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Ukrainian Efforts in Implementation of Fundamental Principles of Physical Protection

Outline of presentation

- Nuclear and radiation safety and physical protection. Brief excursus to mutuality
- Nuclear energy utilization and basis of physical protection in Ukraine
- Risks and threats
 - Main types of risks for nuclear and other radioactive materials
 - Credible threats for nuclear security
 - Primary targets of unlawful acts
- Implementation of 12 Fundamental Principles of physical protection in Ukraine

Convention
on the Physical Protection
of Nuclear Material

LEGAL SERIES No. 12

INFCIRC/225/Rev.4
(Corrected)

THE
PHYSICAL PROTECTION
OF
NUCLEAR MATERIAL
AND
NUCLEAR FACILITIES



INTERNATIONAL ATOMIC ENERGY AGENCY

IAEA-TECDOC-967

Guidance and considerations for
implementation of
INFCIRC/225/Rev.3,
The Physical Protection of
Nuclear Material

IAEA-TECDOC-1276

Handbook on the
physical protection of
nuclear materials and facilities

INTERNATIONAL ATOMIC ENERGY AGENCY IAEA
May 2002

CODE OF CONDUCT ON
THE SAFETY AND SECURITY OF
RADIOACTIVE SOURCES

放射源安全和保安行为准则

CODE DE CONDUITE SUR
LA SÛRETÉ ET LA SÉCURITÉ
DES SOURCES RADIOACTIVES

КОДЕКС ПОВЕДЕНИЯ ПО
ОБЕСПЕЧЕНИЮ БЕЗОПАСНОСТИ И
СОХРАННОСТИ РАДИОАКТИВНЫХ
ИСТОЧНИКОВ

CÓDIGO DE CONDUCTA
SOBRE SEGURIDAD TECNOLÓGICA
Y FÍSICA DE LAS FUENTES
RADIATIVAS

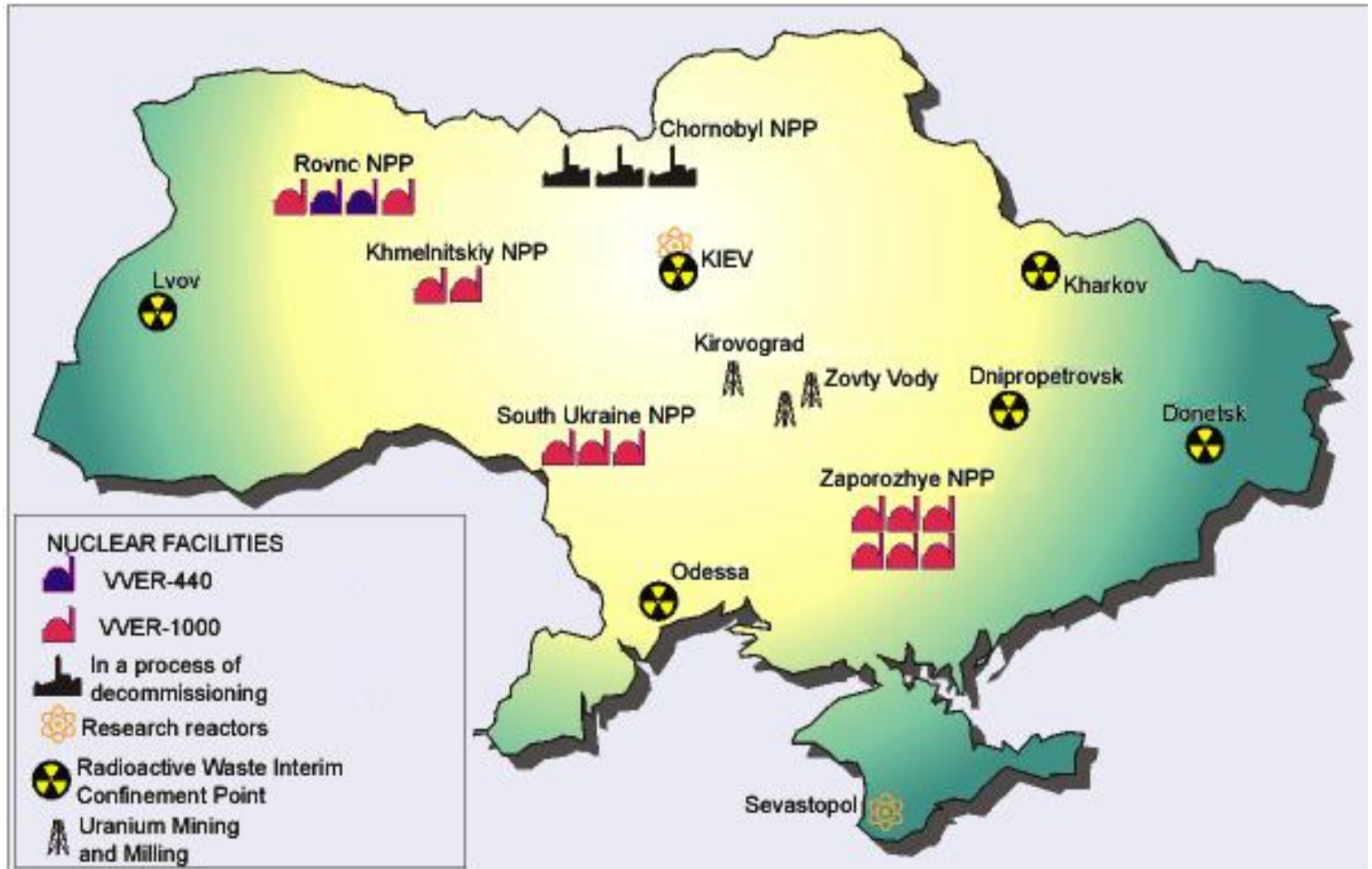
مدونة قواعد السلوك بشأن أمن المصادر
المتنعة وأمنها

IAEA
International Atomic Energy Agency

From accountancy and control and
guarding to physical protection.
From physical protection of nuclear
material to security of radioactive
materials and associated facilities

In 2001 by document
GC(45)/INF/14 “Measures to
Improve the Security of Nuclear Materials
and other Radioactive Materials”
4 Objectives and 12 Fundamental Principles of Physical
Protection were implemented

Nuclear and Radioactive Facilities in Ukraine





Steps of physical protection in Ukraine

- Decree of Supreme Council No 3182-XII of 05 May 1993 adopted Convention on the Physical Protection of Nuclear Material as binding for Ukraine and declared the necessity of state regulation of relationship in the area of physical protection.
- Decree of President of Ukraine No 608/93 “On measures of the physical protection of nuclear materials and nuclear facilities” (substituted now) published on 5 December 1993 was the primary legal document constituting the physical protection requirements.
- In 2000 the Law “On physical protection of nuclear facilities, nuclear materials, radioactive wastes and other radioactive sources” was adopted. It was amended repeatedly and still remains the principal basis of physical protection in Ukraine.
- Ukraine was among the initiators of amending the Convention on the Physical Protection of Nuclear Material and undersigned the Amendment to it in 2005.
- Ratification of the Amendment by the dedicated law in 2008 became the legal ground for implementation of not only 12 fundamental principles of physical protection but also of some concepts new for Ukraine.



Accidents at nuclear facilities with overall consequences – direct examples of risks

Violation of nuclear safety during the tests of physically deficient reactor caused the accident at Chernobyl NPP in 1986. The main cause of Chernobyl disaster was the lack of safety culture as such.

Accident at Fukushima NPP in March 2011 showed the impact of natural disaster on nuclear safety when technological equipment failure resulting from a resulted in reactor explosion.



As world practice displays the main causes of accidents at nuclear facilities are:

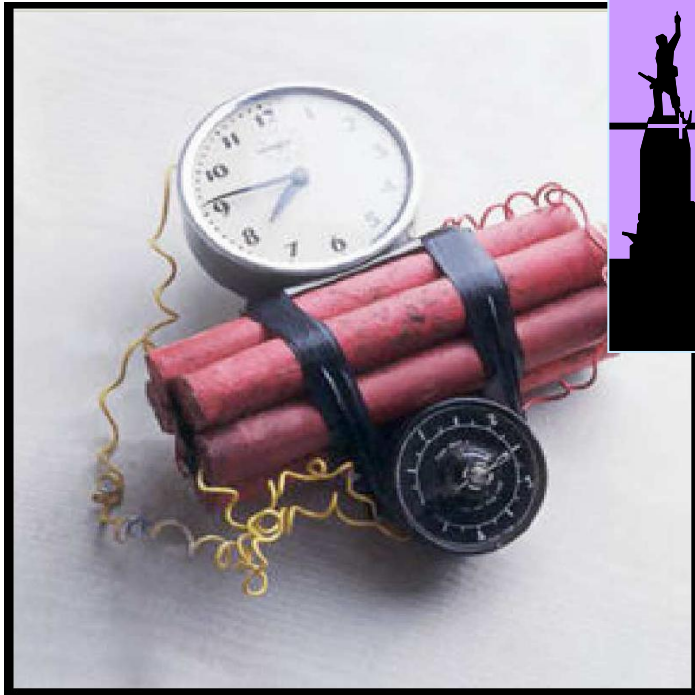
- failures of technological equipment and structures
- human errors and violation of nuclear safety

Radiation incidents have less radiological consequences



but are much more numerous

Deliberate and malicious acts
aimed at nuclear facilities,
radioactive waste management
facilities or other radioactive
sources



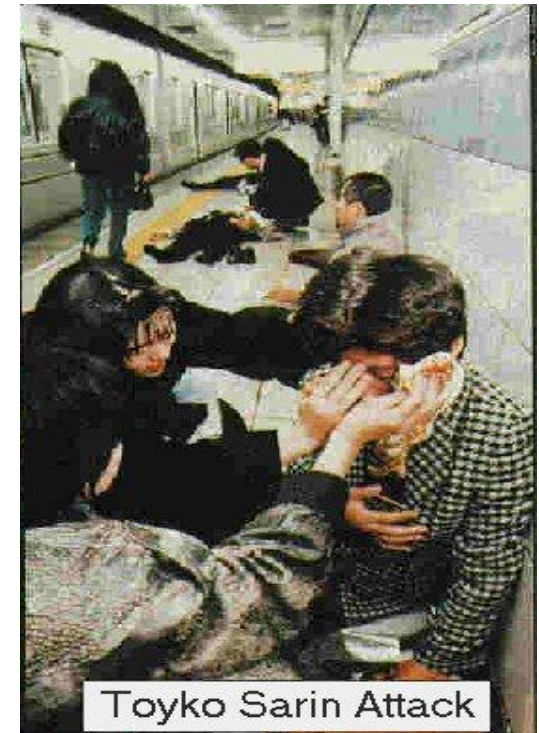
may have unacceptable
radiation consequences

Main types of risks

- **For nuclear materials and nuclear facilities:**
 - risk of unlawful acquisition of nuclear material for production of nuclear explosive device – atomic bomb;
 - risk of unlawful acquisition of nuclear material resulting in dispersion and dissemination of material;
 - risk of sabotage at nuclear facility.
- **For radioactive waste and radiation sources and associated facilities:**
 - theft or other unlawful acquisition for subsequent sale when the offender does not intend to apply materials by himself;
 - theft or other unlawful acquisition for production of radiological dispersal device – so-called dirty bomb;
 - risk of sabotage directly at facility.

Dirty bomb scenarios

- Point application (London, 23 November 2006)
- Airborne dissemination over the large populated area
- Dispersion in the closed space of crowd (e.g. metro)



Threat of terrorism is credible



Terrorist attacks may differ by objectives, targets and scale: a) airborne attack in New York on 11 September 2001; b) series of explosions on tram and bus stops in Dnipropetrovsk on 25 May 2012.

Threat specific for Ukraine

- infringement relative to nuclear and other radioactive materials for profiteering purposes



a)



b)



c)

Primary targets of unlawful acquisition in Ukraine: a) radioactively contaminated metal scrap, especially nonferrous; b) industrial radioactive sources; c) small amounts of nuclear material mainly for research purposes

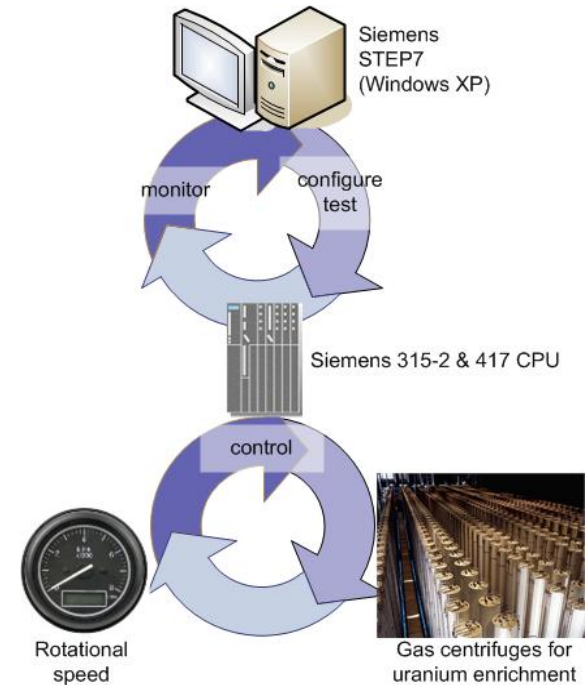
Case of “nuclear fraud”



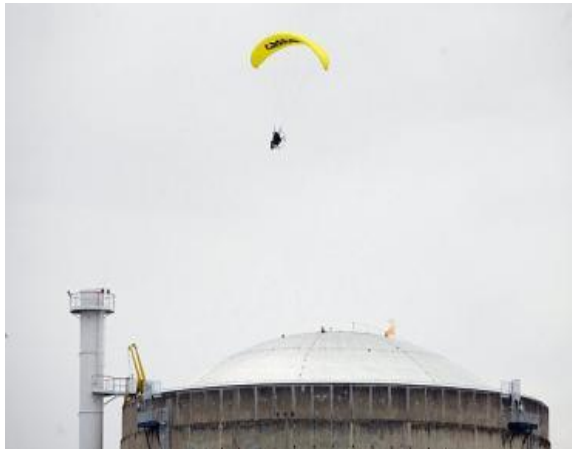
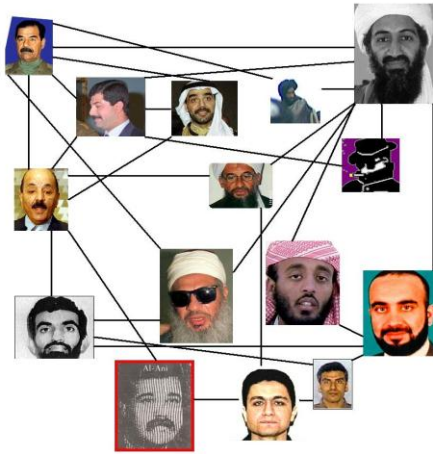
Attempt to sell under the guise of 3,7 kg of plutonium the lead container with radioactive source for smoke detector, of 500 μg mixed isotopes of plutonium inside. Zalischyky, Chernivtsi region, Ukraine, 2009

Risks not related directly to impact on nuclear facilities and radioactive materials

- Risk of leakage of sensitive nuclear information suitable for malicious use
- Unauthorized acquisition, destruction or distortion of vital information in computer networks



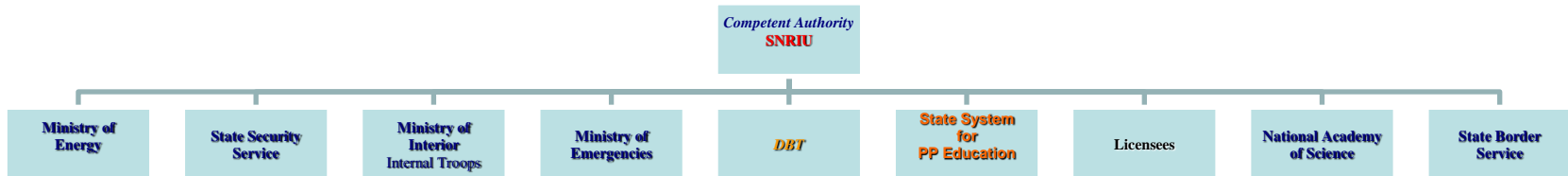
Threats to nuclear security



Credible threats for nuclear security: a) well-subsidized and capable terrorist organizations; b) criminals acting alone or in groups; c) mass demonstrators; d) extreme activists; e) extremist organizations often involving young people; f) hackers are also involved

Fundamental Principle A: Responsibility of the State

The responsibility for the establishment, implementation and maintenance of a physical protection regime within a State rests entirely with that State.



Interaction scheme of State Physical Protection System of Ukraine

Fundamental Principle A: *Responsibility of the State*

In the case of an imminent threat of nuclear terrorism act, the State Physical Protection System interacts with State Counterterrorism System



Fundamental Principle B: Responsibilities During International Transport

The responsibility of a State for ensuring that nuclear material is adequately protected extends to the international transport thereof, until that responsibility is properly transferred to another State, as appropriate.



International transportations in Ukraine are carried out by all the conveying equipment and accordingly to bilateral or trilateral international agreements and in compliance with international conventions in which Ukraine participates, including the CPPNM



Fundamental Principle B: *Responsibilities During International Transport*

In this, Ukraine adheres to the following principles:

- the export of nuclear material is not permitted to a country which does not provide assurance that such material will be protected during the international nuclear transport at the proper level;**
- the receipt/conveyance of nuclear material is not permitted from a country which does not provide assurance that such material will be protected during the international nuclear transport at the proper level;**
- the transit transportation of nuclear material is not permitted if other member states do not provide assurance that such material will be protected during the international nuclear transport at the proper level;**
- In crossing the state borders, procedure for assignment of responsibility for physical protection is established;**
- detailed information on transportation is confidential and should be protected;**
- for every transportation, physical protection system is established;**
- transportation of nuclear materials across the territory of Ukraine is guarded by Interior Troops of Ministry of Internal Affairs.**

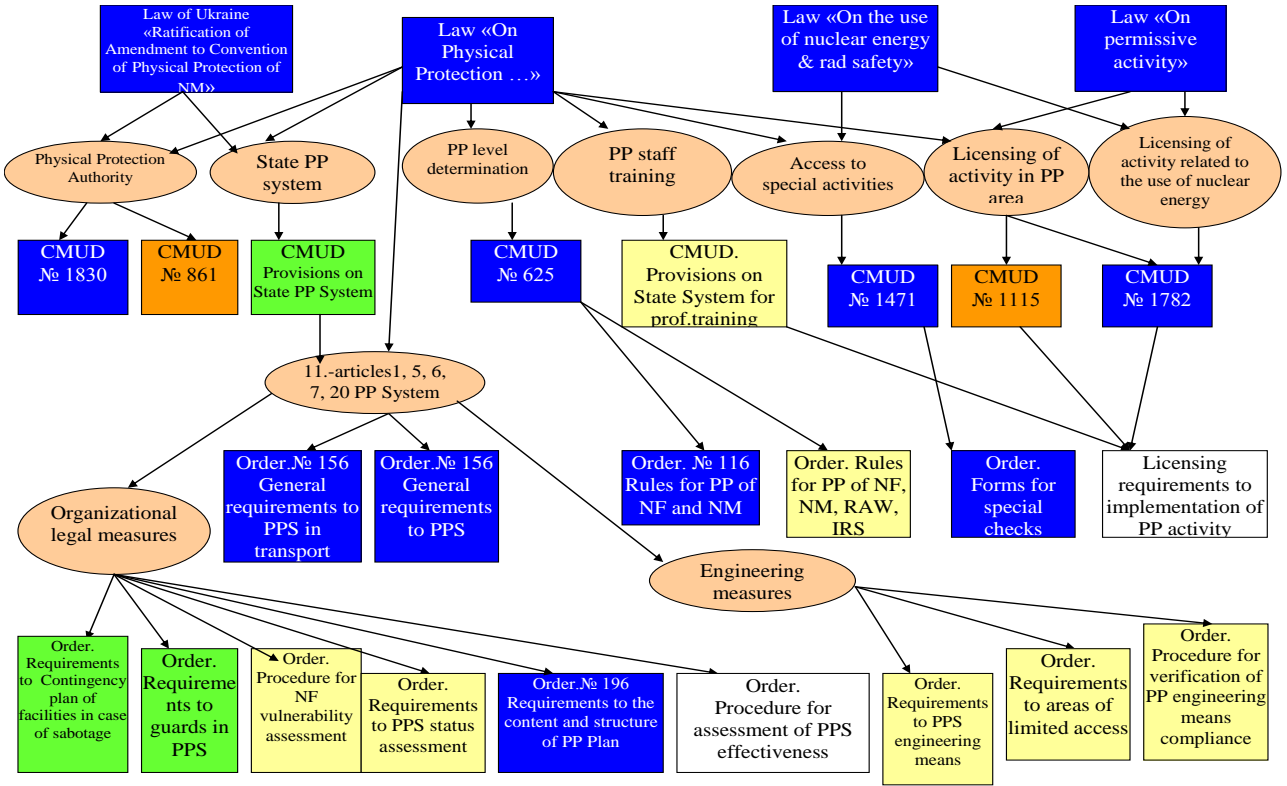
Fundamental Principle B: *Responsibilities During International Transport*



Means of surveillance over transport of radioactive materials on borders and within Ukraine: a) inauguration of a passenger detecting portal on border crossing at Boryspil International Airport; b) customs inspection using a portable radiometer; c) railway portals on border crossing (c) and spur-track of Donetsk metallurgical plant.

Fundamental Principle C: Legislative and Regulatory Framework

The State is responsible for establishing and maintaining a legislative and regulatory framework to govern physical protection.



Hierarchy pyramid - a diagram indicating the titles of acts and regulatory matters, shows the position of acts by levels and their interrelations

Fundamental Principle D: Competent Authority

The State should establish or designate a competent authority which is responsible for the implementation of the legislative and regulatory framework, and is provided with adequate authority, competence and financial and human resources to fulfill its assigned responsibilities.



- The competent authority of State physical protection system of Ukraine is the State Nuclear Regulatory Inspectorate.
- Article 62 of Law for Nuclear Energy and Article 25 of Law for Physical Protection determine the status and responsibilities of the regulatory authority for physical protection.
- In 1996, following Article 5 of CPPNM, it was appointed by governmental decree as a central authority for physical protection matters.
- In the Presidential Decree of 2011 establishing the Statute of the State Nuclear Regulatory Inspectorate of Ukraine, it is appointed a competent authority for physical protection matters.

Fundamental Principle E: Responsibility of the License Holders

The responsibilities for implementing the various elements of physical protection within a State should be clearly identified. The State should ensure that the prime responsibility for the implementation of physical protection of nuclear material or of nuclear facilities rests with the holders of the relevant licenses or of other authorizing documents (e.g., operators or shippers).



Licensees are subjects of the State Physical Protection System as well. Functioning in different areas of nuclear energy and being responsible for nuclear and radiation safety under their licenses, the licensees are also responsible for physical protection. The basic law determines responsibility of operators in Article 33 and of other licensees in Article 32 for fulfilment the immediate and principal requirements of physical protection. These requirements are stated in articles 18-21 of the physical protection law and in the rules of physical protection. Fulfilment of requirements of physical protection is obligatory for granting a license or another authorization and for further economic and other activities in nuclear energy.

ДЕРЖАВНИЙ КОМІТЕТ ЯДЕРНОГО РЕГУЛЮВАННЯ УКРАЇНИ
Ідентифікаційний код 21721081

Серія ОВ 000029

Видана Севастопольському Інституту ядерної енергії та промисловості
Україна, 99033 м. Севастополь-33, вул. Курчатов

Ідентифікаційний код юридичної особи 24490813

на право провадження діяльності з підготовки, перепідготовки та підвищення кваліфікації фахівців фізичного захисту ядерних установок та ядерних матеріалів

місце провадження діяльності Севастопольський Інститут ядерної енергії та промисловості, м. Севастополь

Особливі умови та правила провадження даного виду діяльності згідно з розділом 1

Ліцензія видана на підставі документів, наведених у розділі 2

Найменування підрозділу або органу, що повинен здійснювати контроль за дотриманням умов та правил провадження виду діяльності, що ліцензується
Державний комітет ядерного регулювання України

Дата видачі 5 жовтня 2001 р.
Термін дії ліцензії 5 жовтня 2004 р.

Заступник Голови _____ **В. Радіцько**
М.П.

Внесення змін до ліцензії _____
Зміну внесено " ____ " _____ 200__ р.

(оскар) _____ (ліцензія) _____ (відкликати та відкликати)

ПОЛОЖЕННЯ

про роботу групи з формування, розвитку та підтримання культури захисності в організаціях, що здійснюють фізичний захист

1. Загальні положення

1.1. Згідно з Поправкою до Конвенції про фізичний захист ядерного матеріалу та ядерних установок, ратифікованої Законом України 356-VI від 03.09.2006, культуру захисності визначено як один із основоположних елементів фізичного захисту ядерного матеріалу та ядерних установок.

На міжнародній конференції МАГАТЕ "Питання фізичного безпеки: виклики майбутнього глобального розвитку" (Лондон, 2005 р.) заявлено, що основоположними принципами ядерної безпеки є першочисленість запровадження культури захисності в усіх зацікавлених організаціях.

Відомимо до Закону України "Про фізичний захист ядерних установок, ядерних матеріалів, радіоактивних відходів, інших джерел іонізуючого випромінювання" виступила пріоритетна культура захисності є однією з засад запровадження довгочасної політики з фізичного захисту, а виконання її положень є розробленою та здійсненою заходами щодо формування культури захисності, що вказується на Державній комісії ядерного регулювання України (далі – Держкоматрегулювання України).

1.2. Робота групи створюється цією Держкоматрегулювання України з метою прискорення формування, розвитку та підтримки культури захисності в організаціях, що здійснюють фізичний захист.

1.3. Робота групи з формування, розвитку та підтримки культури захисності (далі – робоча група) у своїй діяльності керується Конституцією та законами України, указами Президента України, актами Кабінету Міністрів України, Держкоматрегулювання України і цим Положенням.

Робоча група у своїй діяльності також використовує документи, складі Міжнародним агентством з атомної енергії, зокрема, документ "Культура захисності: Керівництво з виробництва".

1.4. Склад робочої групи затверджується рішенням засіданням Голови Держкоматрегулювання України.

До складу робочої групи можуть входити представники державних органів, ядерних установок, об'єктів, призначених для поводження з

Fundamental Principle F: Security Culture

All organizations involved in implementing physical protection should give due priority to the security culture, to its development and maintenance necessary to ensure its effective implementation in the entire organization.

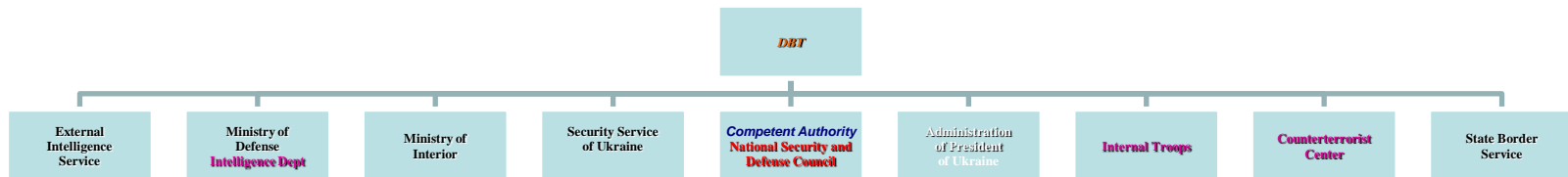
Definition of security culture is cited in the Law for Physical Protection and differs a little from that given in IAEA Recommendations, but more in letter than in spirit:

Security culture is the characteristic of activities of institutions and of behaviour of individuals testifying that for security of nuclear facilities, nuclear materials, radioactive wastes and other radioactive sources attention is paid, giving proper significance of security, to nuclear and radiation safety.

For support of operators and other licensees to provide and maintain security culture, the special Working Group of representatives of authorities and operators was established under SNRIU.

Fundamental Principle G: *Threat*

The State's physical protection should be based on the State's current evaluation of the threat.



Scheme of interaction of involved authorities in development and maintaining the DBT in Ukraine.

Fundamental Principle H: Graded Approach

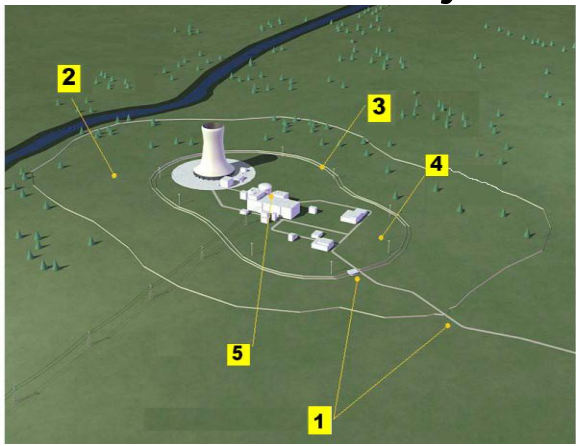
Physical protection requirements should be based on a graded approach, taking into account the current evaluation of the threat, the relative attractiveness, the nature of the material and potential consequences associated with the unauthorized removal of nuclear material and with the sabotage against nuclear material or nuclear facilities.



In Ukraine four levels of physical protection are established based on the categorization of materials and facilities. Category is the determining factor for physical protection of materials and facilities and depends upon their potential danger. The categories were elaborated especially for needs of physical protection according to IAEA recommendations and do not coincide with those of nuclear and radiation safety.

Fundamental Principle I: Defence in Depth

The State's requirements for physical protection should reflect a concept of several layers and methods of protection (structural or other technical, personnel and organizational) that have to be overcome or circumvented by an adversary in order to achieve his objectives.

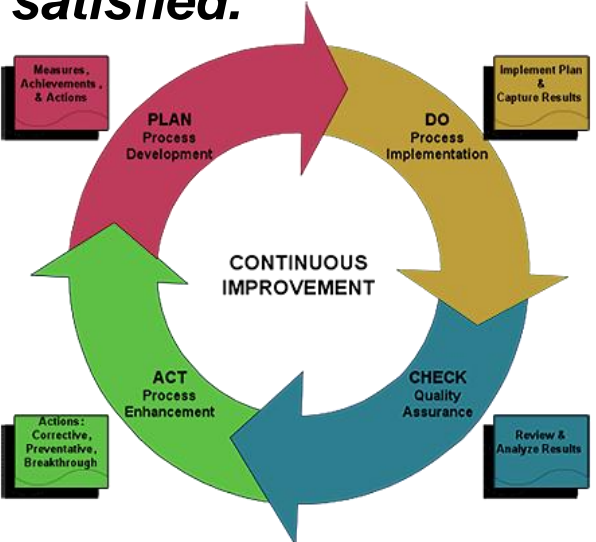


Defence in Depth: a) airphoto of NPP; b) restricted areas of NPP; c) protected area of research nuclear assembly; d) entrance to controlled access area of waste storage.



Fundamental Principle J: Quality Assurance

A quality assurance policy and quality assurance programs should be established and implemented with a view to providing confidence that specified requirements for all activities important to physical protection are satisfied.



According to physical protection legislation of Ukraine establishment and maintaining of quality assurance system of physical protection are among the primary requirements for granting a license. Operators develop and implement measures for quality assurance of physical protection at the stages of determining, development, and operation of physical protection systems and provide information on its status in annual reports for the regulatory authority.

Fundamental Principle K: Contingency Plans

Contingency (emergency) plans to respond to unauthorized removal of nuclear material or sabotage of nuclear facilities or nuclear material, or attempts thereof, should be prepared and appropriately exercised by all licenseholders and



Scenario examples:

- a) adversary movements;
- b) off-site force involvement;
- c) sufficient counteraction to adversaries;
- d) mitigation of radiological consequences.



Fundamental Principle L: Confidentiality

The State should establish requirements for protecting the confidentiality of information, the unauthorized disclosure of which could compromise the physical protection of nuclear material and nuclear facilities.

In Ukraine access to confidential and secret information is regulated by the Law “On Information” [16]. Physical protection legislation provides limited access to nuclear security information for the matters of national security.

On this basis, the Rules for securing the information on physical protection were approved in 1998. This act constitutes a procedure for classifying information as confidential or secret, rules of using and securing such information.

Of course, these rules do not take into account the need of securing the electronic information. Protection of information in computer networks is a separate item which is only starting to be examined and regulated in Ukraine.

CONCLUSIONS

- The presence of a substantial number of nuclear facilities, radioactive waste storages and other radioactive sources in Ukraine poses threats of malicious acts – sabotage, theft and dissemination of radioactive materials, which could result in inadmissible radiological consequences.
- The threats are real and taken into account at the State level as threats to national security.
- The principal instrument of counteraction to these threats is physical protection.
- The fundamental principles of physical protection are the reliable and comprehensive basis for creating the up-to-date physical protection systems at the state and facility levels and for assessment, control and regulation of physical protection and are fully implemented in Ukraine.