Report on the analysis of the current regulatory and legal framework regarding the handling of radioactive materials, including IRSs in unlawful circulation

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ABBREVIATIONS AND ACRONYMS

CPPNM	Convention on the Physical Protection of Nuclear Material
CR	Resolution of the Cabinet of Ministers of Ukraine (Cabinet Resolution)
EF	Engineering Features
IAEA	International Atomic Energy Agency
IRRS	Integrated Regulatory Review Service
LoU	Law of Ukraine
ME	Ministry of Emergencies
MENR	Ministry of Environment and Natural Resources of Ukraine
MH	Ministry of Health
MIA	Ministry of Internal Affairs
NASU	National Academy of Sciences of Ukraine
NI	Nuclear Installation
NM	Nuclear Material
NRI NASU	Nuclear Research Institute of the National Academy of Sciences of Ukraine
NRS	Nuclear and Radiation Safety
PP	Physical Protection
PPS	Physical Protection System
PPS EF	Physical Protection System Engineering Features
Radon	Ukrainian State Corporation Radon
RM	Radioactive Material
RS	Radiation Source
SBGS	State Border Guard Service
SESU	State Emergency Service of Ukraine
SHES	State Health and Epidemiological Service
SNRIU	State Nuclear Regulatory Inspectorate of Ukraine
SPPS	State Physical Protection System
SSU	Security Service of Ukraine
SSPT	State System of Professional Training, Professional Development and Skill Improvement for Experts on Physical Protection, Accounting and Control of Nuclear Materials

1. OBJECTIVES AND METHOD OF ANALYSIS

Ukraine has the regulatory and legal framework relating to radiation safety and physical protection in the management of radioactive materials (RM).

Prior to the adoption of amendments to the Criminal Code of Ukraine in 2016, incentive measures for the voluntary delivery of orphaned radiation sources (RS) by the public were ineffective because there was criminal liability for the illicit management of radioactive materials. In addition, there was no exemption from liability for voluntary delivery.

Therefore, Article 265 of the Code was extended by part 4 in 2016, according to which a person is released from criminal liability in the event of voluntary delivery of RM, including RS, which he/she managed illicitly.

The objective of this analysis is to identify gaps in the regulatory and legal framework governing the safe management of RM, including RS beyond regulatory control or in illicit trafficking, and to confirm that the current regulatory and legal framework is adequate and non-contradictory with respect to provisions of the Criminal Code relating to the amnesty of revealed RS.

The method of the analysis involves a systematic review of current Laws of Ukraine and regulations on nuclear and radiation safety for the management of RM, with a focus on RS beyond regulatory control or in illicit trafficking.

The scope of analysis covers:

– system for regulation of safety in the management of RM and the hierarchic pyramid of regulatory and legal documents on RM management;
– regulations related to the management of RM beyond regulatory control;
– regulatory and legal framework for RM physical protection and security;
– Criminal Code of Ukraine.

Analysis is carried out with the use of the following criteria that are the key for implementation of the Project “Amnesty of orphaned IRS”:

– completeness and consistency of the regulatory and legal framework for RM management;
– adequacy of the regulatory and legal framework for RM management for project implementation;
– need to develop detailed procedures to govern organizational and procedural issues related to management of RS beyond regulatory control or in illicit trafficking.

2. OVERVIEW OF REGULATORY AND LEGAL FRAMEWORK ON RADIOACTIVE MATERIAL MANAGEMENT

2.1 Regulation of Safety in Radioactive Material Management

The nuclear legislation of Ukraine applies to all types of nuclear and radioactive materials, including radioactive waste and RS, as well as associated nuclear installations and facilities for management of radioactive waste and RS. Activities involving all these materials and facilities should be conducted in compliance with authorizations envisaged by law and in compliance with regulations, rules and standards on nuclear and radiation safety and security of nuclear installations, nuclear materials, radioactive waste and other RS.

In the area of nuclear energy, nuclear installations and radioactive waste storage facilities are conventionally considered to pose the main risks for nuclear and radiation safety and security. Therefore, most safety and security measures are focused on them. These facilities and materials are isolated from the public and the environment. However, Ukraine has a large number of RS with different activities and purposes.

Activities relating to the use of RS (regardless of their applications) are subject to state regulation, including issue of licenses and registration of RS, state oversight and enforcement measures.

The State Nuclear Regulatory Inspectorate of Ukraine (SNRIU) is a central executive body, which establishes and implements the state policy pertaining to the safe use of nuclear energy since 1995, through issue of authorizations, conduct of inspections, and enforcement measures.

Ukraine is one of the first countries that joined (in 2003) the implementation of the Code of Conduct on the Safety and Security of Radioactive Sources (IAEA, 2003) [1]. To date, most provisions of the Code [1] have been implemented into the national legal framework. Within implementation of the Code [1], a national program for establishing the register of radiation sources and safe storage of disused high-level radiation sources was developed. The State Register of Radiation Sources [2] was established to ensure mandatory state registration of RS for their accounting and control, analyze RS qualitative and quantitative composition (except for RS for military purposes), and predict RS accumulation, scope of maintenance, need for production capabilities of RS manufacturers and specialized radioactive waste management enterprises. Moreover, to implement provisions of the Code [1], the state system for RS licensing and control was substantially improved: eight regional inspectorates were established and started their activities in 2006. Interregional distribution of SNRIU inspectorates is shown in Fig. 1

Ukraine lost regulatory control on the territories of the Autonomous Republic of Crimea and some territories of the Donetsk and Luhansk regions because of external aggression. The connection with the Crimean State Nuclear and Radiation Safety Inspectorate was actually lost in May-June,

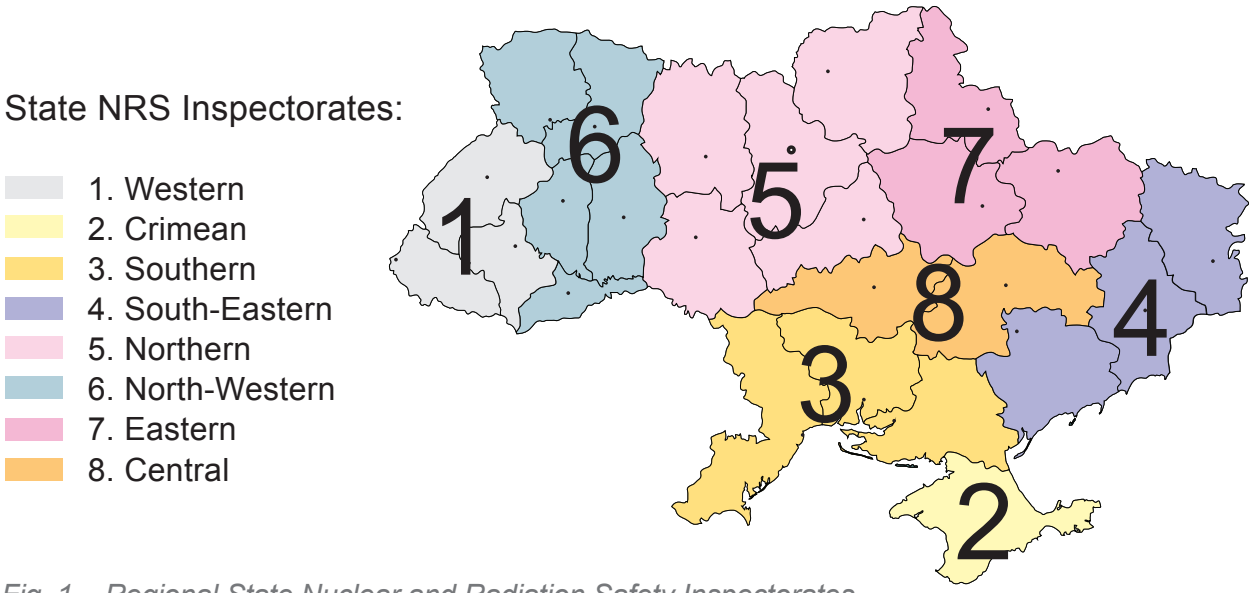

Fig. 1 – Regional State Nuclear and Radiation Safety Inspectorates

and it became officially subordinated to Rostekhnadzor of the Russian Federation from September 2014. The South-Eastern State Nuclear and Radiation Safety Inspectorate located in the city of Donetsk continued its activities and was moved to the city of Zaporizhzhya in December 2014.

At present, SNRIU performs functions of state regulation of RS safety directly and through its territorial bodies – seven state nuclear and radiation safety inspectorates.

SNRIU and the state territorial nuclear and radiation safety inspectorates provide regulatory control over RS use at 4167 nuclear entities and RS production at 22 nuclear entities. 2481 of them conduct activities related to the use of RS not released from licensing and having appropriate licenses. The state registration of RS is an authorizing procedure for other nuclear entities.

As of the beginning of 2018, there are 3620 owners of registered RS in Ukraine that use 23565 RS including 8736 radionuclide sources and 14829 non-radionuclide facilities that generate radiation. It should be noted that RS were produced and extensively used in the Soviet Union times. After the collapse of the USSR, many sources became uncontrolled after the closure of enterprises or their stealing. Since management of spent radiation sources required financial costs, some enterprises and institutions tried to get rid of them illegally. Therefore, a significant number of the so-called legacy sources, namely orphaned, lost, stolen, and hidden ones, has been accumulated in Ukraine.

One of the main principles of the state regulation is a graded approach to various activities related to the use of RS, considering their potential nuclear and radiation safety by:

– release of RS with low level of potential danger from regulatory control. The release levels and the release order are established in Resolution of Cabinet of Ministers of Ukraine No. 1174 of 16 November 2011 [3] and Order of the State Nuclear Regulatory Committee of Ukraine No. 84 of 1 July 2010 [4];
– registration of all RS that are not released from regulatory control in the State Register of Radiation Sources. The procedure for RS state registration is approved by Cabinet Resolution No. 1718 of 16 November 2000 [5];
– licensing of activities related to the use of RS with medium and high level of potential danger in compliance with the requirements established in the Law of Ukraine «On Authorizing Activity in Nuclear Energy» [6]. A decision on release of RS use from licensing is made by the SNRIU, if RS comply with the «Criteria for Release of Activities Related to the Use of Radiation

Sources from Licensing» approved by Cabinet Resolution No. 1174 of 16 November 2011 [3], by approving a list of respective RS.

The international categorization of RS was implemented; particularly, the categories for radionuclide RS (1-5) according to their potential danger were approved by Cabinet Resolution No. 1382 of 5 December 2007 [7].

Any activity related to RS is authorized if the nuclear entity confirms compliance with the nuclear and radiation safety regulations and standards and justifies safety of these RS.

Like other countries of the world, Ukraine seeks to ensure international safety modes by implementing international safety requirements, international best practices, and the most efficient tools for state regulation of nuclear and radiation safety.

Since 2014, a series of measures have been started to implement Council Directive 2013/59/Euratom [8] stating basic safety standards for protection against the dangers arising from exposure to ionizing radiation provided by Cabinet Resolution "On Approval of Plans Developed by the State Nuclear Regulatory Inspectorate of Ukraine for Implementation of Some EU Legal Acts" No. 110-r of 18 February 2015 [9].

The new system implemented in the Directive [8] provides for a more flexible approach specifying the basic principles and reference levels of exposure doses at the level of standards and rules, which should not be violated; i.e., these provisions do not require frequent revision.

2.2 Hierarchic Pyramid of Regulatory and Legal Documents on Radioactive Material Management

As in many other countries, Ukrainian legislation has a hierarchic structure. The structure of regulations on nuclear and radiation safety (NRS) existing in Ukraine can be presented as a hierarchic pyramid (see Fig. 2).

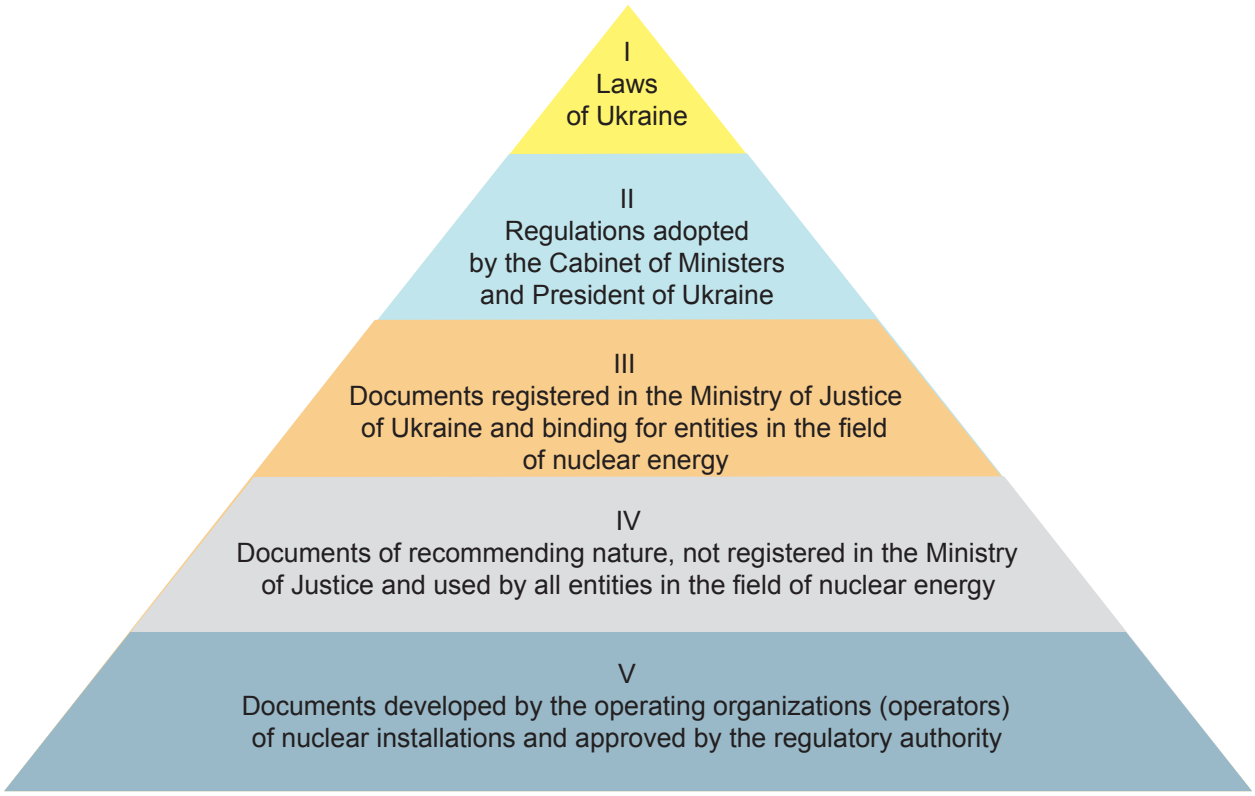

Fig. 2 – Hierarchic Pyramid of Regulatory and Legal Framework on NRS

The documents that belong to the respective levels of the hierarchic pyramid are described in Table 1.

Table 1 – Description of the Hierarchic Pyramid

<table>
<tr><th>Level</th><th colspan="3">Types of documents</th></tr>
<tr><td></td><td colspan="3">Laws of Ukraine that:</td></tr>
<tr><td>I</td><td colspan="2">regulate social relations and define the basis for internal and external state policy in the field of nuclear energy, in particular, its purpose and tasks, basic concepts used, principles of safety and protection in the conduct of activities, consequences of incompliance with established regulations and standards;</td><td>ratify international obligations of Ukraine (conventions, treaties) in the field of nuclear energy, which establish obligations of the state in relation to other countries.</td></tr>
<tr><td rowspan="2">II</td><td colspan="3">Regulations adopted by the Cabinet of Ministers and President of Ukraine, which establish:</td></tr>
<tr><td colspan="2">powers of central executive bodies, procedure for the conduct of activities (without technical aspects) or specific rules of conduct for entities in the field of nuclear energy;</td><td>procedure for the conduct of activities (without technical aspects) or specific rules of conduct for entities of architectural and construction activities and activities related to protection of the environment, etc., i.e. regulations that do not directly relate to the field of nuclear energy, but are binding for all entities in the field of nuclear energy.</td></tr>
<tr><td rowspan="2">III</td><td colspan="3">Regulations registered in the Ministry of Justice of Ukraine and binding for all entities in the field of nuclear energy (regulations and standards):</td></tr>
<tr><td colspan="2">adopted by the state nuclear regulatory authority, which establish requirements for nuclear and radiation safety;</td><td>adopted by other central executive bodies, which do not directly establish requirements for nuclear and radiation safety, but are but are binding for all entities in the field of nuclear energy.</td></tr>
<tr><td rowspan="2">IV</td><td colspan="3">Regulatory documents of recommending nature, not registered in the Ministry of Justice of Ukraine and are used by all entities in the field of nuclear energy:</td></tr>
<tr><td>adopted by the state nuclear regulatory authority (denoted as RD);</td><td>adopted by other central executive bodies (DBN, GOST, OST, DSTU etc.);</td><td>regulations of the former USSR (PNAE, PBYa etc.) when do not contradict current legislation.</td></tr>
<tr><td>V</td><td colspan="3">Documents developed by the operating organizations (operators) of nuclear installations and agreed by the state nuclear regulatory authority.</td></tr>
</table>

The regulatory provisions established in these documents identified in the current hierarchic pyramid are of hybrid nature since they are based on the strict regulatory approach adopted in the former USSR that is adjusted in some aspects by Western approaches to regulatory control.

The regulatory and legal documents that govern the safe management of RS are a part of the general structure of the regulatory and legal framework on NRS.

The structure of the current regulatory and legal framework for the safe management of RS used for licensing and regulatory oversight over the use of RS in industry, medicine and research is presented below (see Table 2 and ANNEX 1).

Table 2 – Basic Regulatory and Legal Documents Regulating Safety of Radiation Sources

Regulatory and legal documents of Ukraine regulating safety regarding the use of radiation sources	
Level I	– Law of Ukraine “On Nuclear Energy Use and Radiation Safety” [10]. – Law of Ukraine “On Authorizing Activity in Nuclear Energy” [6]. – Law of Ukraine “On Human Protection against Ionizing Radiation” [11]. – Law of Ukraine “On Physical Protection of Nuclear Installations, Nuclear Material, Radioactive Waste and Other Radiation Sources” [12].
Level II	– Cabinet Resolution “On Approval of Criteria for Release of Activities Related to the Use of Radiation Sources from Licensing” No. 1174 of 16 November 2011 [3]. – Cabinet Resolution “On Approval of Technical Regulation on Sealed Radiation Sources” No. 1382 of 5 December 2007 [7]. – Cabinet Resolution “Some Issues of State Regulation of Activities Related to the Use of Radiation Sources” No. 1718 of 16 November 2000 [5]. – Cabinet Resolution “On Approval of Provisions on the State System for Professional Training, Professional Development and Skill Improvement for Experts on Physical Protection, Accounting and Control of Nuclear Materials” No. 263 of 21 March 2012 [13]. – Cabinet Resolution “On Approval of Provisions on the Procedure for Radioactive Material Transport through the Territory of Ukraine” No. 1373 of 15 October 2004 [14]. – Cabinet Resolution “Some Issues Related to Radioactive Material Transport” No. 1196 of 3 October 2007 [15]. – Cabinet Resolution “On Approval of the Procedure for State Oversight of Compliance with Nuclear and Radiation Safety Requirements” No. 824 of 13 November 2013 [16].
Level III	**Main documents that establish basic principles and criteria of radiation protection:** – Radiation Safety Standards of Ukraine (NRBU-97) [17]. – Radiation Safety Standards of Ukraine. Supplement: Radiation Protection against Potential Radiation Sources NRBUУ-97/D-2000 [18]. – Basic Health and Radiation Safety Rules of Ukraine (OSPU-2005) [19].

Regulatory and legal documents of Ukraine regulating safety regarding the use of radiation sources	
Level III	**Regulations on safe use of RS in industry that establish the following rules and requirements:** – Safety Requirements and Conditions (Licensing Terms) for the Use of Radiation Sources (NP 306.5.05/2.065-2002) [20]. – Safety Requirements and Conditions (Licensing Terms) for the Production of Radiation Sources (NP 306.5.203-2015) [21]. – Requirements for the Safety Analysis Report on the Use of Radiation Sources (NP 306.5.05/2.066-02) [22]. – Procedure for Interaction between the Sate Register of Radiation Sources and State Register of Radioactive Waste [23]. – Plan of Response to Radiation Accidents (NP 306.5.01/3.083-2004) [24]. – Requirements for the Safety Analysis Report on the Production of Radiation Sources (NP 306.5.05/2.052-2001) [25]. – Requirements for the Annual Report on Radiation Safety Analysis for the Production of Radiation Sources (NP 306.5.05/3.055-02) [26]. – Procedure for Release of Radioactive Materials from Regulatory Control within Practices (NP 306.4.159-2010) [4]. – Safety Requirements and Conditions (Licensing Terms) for the Use of Radiation Sources in Radioisotope Inspection (NP 306.5.161-2010) [27]. – General Requirements for the Management System for Nuclear Energy Activities [28]. – Rules on Radiation Safety of Electron Accelerators (NP 306.5.192-2013) [29]. – Requirements for the Periodicity and Contents of Reports Submitted by the Licenses in Nuclear Energy (NP 306.1.129-2006) [30]. – Rules on Nuclear and Radiation Safety in Nuclear Material Transport (PBPRM-2006) (NP 306.6.124-2006) [31]. – List of Radiation Sources Released from Licensing in Their Use (NP 306.5.195-2013) [32]. – Procedure for Use of the State Register of Radiation Sources (NP 306.5.201-2015) [33]. – Requirements for the Quality Management System for Diagnostic and Therapeutic Procedures Using Radiation Sources (NP 306.5.148-2008) [34].

Safe use of RS is regulated in compliance with the above regulatory and legal documents. The laws identify the main principles and define obligations of the parties involved in activities pertaining to the use of RS. Cabinet resolutions establish procedures for obtaining licenses for activities with RS, criteria for release from licensing, procedure for RS registration in the State Register of Radiation Sources etc. Regulatory documents identify safety criteria, establish licensing conditions for activities with RS and determine specific safety rules for RS use for individual applications.

3. ANALYSIS OF REGULATORY AND LEGAL DOCUMENTS ON MANAGEMENT OF RADIOACTIVE MATERIALS BEYOND REGULATORY CONTROLT

The main document that governs the management of RM beyond regulatory control is Cabinet Resolution «On Approval of the Procedure for Interaction of Executive Bodies and Legal Entities in the Area of Nuclear Energy in Case of Illicit Trafficking of Radioactive Materials» No. 813 of 2 June 2003 [38] (hereinafter referred to as the Procedure).

This Procedure [38] regulates interaction of executive bodies and legal entities in the area of nuclear energy use in detecting illicit trafficking of RM, which does not require radical actions to mitigate possible radiation consequences, and defines a set of measures aimed at preventing or minimization of damage to health of the public and environment due to radiation exposure. Besides, this document defines the notion of illicit trafficking of RM, identifies participants of measures for the initial survey of detected materials or objects, their duties and tasks, measures for RM transport to temporary storage or disposal facilities and measures taken outside the location where suspect material/object was detected.

The document defines executive bodies involved into response to the detection of RM illicit trafficking, namely:

- local executive bodies;
- law enforcement bodies;
- State Ecological Inspection;
- state border guard bodies of SBGS;
- ME territorial bodies (at present SESU);
- SNRIU;
- MENR;
- SHES;
- State Corporation “Radon”;
- NRI NASU or other competent organizations.

Local executive bodies coordinate activities in taking measures at the location where suspect material/objects were detected.

The procedure establishes measures that shall be implemented at locations where suspect material/object was detected and defines basic functions of relevant executive bodies (see Fig. 3) as follows:

– representatives of MENR, SHES and SNRIU conduct a radiological survey of the locations where suspect material/object was detected and develop conclusions on basic parameters of the radiation situation in site upon its results;

– NRI NASU or another competent body provides expert assessment of the situation at the site where suspect material/object was revealed in certain situations (inability to identify RM when this is required for radiation protection of the public and environment and/or pretrial investigation; detection of neutron radiation, which testifies the presence of NM) and conducts in-depth analysis if necessary;

– law enforcement bodies conduct a survey of such a location and take relevant measures to identify the features of the crime and those who committed it and keeping evidence at the crime scene;

– representatives of an enterprise of the State Corporation "Radon" of the Ministry of Emergencies within the service area carry out dosimetric control of people involved into activities in the controlled area and those involved into RM transport;

– territorial bodies of the Ministry of Internal Affairs or state border guard bodies of SBGS (during the illegal crossing of the state border outside the border crossing points) ensure protection of the location where suspect material/object was detected, as well as protection and escorting of such a material/object in transport to a temporary storage or disposal facility.

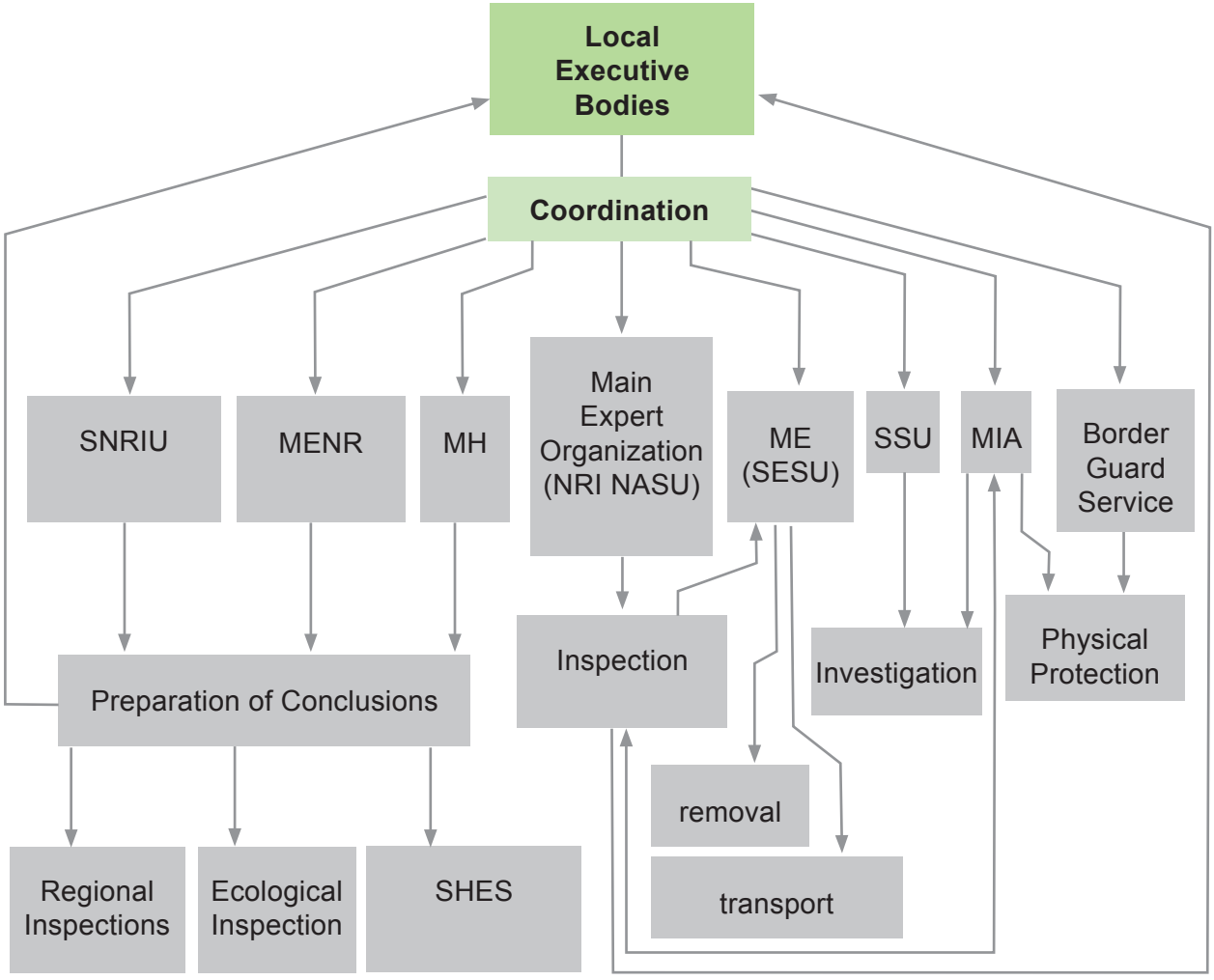

Fig. 3 – Interaction between Executive Bodies in Case of Illicit Trafficking of Radioactive Material

Based on conclusions and recommendations of representatives of law enforcement bodies and experts of SHES, SNRIU and MENR, the local executive body shall make a decision on further actions with RM withdrawn from illicit trafficking.

The Procedure [38] sets requirements for compliance with radiation safety rules in performing activities with radioactive materials that were in illicit trafficking, including their transport to safe storage places – enterprises of the State Corporation Radon within the service area.

The Procedure [38] defines the sources of funding for measures related to survey, review, protection, transport, temporary storage of RM detected in illicit trafficking, mitigation of radiation accident consequences, and other expenses related to illicit trafficking of RM. Such sources include the budget funds provided by the relevant executive body or owner's (user's) funds in case of establishing such an owner (user) of specified radioactive materials.

The SNRIU shall perform the following activities to comply with international obligations and to inform population, state, public and other organizations:

– send an official notification on the detection of suspect material/object to the IAEA database on illicit trafficking using an established form;
– places information on the detection of suspect material/object on its official website.

According to recommendations of IRRS mission conducted by the IAEA in 2008, the Procedure was revised in the part of providing funding for measures related to RM detected in illicit trafficking and other costs. The Procedure [38] was extended by the provision according to which a person who finds or detects suspect material/object shall not be financially liable for expenses related to illicit trafficking of radioactive materials.

At the same time, the Procedure [38] establishes very brief standards, some of which need to de detailed and specified.

The analysis of the Procedure [38] demonstrated that this document developed in 2003 does not comply with the current state of affairs in relation to executive bodies specified in it. The Procedure [38] needs to be updated in order to reconsider executive bodies involved into response to the detection of illicit trafficking of RM, their names and prescribed functions. Thus, according to the Resolution of the Cabinet of Ministers of Ukraine "Some Issues of the State Health and Epidemiological Service" No. 348 dated 29 March 2017, SHES was closed down and its duties were entrusted to the State Service on Food Safety and Consumers Protection in fulfilling tasks and functions on the implementation of state policy on health and epidemiological wealth of the public and on control (oversight) of compliance with health and safety legislation (except for functions for the implementation of state policy in the field of epidemiological oversight (supervision) and in the field of occupational health and functions for dosimetric control of workplaces and radiation doses of workers). SHES functions were also transferred to the State Service of Ukraine on Labor in the field of dosimetric control of workplaces and radiation doses of workers and partially to the Laboratory Centers of MH. MENR and State Ecological Inspection were conversed. Some executive bodies created new structural subdivisions, which shall be directly involved in response to the detection of illicit trafficking of hazardous, including radioactive, materials.

Another urgent issue, as practice shows, is the financing of expert assessment, in-depth analysis, of RM detected in illicit trafficking that is performed by NRI NASU before establishing the owner (user) of the specified radioactive materials.

The Procedure [38] provides for "other competent bodies" except for NRI NASU. However, there are no criteria for determining such an organization and procedure for recognition. The list of such competent recognition is also not available.

The Procedure [38] does not define the form of reporting document based on the survey of the location where illicit trafficking of radioactive materials was detected that include inspection protocols and certificates with measured radiation parameters (minimum scope of measurement, descriptive information, video and photo materials, presentation form, etc.), form of the report on conducted research and preliminary estimations.

The issue of consistency of provisions and functions of new structural subdivisions of executive bodies regarding interaction in the detection of illicit trafficking of RM is a current challenge.

The Procedure [38] establishes the need for a system to prevent illicit trafficking of RM. Therefore, a document shall be developed to define objectives of such a system, activities of its participants and competent/coordinating body, their tasks and powers, procedure for system functioning.

Besides, it is necessary to develop recommendations on clear and relevant information on the detected material for reporting to population, state and public organizations, and comply with international obligations of Ukraine.

The Procedure identifies law enforcement bodies, as state executive bodies involved in activities in the detection of illicit trafficking of RM. However, it is not indicated what law enforcement bodies other than the Ministry of Internal Affairs and SBGS can be involved into such activities. In addition, there is no distribution of responsibilities between these bodies. In particular, within the conversion of the Ministry of Internal Affairs, the National Police has been created. Its structure includes the Department for Activities Related to Hazardous Materials. Tasks and functions prescribed to it shall be coordinated with the Procedure.

The practical experience of applying the Procedure demonstrated a number of problematic issues.

1. In particular, functions/actions of local executive bodies that are the main authorities coordinating activities in the detection of illicit trafficking of RM are not sufficiently detailed.
2. Problematic issues include practical aspects of financing of such activities, especially those cases when the owner (user) of specified RM is not established. The deadlines of required reviews are delayed or review are not carried out due to the lack of funding.
3. Another problem is the arrangement of sites or premises for RM storage in situ before transport to an enterprise of the State Corporation Radon. This can be a significant period of several days, during which the radiation and physical protection of these hazardous materials shall be ensured.
4. The State Ecological Inspectorate and State Emergency Service of Ukraine are under conversion process. Changing or redistributing functions will have a corresponding impact on their activities within the interaction with other executive bodies. Currently, there are some problems regarding interaction of the State Ecological Inspectorate of Ukraine and SBGS in the detection of radioactive materials at border crossing points.
5. The Procedure establishes that the Nuclear Research Institute or another expert organization shall inform the specified law enforcement body, the SNRIU and other executive bodies whose competence covers the creation of a system for preventing illicit trafficking on results of research and reviews. The list of “other executive bodies whose competence covers the establishment of a system for preventing illicit trafficking” is not presented, which creates certain problems regarding the fact that the information will not be submitted, at least in a timely manner, to the attention of those bodies that need it.
6. A separate issue is equipping of all involved executive bodies and legal entities involved into response to illicit trafficking of RM with instrumentation, including technical condition of this instrumentation.

4. ANALYSIS OF REGULATORY AND LEGAL FRAMEWORK ON PHYSICAL PROTECTION AND SECURITY OF RADIOACTIVE MATERIALS

Articles 7 and 61 of the Law of Ukraine "On Nuclear Energy Use and Radiation Safety" [10], which is the basic one in nuclear legislation, establishes mandatory physical protection for all activities in the field of nuclear energy, in particular, for RS production, use, storage and maintenance. Provision of physical protection is a prerequisite for granting a permit (license) for such activities. The nuclear entities (Article 63) are responsible for incompliance with the procedure for determining, ensuring and continuous functioning of RS physical protection systems. As stated in Article 60 of the Law [10], the objectives of RS physical protection are to:

– form conditions to minimize possible sabotage, theft or any other illegal withdrawal of RS;
– assist in taking measures to find and bring the lost RS back and minimize radiological consequences of sabotage.

Therefore, the Law [10] establishes the basic provisions on RS physical protection. At the same time, Article 1 of the Law [10] requires specification of the term "radiation source", since there are two different notions in practice, and this causes some contradictions. According to the Law [10], RS is any physical object that can generate radiation by means of radioactive substances or other physical principles except for nuclear installations. This broad notion includes both a radioactive waste storage facility and a temporary storage facility for nuclear material during transport. At the same time, in this Law [10] (Articles 27, 29, 32) and in other regulations on nuclear and radiation safety, a radiation source in a narrower sense is considered an object that can be produced, supplied, transported or that can be in illicit trafficking.

The Law of Ukraine "On Physical Protection of Nuclear Installations, Nuclear Material, Radioactive Waste and Other Radiation Sources" [12] is the basic law in the establishment and maintenance of RS security and physical protection. It sets forth the conditions for achieving the objectives of physical protection and primary requirements for physical protection. At the same time, the specific objects of physical protection stated in Article 5 do not consider revealed radioactive materials in illicit trafficking.

The main document for RS is Cabinet Resolution No. 625 of 26 April 2003 [39] establishing the procedure for specification of the level of physical protection for radiation sources depending on their potential hazard. The minimum required physical protection conditions for two levels are established for high-level and low-level sources, accordingly. These requirements can be increased taking into account the assessment of the threat of sabotage, theft or any other illegal withdrawal of radioactive materials. The threat assessment is set forth in the regulation "Design-Basis Threat

for Nuclear Installations, Nuclear Material, Radioactive Waste and Other Radiation Sources in Ukraine», approved by the Presidential Decree [40].

Based on the National Design-Basis Threat, the licensees responsible for RS included into the List of Radiologically Hazardous Facilities in Ukraine Subject to the Development of Facility-Level Design-Basis Threat [41] shall develop facility-level design-basis threats, establish and maintain the physical protection systems for facilities and materials. Allocation of responsibilities in the field of physical protection with reference to the valid regulatory documents is shown in Fig. 4.

In order to maintain the security mode, RS should be located in strict-access areas provided with physical protection systems. The boundaries of this system are physical barriers that limit the RS management facility. Detailed requirements for the strict-access areas and control of access to RS are set forth in the Requirements for Strict-Access Areas and for Monitoring and Control of Access to Strict-Access Areas [42].

The instrument to provide physical protection of RS management facilities is the physical protection system consisting of administrative, legislative and engineering measures. Engineering measures are implemented in compliance with the Requirements for Engineering Features of Physical Protection Systems for Nuclear Installations, Nuclear Material, Radioactive Waste and Other Radiation Sources [43]. Protection of RS management facilities and RS in transport is provided by the guarding entities in accordance with the Requirements for Guarding in the Physical Protection System for Nuclear Installations, Facilities for Management of Radioactive Waste and Other Radiation Sources, and Nuclear Materials [44].

The interrelation between the regulations on physical protection is shown in Fig. 4. At the same time, the regulatory and legal framework on physical protection of radiation sources has some gaps at the level of orders of central executive bodies. There are no documents establishing specific requirements for physical protection of RS and general requirements for RS physical protection systems. These requirements could be combined in regulation “Rules for Physical Protection of Radiation Sources». Moreover, IAEA recommends in its nuclear security series for the member countries to develop and implement regulations on the nuclear security of RS and associated facilities and activities [45] and on the nuclear security of RS out of regulatory control [46].

The regulatory and legal framework on RS physical protection includes the Rules for the Security of Nuclear Material, Radioactive Waste and Other Radiation Sources [47]. This regulation was adopted in 2000. It does not fully comply with current experience, requirements for security, IAEA standards and recommendations and, therefore, should be revised.

Incompliance with legislation of Ukraine on physical protection entails responsibility in accordance with the law. In compliance with Article 32 of the Law [12], violations in the area of RS physical protection include:

– incompliance with the standards, rules and regulations and guidelines on physical protection;
– incompliance with the requirements for physical protection;
– incompliance with the prescriptions of state administrative bodies and the state regulation in nuclear energy and radiation safety related to physical protection;
– illicit receiving, possession, use, transfer, modification or dispersion of RS;
– theft of RS or their capture, as well as an attempt to commit such actions;
– illicit intrusion into a vehicle intended for RS transport;
– committal or an attempt to commit sabotage.

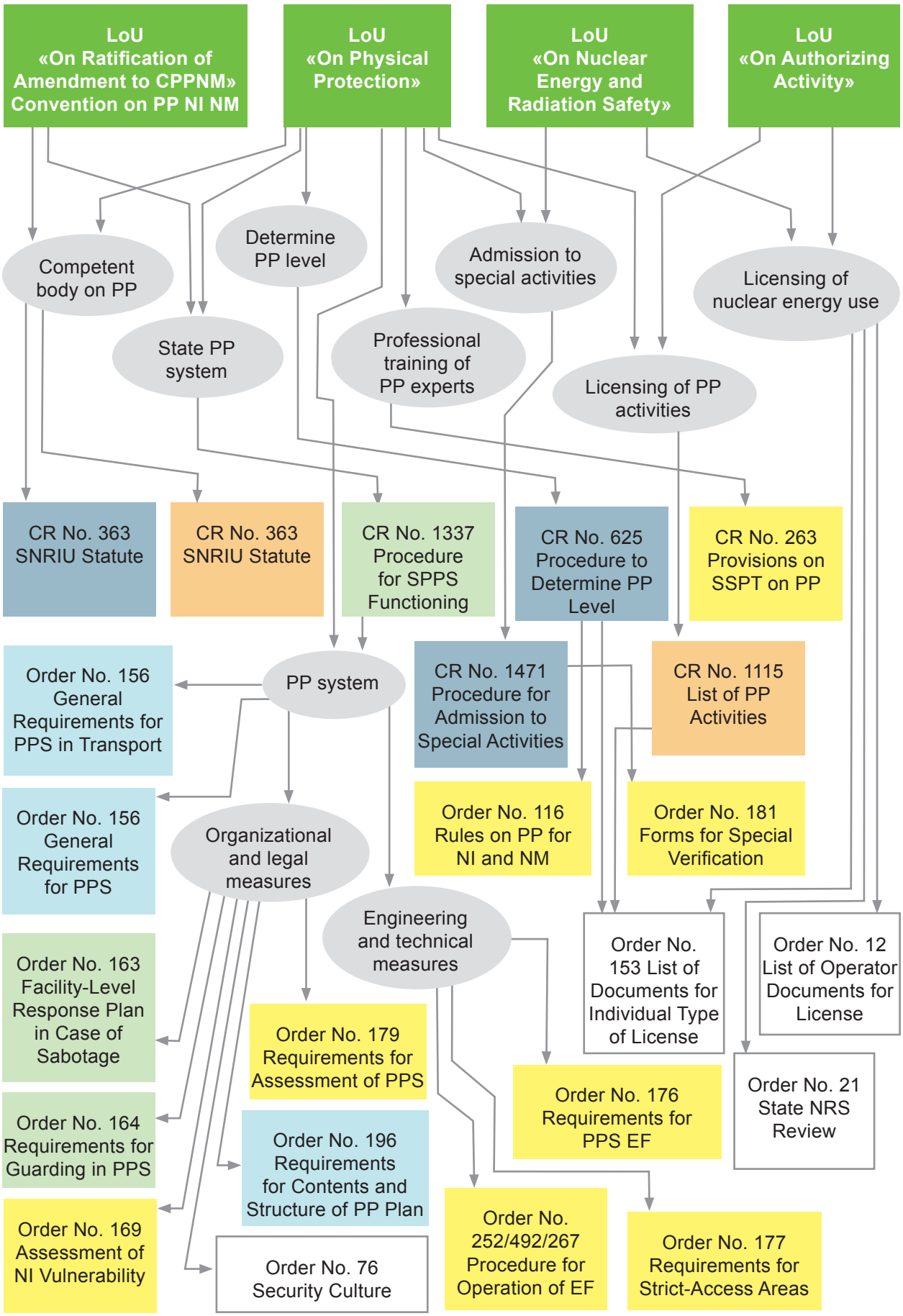

Fig. 4 – Interrelation between Regulatory and Legal Documents on Physical Protection

5. ANALYSIS OF CRIMINAL CODE OF UKRAINE ON RADIOACTIVE MATERIAL MANAGEMENT

Criminal liability for crimes against national and public security is defined in the Criminal Code of Ukraine [48]. Many types of offences related to radioactive materials were criminalized in 2007-2010 as was recommended by the mission of United Nations Office on Drugs and Crime. Previously, these offences were subject only to administrative liability, which did not contribute to the prevention and combating illicit trafficking of radioactive materials and radiation terrorism. In 2014, a number of articles on illicit management of radioactive materials were revised or extended in connection with serious deterioration of the political situation and military actions in eastern Ukraine.

The Code [48] establishes criminal liability for committing the following crimes in relation to or with the use of radioactive materials, including RS:

– Article 113. Sabotage. Commitment of actions aimed at radioactive contamination – see Articles 1, 2, 32 of the Law [12];
– Article 201. Smuggling. Movement of radioactive materials across the border of Ukraine outside the customs control or with their concealment from the customs control – see Article 2 of the Law [12];
– Article 237. Failure to take measures to mitigate consequences of environmental contamination. Evasion from or inappropriate implementation of measures intended to mitigate consequences of contamination with radioactive substances or radiation – see the second part of Article 2 of the Law [12];
– Article 261. Attack on facilities where radioactive materials are stored or vehicles in which radioactive materials are transported in order to capture or destroy these objects – see Article 1, the second part of Article 32 of the Law [12];
– Article 262. Theft or capture of radioactive materials by fraud or abuse of official position – see Articles 2, 32 of the Law [12];
– Article 265. Illicit management of radioactive materials. Purchase, bearing, storage, use, transfer, modification, cutting and destruction of radioactive materials (radiation sources and others) without permission provided by the law – see Article 32 of the Law [10], Article 32 of the Law [12];
– Article 265-1. Illicit production of a device that scatters radioactive material or emits radiation – see Articles 1, 2, 32 of the Law [12];
– Article 266. Threat to commit theft or use radioactive materials. Radiological blackmail – see Article 32 of the Law [12];
– Article 267. Incompliance with rules for storage, use, transport accounting of radioactive materials, illicit sending via mail or cargo – see Articles 7, 55 of the Law [10], Article 7 of the Law [12].
– Article 190. The attempt of sale of fake radioactive material

The administrative liability of licensee officials dealing with the use of radiation sources for incompliance with nuclear and radiation safety requirements shall be established by the Code of Ukraine on Administrative Offenses [49]:

– Article 95. Violation of nuclear and radiation safety regulations and rules by officials;
– Article 188-18. Failure to comply with prescriptions of state nuclear regulatory authorities, failure to provide information or provision of false information, hindering the implementation of state oversight.

Therefore, the Codes [48] and [49] establish liability for all possible crimes and violations related to RS.

In 2016, Article 265 of the Code [48] was extended by part 4 that provides for the release of a person from criminal liability in the event of voluntary delivery of radioactive materials, including radiation sources, which he/she managed illicitly.

6. ANALYSIS OF REGULATORY AND LEGAL FRAMEWORK ON RADIOACTIVE MATERIAL TRANSPORTATION

The regulatory and legal framework has been established to ensure safe transportation of radioactive material in Ukraine, which includes laws and other regulations on nuclear and radiation safety, including those for safety in transfer of hazardous cargoes. This regulatory framework has a hierarchical structure and consists of three levels:

First level – Laws of Ukraine:

– On Nuclear Energy Use and Radiation Safety;
– On Authorizing Activity in Nuclear Energy;
– On Transport of Hazardous Cargoes [50].

Second level – Cabinet Resolutions:

– On Approval of the Procedure for Transport of Radioactive Materials through the Territory of Ukraine No. 1373 dated 15 October 2004 [51];
– Some Issues of Radioactive Material Transport No. 1196 dated 03 October 2007 [15], approving the procedure for issuing permits for international shipment of radioactive materials;
– On Approval of the Procedure for State Control of International Transfer of Dual-Use Goods No. 86 dated 28 January 2004 [52].

Third level – regulations approved by the SNRIU and other involved central executive bodies:

- Rules for Nuclear and Radiation Safety in Transport of Radioactive Materials, (PBPRM-2006). Approved by SNRIU Order No. 132 dated 30 August 2006 and registered in the Ministry of Justice of Ukraine on 18 September 2006 by No. 1056/12930 [53];
- Requirements for Quality Assurance Programs for Transport of Radioactive Materials. Approved by SNRIU Order dated 25 July 2006 and registered in the Ministry of Justice of Ukraine on 5 October 2006 by No. 1092/12966 [54];
- Provisions on Planning of Measures and Actions in the Event of Accidents in Radioactive Material Transport (NP 306.6.108-2005). Approved by SNRIU Order No. 38 dated 7 April 2005 and registered in the Ministry of Justice of Ukraine on 22 April 2005 by No. 431/10711 [55];
- Procedure for Issuing Certificates on Safe Transport of Radioactive Material. Approved by SNRIU Order No. 119 dated 6 September 2007 and registered in the Ministry of Justice of Ukraine on 20 September 2007 by No. 1079/14346 [56];
- Safety Requirements and Conditions (Licensing Terms) for Radioactive Material Transport (NP 306.6.095-2004). Approved by SNRIU Order No. 141 dated 31 August 2004 and registered in the Ministry of Justice of Ukraine on 9 September 2004 by No. 1125/9724 [57];
- Requirements for the Safety Analysis Report on Radioactive Material Transport (NP 306.6.096-2004). Approved by SNRIU Order No. 141 dated 31 August 2004 and registered in the Ministry of Justice of Ukraine on 9 September 2004 by No. 1127/9726 [58];
- Procedure for Submitting SNRIU Conclusions in International Shipment of Radioactive Materials (NP 306.6.097-2004). Approved by SNRIU Order No. 138 dated 26 August 2004 and registered in the Ministry of Justice of Ukraine on 8 September 2004 by No. 1119/9718 [59];
- Reference Material to Rules for Nuclear and Radiation Safety in Transport of Radioactive Materials (PBPRM-2006). Approved by Order of SNRIU Deputy Chairperson dated 20 November 2009 [60];
- Methodological Recommendations on Development of Radiation Protection Program for Radioactive Material Transport. Approved by SNRIU Order No. 101 dated 2 August 2010 [61];
- Rules for Road Transport of Hazardous Cargoes. Approved by Ordinance of the Ministry of Internal Affairs of Ukraine No. 822 dated 26 July 2004 and registered in the Ministry of Justice of Ukraine on 20 August 2004 by No. 1040/9639 [62];
- Rules for Transport of Hazardous Cargoes. Approved by Ordinance of the Ministry of Transportation and Communication of Ukraine No. 1430 dated 25 November 2008 and registered in the Ministry of Justice of Ukraine on 26 February 2009 by No. 180/16196 [63].

In accordance with the Law of Ukraine «On the Transport of Dangerous Goods», the main state institution responsible for management of transportation of dangerous goods is the Ministry of Transport and Infrastructure of Ukraine.

With the aim of implementation of Council Directive 2006/117/EURATOM of 20 November 2006 on the supervision and monitoring of radioactive waste and spent fuel control for the implementation of the measure 3, the task 1 of Chapter 1 of the Implementation Plan for Section V «Economic and Industrial Cooperation» of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and its Member States, on the other hand, for the years 2017-2019, approved by the order of the Cabinet of Ministers of Ukraine dated 21 July 2017 № 503-p. there was initiated the process of introducing changes in the Decree of the Cabinet of Ministers of Ukraine «On Procedure for Issuing Permits for International Carriage of Radioactive Materials» of October 3, 2007, No.1196.

The State Nuclear Regulatory Inspectorate of Ukraine (SNRIU) is responsible for safety regulation in radioactive material transport according to legislation.

In compliance with the Statute of SNRIU approved by Cabinet Resolution No. 363 dated 20 August 2014, the SNRIU is responsible for:

– development and implementation of principles, provisions and guidelines,
– issues of official permits (licenses for radioactive material transport,
– permits of international shipment of radioactive material, approval certificates),
– conducting of regular reviews and assessments, inspections and enforcement measures for safe radioactive material transport.

The SNRIU:

– develops and approves regulations, rules and standards on nuclear and radiation safety for radioactive material transport;
– approves requirements for quality control of radioactive material transport in terms of nuclear and radiation safety;
– approves requirements and conditions (licensing terms) for radioactive material transport;
– determines a list of documents to be submitted to obtain a license for radioactive material transport and requirements for their structure and contents, and procedure for reporting by licensees;
– licenses activities of radioactive material transport;
– issues permits for international shipments of radioactive materials;
– provides conclusions on compliance with requirements of nuclear and radiation safety and physical protection of transport operations in case of export, import, temporary export, temporary import, re-export and transit of radioactive materials that can be used for production of nuclear weapons;
– approves the design of packaging for radioactive materials, transport and special conditions;
– agrees technical conditions for transport packaging;
– performs oversight and inspection of transport operations;
– performs functions of a competent authority responsible for safe radioactive material transport.

It is necessary to note that the basic document “Rules for Nuclear and Radiation Safety in Transport of Radioactive Materials” PBPRM-2006 is at initial step of revising to bring it into compliance with the latest IAEA “Regulations for the Safe Transport of Radioactive Material” No. SSR-6, 2012 Edition, IAEA, Vienna (2012). According to the SNRIU tentative planning, the updated version of PBPRM-2006 should be put in force in 2020.

Since the main condition for ensuring safety in transport of radioactive material includes the use of approved packages, the consignor is directly responsible for safe transport of radioactive material in accordance with Article 54 of the Law of Ukraine “On Nuclear Energy Use and Radiation Safety”. To obtain a license for radioactive material transport, a permit for international shipment of radioactive material and a certificate of approval, the applicant shall submit the application and documents in compliance with established requirements.

State oversight of compliance with requirements for nuclear and radiation safety is conducted in compliance with the Procedure approved by Cabinet Resolution No. 824 dated 13 November 2013. According to this document, the SNRIU conducts scheduled inspections envisaged by annual schedules, and unscheduled inspections.

The graded approach is applied in radioactive material transport, in particular, in:

– classification of radioactive materials;
– use of packaging;
– identification of package category;
– placement of hazard signs and marking.

Based on the analysis done it may be concluded that the existing regulatory and legal framework in the field of radioactive material transportation is sufficient and adequate for implementation of the Amnesty Project.

The on-going revising of the PBPRM-2006 will be considered during the development of the Procedure for Interaction between Executive Bodies in the Area of Nuclear Energy for the purposes of the Amnesty Project.

7. GAPS IN REGULATORY AND LEGAL FRAMEWORK ON RADIOACTIVE MATERIAL MANAGEMENT

Upon analysis of the regulatory and legal framework presented in Sections 3-5, Table 3 provides a list of revealed gaps to be eliminated to support implementation of the Amnesty Project.

Table 3 – List of Gaps in the Regulatory and Legal Framework on Radioactive Material Management

Regulation	References in the document	Inaccuracy	Correction
Cabinet Resolution «On Approval of the Procedure for Interaction of Executive Bodies and Legal Entities in the Area of Nuclear Energy in Case of Illicit Trafficking of Radioactive Materials» No. 813 of 2 June 2003	Paras. 4, 5, 10,11, 13 in the Procedure	SHES	State Service of Ukraine for Food Safety and Consumer Protection or State Labor Service of Ukraine or laboratory centers of MH depending on their tasks and functions

Regulation	References in the document	Inaccuracy	Correction
Cabinet Resolution «On Approval of the Procedure for Interaction of Executive Bodies and Legal Entities in the Area of Nuclear Energy in Case of Illicit Trafficking of Radioactive Materials» No. 813 of 2 June 2003	Para. 13	Ukrainian State Corporation Radon of ME	Ukrainian State Corporation Radon
	Paras. 4, 13, 15	ME	State Emergency Service of Ukraine (SESU)
	Para. 4	MIA territorial bodies	National police
	Paras. 3,4, 5, 8, 10, 11,13, 15	MENR	Ministry of Environment and Natural Resources of Ukraine (MENR of Ukraine)
	Para. 7	A local executive body can apply to the main expert organization - Nuclear Research Institute of the National Academy of Sciences of Ukraine (NRI NASU) - or another competent organization for expert evaluation of the situation at the site where a suspicious material/item has been revealed.	There are neither criteria nor procedure to identify a competent organization; a list of competent organizations is not provided either. This provision should be detailed.
	general	The Procedure does not establish the form for reports to be drawn up after inspecting the site where radioactive materials have been revealed in illicit trafficking, such as inspection records and radiological measurement records (minimum scope of measurements, descriptive information, video and photo material, form for finalization of results etc.) and for reports on analyses and preliminary evaluations.	Develop the form for the reports.

Regulation	References in the document	Inaccuracy	Correction
Cabinet Resolution «On Approval of the Procedure for Interaction of Executive Bodies and Legal Entities in the Area of Nuclear Energy in Case of Illicit Trafficking of Radioactive Materials» No. 813 of 2 June 2003	general	The Procedure determines the need to establish a system to prevent illicit trafficking of radioactive materials, but does not defines the associated mechanism.	Develop a document that would identify objectives of this system, its participants and competent/ coordination body, their tasks and authorities, and would establish the procedure for operation of this system (not relevant to the Amnesty Project).
	general	The Procedure does not specify how information on revealed material should be prepared to be communicated to the public, state and public organizations and in the framework of international obligations of Ukraine.	Develop recommendations on provision of clear and objective information on revealed material to be communicated to the public, state and public organizations and in the framework of international obligations of Ukraine.
	general	The Procedure does not specify functions/actions of local executive bodies in sufficient detail, which are the main agents that coordinate actions if radioactive material is revealed in illicit trafficking.	Develop a document to identify functions/ actions of local executive bodies.

CONCLUSIONS AND RECOMMENDATIONS

In the framework of this subtask, the current regulatory and legal framework on nuclear and radiation safety relating to the management of RM, including RS beyond regulatory control or in illicit trafficking, has been analyzed.

Upon analysis, the following conclusions have been made:

1. Ukraine has a multilevel system of regulatory and legal documents on nuclear and radiation safety that cover all aspects of RM management.
2. Current regulatory framework considering amendments to the Criminal Code of Ukraine is sufficient to ensure successful implementation of the Amnesty Project. No critical gaps have been revealed that would hinder project implementation.
3. Individual gaps have been found, including contradictory and insufficiently detailed requirements on management of RS beyond regulatory control or in illicit trafficking, which are recommended to be eliminated to support implementation of the Amnesty Project.

Major gaps in the regulatory and legal framework relating to RM management:

1. The main regulatory document on management of RM beyond regulatory control or illicit trafficking, Cabinet Resolution «On Approval of the Procedure for Interaction of Executive Bodies and Legal Entities in the Area of Nuclear Energy in Case of Illicit Trafficking of Radioactive Materials» No. 813 of 2 June 2003 (Procedure), does not comply with the current state relating to executive bodies indicated in it and should be updated to specify and correct the names of the executive bodies that are involved into response to illicit trafficking of radioactive materials and to specify their functions.
2. The Procedure does not specify functions/actions of local executive bodies in sufficient detail, which are the main agents that coordinate actions if radioactive material is revealed in illicit trafficking.
3. The Procedure does not establish the form for reports to be drawn up after inspecting the site where radioactive materials have been revealed in illicit trafficking, such as inspection records and radiological measurement records, and the form for reports on analyses and preliminary evaluations.
4. Application of the Procedure has revealed a number of issues, such as:

– financial aspects relating to activities in compliance with the Procedure, especially when it comes to cases when the owner (user) of radioactive materials is not identified (because of the lack of funding, required reviews are not carried out or are protracted);
– arrangement of sites or premises for storage of revealed radioactive materials in situ until they are transferred to an enterprise of the State Corporation Radon;
– communication and procedures for exchange of information between executive bodies;
– individual issue relating to provision of all executive bodies and legal entities involved into response to illicit trafficking of radioactive materials with instrumentation, including technical condition of this instrumentation;
– lack of procedures for communicating clear information on revealed material to the public, state and public organizations and in the framework of international obligations of Ukraine.

In the framework of subsequent subtasks, it is recommended that efforts be focused on the following aspects:

1. Develop recommendations to revise and update the Procedure for Interaction of Executive Bodies and Legal Entities in the Area of Nuclear Energy in Case of Illicit Trafficking of Radioactive Materials (Cabinet Resolution No. 813 of 2 June 2003), considering the gaps revealed (subtask 2.2).
2. Develop a specific Procedure for Interaction between Executive Bodies in the Area of Nuclear Energy for the purposes of the Amnesty Project (based on Cabinet Resolution No. 813 of 2 June 2003) (subtasks 2.2, 2.3, 2.4).

3. Develop recommendations (roadmap) to implement measures for improvement of interaction between executive bodies dealing with the use of nuclear energy in case of illicit trafficking of radioactive materials, including RS amnesty, at national and local levels upon results of common discussion at interdepartmental meetings (subtask 2.3).
4. Develop communication procedures and forms for reports to be used in voluntary delivery of RS (inspection records and radiological measurement records, form of inspection reports, etc.) (subtask 2.4).

REFERENCES

[1] International Atomic Energy Agency. Code of Conduct on the Safety and Security of Radioactive Sources, IAEA/CODEOC/2001, IAEA, Vienna (2001).

[2] Cabinet Resolution «On Establishment of the State Register of Radiation Sources» No. 847 of 4 August 1997.

[3] Cabinet Resolution «On Approval of Criteria for Release of Activities Related to the Use of Radiation Sources from Licensing» No. 1174 of 16 November 2011.

[4] Procedure for Release of Radioactive Materials from Regulatory Control within Practices (NP 306.4.159-2010), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 84 of 1 July 2010 and registered in the Ministry of Justice of Ukraine on 20 August 2010 by No. 718/18013.

[5] Cabinet Resolution «Some Issues of State Regulation of Activities Related to the Use of Radiation Sources» No. 1718 of 16 November 2000.

[6] Law of Ukraine «On Authorizing Activity in Nuclear Energy» No. 1370 of 11 January 2000.

[7] Cabinet Resolution «On Approval of Technical Regulation on Sealed Radiation Sources» No. 1382 of 5 December 2007.

[8] Council Directive 2013/59/Euratom, laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.

[9] Cabinet Resolution «On Approval of Plans Developed by the State Nuclear Regulatory Inspectorate of Ukraine for Implementation of Some EU Legal Acts» No. 110-r of 18 February 2015.

[10] Law of Ukraine «On Nuclear Energy Use and Radiation Safety» No. 39 of 8 February 1995.

[11] Law of Ukraine «On Human Protection against Ionizing Radiation» No. 15 of 14 January 1998.

[12] Law of Ukraine «On Physical Protection of Nuclear Installations, Nuclear Material, Radioactive Waste and Other Radiation Sources» No. 2064-III of 19 October 2000.

[13] Cabinet Resolution «On Approval of Provisions on the State System for Professional Training, Professional Development and Skill Improvement for Experts on Physical Protection, Accounting and Control of Nuclear Materials» No. 263 of 21 March 2012.

[14] Cabinet Resolution «On Approval of Provisions on the Procedure for Radioactive Material Transport through the Territory of Ukraine» No. 1373 of 15 October 2004.

[15] Cabinet Resolution «Some Issues Related to Radioactive Material Transport» No. 1196 of 3 October 2007.

[16] Cabinet Resolution «On Approval of the Procedure for State Oversight of Compliance with Nuclear and Radiation Safety Requirements» No. 824 of 13 November 2013.

[17] Radiation Safety Standards of Ukraine (NRBU-97). State Health and Safety Regulations (DGN 6.6.1-6.5.001-98), approved by Ordinance of the Chief State Medical Doctor of Ukraine No. 62 of 1 December 1997.

[18] Radiation Safety Standards of Ukraine. Supplement: Radiation Protection against Potential Radiation Sources NRBUУ-97/D-2000. State Health and Safety Regulations (DGN 6.6.1-6.5.061-2000), approved by Ordinance of the Chief State Medical Doctor of Ukraine No. 116 of 12 July 2000.

[19] Basic Health and Radiation Safety Rules of Ukraine (OSPU-2005) (DSP 6.6.1 116 2005), approved by Order of the Ministry of Health of Ukraine No. 54 of 2 February 2005 and registered in the Ministry of Justice of Ukraine on 20 May 2005 by No. 552/10832.

[20] Safety Requirements and Conditions (Licensing Terms) for the Use of Radiation Sources (NP 306.5.05/2.065-2002), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 125 of 2 December 2002 and registered in the Ministry of Justice of Ukraine on 17 December 2002 by No. 978/7266.

[21] Safety Requirements and Conditions (Licensing Terms) for the Production of Radiation Sources (NP 306.5.203-2015), approved by SNRIU Order No. 148 of 13 August 2015 and registered in the Ministry of Justice of Ukraine on 3 September 2015 by No. 1054/27499.

[22] Requirements for the Safety Analysis Report on the Use of Radiation Sources (NP 306.5.05/2.066-02), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 125 of 2 December 2002 and registered in the Ministry of Justice of Ukraine on 17 December 2002 by No. 978/7266.

[23] Procedure for Interaction between the Sate Register of Radiation Sources and State Register of Radioactive Waste, approved by Order of the Ministry of Environment and Natural Resources of Ukraine and State Nuclear Regulatory Committee of Ukraine No. 117/66 of 22 March 2001.

[24] Plan of Response to Radiation Accidents (NP 306.5.01/3.083-2004), approved by Order of the State Nuclear Regulatory Committee of Ukraine and Ministry of Emergencies of Ukraine No. 87/211 of 17 May 2004 and registered in the Ministry of Justice of Ukraine on 10 June 2004 by No. 720/9319.

[25] Requirements for the Safety Analysis Report on the Production of Radiation Sources (NP 306.5.05/2.052-2001), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 62 of 17 August 2001 and registered in the Ministry of Justice of Ukraine on 31 August 2001 by No. 774/5965.

[26] Requirements for the Annual Report on Radiation Safety Analysis for the Production of Radiation Sources (NP 306.5.05/3.055-02), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 122 of 29 December 2001 and registered in the Ministry of Justice of Ukraine on 4 March 2002 by No. 223/6511.

[27] Safety Requirements and Conditions (Licensing Terms) for the Use of Radiation Sources in Radioisotope Inspection (NP 306.5.161-2010), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 121 of 21 September 2010 and registered in the Ministry of Justice of Ukraine on 20 October 2010 by No. 950/18245.

[28] General Requirements for the Management System for Nuclear Energy Activities, approved by SNRIU Order No. 190 of 19 December 2011 and registered in the Ministry of Justice of Ukraine on 10 January 2012 by No. 17/20330.

[29] Rules on Radiation Safety of Electron Accelerators (NP 306.5.192-2013), approved by SNRIU Order No. 83 of 5 August 2013 and registered in the Ministry of Justice of Ukraine on 21 August 2013 by No. 1442/23974.

[30] Requirements for the Periodicity and Contents of Reports Submitted by the Licenses in Nuclear Energy (NP 306.1.129-2006), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 162 of 16 October 2006 and registered in the Ministry of Justice of Ukraine on 6 December 2006 by No. 1268/13142.

[31] Rules on Nuclear and Radiation Safety in Nuclear Material Transport (PBPRM-2006) (NP 306.6.124-2006), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 132 of 30 August 2006 and registered in the Ministry of Justice of Ukraine on 18 September 2006 by No. 1056/12930.

[32] List of Radiation Sources Released from Licensing in Their Use (NP 306.5.195-2013), approved by SNRIU Order No. 138 of 3 December 2013 and registered in the Ministry of Justice of Ukraine on 19 December 2013 by No. 2148/24680.

[33] Procedure for Use of the State Register of Radiation Sources (NP 306.5.201-2015), approved by SNRIU Order No. 70 of 16 April 2015 and registered in the Ministry of Justice of Ukraine on 18 June 2015 by No. 717/27162.

[34] Requirements for the Quality Management System for Diagnostic and Therapeutic Procedures Using Radiation Sources (NP 306.5.148-2008), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 166 of 3 October 2008 and registered in the Ministry of Justice of Ukraine on 29 October 2008 by No. 1054/15745.

[35] Law of Ukraine «On Civil Liability for Nuclear Damage and Its Financial Coverage» No. 2893-III of 13 December 2001.

[36] Law of Ukraine «On Amendment of the Law of Ukraine on Authorizing Activity in Nuclear Energy» No. 1874-VI of 11 February 2010.

[37] Law of Ukraine «On Radioactive Waste Management» No. 255/95-VR of 30 June 1995.

[38] Cabinet Resolution «On Approval of the Procedure for Interaction of Executive Bodies and Legal Entities in the Area of Nuclear Energy in Case of Illicit Trafficking of Radioactive Materials» No. 813 of 2 June 2003.

[39] Cabinet Resolution «On Approval of the Procedure for Determining the Level of Physical Protection for Nuclear Installations, Nuclear Material, Radioactive Waste and Other Radiation Sources According to Their Category» No. 625 of 26 April 2003.

[40] Presidential Decree No. 520/14t/2015 of 27 August 2015 «On Resolution of the National Security and Defense Council of Ukraine of 20 July 2015 on the Design-Basis Threat for Nuclear Installations, Nuclear Material, Radioactive Waste and Other Radiation Sources in Ukraine».

[41] List of Radiologically Hazardous Facilities in Ukraine Subject to the Development of Facility-Level Design-Basis Threat, approved by SNRIU Order No. 238 of 17 December 2012 and registered in the Ministry of Justice of Ukraine on 2 January 2013 by No. 21/22553.

[42] Requirements for Strict-Access Areas and for Monitoring and Control of Access to Strict-Access Areas, approved by SNRIU Order No. 177 of 5 December 2011 and registered in the Ministry of Justice of Ukraine on 23 December 2011 by No. 1509/20247.

[43] Requirements for Engineering Features of Physical Protection Systems for Nuclear Installations, Nuclear Material, Radioactive Waste and Other Radiation Sources, approved by SNRIU Order No. 176 of 5 December 2011 and registered in the Ministry of Justice of Ukraine on 23 December 2011 by No. 1505/20243.

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[46] IAEA Nuclear Security Series No. 15. Nuclear Security Recommendations on Nuclear and Other Radioactive Material out of Regulatory Control.

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[49] Code of Ukraine on Administrative Offences. As of 5 September 2017. Kyiv: A. V. Palyvoda, 2017.

[50] On Transport of Hazardous Cargoes No.28. As of 28 December 2015.

[51] On Approval of the Procedure for Transport of Radioactive Materials through the Territory of Ukraine No. 1373 dated 15 October 2004

[52] On Approval of the Procedure for State Control of International Transfer of Dual-Use Goods No. 86 dated 28 January 2004

[53] Rules for Nuclear and Radiation Safety in Transport of Radioactive Materials, (PBPRM-2006). Approved by SNRIU Order No. 132 dated 30 August 2006 and registered in the Ministry of Justice of Ukraine on 18 September 2006 by No. 1056/12930

[54] Requirements for Quality Assurance Programs for Transport of Radioactive Materials. Approved by SNRIU Order dated 25 July 2006 and registered in the Ministry of Justice of Ukraine on 5 October 2006 by No. 1092/12966

[55] Provisions on Planning of Measures and Actions in the Event of Accidents in Radioactive Material Transport (NP 306.6.108-2005). Approved by SNRIU Order No. 38 dated 7 April 2005 and registered in the Ministry of Justice of Ukraine on 22 April 2005 by No. 431/10711;

[56] Procedure for Issuing Certificates on Safe Transport of Radioactive Material. Approved by SNRIU Order No. 119 dated 6 September 2007 and registered in the Ministry of Justice of Ukraine on 20 September 2007 by No. 1079/14346;

[57] Safety Requirements and Conditions (Licensing Terms) for Radioactive Material Transport (NP 306.6.095-2004). Approved by SNRIU Order No. 141 dated 31 August 2004 and registered in the Ministry of Justice of Ukraine on 9 September 2004 by No. 1125/9724;

[58] Requirements for the Safety Analysis Report on Radioactive Material Transport (NP 306.6.096-2004). Approved by SNRIU Order No. 141 dated 31 August 2004 and registered in the Ministry of Justice of Ukraine on 9 September 2004 by No. 1127/9726;

[59] Procedure for Submitting SNRIU Conclusions in International Shipment of Radioactive Materials (NP 306.6.097-2004). Approved by SNRIU Order No. 138 dated 26 August 2004 and registered in the Ministry of Justice of Ukraine on 8 September 2004 by No. 1119/9718;

[60] Reference Material to Rules for Nuclear and Radiation Safety in Transport of Radioactive Materials (PBPRM-2006). Approved by Order of SNRIU Deputy Chairperson dated 20 November 2009;

[61] Methodological Recommendations on Development of Radiation Protection Program for Radioactive Material Transport. Approved by SNRIU Order No. 101 dated 2 August 2010;

[62] Rules for Road Transport of Hazardous Cargoes. Approved by Ordinance of the Ministry of Internal Affairs of Ukraine No. 822 dated 26 July 2004 and registered in the Ministry of Justice of Ukraine on 20 August 2004 by No. 1040/9639;

[63] Rules for Transport of Hazardous Cargoes. Approved by Ordinance of the Ministry of Transportation and Communication of Ukraine No. 1430 dated 25 November 2008 and registered in the Ministry of Justice of Ukraine on 26 February 2009 by No. 180/16196.

ANNEX 1
BASIC REGULATORY AND LEGAL DOCUMENTS ON RADIOACTIVE MATERIAL MANAGEMENT

1. Law of Ukraine «On Human Protection against Ionizing Radiation».
2. Law of Ukraine «On Authorizing Activity in Nuclear Energy».
3. Law of Ukraine «On Nuclear Energy Use and Radiation Safety».
4. Cabinet Resolution «On Establishment of the State Register of Radiation Sources» No. 847 of 4 August 1997.
5. Cabinet Resolution «Some Issues of State Regulation of Activities Related to the Use of Radiation Sources» No. 1718 of 16 November 2000.
6. Cabinet Resolution «On Approval of Criteria for Release of Activities Related to the Use of Radiation Sources from Licensing» No. 1174 of 16 November 2011.
7. Cabinet Resolution «On Approval of the Procedure for Interaction of Executive Bodies and Legal Entities in the Area of Nuclear Energy in Case of Illicit Trafficking of Radioactive Materials» No. 813 of 2 June 2003.
8. Cabinet Resolution «On Approval of Technical Regulation on Sealed Radiation Sources» No. 1382 of 5 December 2007.
9. Radiation Safety Standards of Ukraine (NRBU-97). State Health and Safety Regulations (DGN 6.6.1-6.5.001-98), approved by Ordinance of the Chief State Medical Doctor of Ukraine No. 62 of 1 December 1997.
10. Radiation Safety Standards of Ukraine. Supplement: Radiation Protection against Potential Radiation Sources NRBUУ-97/D-2000. State Health and Safety Regulations (DGN 6.6.1-6.5.061-2000), approved by Ordinance of the Chief State Medical Doctor of Ukraine No. 116 of 12 July 2000.
11. Basic Health and Radiation Safety Rules of Ukraine (OSPU-2005) (DSP 6.6.1 116 2005), approved by Order of the Ministry of Health of Ukraine No. 54 of 2 February 2005 and registered in the Ministry of Justice of Ukraine on 20 May 2005 by No. 552/10832.
12. Safety Requirements and Conditions (Licensing Terms) for the Production of Radiation Sources (NP 306.5.203-2015), approved by SNRIU Order No. 148 of 13 August 2015 and registered in the Ministry of Justice of Ukraine on 3 September 2015 by No. 1054/27499 (in effect from 1 January 2016).
13. Safety Requirements and Conditions (Licensing Terms) for the Use of Radiation Sources (NP 306.5.05/2.065-2002), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 125 of 2 December 2002 and registered in the Ministry of Justice of Ukraine on 17 December 2002 by No. 978/7266.

14. Requirements for the Safety Analysis Report on the Production of Radiation Sources (NP 306.5.05/2.052-2001), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 62 of 17 August 2001 and registered in the Ministry of Justice of Ukraine on 31 August 2001 by No. 774/5965.
15. Requirements for the Safety Analysis Report on the Use of Radiation Sources (NP 306.5.05/2.066-02), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 125 of 2 December 2002 and registered in the Ministry of Justice of Ukraine on 17 December 2002 by No. 978/7266.
16. Requirements for the Annual Report on Radiation Safety Analysis for the Production of Radiation Sources (NP 306.5.05/3.055-02), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 122 of 29 December 2001 and registered in the Ministry of Justice of Ukraine on 4 March 2002 by No. 223/6511.
17. Safety Requirements and Conditions (Licensing Terms) for the Use of Radiation Sources in Radioisotope Inspection (NP 306.5.161-2010), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 121 of 21 September 2010 and registered in the Ministry of Justice of Ukraine on 20 October 2010 by No. 950/18245.
18. Rules on Radiation Safety of Electron Accelerators (NP 306.5.192-2013), approved by SNRIU Order No. 83 of 5 August 2013 and registered in the Ministry of Justice of Ukraine on 21 August 2013 by No. 1442/23974.
19. Procedure for Release of Radioactive Materials from Regulatory Control within Practices (NP 306.4.159-2010), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 84 of 1 July 2010 and registered in the Ministry of Justice of Ukraine on 20 August 2010 by No. 718/18013.
20. Procedure for State Review on Nuclear and Radiation Safety (NP 306.1.107-2005), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 21 of 21 February 2005 and registered in the Ministry of Justice of Ukraine on 7 April 2005 by No. 372/10652.
21. Requirements for the Periodicity and Contents of Reports Submitted by the Licenses in Nuclear Energy (NP 306.1.129-2006), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 162 of 16 October 2006 and registered in the Ministry of Justice of Ukraine on 6 December 2006 by No. 1268/13142.
22. Rules on Nuclear and Radiation Safety in Nuclear Material Transport (NP 306.6.124-2006), approved by Order of the State Nuclear Regulatory Committee of Ukraine No. 132 of 30 August 2006 and registered in the Ministry of Justice of Ukraine on 18 September 2006 by No. 1056/12930.
23. Plan of Response to Radiation Accidents (NP 306.5.01/3.083-2004), approved by Order of the State Nuclear Regulatory Committee of Ukraine and Ministry of Emergencies of Ukraine No. 87/211 of 17 May 2004 and registered in the Ministry of Justice of Ukraine on 10 June 2004 by No. 720/9319.
24. List of Radiation Sources Released from Licensing in Their Use (NP 306.5.195-2013), approved by SNRIU Order No. 138 of 3 December 2013 and registered in the Ministry of Justice of Ukraine on 19 December 2013 by No. 2148/24680.
25. Procedure for Use of the State Register of Radiation Sources (NP 306.5.201-2015), approved by SNRIU Order No. 70 of 16 April 2015 and registered in the Ministry of Justice of Ukraine on 18 June 2015 by No. 717/27162.
26. General Safety Rules for Medical Radiation Sources, approved by Order of the SNRIU and Ministry of Health of Ukraine No. 51/151 of 16 February 2017 and registered in the Ministry of Justice of Ukraine on 18 May 2017 by No. 636/30504.

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Reviewer: Chornobyl Research and Development Institute

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