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The Nature of Nuclear Damage, in a Legal Context: Analytic Study

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Abstract

Nuclear damages are considered among the most serious challenges that humanity may face in our current era, as nuclear power is associated with the concept of strength and technological advancement, while simultaneously harboring immense threats to the environment and human health. The roots of this challenge trace back to the use of nuclear energy in various fields, whether in the production of electricity or in military aspects. Amidst this increasing use, the nature of nuclear damages becomes evident, imposing on scientists and researchers the necessity to carefully consider how to counteract the negative effects and adopt measures that reduce the severity of this phenomenon. This research aims to understand the depth of the nature of nuclear damages, analyze the difference between nuclear damages and conventional damages, and recognize the characteristics of nuclear damages that distinguish them from other types of damages. Understanding the nature of nuclear damages is a vital step towards developing effective strategies for preserving the environment and ensuring the safety of humanity amidst the continuous advancement of nuclear technology.

Keywords: *Nuclear Energy, Nuclear Damage, Conventional Damage*

INTRODUCTION

It is widely acknowledged that damages do not all share the same degree or nature. Instead, certain damages possess their own distinct characteristics and attributes that set them apart from others, whether in terms of their source, method of occurrence, or the resulting effects.

Undoubtedly, nuclear damage has its unique nature. In terms of its spread, it can extend over vast areas without recognizing natural or political boundaries, and the impact of a nuclear incident is not confined to the nuclear facility or its workers alone but extends far beyond (Al-Heli, 2019).

Moreover, nuclear radiation affects exposed objects and individuals in varying degrees, depending on the type of radiation. In general, the penetration of these radiations into body tissues results in numerous severe diseases, and the harmful effects of nuclear radiations may not manifest until a long period has elapsed, with these adverse effects being transmitted to future generations genetically (Fadel, 1980).

Experts in this field emphasize the invisible nature of radioactive activity, as it cannot be seen, smelled, or detected by human senses, yet it has profound impacts. One of its effects is its ability to induce changes in the chemical composition of a cell, causing it to perform a function different from its primary one, or rendering it completely incapable of functioning, leading to adverse biological effects on the functioning of the entire body system. Therefore, the destructive forms of radiation are sometimes referred to as ionizing radiation, a term that includes various types such as alpha, beta, and gamma rays, each differing in its nature, properties, and level of danger. Additionally, nuclear pollution is characterized by its cumulative effect; the human body, once exposed to it, or if its materials enter, cannot dispose of it except very slowly, and it may settle in the body, depositing throughout the remainder of an individual's life, continuously emitting radiation to the entire body (Al-Mashhadani, 2015).

This study tackles the issue of distinguishing between nuclear damages and conventional damages, and the challenges that arise in attempting to effectively and accurately identify and classify the impacts of nuclear incidents. It appears that significant difficulties exist in distinguishing between nuclear damages and those

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resulting from other accidents or natural disasters, due to the intertwining of impacts and similarity of symptoms.

The main challenge lies in developing a comprehensive and effective approach to identifying the sources of damage and their unique effects associated with nuclear incidents. This includes distinguishing between the environmental and health effects resulting from radioactive leaks and nuclear pollutants, and identifying the economic and social damages associated with such incidents.

The research aims to present an effective framework for reliably classifying and identifying nuclear damages, contributing to improving rescue and response procedures in nuclear accident scenarios, and also contributing to the development of strategies to mitigate the negative impacts on human health and the environment in the future.

The significance of the research in distinguishing between nuclear damages and conventional damages lies in enhancing our ability to take effective response actions and develop sustainable policies and technologies for environmental conservation and ensuring human safety in the face of increasing nuclear challenges.

Furthermore, the importance of the research also lies in enhancing our capacity to take effective response measures and develop sustainable policies and technologies to preserve the environment and ensure human safety in the face of increasing nuclear challenges.

Upon reviewing previous studies, I did not find any study that has investigated the nature of nuclear damages.

According to Search

The research methodology in the field of nuclear damages relies on the use of an analytical approach to understand the unique nature of this type of damage and nuclear effects. This is achieved through analyzing the differences between nuclear damages and conventional damages, as well as analyzing trends and legal opinions regarding the nature of nuclear damages, with the aim of reaching a clear understanding of the reality of nuclear damages and the crises and problems they cause.

SEARCH CONCEPTS

Distinguishing Between Nuclear Damages and Conventional Damages

To differentiate between nuclear damages and conventional or traditional damages, it must be understood that nuclear damages differ from conventional ones in terms of their severity, exacerbation, and effects. They also differ in legal terms, whether in the extent of the applicability of liability elements, the size and assessment of compensation, the statute of limitations on liability, and the extent of state intervention in compensation. I will outline this with some brevity:

Firstly, nuclear damage differs from conventional or non-nuclear damage in terms of the severity and catastrophic nature of nuclear damage, its rapid spread, the gravity of damages, and the delayed appearance of nuclear damage effects, which may transfer from one generation to another.

Secondly, compensation for nuclear damage according to the civil liability rules for nuclear damages is only realized if the nuclear nature of the damage is established. This means that the damage must be nuclear in nature, resulting from ionizing radiations or the radioactive properties of nuclear materials, even if caused by a conventional accident, or if proving its nuclear nature is impossible, or if the damage is nuclear by association, meaning that it is conventional in nature but arises due to a nuclear accident, establishing a causal relationship with this nuclear incident. However, if both the accident and damage are conventional, not arising from the radioactive properties of nuclear materials, then the general rules of liability apply in the compensation claim, not the exceptional liability rules of the nuclear operator, due to the absence of any nuclear element (Abdul Aal, 2008).

Thirdly, one of the conditions for conventional damage is that the damage must be certain or immediate, in terms of direct damages. Hence, it is difficult for indirect damages, which only appear after a long period, so liability for nuclear damages covers both direct and indirect damages (Fadel, 1976).

Fourthly, the statute of limitations for a compensation claim for nuclear damage differs from that for conventional damage, as it is longer for nuclear damage due to the possibility of delayed appearance of nuclear damages long after the nuclear incident has occurred.

Fifthly, nuclear damages are distinguished from conventional damages in terms of liability provisions. One of the characteristics of liability in the nuclear field is that it is an objective liability that does not rely on the proof of fault; proving a causal relationship between the damage and the nuclear activity or incident is sufficient. Additionally, liability for nuclear damage is exclusively attributed to the nuclear operator and is limited, allowing the state to specify a maximum amount for compensation that the operator is obliged to pay, not exceeding it (El-Dessouky, 2014).

Sixthly, the state bears a portion of the compensation for nuclear damages, in cases exceeding the maximum limit of the operator's liability or when the operator is unable to fulfill this limit.

Given these differences between nuclear and conventional damages, leaving the regulation of nuclear damages and liability to the general rules of liability and compensation does not suffice to resolve the legal issues that arise from them. This has led regulators at the international and national levels (the Saudi regulator) to dedicate special provisions and rules that suit the nature of nuclear damage.

Characteristics of Nuclear Damages

Nuclear damages possess distinct characteristics that set them apart from other types of damages, residing in the intrinsic nature of the damage and its physical effects. These characteristics can be summarized as follows:

Firstly, they are progressive and invisible: Nuclear damage arises from microscopic particles that are imperceptible to the naked eye and cannot be detected through smell or touch. As such, they affect the victim unnoticed, making it difficult to mitigate their harmful effects. Additionally, the damage occurs gradually, not suddenly, but its effects linger over time, possibly extending to several months or even years (Fath Al-Bab, 2015).

Secondly, their spatial extent is vast: Nuclear radiation does not recognize geographical or political boundaries of states but transcends the borders of the state housing the nuclear facility. This is related to wind directions carrying radioactive clouds and their dangers across hundreds of miles, randomly affecting various locations at different altitudes, beyond any human control, leaving people in fear and dread of their inevitable fate against this unique nature of nuclear hazard, threatening humans and the environment with destruction and extinction (Abdullatif, 2006).

Thirdly, the generality of nuclear damages: Nuclear activity often has a general impact, affecting living beings, plants, and properties alike, impacting the environment in its entirety. This makes it difficult to consider such damage as affecting only specific individuals but rather as transboundary pollution, where nuclear damage extends to other environments as it travels through oceans and air without boundaries, thus affecting the unity of the human environment (Al-Heli, 2009).

Fourthly, they are non-perceptible: Nuclear radiations are beyond the human sensory capacities, as the radiation cannot be perceived when penetrating the body; it has no color, smell, taste, or texture, and one may be exposed to it unknowingly until symptomatic diseases appear (Al-Shammari, 2018).

Fifthly, the temporal extension: The harmful effects of radiation extend over time and do not cease with the moment the nuclear incident (explosion or leak) occurs. Instead, the damages arising from it continue from the moment of the incident and extend over decades (Abdullatif, 2016).

Sixthly, the multiplicity of sources and the difficulty in identifying the source: The sources of radiation are varied, making it difficult to pinpoint the source of damage or contribution, in addition to the possibility that these radioactive sources may interact with other factors in causing the same pathological phenomena in living beings, making it impossible to identify the effective factor (Abdul Hamid, 2017).

From the foregoing, it is clear: The characteristics that define nuclear damages have lent these damages their

unique legal nature in terms of liability and compensation.

Proving Nuclear Damages

Reflecting on the nature of nuclear damages and their characteristics reveals the complexities and challenges in proving them, as the effects of these damages do not immediately manifest following a nuclear incident but may delay over periods of time.

While scientific advancements have facilitated the proof of nuclear damage affecting individuals and properties, especially in cases of direct nuclear damages, the challenge lies in indirect nuclear damages that are difficult to detect immediately after a nuclear incident. There are damages that only become apparent years later, possibly transferring from one generation to another, making it difficult to pinpoint their source especially for diseases that could arise from non-nuclear causes such as leukemia, infertility, among others (Mohammed, 1994).

Although it is required for the damage to be certain, meaning that it need not have already occurred but is certain to occur in the future, these conditions, while applicable to some nuclear damages, cannot be applied to many others. Proving these conditions for direct damages, which are apparent on humans immediately upon exposure to radiation, raises numerous difficulties for indirect damages, especially those that emerge after an extended period, possibly affecting successive generations (Al-Mashhadani, 1992).

Scientific expertise, technical means, and scientific and medical detection methods play a role in proving nuclear damages; utilizing scientific methods not only in proving physical damages but also in proving damages and losses to properties through testing samples or models of soil and leaves of the year. Proving nuclear damage in some cases does not raise complex issues, especially if the effects of the damage appeared immediately after the incident, as in cases of instant death, physical deformities, and subsequent property damages due to fires spreading to them, or when symptoms of radiation sickness appear as a result of severe exposure to ionizing radiations like hair loss. Proving physical burns and damages to properties can be evidenced through testimony and circumstantial evidence, though often accompanied by scientific examinations to determine the extent of ionizing radiation exposure (Al-Mashhadani, 1992).

From the above, it is evident: The challenges and complexities in proving nuclear damages are primarily related to indirect or potential damages. Therefore, the researcher believes that solving this issue and difficulty lies in two aspects; the first is expanding the means of proving nuclear damages through modern medical and scientific methods, and the second is extending the statute of limitations, allowing the affected parties more time to initiate claims for compensating the damages incurred.

RESULTS

The research findings on the characteristics of nuclear damages reveal a set of properties that distinguish this type of damage from others. The study highlights the following points:

Gradual and Invisible Damages: Nuclear damages are characterized by their gradual nature and the difficulty of detection with the naked eye due to the damage arising at the level of tiny particles that cannot be seen.

Effects Emerge Over Time: The effects gradually appear over time and can persist for several months or years.

Extensive Range of Damages: Nuclear radiation transcends state borders and geography, with winds capable of transporting radioactive clouds for hundreds of miles, causing damages in various places.

Generality of Nuclear Damages: Nuclear activity affects living beings and the environment broadly, making it difficult to attribute damages to one individual over another.

Transboundary Pollution Occurs: Damage extends to other environments across oceans and air.

Non-Perceptible Damages: Nuclear radiations are intangible to human senses, invisible, odorless, and untouchable.

Symptoms Appear After Time: Making it challenging to detect them immediately.

Temporal Extension: The harmful effects of radiation extend over time, continuing for decades and potentially

transferring between generations.

Multiplicity of Sources and Difficulty in Identifying the Source: The challenge of pinpointing the source of radiation due to its multiple sources and their overlap with other factors, complicating the determination of the responsible factor.

The study indicates that these characteristics pose a challenge in proving nuclear damages, especially regarding indirect damages that may emerge after a long period. The challenges of proof include verifying damages and pollution using modern scientific methods and suggesting an extension of the statute of limitations to allow affected parties to file compensation claims more effectively.

RECOMMENDATIONS

Based on the outcomes derived from studying the characteristics of nuclear damages, the following recommendations can be proposed:

Improve Detection and Monitoring Methods: Support scientific research to develop better technologies for detecting nuclear damages, whether through remote sensing techniques or the analysis of environmental samples.

Enhance International Cooperation in Nuclear Monitoring: To identify affected areas and provide assistance in emergency situations.

Increase Public Awareness: Educate the public about the characteristics of nuclear damages and their impact on human health and the environment, and encourage awareness campaigns on nuclear safety and preparedness for nuclear incidents.

Develop Compensation Capabilities: Establish an effective compensation system that includes swift and fair mechanisms for providing compensation to those affected.

Encourage Insurance against Nuclear Damages: To motivate nuclear institutions to improve safety levels.

Extend the Statute of Limitations: Consider revising legal policies to extend the statute of limitations, giving affected individuals a greater opportunity to file compensation claims after the emergence of indirect nuclear effects.

Strengthen International Cooperation: Enhance cooperation between countries in the field of nuclear safety and handling nuclear incidents, including the exchange of information and expertise.

Create International Mechanisms for Cooperation in Nuclear Emergencies: To address cross-border effects.

Promote Scientific Research: Support scientific research on the effects of nuclear radiation on human health and the environment, contributing to a better understanding of long-term and indirect impacts.

Stimulate Local Community Participation: Active involvement of the local community in providing information and monitoring, enhancing communication between authorities and the community.

Update Environmental Policies: Develop and update environmental policies to consider the unique characteristics of nuclear damages and provide effective measures to address them.

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REFERENCES

Abu Amro, Ahmed. (2016). Compensation For Nuclear Test Damages, New University House.

El-Dessouky, Mohamed El-Sayed. (2014) Principal Aspects Of Civil Liability For Nuclear Damages, Dubai Judicial Institute Journal, Issue(4), Year Two: 20-65.

Al-Shammari, Fahd. (2018). International Liability Arising From Peaceful Uses Of Nuclear Energy, Master's Thesis, Al Al-Bayt University, Jordan.

Abdel Hamid, Emad El-Din Mohamed Kamel. (2015). Criminal Confrontation Of Nuclear Danger, Law Journal, Law College, University Of Bahrain, 2015, Volume(12), Issue(1): 201-248.

Abdullatif, Mohamed Amin Youssef. (2016). State Liability For Nuclear And Radiation Environmental Pollution Damages. 1st Edition. National Center For Legal Publications, Cairo.

Fadel, Samir (1980). Developing International Liability Rules To Suit The Special Nature Of Nuclear Damage, Egyptian Journal Of International Law, Egyptian Society For International Law, Issue(36): 161-173.

Fadel, Samir. (1976). International Liability For Damages Resulting From Peaceful Use Of Nuclear Energy. World Of Books, Cairo.

Fath Al-Bab, Mohamed Rabie. (2016). State Civil Liability For Nuclear Radiation Pollution Damages. Dar Al-Nahda Al-Arabia, Cairo.

Elfeky, A. I. M., Najmi, A. H., & Elbyaly, M. Y. H. (2023). The Effect Of Big Data Technologies Usage On Social Competence. Peerj Computer Science, 9, E1691.

Elfeky, A. I. M., & Elbyaly, M. Y. H. (2023). The Effect Of E-Tutorial Programs On Improving The Producing Digital Content Skill. European Chemical Bulletin, 12, 6581-6587.

Elfeky, A. I. M., & Elbyaly, M. Y. H. (2023). Managing Drill And Practice Programs With A Motivational Design And Their Effects On Improving Students'attitudes Toward Information And Communication Technology Courses. European Chemical Bulletin, 12, 6567-6574.

Elfeky, A. I. M., & Elbyaly, M. Y. H. (2023). The Impact Of Project-Based Learning On The Development Of Cognitive Achievement In The Course Of Applications In Educational Technology Among Students Of The College Of Education At Najran University. European Chemical Bulletin, 12, 6643-6648.

Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). The Effect Of A Simulation Program On Students At The College Of Education's Acquisition Of Hand Embroidery Skills. European Chemical Bulletin, 12, 6575-6580.

Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). Flipped Classroom: Enhancing Fashion Design Skills For Home Economics Students. European Chemical Bulletin, 12, 6559-6566.

Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). The Impact of Problem-Solving Programs In Developing Critical Thinking Skills. European Chemical Bulletin, 12, 6636-6642.

Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). Collaborative E-Learning Environment: Enhancing The Attitudes Of Optimal Investment Diploma Students Towards The Digital Skills Course. European Chemical Bulletin, 12, 6552-6558.

Elfeky, A. I. M., & Elbyaly, M. Y. H. (2023). The Impact of Mobile Learning On Developing The Skills Of Integrated Science Operations Among Students Of The Optimum Investment Diploma. European Chemical Bulletin, 12, 6629-6635.

Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). The Effectiveness of Using Advanced Organizations Within The Virtual Classroom To Enhance The Acceptance Of Technology During Disasters. European Chemical Bulletin, 12, 6603-6612.

Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). The Efficiency of Online Learning Environments In Fostering Academic Motivation. European Chemical Bulletin, 12, 6622-6628.

Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). The Efficiency of Instructional Gaming Programs In Stimulating Creative Thinking. European Chemical Bulletin, 12, 6613-6621.

Elfeky, A. I. M., & Elbyaly, M. Y. H. (2023). The Effect of Simulation Programs On Enhancing Skills Of Digital Applications. European Chemical Bulletin, 12, 6588-6594.

Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). The Effectiveness of Employing Motivational Designed E-Learning Situations On Developing Achievement In Computer Science Curricula For Optimal Investment Students. European Chemical Bulletin, 12, 6595-6602.

Al-Mashhadani, Mohamed Iqbal. (2002). Civil Liability for Nuclear Damages, Master's Thesis, College of Law, University of Baghdad.

Al-Heli, Ahmed Abdel Ghani. (2019). Civil Liability for Peaceful Use of Nuclear Energy, Doctoral Dissertation, Faculty of Law, Tanta University.