:****III. Organization and Implementation of Physical Protection at Nuclear Sites**

34. Physical protection and security system equipment consists of the components and devices included in the following major functional systems:

- a) Guard-signaling
- b) Alarm calling
- c) Access control and management
- d) Optical-electrical surveillance and situation assessment
- e) Communications and notification (including direct wire and radio communications)
- f) Information protection
- g) Power and lighting

42. Physical protection system equipment must be certified in accordance with Russian Federation laws.

Physical protection hardware and software used to process information constituting a state secret must undergo mandatory certification in accordance with established procedures.

**Analysis:**

34: Subsection defines the major functional areas of PPS sub-systems

42: Subsection requires PP equipment to be certified

**43. Requirements for PPS technical subsystems****Analysis:**

There are clear requirements that address the subject of PPS technical sub-systems.

DCN	Title	Topical Areas	Official #	Applicable Sections	Document Level	Issuing Authority	Status
0025	Physical Protection Systems for Nuclear Materials & Facilities. Design Requirements	PP	Minatom Order # 211	6	7	Minatom/Rosatom	Enacted

**Citation:****6 PHYSICAL PROTECTION EQUIPMENT SELECTION AND SITING REQUIREMENTS**

*Entire Section*

**Analysis:**

The section discusses the types of PPS equipment that must be selected and the criteria upon which selection should be based.

General

0032	Requirements for Physical Protection Systems at Nuclear Hazardous Facilities	PP	Minatom Order # 550	7	7	Minatom/Rosatom	Enacted
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**Citation:**

**7 Requirements for Physical Protection and Security Equipment Components and Constituents.**

*Entire Section*

**Analysis:**

This chapter shall present the requirements for various types of physical protection equipment, including security alarm systems, alarms, access control equipment, surveillance/situation assessment, emergency communications, telecoms, power supply, control panels, and engineered barriers. Their tactical characteristics and list of functions shall be set forth in the appropriate federal and ministry level standards documents.

0060	Ministry Methodological Recommendations - Standard Technical Specifications for Creating (Improving) PP Systems for Nuclear Hazardous Facilities	PP	(Not obtained)	Entire Document	7	Minatom/Rosatom	Enacted
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**Citation:**

*Entire Document*

**Analysis:**

This document is the Ministry of Atomic Energy, Standard technical Specification for the Development of PPS and Nuclear Sites

3134	Rules of Physical Protection of Nuclear Materials, Nuclear Facilities and Storage Sites of Nuclear Materials	PP	RF Government Decree # 456	34, 42	4	RF Government	Enacted
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**Citation:****III. Organization and Implementation of Physical Protection at Nuclear Sites**

34. Physical protection and security system equipment consists of the components and devices included in the following major functional systems:

- a) Guard-signaling
- b) Alarm calling
- c) Access control and management
- d) Optical-electrical surveillance and situation assessment
- e) Communications and notification (including direct wire and radio communications)
- f) Information protection
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**Analysis:**

34: Subsection defines the major functional areas of PPS sub-systems

42: Subsection requires PP equipment to be certified