

STUDY ON THE IMPLEMENTATION OF NUCLEAR FORENSICS IN VARIOUS LEGAL SYSTEMS

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Description

This paper describes the challenges associated with the implementation of Nuclear Forensics within the national legal frameworks with the purpose to collect, analyse and interpret items of evidence concerning illicit activities involving nuclear or other radioactive materials found out of regulatory control. It provides an overview of the main aspects related to the integration of Nuclear Forensics into the criminal investigation while focusing on the specificities of the criminal law in *Civil vs Common law systems*. The study provides a brief overview of the roles and responsibilities of the main nuclear security stakeholders that could be involved in responding to, investigating and consequently preventing nuclear security events in a Civil Law country. The “*Country Case Study: Romania*” is put forward as an example of successful implementation of the developed nuclear forensics capabilities within the national legal system.

1. INTRODUCTION

IAEA recommends that member states develop nuclear forensics capabilities according to their nuclear security related needs [1]. However, after such requirements are identified and technical capabilities are established, it can prove challenging to actually implement Nuclear Forensics as a functional tool to prevent and respond to Nuclear Security Events at a national level. The reason thereof is the specificity of legal provisions in national law systems that have to be considered, while the existing international guidance on this matter is mainly addressed from the common law systems’ perspective. The question that remains is “can a guidance which fits the legal requirements of all the law systems be developed or it rather has to be an individual approach?”

2. OVERVIEW OF THE MAIN LEGAL SYSTEMS

Most national law systems in the world belong to either Civil Law or Common Law type, or are a combination of the two, while in a few other cases Islamic Law applies (Shari’ah, traditional Islamic law and structures). The Common Law system is prevalent in the UK and the Commonwealth, as well as the USA, while Civil Law System (Roman system) is represented in the vast majority of countries including the European Union Member States, the Russian Federation, South America (except Guyana). In some countries in Africa and Asia a mixture of the two systems or Islamic Law exists. Therefore, when implementing new scientific tools like those offered by Nuclear Forensics within the scope of the criminal investigation, the peculiarities of various legal systems as well as the specificity of the national legal frameworks have to be taken into consideration.

While some of the same fundamental principles are at the basis of both Civil and Common Law, they evolved separately and have their own legal structures and rules of procedure, even though throughout history the two systems obviously influenced one another. Convergence drivers are for example the modern European integration supported by free movement of people and goods, as well as the globalization and the international cooperation instruments promoted by international bodies. However, divergence factors include historical traditions, political and economic specificities, the Western focus on decentralization and cultural differentiation [2].

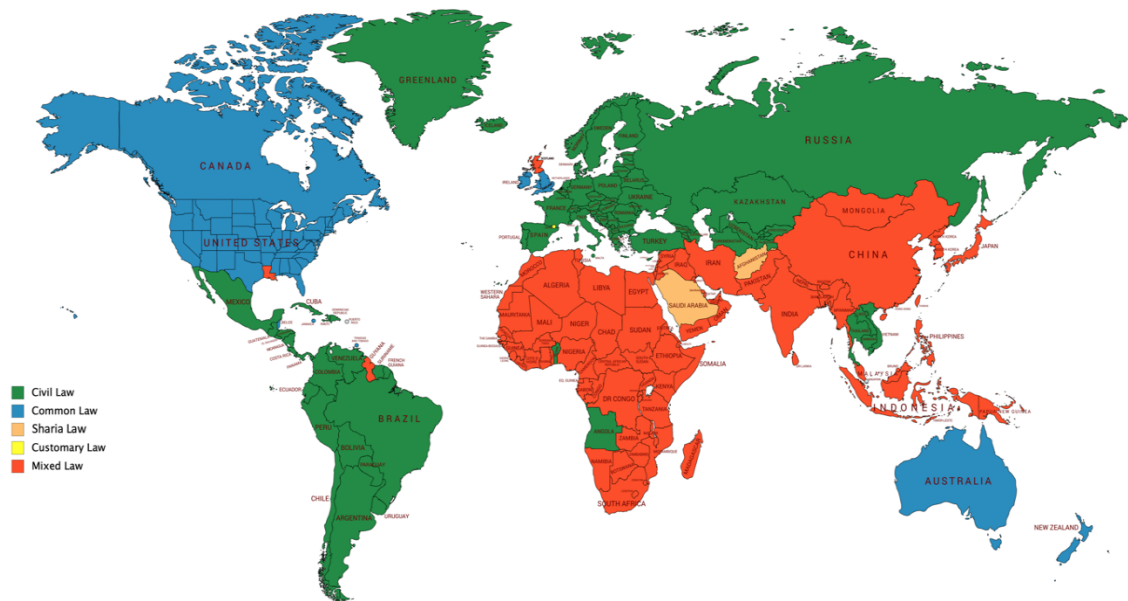


Fig. 1 World Map of different law systems. Adapted from *mapchart.net*

For the purpose of this paper we will refer only to aspects concerning the Criminal law (criminal investigations). In Civil Law systems there is a codified body of laws that prescribe which illicit acts can be subject of criminal prosecution (substantive penal law), which rules are to be followed by various actors of the penal process, which are their rights and obligations and how are they enforced, as well as their roles and responsibilities (procedural law) and the nature and the extent of the penalties. During prosecution and trial, the judicial actors have to establish the facts, to identify the available means of evidence and to determine which legal provisions apply. They unfold their competences and administer the evidence within the framework of specific legal norms. The criminal procedure is of an inquisitorial nature, and the judge is required to examine the evidence. Common Law on the other hand does not rely extensively on written laws, but is based on precedent and the courts have an important role in shaping the case law. The system is adversarial and the judge acts like a moderator, deciding the sentence according to the verdict reached by a jury of people without legal training [3].

While both systems apply an established framework for pre-trial procedures in order to outline the matters at hand, in Civil law systems there is usually an investigation overseen or directed by the judicial authorities (prosecutors or investigating judges) with the purpose to reveal the matters which are relevant and to ensure a legality check when administering the evidence. Evidence is presented both against, but also in favor of the accused. This differs from the Common law set up, where the obligation to present the evidence lies with the parties, primarily. When it comes to the rules of evidence and means of proof i.e. their admissibility and relevance, both systems are in certain respects less or more restrictive than the other. The free evaluation of evidence is the common standard in Civil Law systems. The burden of proof in such systems belongs to the prosecution (or the party that makes the claim in civil cases). Though, traditionally regarded as a common law standard, the right to remain silent has spread across civil law systems, and is nowadays considered by the European Court of Human Rights a ‘generally recognized international standard which lies at the heart of the notion of a fair trial procedure’ [4]. The use of the right to silence combined with the burden of proof means that the prosecution has to identify in many cases alternative means of proof, which have to be lawful, relevant and convincing in order to establish guilt and to secure conviction of offenders.

In what concerns the decision to prosecute in a criminal case, that generally pertains to the prosecutor in Civil law systems. In some European law systems i.e. France, unlike the Common law ones, both judges and prosecutors are magistrates, they both belong to the judicial authority and are subordinated at institutional level to the Justice Minister [5]. In many European legal systems, the two professional categories receive the same

training, are subject to the same professional examinations and their careers are interchangeable. The prosecutorial function varies widely within Common law systems and sometimes can be exerted by certain agencies or even by an interested party. For example, in England and Wales, while the Crown Prosecution Service (CPS) has an independent position from both the Executive and the Judiciary, it has no power to direct the investigation or to be involved in the hearing of witnesses. The Police is entitled to charge with an offence and the role of the CPS only starts after the police investigation is finalized and a decision on the prosecution has been made [6]. On the other hand, in Common law, in principle, the prosecutor has much more discretion in deciding whether to initiate criminal proceedings (the opportunity principle applies as opposed to the legality principle in Civil law), after assessing the evidence and establishing that the case falls within the scope of the law.

In the USA, where the prosecutor's office was traditionally linked to the local community (which in some states elects the head of the office), the trend has been that General Attorneys take up prosecutions concerning higher profile cases with statewide implications for more serious crimes. Law enforcement agencies are part of the Executive. They enjoy investigative powers and are independent from the Prosecutor's Office. The Police decide at what stage the investigation is referred to the Prosecutor's Office for prosecution or legal advice. Unlike the UK however, the public prosecutor is invested with the power to bring charges for more serious offences [7].

The Common Law procedures usually allow for a different legal setup depending on the seriousness of the crimes. In some legal systems, even the composition of the court is different i.e. the UK, where a system of professional judges and magistrates (laypeople) coexists. In the USA, based on the charges established by the prosecutor, a person could be brought before a higher or a lower court. In this stage of the legal process when formal charges are formulated the grand jury plays a significant role. Bail is normally offered awaiting trial and plea bargaining between the prosecutor and the defence lawyer usually takes place instead of an actual formal trial. In Civil Law countries the court can be made of only judges, or judges and lay assessors. Even when expedited proceedings are available in cases where the defendant admits guilt, the court normally is still required to examine evidence as to ground its reasoning [6,7].

3. NUCLEAR FORENSICS WITHIN CIVIL LAW SYSTEMS

Even if the specific field of forensics discussed in this paper belongs to the "nuclear" physics realm, from a legal point of view it is employed within the criminal investigation in a similar manner to other traditional forensics science *specializations* and has to be employed in the legal proceedings in conformity with the national legal framework of the specific country.

We will note here that nuclear forensics still tends to be seen by many as serving primarily the prevention needs of the national (and international) security. This is no surprise, considering the history of this domain and its strong focus on deterrence. It has been stated that nuclear forensics was born as a "national security science" during the Cold War, as "a means of analysing weapons development" [8]. However, over time its scope extended to be used as a tool in the effort to fight the new threat of nuclear terrorism by preventing nuclear materials to reach terrorist entities. In order to achieve that, it is of utmost importance to persuade states to take responsibility for and to strengthen the nuclear security environment. The United States' concern about nuclear terrorism has been echoed by Russia, though the latter assessed there is a higher risk for sabotage of nuclear facilities and radiological terrorism than for the actual production of an Improvised Nuclear Device (IND) by terrorists, given the technical complexity involved, therefore terrorist organizations might rather try to produce and make use of Radiological Dispersive Devices (RDDs/Dirty Bomb) [9].

The different valorisation of nuclear forensics' role in the USA becomes apparent also in the paper of Kristo M.J. in Sarkisov A.A. et al., 2009 [10], where the author stresses that the translation in Russian of nuclear

forensics as “nuclear criminalistics” does not cover the precise meaning of the English terms. However, when one looks up the definition of “forensic” in English language dictionaries¹, the superposition of the two terms (“forensic” being widely used in common law and “criminalistic” being the usual term in civil law systems) is rather exact. When forensics methodologies and techniques are used for a wider scope than analyzing and interpreting evidence for the benefit of a criminal proceeding, it seems that the use of the term is outside its primary meaning. Nevertheless, nuclear security has many components and strengthening the legal framework for sanctioning the unlawful use of nuclear or radioactive materials helps closing the security circle.

By using methods and techniques that allow revealing the origin and history of the materials, by indicating possible transit routes and purposes, and by facilitating investigative leads and links between persons, materials and locations, nuclear forensics plays an essential role in the context of criminal investigations concerning illicit acts with nuclear and radioactive materials. Nuclear forensics provides an invaluable support in identifying Materials found Outside the Regulatory Control (MORC) and therefore can offer an indication of a breach of law or/and security (including physical protection of facilities holding such materials). Depending on each country’s legal provisions, nuclear forensics can also assist in determining the legal qualifications of the deeds, when a distinction has to be made on the seriousness of the offence based on the materials involved or their potential use. At the same time, by establishing provenience, nuclear forensics can also give an early indication of national or foreign links and thus helps directing the criminal investigation towards a potential source of evidence or assessment of cooperation needs. No less are nuclear forensics’ capabilities useful for ensuring proper collection and handling of evidence at the crime scene in those jurisdictions where limited resources are available to the investigators in this specialized field. Through all these means nuclear forensics can help criminal investigation bodies find the truth about a specific incident by answering the questions what, where, how, when and why an illicit activity took place and possibly who was involved.

Regulatory bodies or other national stakeholders possessing information about nuclear or other radioactive materials available in one country might provide informational support to the criminal investigation, together with subject matter expertise to allow forensics experts to draw relevant conclusions from nuclear forensics findings in the laboratory.

As reported in this paper, in Civil law systems, based on the findings of comparative law, it is usually the judicial authorities that decide on the prosecution or even investigation of a case, also on the legal qualification that determines the competence *ratione materiae* and *ratione loci*, as well as on the use of special investigative techniques and measures which restrict freedom, or the exchange of information and cooperation with foreign authorities in order to secure evidence. However, in practice, when establishing points of contact in different countries for the purpose of exchanging information or promoting the use of nuclear forensics, there is many times an oversight of these peculiarities by the international organizations and donors who tend to associate the response to illicit activities involving nuclear or other radioactive materials with main national authorities competent to regulate, control and authorize activities in the nuclear field, or lead agencies responsible for security, like Regulatory Bodies, Emergency Services, Intelligence Agencies or in some cases even Environmental agencies. This confusion leads to lack of awareness about the nuclear forensic capabilities and nuclear security related issues among judicial bodies like prosecutors, judges and judicial police, ineffective handling of situations where nuclear or radioactive materials are involved, lengthy delays and inadequate exchanges of relevant information, which results in failure to open criminal cases when appropriate, or impedes conducting proper investigations.

¹ English Oxford Dictionary (online ed.) defines “forensic” as 1. Relating to or denoting the application of scientific methods and techniques to the investigation of crime ; 2. Relating to courts of law. Equivalent definitions are provided in Merriam-Webster Legal Dictionary (online) and Black’s Law Dictionary (online ed.)

4. SELECTION OF NUCLEAR OR OTHER FORENSICS EXPERTS

Experts are called upon when, during prosecution or trial, there is a need to establish, clarify or assess facts or circumstances that are important for finding the truth. In specialized fields, when expert knowledge is required in order to understand the evidence, the prosecutor or the judge can ask for expert assistance from forensic specialists. Experts must be impartial and qualified. In Civil law systems i.e., Romania (but also Germany, Japan etc) science experts are usually selected by judicial authorities, but can also be hired as party-expert. A list of judicial experts is kept by the Ministry of Justice, following a procedure of certification. When no certified experts are available, authorized specialists can be chosen from a list kept by the court, or otherwise known experts that are available can be called upon. The experts provide written reports though they could also be heard as witnesses if the judicial authority deems appropriate. Moreover, forensics experts are certified or authorized by an entity i.e. the Ministry of Justice following a prescribed procedure, to ensure they are impartial and not biased by the interests of the party they represent, and to verify their professional qualifications. Expert opinion enjoys certain discretion, since in some areas - nuclear forensics included - it is difficult for the representatives of the judiciary to assess the accuracy of the findings, the methodology and the conclusions presented by the expert. However, in case of doubt or incompleteness of the report, or when the findings of the report are challenged by an interested party, or there are contradictions between the findings and the conclusions, the procedural rules allow the prosecutor or the judge to request a supplementary report and even a new opinion (art.172-181 of the Romanian Criminal Procedure Code).

The issue of reliable expert evidence has also been noted inside Common law countries. The US caselaw has established several criteria to test scientific evidence admissibility (Daubert vs Merrell Dow Pharmaceuticals, 1993). The Federal Rules of Evidence require judges to evaluate not only relevance, but also the experts' reliability, though judges do not usually have the skills to carry out this evaluation. Assessment should consider aspects such as testing of the method used, peer review, "known or potential rate of error," and general acceptance within the scientific community [12]. In the UK expert evidence has to pass the test of relevance, reliability and impartiality [13].

5. CASE STUDY: ROMANIA

Romania has a well-established legal framework related to nuclear safety and security which is in accordance with international treaties (NPT, CPPNM, ICSANT) and IAEA recommendations². Nevertheless, a

² Several laws are in place in Romania, which regulate nuclear security, as follows:

Law 111/1996 on the legal regime of nuclear activities (amended by Law 63/2018) establishes the norms for the lawful unfolding of peaceful nuclear activities which make the object of regulation, authorization and control, as to fulfill the nuclear security requirements, as well as the requirements for the protection of the exposed professionals, the patients, the environment, the population and the assets, to achieve minimal risks, in order to comply with the obligations assumed by Romania on the basis of international agreements and treaties. This law applies to a range of activities that can be undertaken by authorized legal entities in relation to nuclear and radiological installations, including intra-community transfer; mining installations for Uranium and Thorium; nuclear and radioactive materials; nuclear waste and orphan sources management; detection and protection equipment for ionizing radiation. According to the law, the national authority for regulating, authorizing and controlling economic activities as described above is the National Commission for the Control of Nuclear Activities (CNCAN).

Law 111/1996 bans any activity related to research, testing, production, possession, import, export, transit or detonation of nuclear weapons and explosive nuclear devices, and criminalizes offences against the legal regime for nuclear activities.

Law 535/2004 on preventing and combating terrorism establishes the National System for Preventing and Combating Terrorism (NSPCT) and sanctions terrorist offences, including those acts involving use of nuclear/radioactive materials. The NSPCT consists of representatives of ministries, national security, judicial and law enforcement agencies, with a view to regularly exchange information, elaborate prevention and countering strategies, and ensure a coordinated response in case of a terrorist act.

Art.345 of the Criminal Code criminalizes noncompliance with the legal regime of nuclear and radioactive materials (other than the activities for which authorization is required according to the Law 111/1996).

National Strategy for Nuclear Safety and Security, approved by Government Decision 600/2014

series of gaps and shortcomings have been identified during the regional exercises organized under the umbrella of GICNT i.e. Olympus and Olympus Reloaded, which aimed to test the existing legal framework and procedures. A close cooperation between DIICOT (the Directorate for Investigation of Organized Crime and Terrorism) and Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering (IFIN-HH) emerged, resulting in increased efficiency of the national response to nuclear incidents. During 2017-2018 5 criminal cases have been opened and 6 nuclear forensics reports have been provided to the judicial authorities to advance the criminal investigations.

Though during the last 30 years around 40 cases of incidents involving nuclear or other radioactive materials outside the regulatory control have been identified [11], there have been virtually no criminal investigations opened as a consequence. This despite legal provisions into force that require various non-judicial, executive agencies that gain knowledge about suspicious activities amounting to a criminal offence to report such incidents to the appropriate criminal investigation or prosecution bodies. A combination of lack of proper understanding of the legal framework by the actors involved, misjudgment about the legal qualification of the deeds or seriousness thereof, unsureness about the entity entitled to make a decision on opening proceedings, miscommunication between competent authorities, lack of coordinated operational procedures and so on and so forth could be behind this situation. Apart from that, it became apparent during exercises or exchanges between various entities with competencies in the area of nuclear security how differently they see their institutional capabilities and cooperation needs, their roles and the unfolding of the detection-response-investigation/prosecution process. The importance of treating from the outset the incident concerning nuclear or other radioactive materials as a potential (serious) crime and its location as a potential crime scene, and consequently the need for proper collection and preservation of evidence by employing nuclear forensics methods and means had to be repeatedly reiterated. Another common confusion concerns the evidence itself, which is regarded by some agencies with competencies i.e. in control or emergency interventions as mere samples of material, overlooking the fact that evidence is de facto and de jure any factual element which serves to establish the existence of an offence, identifying the perpetrators, finding the truth and establishing the facts of the case as to achieve a just resolution of the proceeding (art.97 of the Criminal Procedure Code).

One of the peculiarities of the Romanian Criminal Justice system is the existence of a specialized prosecutorial competence (*ratione materiae*) for certain types of serious crimes i.e. Organized Crime, Terrorism, various forms of trafficking in people or dangerous goods, cybercrimes, crimes against the National Security. In all cases of noncompliance with the legal regime regulating nuclear and radioactive materials unfolded by an organized crime group, or noncompliance with the legal regime for authorization of activities with nuclear materials, as well as for terrorist acts involving nuclear or radioactive materials the competence to carry out the investigation and prosecution of such crimes belongs with the Directorate for Investigating Organized Crime and Terrorism of the Romanian Prosecutor's Office³ (DIICOT). Even more, investigation of all these serious crimes is led by law by the prosecutor, while certain activities are delegated to specialized police units and have to be unfolded under the close supervision of the prosecutor. The prosecutor can authorize provisionally (for up to 48 hours) special investigative measures and can place a person in custody for 24 hours or impose certain obligations to the accused. It is also the prosecutor who can request by Ordinance technical or scientific reports.

Law 78/1993 on the ratification of the 1980 Vienna Convention on the Physical Protection of Nuclear Material (CPPNM).

Decree 21/1970 on the ratification of the Treaty on Non-proliferation of Nuclear Weapons (NPT).

Law 43/1995 on ratification of 1994 Vienna Convention on nuclear security

Law 369/2006 on the ratification of the New York 2005 Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT).

Decree no.3/2014 of CNCAN's President for approving the Norms on nuclear security concerning emergencies at nuclear power plants and response to nuclear incidents.

³ *The Romanian judicial authority includes both judges and prosecutors, as in the French system. However, there are no investigation judges in the Romanian system. Both categories have the same professional qualifications, pass the same examinations and judicial careers are interchangeable.*

Every seizure of MORC insofar as it represents an illicit activity sanctionable by the criminal law, has to be followed by the opening of a criminal investigation and prosecution, given the principle of legality, as opposed to Common law jurisdictions, where prosecution can be dropped based on opportunity assessment.

6. CONCLUSIONS

This paper represents a study of various legal aspects raised by the implementation and use of nuclear forensics capabilities within criminal proceedings where nuclear or other radioactive materials are encountered outside the regulatory control. It comprises the comparison of the main issues relating to substantial and procedural aspects in various legal systems and it reports on the Romanian national experience in implementing nuclear forensics within country's legal framework. The following main conclusions can be drawn:

- a. The implementation of nuclear forensics as a component of forensics science at the national level should be done in accordance with the state's national penal legislation, as nuclear forensics is, first and foremost the analysis of nuclear or other radioactive materials within criminal cases.
- b. In Civil law systems, every seizure of MORC insofar as it represents an illicit activity sanctionable by the criminal law shall be followed by the opening of a criminal investigation and/or prosecution, given the principle of legality, as opposed to Common law jurisdictions, where prosecution can be dropped based on opportunity assessment;
- c. International information exchange on nuclear forensics and other cooperation responsibilities should be established via channels primarily responsible for criminal investigations such as judicial authorities in Civil law countries or police in Common law countries or other investigative bodies.

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