



# **Regulatory Measures to Ensure the Continued Effectiveness of Physical Protection Systems during a Nuclear or Radiological Emergency Caused by a Nuclear Security Event**

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- Mandatory nature of physical protection measures
- Responsibility of the regulatory body
  - ✓ development and enactment of regulations
  - ✓ licensing of nuclear activities
  - ✓ licensing of personnel
  - ✓ control of operators' compliance with regulations and license conditions
  - ✓ enforcement
- Responsibility of the operator
  - ✓ ensuring safety and security
  - ✓ emergency preparedness
- Responsibility of the Government
  - ✓ Ensuring safety and security in case the operator is unable to perform safety function



- Ensuring continuous effectiveness of physical protection system (PPS) under any operation conditions
  - ✓ duplication and redundancy of PPS elements
  - ✓ corrective measures
  - ✓ additional external supporting pro-forces
  - ✓ ensuring effectiveness of physical protection systems by the operator in accordance with the plan of action in emergency
  - ✓ regulatory assessment of operator's actions in emergency
- The regulatory body informs the competent authorities or the government when the operator's actions are insufficient
- Informing public
- Conducting of emergency exercises



- Combined approach
  - ✓ prescriptive requirements
  - ✓ performance approach
- Physical protection (PP) level depends on:
  - ✓ overall potential hazard of a nuclear facility
  - ✓ NM category according to the IAEA criteria
  - ✓ potential impact of sabotage
- PP subject-matter (target) – nuclear material or equipment, which if treated illegally, may cause unacceptable radiological consequences



## Radioactive sources:

- ✓ the potential hazard based on radiological characteristics of potential impact from radiation exposure
- ✓ the potential of unauthorized removal
- The physical protection level is established depending on a combination of hazards
  - ✓ specific requirements for each level of physical protection
  - ✓ graded approach



## Nuclear facilities

- Objective assessment of PPS effectiveness
- Establishment of a justified criteria for allowable values of effectiveness
  - ✓ as a rule, this is a calculated quantitative characteristic, which rely on the results of the vulnerability analysis
  - ✓ vulnerability analysis based on the design basis threat (DBT), which depends on the threat assessment at the governmental level



- In-depth inspection of the physical protection system's conformance to the established requirements for a facility carried out in course of licensing
  - ✓ review of safety/security justification documents
  - ✓ conformance inspection of the submitted data and documents to their real state on the site
- Licensee's staff responsible for physical protection assurance must have an appropriate license
  - ✓ examination of theoretical knowledge
  - ✓ working experience
  - ✓ health state of the staff
  - ✓ special training certificate



- The regulation requires ensuring and maintaining effectiveness of the physical protection system by means of:
  - ✓ a set of engineering and technical equipment
  - ✓ guard force and control systems aimed at detection, detaining, and neutralizing adversaries

All these measures need to be reflected in legal documents.

The physical protection system is defined as a set of engineering and technical equipment, guard forces and organization measures





- The results of the vulnerability analysis are to be revised when new factors affecting nuclear security emerge
  - ✓ If such factors do not seem to emerge, the results are to be revised or updated not less than once every five years
- In case of abnormalities, the regulator calls on the operator to take necessary corrective measures
  - ✓ The sufficiency of such measures has to be justified by the effectiveness assessment of the physical protection system



- The effectiveness of the physical protection system is also to be inspected in course of emergency response exercises
  - ✓ the need to protect the facility against possible unauthorized actions
  - ✓ the conditions where the physical protection system is affected by accident factors or emergency situation



## Licensing - Requirements to Nuclear Security

Siting: the general requirement is the low level of criminal activity in the region

Design: PPS design compliance with the requirements

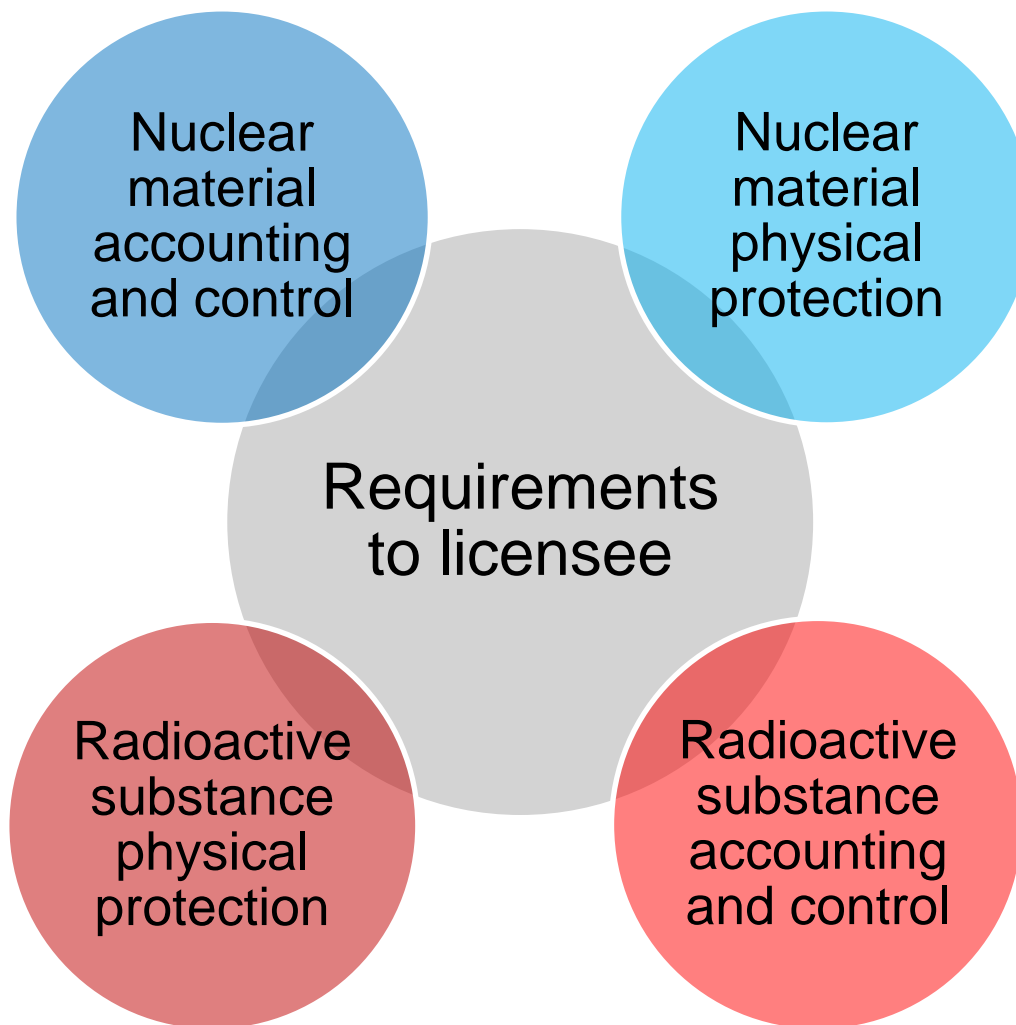
Construction: compliance of PPS with the PPS design

Operation: a full range of requirements for MPC&A

Decommissioning: a set of requirements with account to the category of nuclear and other radioactive materials



## Requirements to Nuclear Security





## Required documents on accounting and control of nuclear materials

- MC&A examination results of personnel of the licensee
- plans of personnel training and retraining
- Rostechnadzor's permissions (licenses) to be obtained by MC&A personnel
- copies of provision (instruction) on nuclear material accounting and control
- MC&A instructions for each material balance area (MBA)
- the document of nuclear material physical inventory
- the list of the MC&A documents available on the site

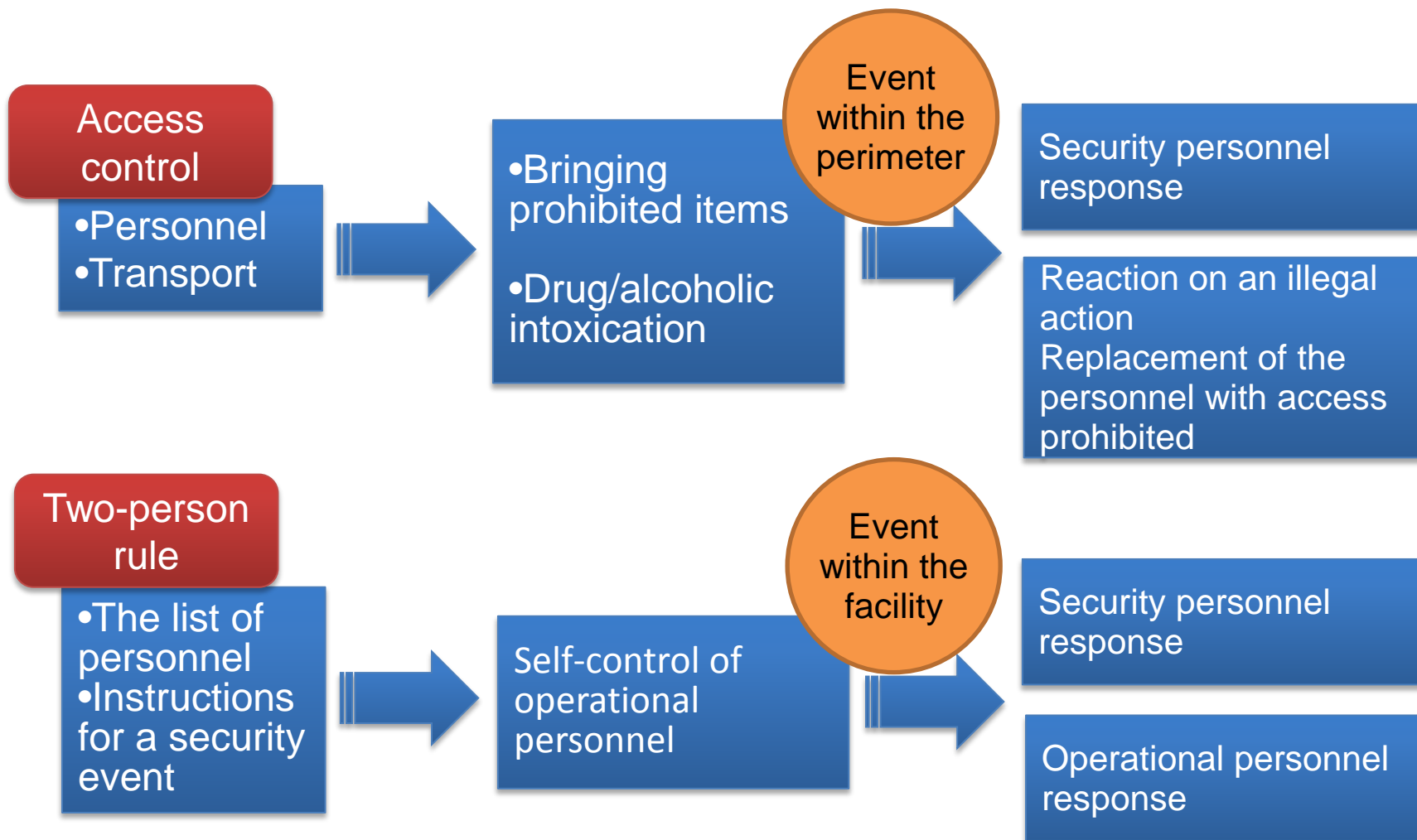


## Required documents on physical protection of nuclear materials

- Data on security personnel examination, training and retraining
- Rostechnadzor's permissions (licenses) to be obtained by security personnel
- Information on:
  - ✓ PPS design compliance with NS requirements
  - ✓ certificates for technical means
  - ✓ protective force activity organization
  - ✓ counter-terrorist protection passport
  - ✓ nuclear material category
  - ✓ vulnerability analyses report
  - ✓ compliance of PPS effectiveness with the established criteria
- The list of PP documents in use within the organization

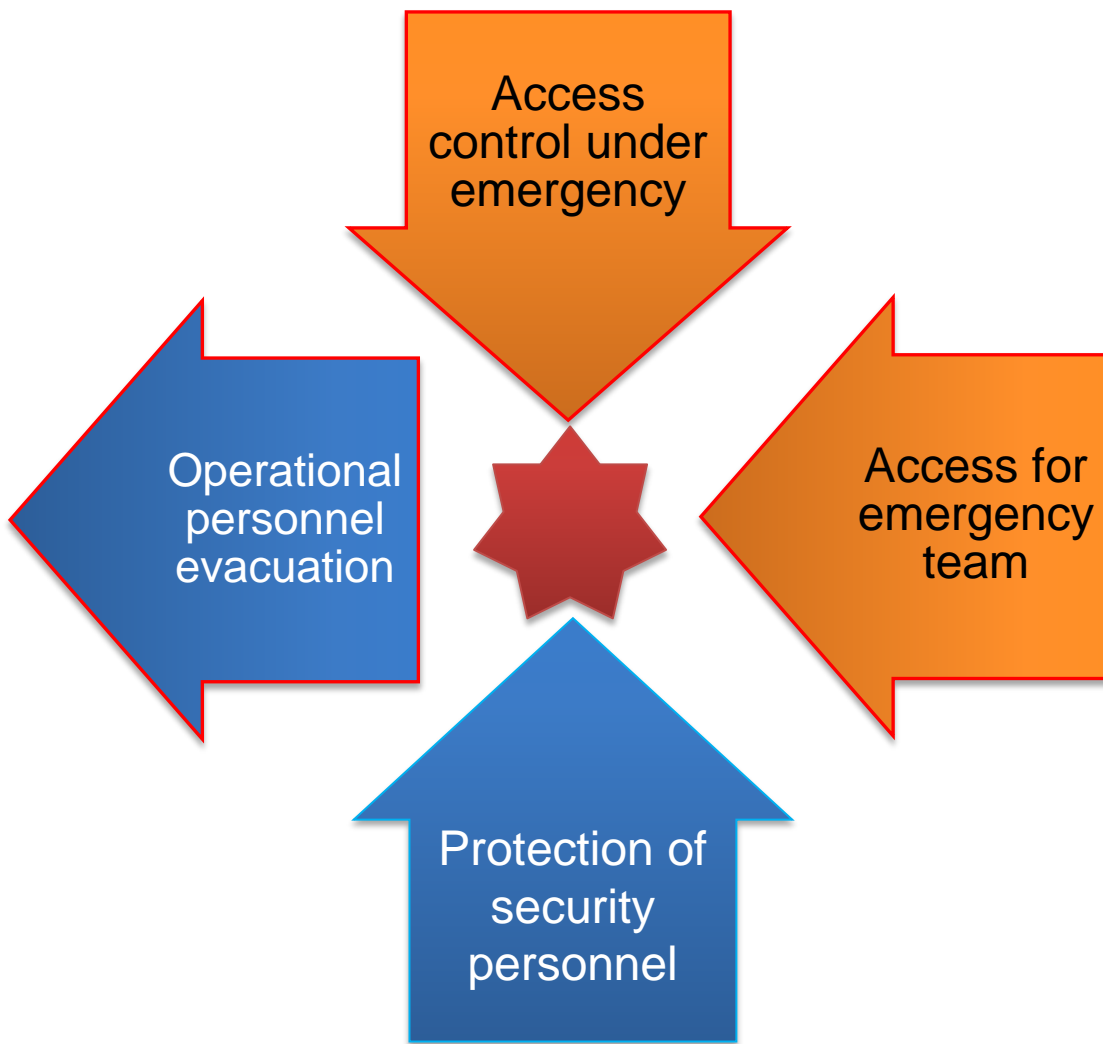


## Normal operation





# Emergency situations







## Requirements to an emergency plan

- ✓ Radiation protection
  - ✓ Engineering protection means
    - ✓ Physical protection
      - ✓ Evacuation management
        - ✓ Medical protection



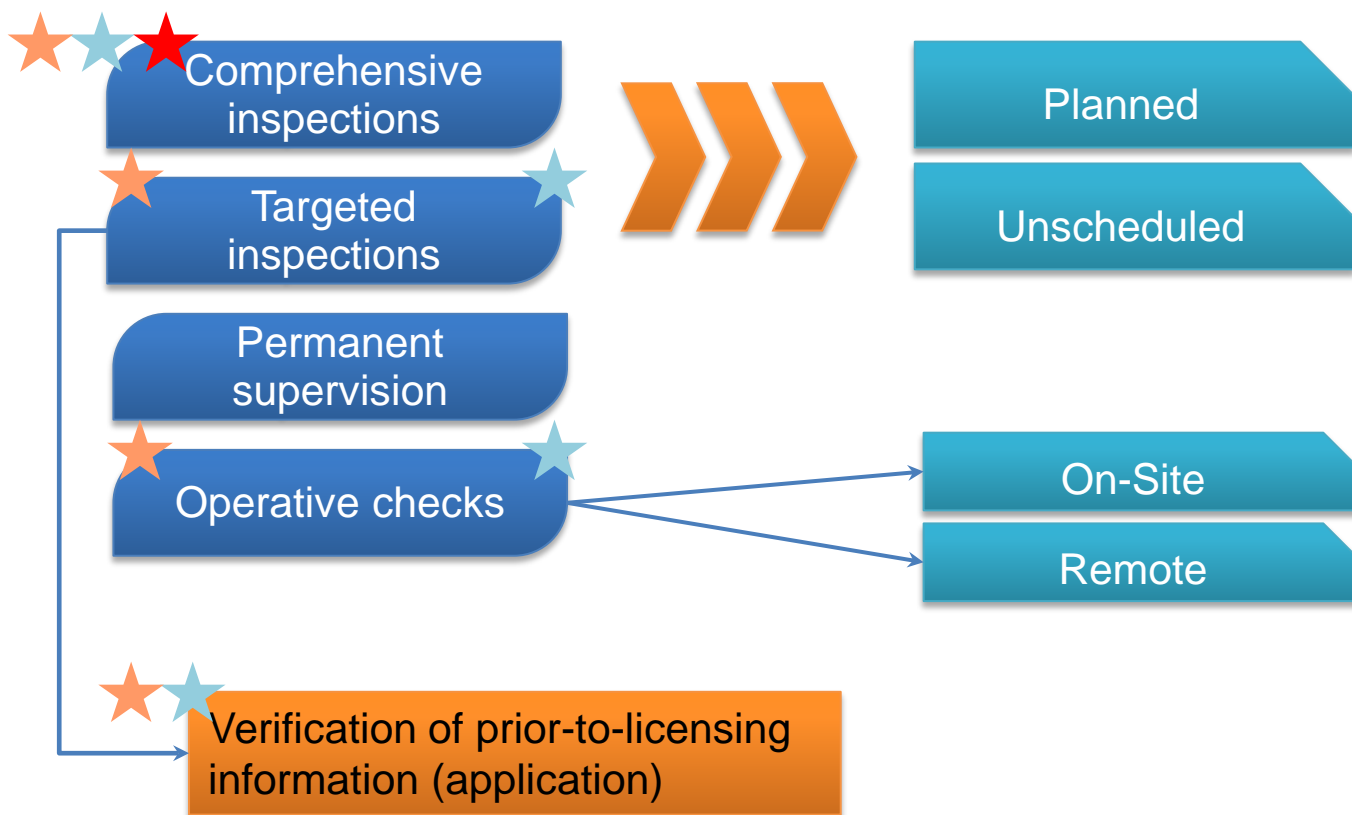
# Requirements to emergency preparedness. Physical protection

Planning of organizational and technical actions and pro-forces actions including:

1. ensuring effective controlled access of rescue team into the protected areas;
2. assistance in free evacuation of personnel from the territory and engineering structures of NPP through all check points and exits;
3. ensuring protection of staff of external protection posts;
4. building-up a mobile reserve to strengthen or change the guard;
5. secure NPP protection management from a protected point;
6. prevention of unauthorized access;
7. timely detection of unauthorized action;
8. hindrance to penetration of the violator;
9. suppression of unauthorized actions;
10. detention of the persons involved in preparation or commission of sabotage or theft of nuclear materials;
11. prevention of terrorist attacks.



# Inspections



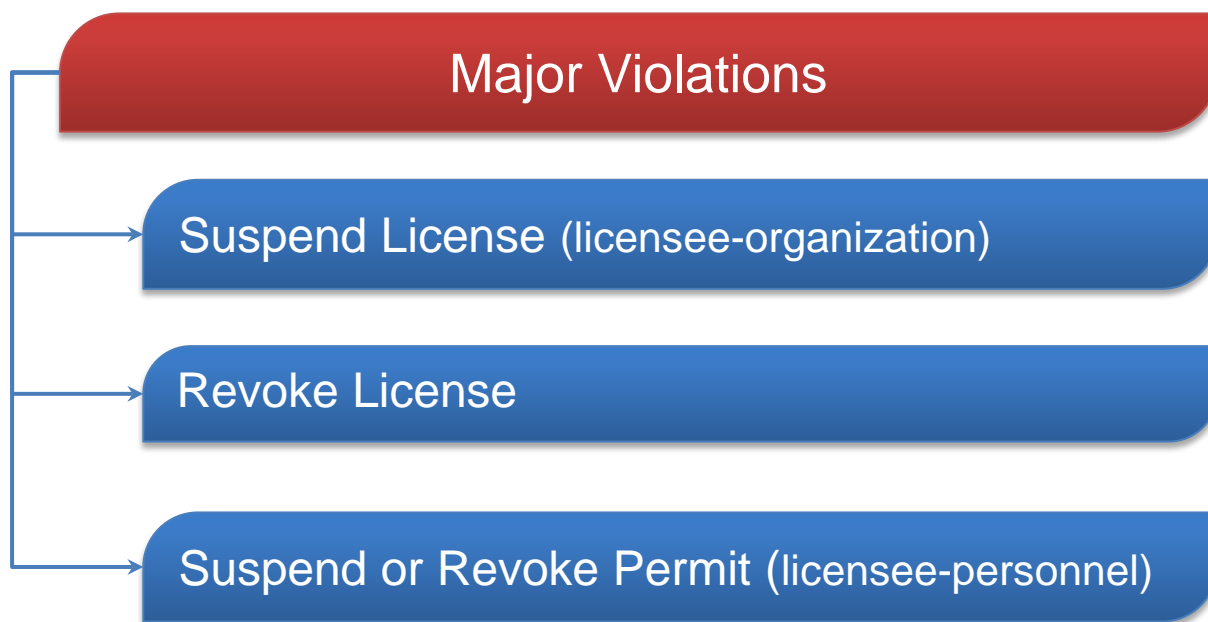


# Supervision Technique/Sanctions





## Other sanctions





## Inspection staff training

- Inspector is to be trained in nuclear safety, radiation safety and nuclear security
- For specific security issues inspection team may include experts
- General theoretical training courses include nuclear safety, health physics, radiation protection, physical protection and accounting and control
- Special training courses are focused on specific issues including, for example, NM measurement technology



## Nuclear security inspections

**Supervision on physical protection**

**Accounting and control verification**





## Questions for the future

- Accounting of nuclear security factors in overall risk assessment
- Acceptable risk - how to evaluate?
- Reasonable balance between nuclear security information protection and general nuclear safety/security information transparency





# Thank you for your attention!

Regulatory authority [www.gosnadzor.ru](http://www.gosnadzor.ru)

Technical support organization [www.secnrs.ru](http://www.secnrs.ru)