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The Role Of Specific Expertise In Establishing Facts Of Illegal Use Of Mass Destruction Weapons

Abstract: Mass destruction weapons (ABC weapons) pose the greatest threat to humanity in the 21st century. Weapons of mass destruction traditionally include chemical, bacteriological (biological) and nuclear. The development of different types of mass destruction weapons has been facilitated by scientific and technological advancements, and is associated with scientific and technical progress of the international community. Therefore, countermeasures and establishment of facts of illegal use (trafficking) of mass destruction weapons should be based on specific (scientific) expertise.

The article outlines peculiarities of involving well-versed persons to collect samples at the scene of crimes committed with the use mass destruction weapons, along with the process of appointing forensic examinations. Emphasis is made on the appointment and conduct of forensic examination of nuclear and other radioactive materials and on the development of a new area in forensic science: nuclear forensics.

Keywords: mass destruction weapons, involvement of well-versed persons, sampling at crime scene, specific expertise, forensic science, forensic examination of nuclear and other radioactive materials, nuclear forensics.

Research Problem Formulation. Currently, there are risks associated with the possibility of illegal use (trafficking) of mass destruction weapons (commitment of criminal offenses). Commission of criminal offenses in the field of illegal use of weapons or trafficking of mass destruction weapons is manifested in criminal activity, which is denoted by such terms as nuclear crime, nuclear smuggling, nuclear terrorism, chemical terrorism, biological (bacteriological) terrorism, etc.¹. The spread of international terrorism is classified as one of major real threats to Ukraine's national security (Article 7 of the Law of Ukraine On the Fundamentals of National Security of Ukraine). The Criminal Code of Ukraine stipulates a number of articles that establish responsibility for committing criminal offenses involving the use or trafficking of mass destruction weapons. This issue is becoming increasingly relevant. This issue is becoming increasingly relevant since the aggressor threatens to use nuclear weapons, fires missiles near nuclear power plants (Chernobyl, Zaporizhzhia, Khmelnytskyi, Rivne, etc. NPPs) in the Russia's war against Ukraine, and what is more, hostilities take place in the territories of such special facilities. An act of nuclear terrorism is the seizure of the Chernobyl and Zaporizhzhia NPPs by the Russian military forces². Investigation and trial presuppose the establishment of facts of illegal use (trafficking) of mass

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Declaration of Competing Interest

The author declare that they have no conflict of interest.

¹ Біленчук П. Д., Кофанов А. В., Кобилянський О. Л., Маслюк О. В. Ядерна злочинність: поняття, сутність, класифікація, характеристика, шляхи запобігання, протидії, розслідування: монографія / за ред. П. Д. Біленчука. Київ: ННІПСК КНУВС, 2009. 88 с.

² Shepitko V., Shepitko M. Nuclear Forensics: Formation and Role in Modern Conditions. 18th International Congress "Criminalistics and Forensic Expertology: Science, Studies, Practice, 8-10 September 2022, Vinius (Lithuania). P. 20-30.

Валерій Шепітько

**РОЛЬ СПЕЦІАЛЬНИХ
ЗНАНЬ У ВСТАНОВЛЕННІ
ФАКТІВ НЕЗАКОННОГО
ВИКОРИСТАННЯ ЗБРОЇ
МАСОВОГО ЗНИЩЕННЯ**

Анотація: Зброя масового знищення (ураження) (ABC-зброя, англ. ABC weapons) являє найбільшу загрозу людству у XXI столітті. До зброї масового знищення традиційно відносять хімічну, бактеріологічну (біологічну) та ядерну. Розроблення різних видів зброї масового знищення ґрунтується на досягненнях науки і техніки, пов'язано з науково-технічним прогресом світового співтовариства. Тому й протидія та встановлення фактів незаконного застосування (обігу) зброї масового знищення мають ґрунтуватися на спеціальних (наукових) знаннях.

У статті визначено особливості залучення обізнаних осіб для відбору проб (зразків) на місці вчинення злочинів з використанням зброї масового знищення, а також звернення до проведення судових експертиз. Особлива увага приділена призначенню та проведенню судової експертизи ядерних та інших радіоактивних матеріалів та формуванню нового напрямку в криміналістиці – ядерній криміналістиці.

Ключові слова: зброя масового знищення, залучення обізнаних осіб, відбір проб (зразків) на місці вчинення злочинів, спеціальні знання, судова експертиза, судова експертиза ядерних та інших радіоактивних матеріалів, ядерна криміналістика.

destruction weapons, the need to record relevant evidentiary information and apply specific expertise (provision of specialists' assistance and conduct of forensic examinations).

Analysis of Essential Researches and Publications. Individual scientists addressed the issue of criminal responsibility in the field of illegal use and trafficking of mass destruction weapons. In particular, these are attempts to systematize criminal offenses in the field of illegal trafficking of radioactive materials (O. V. Taran, O. H. Sandul, etc.)³. Other scientists tried to study into the issues of combating the illegal trafficking of mass destruction weapons (P. D. Bilenchuk, M. T. Dolishchuk, A. V. Kofanov, T. V. Obikhod, O. I. Pluzhnyk, etc.)⁴. Some researchers addressed the issues of investigating crimes related to illegal trafficking of mass destruction weapons (O. O. Knyzhenko, S. O. Knyzhenko, O. V. Masliuk, etc.).

The Article Purpose is to determine the role of specific expertise in establishing facts of the illegal use (trafficking) of mass destruction weapons as well as peculiarities of involving well-versed individuals to collect samples at the scene of such crimes. The article also outlines the appointment and conduct of forensic examinations of nuclear and other radioactive materials.

Main Content Presentation. The specificity of criminal offense subject (nuclear and radioactive materials, chemical warfare agents, pathogenic microorganisms or other biological agents) necessitates the application of specific expertise in various fields: nuclear physics, chemistry, toxicology, military toxicology, radiology, microbiology, virology, medicine, military medicine, forensic medicine, etc. Literary sources have emphasized the importance of considering the unique features of radioactive and other materials and substances when selecting protective measures and methods for detecting and seizing such objects. In this respect, forensic experts should be assisted by experts (specialists) in nuclear physics, radiology, chemistry, and medicine⁵. During the investigation of such offenses, it is possible to use traditional forensic knowledge.

An important focus of the use of specific expertise during investigation of criminal offenses related to illegal use or trafficking of mass destruction weapons is involvement of specialists while crime detection and investigation. A specialist is a person who possesses specific expertise and skills in using technical and other means and has the right to provide consultations during pre-trial investigation and court proceedings on matters requiring the application of relevant specific expertise and skills (Part 1, Article 71 of the Criminal Procedural Code of Ukraine)⁶. In the course of investigation of illegal use or trafficking of mass destruction weapons, a specialist must assist the investigator in identifying, fixing and seizing evidence at the scene. The specialist must collect samples during scene inspection, which will later be used for appointment and conduct of forensic examinations.

Peculiarities of involving well-versed persons for collecting samples at the scene of crimes committed with the use of mass destruction weapons. In compliance with the Law of Ukraine On National Police, the main powers of the National Police within the limits of its competence as defined by law, include, in particular, monitoring compliance with radiation safety rules in specially designated areas of radiation contamination (clause 23, Part 1,

³ Таран О. В., Сандул О. Г. Кримінальна відповідальність за злочини у сфері незаконного обігу радіоактивних матеріалів. *Ядерна та радіаційна безпека*. 2018. 3(79). С. 66-70.

⁴ Див., наприклад: Долішук М. Т., Плужник О. І. Проблемні питання запобігання незаконному поводженню з радіоактивними матеріалами в Україні. *Південноукраїнський правничий часопис*. 2019. 2-7. С. 29-31.

⁵ Книженко О. О., Книженко С. О. Незаконне поводження з радіоактивними матеріалами: розслідування та притягнення до кримінальної відповідальності. *Юридичний бюлетень*. 2020. Вип. 15. С. 118.

⁶ Криміналістика: підручник: у 2 т. Т. 1 / за ред. В. Ю. Шепітька. Харків: Право, 2019. С. 440.



Article 23) and contributing to the establishment of a military or emergency regime or area of emergency environmental situation, as contemplated by laws, if any such regime is declared for the whole territory of Ukraine or in any specific area (clause 24, Part 1, Article 23)⁷.

In case of detecting radioactive, chemical and nuclear materials or obtaining information about commission of a criminal offense with the use of mass destruction weapons, the procedure for the actions of police bodies (units) is regulated by the corresponding Instruction approved by the Order of the Ministry of Internal Affairs of Ukraine No. 754 dated September 6, 2017⁸.

In the Instructions on the procedure for police bodies (units) in the case of detecting radioactive, chemical and nuclear materials or obtaining information about violations of the rules or illegal handling thereof (clause 1, Part II), it is stated that when receiving a notification about violation of the rules or illegal handling of radioactive, chemical and nuclear materials or direct detection of the questioned object, police officers are obliged to immediately take measures on individual and public safety, prevent further contact of people and animals with such objects, and mandatorily notify the operations duty officer (of the police unit) about this fact⁹.

At the scene, the investigator as part of the investigative operations group (IOG) has to: 1) only after initial examination by the specialists of authorities concerned and their confirmation of the absence of negative factors (safe level of radioactive contamination, chemical contamination), organize the IOG work in order to identify and fix signs and traces of a crime, as well as persons who committed it; 2) relying on the results of scene inspection, draw up a protocol of scene inspection, in which the results of preliminary identification of the questioned object, by whom it was seized and where it was sent for further research, must be outlined. The protocol is signed by all participants who were involved in inspection, including a specialist who carried out seizure (clause 9, Section II of the Instructions)¹⁰.

It seems quite specific that seizure of a questioned object is carried out in the presence of a forensic inspector by specialists equipped with personal protective equipment, in accordance with the powers of one of the authorities concerned or another subject whose sphere of authority includes the handling of the relevant radioactive, chemical and nuclear materials (clause 8, Section II of the Instructions)¹¹.

In literary sources, emphasis is made on the fact that there is a need to take into account features of radioactive and other materials and substances, selection of means of protection, identification of methods helping to detect and seize such objects. In this sense, criminalists should be assisted by experts (specialists) in nuclear physics, radiology, chemistry and medicine¹².

In conformity with the Regulation on investigative units of the National Police of Ukraine approved by the Order of the Ministry of Internal Affairs of Ukraine No. 570 dated July 6, 2017, a person who applies specific expertise is defined. Such a person is a forensic inspector (crime-scene tech) who possesses scientific, technical or other specific expertise and skills in application of the technical or other means and as a specialist participates in crime detection and investigation and provides practical assistance to

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THE ROLE OF SPECIFIC EXPERTISE IN ESTABLISHING FACTS OF ILLEGAL USE OF MASS DESTRUCTION WEAPONS

The research paper outlines issues of applying specific expertise in investigation of crimes related to illegal use (trafficking) of mass destruction weapons. The sequence of actions of police bodies (units) in case of detection of radioactive, chemical and nuclear materials or receiving information about commission of a criminal offense involving the use of mass destruction weapons has been analyzed. The role of civil protection emergency rescue service of the State Emergency Service of Ukraine during work with dangerous materials and substances (radioactive, chemical, bacteriological) has been underlined. Emphasis has been made on the peculiarities of involving well-versed persons for collecting samples at the scene of crimes committed with the use of weapons of mass destruction, and the possibilities of appointing and conducting forensic examinations have been determined. The identifying essence of forensic examination of nuclear and other radioactive materials as a type of examination of materials, substances and products (class of forensic examinations) has been established. Its tasks, objects and implementation procedure have been considered. Focus has been made on the development of a new area in forensics: nuclear forensics and the functioning of nuclear forensics laboratories.

Keywords: mass destruction weapons, involvement of well-versed persons, sampling at crime scene, specific expertise, forensic science, forensic examination of nuclear and other radioactive materials, nuclear forensics.

⁷ Закон «Про Національну поліцію». URL: <https://zakon.rada.gov.ua/laws/show/580-19#Text>

⁸ Інструкція про порядок дій органів (підрозділів) поліції в разі виявлення радіоактивних, хімічних та ядерних матеріалів або отримання інформації про порушення правил чи незаконне поводження з ними: наказ Міністерства внутрішніх справ України 06.09.2017 № 754. URL: <https://zakon.rada.gov.ua/laws/show/z1240-17#Text>

⁹ Там само.

¹⁰ Там само.

¹¹ Там само.

¹² Книженко О. О., Книженко С. О. Незаконне поводження з радіоактивними матеріалами: розслідування та притягнення до кримінальної відповідальності. *Юридичний бюлетень*. 2020. Вип. 15. С. 118.

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**RÔLE DES CONNAISSANCES
SPÉCIALES DANS
L'ÉTABLISSEMENT DES FAITS
D'UTILISATION ILLÉGALE
D'ARMES DE DESTRUCTION
MASSIVE**

Résumé : Les armes de destruction massive (dommages) (armes ABC) représentent la plus grande menace pour l'humanité au 21^{ème} siècle. Les armes de destruction massive comprennent traditionnellement les armes chimiques, bactériologiques (biologiques) et nucléaires. Le développement de divers types d'armes de destruction massive est basé sur les réalisations de la science et de la technologie, liées au progrès scientifique et technique de la communauté mondiale. Par conséquent, neutralisation et l'établissement de faits d'usage illégal (circulation) d'armes de destruction massive doivent être fondés sur des connaissances (scientifiques) spéciales.

L'auteur de l'article définit les spécificités de l'implication de personnes bien informées pour prélever des échantillons (échantillons) sur les lieux de crimes avec l'utilisation d'armes de destruction massive, ainsi que pour demander des examens judiciaires. Une attention particulière est accordée à la nomination et à la conduite d'examen judiciaires de matières nucléaires et autres matières radioactives et à la formation d'une nouvelle direction en criminalistique : à savoir : criminalistique nucléaire.

Mots clés : armes de destruction massive, implication de personnes bien informées, échantillonnage (échantillons) sur les lieux des crimes, connaissances spéciales, examen judiciaire, examen judiciaire des matières nucléaires et autres matières radioactives, criminalistique nucléaire.

investigators in their organization (clause 1, Section IX of the Regulation). Forensic inspector, also known as a crime-scene technician, with the use of specific expertise and skills, scientific and technical means and specialized equipment, does the following: carries out measurements, makes photos, audio or video recording, draws up plans and schemes, produces graphic images of the inspected place or individual objects, designs photos, audio and video materials upon completion of investigative (detective) actions; detects, fixes, seizes and packs physical objects that contain traces of a committed offense; conducts rapid analysis according to external characteristics of seized objects (without provision of a written conclusion); draws the investigator's attention to factual data relevant to investigation of criminal offense circumstances (subclauses 2, 3, 4, Part 5, Section IX of the Regulation)¹³.

Inspection of a scene related to investigation of criminal offenses involving illegal use or trafficking of mass destruction weapons takes place in dangerous conditions, it is necessary to perform tasks using hazardous materials and substances (radioactive, chemical, bacteriological). Therefore, in case of availability of data on illegal use or trafficking of mass destruction weapons, it is vital to contact civil protection emergency rescue services of the State Emergency Service of Ukraine. Article 2 of the Code of Civil Protection of Ukraine stipulates that "emergency service is a range of organisationally linked authorities, forces and tools under a single organisational structure to provide rescue and other urgent operations". Civil Protection is the function of the state that protects people, territories, environment and property against emergency through prevention, dealing with the aftermath and providing assistance to affected persons in times of peace and during the special period (Article 4 the Code of Civil Protection of Ukraine). At the same time, clause 24 of Article 2 of the Code of Civil Protection of Ukraine defines emergency situation as following: "emergency – a situation within a specific territory or business site within it or water facility with disrupted living conditions of people as a result of the catastrophe, accident, fire, natural disaster, epidemic, epizootic, epiphytotic, use of weapons or other dangerous events that (may) endanger human life and health, lead to a great number of dead and injured, cause significant material damage, and make the territory or object uninhabitable, unsuitable for economic activities."

In 2020, the Methodological Guidelines on Sampling Procedures during Emergency Situations Associated with Exposure (Release) of Hazardous Chemical Substances were prepared and published by the OSCE Project Coordinator in Ukraine within the framework of the Enhancing Ukraine's Chemical Emergency Response Capacity Project with the financial support of the US and Germany. These Guidelines state that when responding to emergency situations related to exposure (release) of hazardous chemicals, identification of a chemical substance, determination of its chemical-physical properties and hazards¹⁴ are increasingly important. These Methodological Guidelines include step-by-step actions and procedures that must be followed during collection of samples of various types, their packaging, labelling, ensuring their preservation, transportation, and storage before transfer to the corresponding analytical laboratory.

The sampling procedure (collection of samples) during response to emergency situations is carried out by civil protection emergency rescue service of the State Emergency Service of Ukraine. Such actions are regulated by the Methodological Guidelines on Sampling Procedures during

¹³ Положення про слідчі підрозділи Національної поліції України: Наказ Міністерства внутрішніх справ України 06.07.2017 № 570. URL: <https://zakon.rada.gov.ua/laws/show/z0918-17#Text>

¹⁴ Методичні рекомендації щодо процедур відбору проб під час надзвичайних ситуацій, пов'язаних з виливом (викидом) небезпечних хімічних речовин. Київ: Ваіте, 2020. 54 с.

Emergency Situations Associated with Exposure (Release) of Hazardous Chemical Substances approved by the Order of the Emergency Situations of Ukraine No. 602 dated September 8, 2021. These guidelines explicitly state that one of the prerequisites for a high-quality response to incidents involving hazardous chemicals is identification of a dangerous substance, its properties and hazards. The key to a qualitative identification of a substance is a properly executed sampling procedure at the scene (Section II, Part 1, clause 1).

When receiving samples, their packaging and labelling are of particular importance. Specifically, the packaging procedure for each sample includes: 1) primary packaging/container into which the sample is directly placed; 2) dense airtight packaging for disinfection, which is impervious to liquids and allows the sample to be disinfected¹⁵.

The procedure of obtaining samples for forensic examination is established by the procedural legislation of Ukraine (Article 245 of the Criminal Procedural Code of Ukraine). Unlike physical evidence, samples for expert research are not related to the event under investigation and undoubtedly originate from a specific object¹⁶. Therefore, it is necessary to consider samples and a standard (etalon) as a certain reference material.

There are peculiarities in radioactive evidence collection. A certain algorithm of actions is suggested in specialized literary sources. In particular, the location of radioactive evidence is established by hardware means and its nuclear-physical characteristics are determined. It is recommended to characterize the scene by drawing diagrams (preferably indicating GPS coordinates and compass orientation), marking the location of radioactive and other physical evidence, radioactive contamination area, establish boundaries of monitored zones. It is suggested to take photographs of the scene and physical evidence¹⁷.

To obtain samples of nuclear and other radioactive materials, it is possible to involve specialists of Institute for Nuclear Research of the National Academy of Sciences of Ukraine, who currently have a mobile nuclear forensics laboratory¹⁸.

When obtaining samples, it is essential to apply special methods and use scientific and technical means. Special devices for radiation reconnaissance and monitoring, and chemical reconnaissance are used to obtain data for the purpose of assessing the radiation and chemical situation. In particular, the devices used for measurement include: indicators (used to detect radioactive contamination of an area and different objects); radiometers (used to measure the energy output of various forms of radiation); X-ray meter (intended to measure radiation levels in an area contaminated with radioactive substances); radiation dosimeters (aimed at measuring total radiation doses received by personnel)¹⁹.

In case of seizing samples and other objects with radioactive materials from the scene, it is essential to adhere to the established procedure for their transportation. Clause 11 of the Procedure for Interaction of Executive Power Bodies and Legal Entities Conducting Activities in the Field of

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ROLA OKREŚLONYCH EKSPERTÓW W USTALANIU FAKTÓW NIELEGALNEGO UŻYCIA BRONI MASOWEGO RAŻENIA

Streszczenie: Broń masowego rażenia (broń ABC) stanowi największe zagrożenie dla ludzkości w XXI wieku. Broń masowego rażenia tradycyjnie obejmuje chemiczną, bakteriologiczną (biologiczną) i nuklearną. Rozwój różnych rodzajów broni masowego rażenia został ułatwiony przez postęp naukowy i technologiczny i jest związany z postępem naukowo-technicznym społeczności międzynarodowej. Dlatego przeciwdziałanie i ustalanie faktów nielegalnego użycia (handlu) bronią masowego rażenia powinno opierać się na konkretnej (naukowej) ekspertyzie.

W artykule przedstawiono specyfikę angażowania osób dobrze zorientowanych w pobieranie próbek z miejsc zbrodni popełnionych z użyciem broni masowego rażenia, wraz z procesem wyznaczania oględzin przez kryminalistów. Nacisk kładzie się na powołanie i prowadzenie badań kryminalistycznych materiałów jądrowych i innych materiałów promieniotwórczych oraz na rozwój nowej dziedziny kryminalistyki: kryminalistyki jądrowej.

Słowa kluczowe: broń masowego rażenia, zaangażowanie dobrze zorientowanych osób, pobieranie próbek z miejsc zbrodni, specjalistyczna ekspertyza, kryminalistyka, kryminalistyczne badanie materiałów jądrowych i innych materiałów promieniotwórczych, kryminalistyka jądrowa.

¹⁵ Методичні рекомендації щодо процедур відбору проб під час надзвичайних ситуацій та небезпечних подій, пов'язаних з впливом (викидом) небезпечних хімічних речовин. URL: <https://cn.dsns.gov.ua/files/Slujebka/2020/Metoduchni%20recomendacii%20po%20vidbory%20prob.pdf>

¹⁶ Велика українська юридична енциклопедія: у 20 т.: Т. 20: Криміналістика, судова експертиза, юридична психологія / редкол.: В. Ю. Шепітько (голова) та ін. Харків: Право. 2018. С. 327, 328.

¹⁷ Біленчук П. Д., Кофанов А. В., Кобилянський О. Л., Маслюк О. В. Особливості розслідування злочинів у сфері обігу радіоактивних матеріалів: монографія. Київ, 2009. С. 69.

¹⁸ Щодо заходів у сфері ядерної криміналістики.. URL: <https://snriu.gov.ua/news/shchodo-zakhodiv-u-sferi-yadernoi-kriminalistiki>

¹⁹ Теплоухов Б. П. Зброя масового ураження та захист від неї: навч. посібник. Київ: ВІКНУ, 2008. С. 60.

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**DIE ROLLE SPEZIFISCHER
EXPERTISE BEI DER
FESTSTELLUNG VON
FAKTEN ÜBER DEN
ILLEGALEN EINSATZ VON
MASSENVERNICHTUNGSWAFFEN**

Das Forschungspapier skizziert Fragen der Anwendung spezifischer Fachkenntnisse bei der Untersuchung von Verbrechen im Zusammenhang mit dem illegalen Einsatz (Handel) von Massenvernichtungswaffen. Analysiert wurde die Handlungsabfolge der Polizeiorgane (Einheiten) im Falle des Auffindens radioaktiver, chemischer und nuklearer Materialien oder des Erhalts von Informationen über die Begehung einer Straftat, die den Einsatz von Massenvernichtungswaffen beinhaltet. Unterstrichen wurde die Rolle des Zivilschutz-Notrettungsdienstes des Staatlichen Rettungsdienstes der Ukraine bei der Arbeit mit gefährlichen Materialien und Substanzen (radioaktiv, chemisch, bakteriologisch). Dabei wurde auf die Besonderheiten der Hinzuziehung sachkundiger Personen zur Entnahme von Proben am Tatort mit Einsatz von Massenvernichtungswaffen hingewiesen und die Möglichkeiten der Beauftragung und Durchführung forensischer Untersuchungen ermittelt. Das identifizierende Wesen der forensischen Untersuchung von nuklearen und anderen radioaktiven Stoffen als eine Art der Untersuchung von Materialien, Stoffen und Produkten (Klasse der forensischen Untersuchungen) wurde festgestellt. Ihre Aufgaben, Gegenstände und Durchführungsverfahren wurden berücksichtigt. Der Schwerpunkt liegt auf der Entwicklung eines neuen Bereichs in der Forensik: der Nuklearforensik und der Funktionsweise von Nuklearforensiklabors.

Schlüsselwörter: Massenvernichtungswaffen, Einbeziehung von Fachleuten, Probenahme am Tatort, spezifisches Fachwissen, forensische Wissenschaft, forensische Untersuchung von nuklearem und anderem radioaktivem Material, Nuklearforensik.

Nuclear Energy Use stipulates that, in the event of discovery of radioactive materials while illegal trafficking, the law enforcement agency, based on scene inspection and required measures taken to identify signs of a crime and of persons who committed it, provides the local executive body with his/her conclusion on the need to transport seized radionuclide source to Institute for Nuclear Research, another forensic science organization, in order to perform an in-depth analysis on the discovery of its origin and/or purpose or for temporary storage or disposal. Based on this conclusion, as well as conclusions and recommendations of experts from the State Sanitary-Epidemiological Service of Ukraine (currently, the State Service for Food Safety and Consumer Protection), State Nuclear Regulatory Inspectorate of Ukraine and the Ministry of Environmental Protection and Natural Resources of Ukraine, the local executive body makes a decision on further actions with seizure of radioactive material from illegal trafficking²⁰. If necessary, after transportation of seized radioactive materials from the place of their discovery, completion of scene inspection and adoption of required measures in order to identify signs of a crime and persons who committed it are carried out, consequences of the radiation accident are eliminated and informing is provided in compliance with the legislation on protection of the population and the territory from natural and man-made emergency situations (clause 12 of the Procedure)²¹.

Clause 13 of the Procedure for Interaction of Executive Power Bodies and Legal Entities Conducting Activities in the Field of Nuclear Energy Use stipulates that in the case of detection of radioactive materials in illegal trafficking (in compliance with the adopted decision on transportation of radioactive materials seized from illegal trafficking as stated in clause 11 of this Procedure), the local executive body sends an application to the relevant state specialized enterprise Radon Association²².

Investigation of criminal offenses involving illegal use and trafficking of mass destruction weapons requires turning to specific expertise in the form of carrying out forensic examinations: forensic examination of nuclear and radioactive materials, forensic examination of man-made explosions, forensic medical examinations, forensic biological examinations, forensic environmental examinations, criminalistics examinations, etc. The appointment and conduct of forensic examinations depend on the type of criminal offense that was committed. Specifically, a sabotage commission may result in man-made disasters and the risk of radioactive, chemical, or bacterial contamination in a particular area or other territory. In such cases, it is essential to appoint and perform a forensic examination of man-made explosions, which involves researching phenomena, processes, and physical objects related to an explosion that is not associated with the use of ammunition or improvised explosive devices, under conditions that may lead to such explosions²³.

Forensic examination of nuclear and other radioactive materials. Forensic examination of nuclear and other radioactive materials is classified as a type of forensic examination of materials, substances and products. At the same time, forensic examination of materials, substances and products (forensic materials science) is a class of forensic examination in which physical evidence such as solid, liquid and gaseous substances, products

²⁰ Порядок взаємодії органів виконавчої влади та юридичних осіб, які провадять діяльність у сфері використання ядерної енергії, в разі виявлення радіоактивних матеріалів у незаконному обігу. URL: <https://zakon.rada.gov.ua/laws/show/813-2003-п#Text>

²¹ Порядок взаємодії органів виконавчої влади та юридичних осіб, які провадять діяльність у сфері використання ядерної енергії, в разі виявлення радіоактивних матеріалів у незаконному обігу. URL: <https://zakon.rada.gov.ua/laws/show/813-2003-п#Text>

²² Там само.

²³ Судові експертизи в процесуальному праві України: навч. посібник / за заг. ред. О. Г. Рувіна. Київ: Вид-во Ліра-К, 2019. С. 223, 224.

and their parts is examined, which contain evidentiary information about case circumstances that are established on the basis of specific expertise in the field of individual kinds and types of forensic examination of materials, substances and products²⁴. The subject of forensic examination of materials, substances and products consists of factual data and circumstances established on the basis of theoretical and methodological principles of research on physical evidence developed in criminalistics, namely materials, substances and products, using data from natural and technical sciences²⁵. In compliance with the Instructions on the Appointment and Conduct of Forensic Examinations and Expert Research approved by the Order of the Ministry of Justice of Ukraine No. 53/5 dated 08.10.1998 (as amended by the Order of the Ministry of Justice of Ukraine No. 1950/5 dated 26.12.2012), forensic examination of materials, substances and products is classified as criminalistics (clause 1.2.1.)²⁶.

Nuclear forensics is a type of forensic examinations which lies in the study of nuclear and other radioactive materials in order to find evidence of their origin, places and ways of their illegal trafficking and enrichment, as well as weak points in ensuring safety of such materials²⁷. Nuclear forensics is a relatively new field of scientific research that is due to the surge in nuclear smuggling and aims to shed light on a number of questions related to identification, assessment of the degree of danger, determination of origin and ways of transportation of seized nuclear, radioactive materials and radiation sources, which is currently one of significant issues of international security²⁸.

As stated by individual researchers, principal tasks of the forensic examination of radioactive materials include: categorizing the questioned object as radioactive; establishing its chemical composition; determination of the technological purpose, time, method and place of production; identification of the likely company-owner of the material under study; determination of cost estimates of the extracted ionizing radiation source (radioactive source) (abbreviated as IRS) according to official catalogues for its legal use²⁹.

Forensic examination of nuclear and other radioactive materials relates to identification research. L. Koch rightly emphasizes that in every nuclear or radioactive material, the isotopic composition of the chemical elements included in it is unique and differs from composition of elements in natural conditions. The nature of the spread of isotopes reflects the processes of enrichment and irradiation in nuclear reactors³⁰.

What can be an expert research object in this case? The objects of the expert research of radioisotope IRS are not only extracted materials, but also the reference samples necessary for conducting comparative study. Identification of radioactive materials, the completeness of collected

²⁴ Велика українська юридична енциклопедія: у 20 т.: Т. 20: Криміналістика, судова експертиза, юридична психологія / редкол.: В. Ю. Шепітько (голова) та ін. Харків: Право, 2018. С. 245.

²⁵ Судові експертизи в процесуальному праві України: навч. посібник / за заг. ред. О. Г. Рувіна. Київ: Вид-во Ліра-К, 2019. С. 223, 224.

²⁶ Інструкція про призначення та проведення судових експертиз та експертних досліджень URL: <https://zakon.rada.gov.ua/laws/show/z0705-98#Text>

²⁷ Шепітько В., Шепітько М. Кримінальне право, криміналістика та судові науки: енциклопедія. Харків: Право, 2021. С. 302.

²⁸ Большаков В. Б., Косач Н. І. Регіональні лабораторії з ядерної криміналістики – інструмент МАГАТЄ і ЄС у боротьбі з міжнародним тероризмом. Метрологія. 2014. С. 68.

²⁹ Маслюк О. В. Розслідування злочинів у сфері обігу радіоактивних матеріалів: автореф. дис. ...канд. юрид. наук. Київ, 2008. С. 12.

³⁰ Кох Л. Следы-доказательства. Судебная экспертиза и незаконный оборот ядерных материалов. Бюллетень МАГАТЭ. 2003. 45/1. С. 22.

information is almost the key goal of the forensic examination of nuclear crime cases, and its results define the further course of investigation³¹.

Clause 2 of the Resolution of the CMU On Approval of the Procedure for Interaction of Executive Power Bodies and Legal Entities Conducting Activities in the Field of Nuclear Energy Use in the Event of Detection of Radioactive Materials in Illegal Trafficking No. 813 dated June 2, 2003, states “to entrust performance of functions of the main expert organization on research and determination of characteristics of radioactive materials that have been withdrawn from illegal trafficking to Institute for Nuclear Research of the National Academy of Sciences of Ukraine.” Currently, principal tasks of Institute for Nuclear Research of the National Academy of Sciences of Ukraine include “forensic examination of nuclear and other radioactive materials withdrawn from illegal trafficking.”³² Other Institutes of the National Academy of Sciences of Ukraine are also involved in the field of nuclear forensics³³.

In order to conduct forensic examination of nuclear and other radioactive materials withdrawn from illegal trafficking in Ukraine, a pilot project of a database for nuclear forensics in Ukraine and a nuclear forensics laboratory equipped with modern radiometric, dosimetry and spectrometric equipment were created at the Center for Environmental Problems of Atomic Energy (CEPAE) to ensure expert support when carrying out on-site activities on nuclear or radioactive material seizure, provide expert support to law enforcement agencies in the course of criminal investigation and carry out forensic examination on behalf of state authorities³⁴.

Today, Nuclear Forensics Laboratory operates at Institute of Nuclear Research of the National Academy of Sciences of Ukraine. This laboratory was organized in 2016. Its principal task is to provide expert support in implementation of measures to combat illegal trafficking of nuclear and other radioactive materials, to draw up expert conclusions on behalf of central authorities. The European Commission proposed to set up a regional network of nuclear forensics laboratories with the basic laboratory at Institute for Nuclear Research of the National Academy of Sciences of Ukraine. Tasks of nuclear forensic laboratories should be to provide expert support to law enforcement agencies during investigations as well as to provide expert support to other national institutions involved in combating illegal trafficking and nuclear smuggling. In 2018, the nuclear forensics laboratory was accredited by the National Accreditation Agency of Ukraine in accordance with the requirements of ДСТУ ISO/IEC 17025:2006 in the field of testing nuclear and other radioactive materials. What is more, experts of the Center for Environmental Problems of Atomic Energy (CEPAE) have created a database for nuclear forensics in Ukraine. The main areas of CEPAE research are: nuclear forensics research; forensic examination of nuclear materials and other radioactive substances out of regulatory control³⁵.

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³¹ Біленчук П. Д., Кофанов А. В., Кобилянський О. Л., Маслюк О. В. Особливості розслідування злочинів у сфері обігу радіоактивних матеріалів: монографія. Київ, 2009. С. 51.

³² Інститут ядерних досліджень НАН України. URL: www.kinr.ua/KINR_booklet2010.pdf ; www.kinr.kiev.ua

³³ Біленчук П. Д., Обіход Т. В. Правове і криміналістичне забезпечення протидії ядерному тероризму. Часопис Київського університету права. 2017. № 1. С. 295.

³⁴ Вишневський І. М., Дорошко Н. Л. Провідний ядерний центр України. До 45-річчя від часу заснування Інституту ядерних досліджень НАН України. *Вісник НАН України*. 2015. № 9. С. 77.

³⁵ Див.: Інститут ядерних досліджень НАН України. URL: www.kinr.kiev.ua

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