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Physical Damages Warranting Compensation According To The Civil Liability System In The Nuclear Field

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Abstract: *Using an analytical methodology, the study examined the scope of bodily injuries eligible for compensation under the civil liability regime in the nuclear field. The findings revealed that the scope of compensable bodily harm resulting from nuclear damage includes, primarily, death, as well as non-fatal personal or bodily injuries, whether such injuries are direct or indirect, along with the subsequent damages arising therefrom. Compensation for bodily harm, regardless of its type, generally does not present legal challenges when the damage is immediate. However, in cases of delayed harm, it becomes necessary for the competent court and the trial judge to rely on medical evidence to establish the causal link between the injury and the harmful act.*

The study recommended the establishment of clear and specific criteria for determining bodily injuries eligible for compensation under civil liability for nuclear damage, given the special nature of such liability. It also emphasized the importance of adopting all safety, security, and protection measures to safeguard workers in the nuclear field in particular, and the public in general.

Keywords: *Nuclear Energy, Bodily Harm, Compensation, Death, Injury.*

INTRODUCTION

The diverse and expanding uses of nuclear energy across various fields—both civilian and military—have been accompanied by a wide range of serious risks and threats arising from such applications. These risks may adversely affect humans either directly or indirectly, and may also harm the surrounding environment, or simultaneously impact both. Among the most severe forms of harm to humans are direct injuries that threaten bodily integrity and vital organs, in addition to damages that infringe upon the fundamental right to life by exposing individuals to risks of death or serious illness. Moreover, there are indirect harms that may affect mental and psychological health due to fear of nuclear radiation or resulting environmental contamination.

This study addresses the issue of the scope or limits of bodily injuries that may be eligible for compensation under the special rules of civil liability for nuclear damage—rules that differ in nature from conventional or general principles of law.

The primary aim of this study is to clarify the types of bodily harm that warrant compensation within the framework of civil liability for nuclear damage, focusing on analyzing such injuries in terms of their scope, conditions, and legal implications. It also seeks to compare how these harms are treated in various national legal systems, such as the Saudi legal framework and other comparable legal systems, particularly in relation to the rules, requirements, and procedures governing compensation. Additionally, the study analyzes international legal approaches by reviewing relevant international conventions regulating civil liability for nuclear damage, highlighting the similarities and differences between these international instruments and domestic legislation. This comparative analysis aims to assess the degree of alignment between national laws and international standards in this field.

RESEARCH METHODOLOGY

The research methodology adopted in examining bodily injuries eligible for compensation under the civil liability regime in the nuclear field is based on an analytical approach. This methodology is employed to analyze and clarify the nature of bodily harm that qualifies for compensation according to the nuclear civil liability system. The study focuses on identifying the types of bodily injuries, how they are assessed, and the mechanisms for providing appropriate compensation.

Nuclear Energy: Between Benefits and Risks:

Nuclear energy is regarded as one of humanity's most significant and simultaneously most dangerous discoveries. It poses a real threat, particularly in the military domain, which is why nuclear weapons are described not only as dangerous but also as devastating. Consequently, nuclear weapons are classified as weapons of mass destruction. The use of such weapons, or the occurrence of a nuclear disaster, may lead to the leakage of hazardous nuclear radiation, either from the components of the weapon itself or from reactors used for energy production. This, in turn, can result in severe environmental contamination, threatening human survival and rendering some areas uninhabitable. Moreover, such incidents constitute violations of fundamental human rights, which are protected on international, regional, and national levels—such as the right to life, bodily integrity, freedom of movement, and the right to clean air and a healthy environment (Hassan, 2013).

On the other hand, nuclear energy is currently viewed as the most viable and foreseeable alternative to traditional energy sources in meeting the growing demands of economic development. This perspective has been reinforced by the ongoing depletion of fossil fuels by developed countries and the lack of effective measures to preserve these resources, which are considered the common heritage of all humanity.

Furthermore, the developing world—which represents two-thirds of the global population—has a legitimate right to access these resources, both now and in the future (Mostafa, 1979).

Therefore, nuclear energy has never been outside the scope of legal concern. The international community, which has long endeavored to limit the use of nuclear energy to peaceful purposes, must also take further steps to ensure that this form of energy is governed by the rule of law.

This includes guaranteeing the individual's right to fair and adequate compensation for harm resulting from the peaceful use of nuclear energy, by establishing and regulating civil liability for such use.

Nuclear energy has thus been subjected to various legal and regulatory frameworks, often in the form of administrative regulations, aiming to secure the facilities and methods used in the exploitation of nuclear energy and related high-risk activities particularly the transportation of nuclear materials required for its production. There is no doubt that precise legal regulation and the establishment of technical standards for the safe use and operation of nuclear energy are closely tied to the legal framework governing civil liability for its use. The primary objective of these technical rules is to minimize the likelihood of nuclear incidents to the greatest extent possible. Naturally, this contributes to reducing the circumstances under which civil nuclear liability arises (Abd Al-Aal, 2008).

THE NATURE AND TYPES OF COMPENSABLE BODILY HARM

First: The Concept of Bodily Harm:

Bodily harm represents one of the most significant and dangerous consequences of nuclear accidents, as it directly affects individuals' physical integrity and lives. Notably, legislation does not provide a precise definition of the human body; rather, it refers to the entire physical form of the individual, without distinguishing between natural or artificial components, nor between those that perform vital functions and those that do not (Al-Sharif, 2008).

Any harm that affects the human body is considered a singular form of damage regardless of individual differences, as every person has an intrinsic interest in preserving the integrity and proper functioning

of their body. Therefore, it is essential to protect the human body from any form of violation (Abdel-Mawla, 2002).

Contemporary scholars broadly define bodily harm as physical injuries that result in disfigurement, disability, or reduced earning capacity (Al-Khafif, 2000). Another definition includes any harm to the human body, whether it involves amputation of limbs, impairment of physical functions, disfigurement, or disability that impedes work and livelihood (Boussak, 1999).

Two schools of thought exist regarding the definition of bodily harm. The first adopts a narrow view, defining it as harm to the physical and psychological integrity of the human body, whether resulting in fatal or non-fatal injuries (Al-Sindi, 2002). Others describe it as any violation of a person's physical integrity that causes temporary or permanent disability or death (Zahra, n.d.; Abu Arabi, 2007), or as any infringement on an individual's life, physical, mental, or reproductive health (Abd Al-Aal, 2008). In this view, bodily harm includes any impairment to bodily integrity that leads to injury, incapacity, or death, regardless of whether the incapacity is permanent or temporary, total or partial (Abu Al-Lail, 1995).

The second school adopts a broader definition. Suleiman Morcos, for example, defines bodily harm as any impairment to health that results in financial loss (Morcos, 1988). Others define it as financial and non-financial damages resulting from physiological injury to the body (Roshdi, 1989).

According to this study, bodily harm can be defined as injury to the human body, including death and all physical, mental, psychological, sexual, and genetic diseases resulting from a nuclear accident or exposure to radiation, even if such effects appear only after a delay.

Scholars have also debated the legal nature of death as a type of harm, forming three main perspectives: one considers death a moral harm (Al-Ameri, 1981), since life is invaluable (Abu Gharabi, 2009); another sees it as material damage (Nassira, 2019), as it represents the loss of the most valuable human asset—life—due to an unlawful act; a third views death as a form of bodily harm grounded in the right to preserve one's physical existence and natural life (Yaqout, 1980).

SECOND: TYPES OF COMPENSABLE BODILY HARM

According to Article 2 of the Saudi Civil Liability Law for Nuclear Damage, "For the purposes of this law, civil liability arises from nuclear damage, including: 1—death or injury." Therefore, compensable bodily harm includes both death and non-fatal physical injuries.

1. Death:

Jurisprudentially, death is defined as the separation of the soul from the body (Abu Zaid, 1987). Medically, death is confirmed by the cessation of vital organ functions—heart, lungs, and brain—due to the irreversible cessation of metabolic and chemical processes. This definition is essential in determining legal and medical consequences such as the withdrawal of life support, autopsy procedures, burial, issuance of death certificates, inheritance rights, and marital waiting periods (Taha, 2001).

Exposure to high doses of radiation often leads to severe symptoms such as vomiting, weakness, bleeding, fever, and ultimately death within days (Haddad, 1995). Any interference with the human right to life is thus a definitive harm warranting compensation (Mohamed, 2002). Law protects an individual's interest in preserving their physical and psychological integrity, and any impairment of these elements within one's natural lifespan constitutes actionable harm (Ahmed, 1988).

2. Non-Fatal Bodily Injuries:

Victims of nuclear accidents may suffer from various injuries and conditions, including cancer, leukemia, skin diseases, genetic disorders, vision problems, hair loss, and immune system deficiencies (Abd Al-Aal, 2008; Ahmed, 2016).

One of the most significant injuries is infertility, which may result from damaged or absent reproductive cells or altered genetic material. Radiation exposure in women can lead to hormonal imbalances,

cessation of menstruation, increased body temperature, miscarriage, or birth defects, often resulting in neonatal death (Nayel, 1994).

Bodily harm, regardless of its type or severity, may give rise to secondary damages affecting others, commonly referred to as personal or indirect damages (Jilali, 2008). These encompass all injuries affecting natural persons, whether physical, psychological, or moral. They include all forms of physical trauma and diseases caused by radiation, as well as moral damages typically associated with physical harm, such as disfigurement and heritable genetic damage affecting future generations (Sadat, 2017; Fath Al-Bab, 2016; Abu Amro, 2016).

CONCLUSION

It is evident that compensable bodily harm resulting from nuclear damage primarily includes death and personal or physical injuries, whether direct or indirect, along with any subsequent harms. The study recommends establishing a clear standard for determining what injuries qualify for compensation, especially as national systems and international conventions often lack explicit definitions or categorizations of compensable injuries.

ASSESSMENT OF BODILY HARM AND ITS CONSEQUENCES

The Saudi legislator has not addressed the method by which bodily injuries resulting from nuclear damage should be assessed. In this regard, guidance may be drawn from comparative nuclear law and legal doctrine. One of the key features of the compensation mechanism for nuclear bodily harm is found in the German Nuclear Law. According to paragraph one of Article 28 of that law, compensation in the event of death resulting from a nuclear accident includes (Abd Al-Aal, 2008; Zaki, 1990):

(a) Expenses incurred prior to death in attempts to achieve recovery.

(b) Financial losses suffered by the victim before death, including lost earnings due to total or partial incapacity caused by illness stemming from the accident.

(c) Costs arising from increased needs of the victim, and damage caused by hindered professional advancement.

(d) Funeral and burial expenses.

Furthermore, if the deceased was legally responsible for supporting another person at the time of the injury, and the death resulted in deprivation of such support, the liable party must compensate the dependent within the limits of the support the victim would have provided during the remainder of their life. This obligation remains valid even if the dependent was an unborn fetus at the time the liable party caused the bodily harm (Abd Al-Aal, 2008).

Compensation for death does not vary from one victim to another, regardless of gender, age, financial status, social background, or educational level. This is because the right to life is a universal human entitlement. Accordingly, compensation is based on the extent of the harm sustained, with no regard to the specific characteristics of the victim (Al-Aneebi, 2007).

In cases other than death, compensation for bodily injuries, as outlined in Article 29 of the German Nuclear Law, should include:

(a) Medical expenses incurred throughout all stages of treatment.

(b) Loss of earnings resulting from total or partial, temporary or permanent incapacity to work.

(c) Costs and damages arising from increased needs and impaired professional development.

(d) Finally, the injured party may seek equitable compensation for moral and psychological harm if the bodily injury was caused intentionally or due to negligence by the liable party (Abd Al-Aal, 2008).

Therefore, non-fatal bodily injuries resulting from nuclear accidents include all consequences such as disability, wounds, and related conditions. This encompasses all expenses related to medical care,

recovery, and rehabilitation—including doctors' fees, hospital charges, medications, and surgical procedures. In France, for example, particularly in severe disability cases, the liable party may be required to cover the cost of purchasing specialized vehicles for the disabled, homes equipped with elevators and adapted rooms, long-term hospital care, or private nursing care for the remainder of the victim's life.

In addition to direct expenses, compensation also includes lost income due to temporary or permanent, total or partial incapacity (Al-Sarhan, 1988). A fundamental principle in damage assessment is the "full compensation rule" (Desouki, 1972; Al-Ameri, 1881). However, when bodily damage is permanent or variable, full compensation in the strict sense may not be achievable. How can one restore a severed leg or a lost eye? How can physical or psychological pain be truly erased?

Therefore, the aim of compensation is to redress the harm rather than fully restore the victim. It seeks to return the injured party, as much as possible, to their pre-damage condition. Even though the general rule is to fully compensate and restore the previous status, the compensation should be proportional to the actual harm suffered. It should not exceed the value of the damage, so that the compensation does not become punitive or a source of profit for the victim (Al-Shar'a, 2014; Al-Duwaik, 2006; Al-Hakim, Al-Bakri, & Al-Bashir, 1980).

In conclusion, compensation for bodily injuries—regardless of their type—generally poses no legal issues if the injuries are immediate. However, if the effects are delayed, the competent court and judge must rely on medical expertise to establish the causal link between the harm and the wrongful act.

FINDINGS

The findings of the study on compensable bodily injuries under the civil liability regime in the nuclear field are as follows:

1. The deprivation of the right to life due to nuclear damage constitutes an actual and compensable harm in itself. Laws and legal systems have paid considerable attention to safeguarding the human right to life.
2. The nature of the relationship between the right to life and the right to bodily integrity lies in the former being the interest protected by law to ensure the body maintains the minimum of its vital functions, while the latter is the interest protected by law to ensure that the body continues to perform all its functions, even the least essential.
3. The scope of compensable bodily harm resulting from nuclear damage primarily includes death, or non-fatal personal or physical injuries—whether direct or indirect—and any resulting consequential damages.
4. Compensation for bodily injuries, regardless of type, generally does not pose legal difficulties if the injuries are immediate. However, in the case of delayed harm, the competent court and presiding judge must rely on medical evidence to establish the causal link between the injury and the harmful act.

RECOMMENDATIONS

Based on the findings derived from the study on compensable bodily injuries under the civil liability regime in the nuclear field, the following recommendations can be proposed:

1. Clear and specific criteria should be established to define bodily injuries eligible for compensation under civil liability for nuclear damage, considering the unique nature of this type of liability.
2. Every state must fulfill its national and international obligations regarding the possession and use of nuclear energy.
3. It is essential to implement all safety, security, and protection measures to safeguard nuclear workers

in particular, and the general public more broadly.

4. Civil liability for harm affecting human life and bodily integrity should be based on the occurrence of damage itself, rather than on the element of fault.
5. The state should be obligated to compensate victims for harm to life and bodily integrity in all cases where the injured party is unable to obtain compensation, or where the compensation received is insufficient to fully redress the harm.

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