

## **NUCLEAR SAFETY WITH REFERENCE TO LEGAL LIABILITY INSURANCE AND RESPONSIBILITY WITH NUCLEAR DAMAGE**

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### **ABSTRACT**

In today's world there is more than one point of view and different debates about how to determine and what constitutes the concept of nuclear security. A narrow attitude, which we can not agree with, is that it is an area that deals with issues of the model of physical security of nuclear materials. A broader interpretation of nuclear safety advocates a more comprehensive view of the activities that support the more 'aims and content of nuclear safety'. This multidisciplinary approach is necessary for effective and sustainable nuclear security framework, both at the national and supranational levels. Generally speaking, nuclear safety can be defined as a set of measures to ensure the conditions for the operation of the nuclear facility to prevent nuclear accidents or mitigate their consequences and reduce the radiation risk to the prescribed level. It is well known that nuclear safety cannot be treated outside of the context of responsibility for carrying out nuclear activities and nuclear damage caused by a nuclear accident, and thus the insurance to cover liability for nuclear damage.

*Keywords:* nuclear safety, radioactive waste, nuclear damage, liability, insurance.

### **AIMS AND BACKGROUND**

Nuclear safety, above all, is one of the most sensitive issues of the EU policy, but also the global policy of environmental protection. The controversy of this issue gives rise to a debate on the place and the role of nuclear power and energy policy in general. For example, it is interesting to present the results of a study<sup>1</sup> in which more than half of the citizens of Europe are experiencing the risks of nuclear energy larger than

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benefits of nuclear energy as an energy source. As the summary of this paper noted, there are different answers to a question what a nuclear safety is. Effective approaches are given by the prestigious scientific and educational institutions worldwide. For example, the Institute for Nuclear Security, within the Howard H. Baker Jr. Centre for Public Policy at the University of Tennessee Knoxville, brings the complete capabilities of the University community to bear on one of the most challenging issues of our time – nuclear security. This institute has a human mission to coordinate and improve the collective knowledge and skills, in terms of complex global efforts related to the recognition of nuclear safety. In this regard, The Institute for Nuclear Security, within the Howard H. Baker Jr. Centre for Public Policy at the University of Tennessee Knoxville advocates a much broader concept of including activities that support the following objectives of nuclear safety<sup>2</sup>: (1) Nuclear or radiological materials or device are not diverted to illicit or malicious purposes; (2) Potential threat materials are secured or replaced where feasible, so as to reduce the opportunities for malicious use; (3) Nuclear weapons and related technology are appropriately controlled and monitored; (4) The proliferation of nuclear weapons or other nuclear/radiological threats is discouraged, detected, and/or dissuaded; (5) Systems that support peaceful uses of nuclear energy are increasingly proliferation resistant; (6) Efforts to acquire nuclear/radiological threats by malefactors are anticipated, stopped, investigated, and effectively countered; (7) Consequences of radiological or nuclear incidents, including attacks, are mitigated or mineralised through prior planning and engineering, as well as effective response, emergency management, and remediation. As noted, ‘nuclear damage’ can not be viewed outside the context of nuclear safety and it can be defined as damage caused by death, bodily injury or other impairment of health of human, the loss of or damage of property, arising out of or results from the radioactive properties or a combination of these properties with toxic, explosive or other hazardous properties of nuclear fuel or radioactive products or waste, contained in a nuclear facility or nuclear material that is sent to a nuclear facility or is produced or emitted from it. Likewise, the nuclear damage is defined as damage caused by death, bodily injury or other impairment of health of human, the loss of or damage of property, arising out of or the result of another ionising radiation, which comes from any other source of radiation in a nuclear plant<sup>3</sup>. Therefore, editing liability for nuclear damage arising as a result of utilisation of nuclear energy for peaceful purposes, and insurance that users of nuclear installations must be completed and maintained, or have a financial guarantee to cover its liability for nuclear damage must be of such a character that the users of nuclear installations are liable for nuclear damage regardless of fault. Finally, nuclear safety is a particularly vulnerable area that should be considered through the prism of contemporary security challenges, risks, and threats. Specifically, starting from the fact whether the primacy will be given by the global community, the continuous improvement of nuclear safety, and outcomes depend on efforts of terrorist groups, including the Islamic State, to seize the materials they need to create so-called ‘Dirty’ radioactive bomb, which is usually said to be a small cost

but a great risk. Therefore, effective and sustainable nuclear safety must be able to respond to all potential threats, and in a unique, harmonised and efficient manner, for which adequate legislative is fundamental. The regulations in the field of nuclear safety and radioactive waste include 54 different acts<sup>4</sup>. Total EU legislation in the field of nuclear safety and radioactive waste could be grouped into several categories, such as international conventions in the field of nuclear safety and radioactive waste management and the regulation, directives and other sources of law enacted by the authorities of the EU and which regulate certain specific issues such as security of nuclear installations, the risk of ionising radiation, the cross-border movement radiological emergencies, etc.<sup>5</sup> A significant number of international agreements in this area were concluded within or under auspices of the International Energy Agency and these documents are of great importance for the EU and the Member States. Notable is the Convention on Nuclear Safety<sup>6</sup>, which entered into force on 24 October 1996 and which, in the broadest ways covers issues of ‘safety of nuclear plants’ (Art. 3). The Convention calls for the obligation to apply the basic principles of security of nuclear installation and nuclear power plants including storage, handling, and disposal of radioactive materials for as long as it is on the same site as well as nuclear power plants and it is directly connected with the operations of nuclear installations (Art. 2.i). We consider the Convention on Early Notification of a Nuclear Accident systematic<sup>7</sup>, in which the Contracting States committed themselves at the national level to undertake various legislative, administrative and other measures necessary to achieve the objectives of the Convention, namely the timely notification of a Nuclear Accident and the Convention on Assistance in the case of a nuclear accident or radiological emergency situation<sup>8</sup> which suggests the necessity of solidarity and international assistance. Joint Convention on the Safety Management of used fuel and Radioactive Waste Management<sup>9</sup> is the first global international legal instrument that regulates the field of spent fuel and radioactive waste. The agreement between the European Atomic Energy Community (Euratom) and non-member states of the European Union on the participation of non-member states of the Community arrangements regarding the early exchange of information in case of radiological emergency (Ecurie)<sup>10</sup> which related to the arrangements for the exchange of information in all cases where one of the participating countries or the Member State of Euratom decides to take measures of general character in order to protect the public in case of radiological emergency which has occurred due to an accident that occurred on its territory within the certain activities. In addition to these Conventions, the issues of nuclear safety and radioactive waste management are also connected with: Convention on Civil Liability in the field of maritime transport of nuclear materials, the Treaty banning nuclear weapon tests in the atmosphere, outer space and under water, the Paris Convention on Third Party’s Liability in the field of nuclear energy, the Brussels Convention Supplementary to the Paris Convention and the Treaty on the Non-Proliferation of Nuclear Weapons, etc. For a comprehensive view, it is appropriate to specify the basic regulations relating to the safety of nuclear installations the risk of

ionising radiation, the cross-border movement of radioactive substances and matters concerning radiological emergencies: the basic regulation related to the safety of nuclear installations is the Council Directive 2009/71/Euratom which established the Community framework for the nuclear safety of nuclear installations<sup>11</sup>. The objectives of this Directive are: (a) establishing a framework of Community policies to maintain and improve the nuclear safety and its regulation; (b) creating the conditions so that the Member States can provide appropriate national mechanisms for the high level of nuclear safety and protection of workers and the general public against the dangers arising from ionising radiation from nuclear installations (Art. 1). The main regulations governing issues of importance to ionising radiation are: Council Directive 96/29/Euratom of 13 May 1996, which establishes the basic safety standards for the protection of the workers health and the general public against the dangers arising from ionising radiation<sup>12</sup> and Council Directive 2003/122/Euratom on the control of high-activity sealed radioactive sources and of unknown origin<sup>13</sup>. The purpose of the Directive is to prevent exposure of workers and general public to ionising radiation arising from inadequate control of high-activity sealed radioactive sources of unknown origin and harmonisation of existing control measures in the Member States setting specific requirements that ensure surveillance of any such sources (Article 1. Paragraph 1). In terms of cross-border movement of radioactive substances, important regulations are: Council Regulation No 1493/93/Euratom of 8 June 1993 on shipments of radioactive substances between Member States<sup>14</sup>, which seeks to establish a system of delivery of releases of radioactive waste between Member States and Council Directive No 2006/117/Euratom of 20 December 2006 on the supervision and control of shipments of radioactive waste and spent fuel<sup>15</sup>, which regulates the community system for the supervision and control of transboundary shipments of radioactive waste and spent fuel to ensure adequate protection of the population. When it comes to radiological emergencies, basic regulation is Council Directive 89/618/Euratom on informing the general public about health protection measures to be applied and steps that should be taken in the event of radiological emergency<sup>16</sup>. The Directive defines (at the Community level) common objectives with regards to measures and procedures for informing the public in order to improve the health care, which is provided in the event of a radiological emergency (Article 1)<sup>17</sup>.

## EXPERIMENTAL

As early as the 1950s, when nuclear power was in its very infancy, most Western States acknowledged that the consequences of a nuclear accident would not stop at geographical borders. Because of the transboundary effects of a nuclear accident, two special nuclear liability regimes were created under the auspices of the OECD and of the United Nations to compensate victims equitably. Following the American 1957 Price – Anderson Act, the first international nuclear liability regime was founded in 1960 by Western European countries which adopted the Convention on Third Party

Liability in the Field of Nuclear Energy, called the Paris Convention. The Paris Convention entered into force on 1 April 1968 and has 15 contracting parties. This convention fixed the main principles of the operator liability for the damage caused by their activity and determined which competent court would have jurisdiction to hear claims and which State law would apply in the event of a nuclear incident<sup>18</sup>. Vienna Convention on Civil Liability for Nuclear Damage, adopted on 21 May 1963 in Vienna<sup>19</sup>, more than half a century ago in its preamble realised ‘that it is desirable to establish some minimum standards for the provision of financial protection against damage arising from certain aspects of the use of nuclear energy for peaceful purposes, considering that the Convention on Civil Liability for Nuclear Damage also contributes to the development of friendly relations between the countries, regardless of differences in the constitutional and social order’. Later, other important international documents sought to extend the geographical scope, raise the amount of compensation that is available to victims of a nuclear accident in the further expansion and deepening the definition of nuclear damage. The international regime for nuclear liability is established in these ways: exclusive liability of operator, authorities with exclusive jurisdiction, liability limited in time, liability limited in amount and strict liability of operator as we can see in Fig. 1.



Fig. 1. Nuclear power and sustainability<sup>20</sup>

Most conventions and laws regarding nuclear third party liability have at their heart principles as a strict liability of the nuclear operator and exclusive liability of the operator of a nuclear installation. Compensation without discrimination based on nationality, domicile or residence is very important, too. Mandatory financial coverage of the operator liability, exclusive jurisdiction (only courts of the state in which the nuclear accident occurs have jurisdiction) and limitation of liability in amount and in time are basic principles<sup>21</sup>. The international legal instruments are elements of strong base of the national and regional nuclear safety infrastructure as we can see in Fig. 2.



Fig. 2. National and regional nuclear safety infrastructure<sup>22</sup>

At the present time, due to concerns about the broad scope of threats to nuclear security, which occurred in the recent past (Fig. 1), the international community seeks to establish the liability regime around the world, strict control and absolute liability for the operator or licensee to perform nuclear activities. In this regard, in addition to the financial responsibility, financial guarantees, and insurance policies are required as a form of security that certain benefits will be available to victims of nuclear accidents. International legal standards stipulate that any person who is entitled to compensation for nuclear damage may file a direct lawsuit against the irresponsible user or directly against the insurer or other person providing a financial guarantee in case of nuclear damage. However, the structure of the security of nuclear plants differs from ordinary industrial risk. Specifically, the definition of nuclear damage includes issues relating to property, health, and loss of life, but there are quite vague and undefined provisions for environmental damage, preventive measures and economic loss, which significantly reduce the total number of the potential applicants. On the other hand, the operator must maintain insurance or other financial security for the amount corresponding to his obligation. Nevertheless, in practice, these are limited and unavailable for a large number of potential applicants, which can be demonstrated through the example of a disaster at Chernobyl and Fukushima, which are the only two nuclear accidents of a seventh degree in the world – ranking based on seven-level International Scale of Nuclear Accidents by the UN. The aforementioned leads us to the conclusion that there is a huge gap between the normative and the actual or real situation. Liability for Nuclear Damage envisaged in the legislation of the Republic of Serbia, including the Law on Protection against Ionising Radiation and Nuclear Safety<sup>23</sup> explicitly states that ‘the holder of a license to perform a nuclear activity shall be liable for nuclear damage caused by a nuclear accident in accordance with the Law on Ratification of the Vienna Convention on civil liability for nuclear damage and the present law. Furthermore, the licensee must complete and maintain insurance to cover his liability for nuclear damage. The insurer cannot suspend or cancel the insurance unless he had previously informed the licensee in written form not later than six months before the suspension, or cancellation of the insurance. The right to compensation

for nuclear damage shall terminate upon the expiration of ten years from the day of the nuclear accident. If nuclear damage was caused by nuclear accident related to a nuclear material which, at the time of the nuclear accident, was stolen, lost, thrown from a ship or abandoned, calculated from the date of a nuclear accident and it is 20 days from the day of the theft, loss, throwing away from the ship or abandonment of nuclear material. In this respect, the claim for compensation for nuclear damage can be filed within three years from the day when the legal or natural person who has suffered nuclear damage knew or should have known about the nuclear damage and the licensee to perform a nuclear activity responsible for it, but not later than the expiry of the deadline stipulated by the present law. For deciding on compensation for nuclear damage, jurisdiction is of the court in whose area the nuclear facility was. If nuclear damage occurred during the transport of nuclear material, jurisdiction is of the court in whose territory the nuclear accident occurred...’

## RESULTS AND DISCUSSION

As in many apparently legally constituted and regulated areas, there is a huge gap between the law and reality in the field of nuclear safety and liability for nuclear damage. Nuclear accidents and their conditions have incalculable consequences for human health and life, but also to our environment. Endangering the environment and its protection are a decades-old problem of humanity. The disappearance of harmony between nature and human has produced various and numerous dangers that degrade the current civilisation achievements, inflicting great harm on people, their life and health, physical integrity, and many other values<sup>24</sup>. Many international documents that are seeking ways to set the absolute standard in the field of nuclear safety and liability for nuclear damage are not effective in practice. For example, the nuclear accident in Chernobyl in 1986 had far-reaching consequences, both at the national and supranational levels to human health and the environment. The issue of liability and insurance for nuclear damage in relation to this accident has become irrelevant because it had a transnational character, and the damage caused to people and the environment is immeasurable, doubtful and out of the framework of international regulation standards<sup>25</sup>. Unfortunately, this demonstrated that the capacity of liability and insurance for nuclear damage was created to meet regulatory, but not real standards. This was confirmed in the events related to Fukushima in 2011 when the limited amount by the operator and the state showed all the senselessness and absurdity of liability and insurance for nuclear damages<sup>26</sup>. At the same time, the intention of the state/states is to avoid responsibility ultimately. These two accidents have definitely set the key question – what is a nuclear damage and liability on this issue<sup>27</sup>. The consequences are disastrous in terms of radioactive contamination of the environment and thus the people. Estimates of the potential adverse health effects of radiation exposure remained inaccessible to the public. Responsibility for both accidents, regardless of whether they were caused by human or natural factors, ultimately had a

populist conclusion and character. For example, the victims of the tsunami in Japan have a minimum fee; they want to return home but they cannot because their homes had disappeared. Finally, the issue of nuclear safety is not narrowly and hermetically closed<sup>28</sup>. Today's world has become a big 'Global Village'. To support this view, let us view the data of the Republic Seismologic Service of Serbia<sup>29</sup> regarding the nuclear testing by North Korea where on 9 September 2016 at 02.30 a.m. this institution registered and located the seismic activity in the region of North Korea, measuring 5.4 on the Richter scale. Seismic activity suggests that ten-kiloton nuclear bomb exploded, which was the most powerful nuclear bomb this country has produced. The epicentre of the earthquake caused by the nuclear bomb, 8000 km away from Belgrade, and up to 22 measuring stations of the Republic Seismological Bureau away, took it eleven and a half minutes to get there.

## CONCLUSIONS

After conducting research in the area of liability regarding nuclear damage, which is one of the most important issues on the global level, we point out that the only effective and sustainable nuclear safety must be able to respond to all potential threats, synchronised and preventively, where adequate legislative and adequate legislation is fundamental, and also its consistent application. As in other important and regulated areas, in the field of nuclear safety and liability for nuclear damage were observed differences in the legislative and the real world. Nuclear accidents and their conditions have incalculable consequences for human health and life, but also to our environment. However, as of 8 May 2016 entered into force the Amendment to the Convention on Physical Protection of Nuclear Material (CPPNM), according to which the International Agency for the Protection of Nuclear Weapons carried out an exchange of information about what measures individual states are taking regarding the physical protection of their nuclear plants and nuclear materials and their durability, as well as regarding the prevention of any form of sabotage, theft or smuggling of nuclear material, gives birth to hopes that the Amendment and strengthening of the Convention will be effective in countering nuclear terrorism and illicit trafficking of nuclear materials. The International Atomic Energy Agency should play an important coordinating role in nuclear safety in the world, and all countries of the world must participate in the decision-making process in this organisation; the same applies to the Republic of Serbia in which the Agency for Protection against Ionizing Radiation and Nuclear Safety of the Republic of Serbia are consequently working in this field.

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